IMPLEMENTING AND SUSTAINING A LEAN MANAGEMENT SYSTEM

by

Derek A. Vandersteur

____________________

Dissertation

Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

____________________

Liberty University, School of Business

May 2022
Abstract

Lean healthcare is a field of research that studies the use of effective goal setting and scientific thinking to drive improvements in the healthcare industry. Lean has been effectively applied in healthcare settings to improve efficiency, patient satisfaction, clinical outcomes, and safety. There have been, however, varying degrees of success achieved in healthcare organizations effectively implementing a lean management system. The problem addressed in this research is that many healthcare organizations in the United States that seek to improve quality and reduce costs by implementing a lean management system are unable to sustain the lean management system thereby missing out on achieving the long-term benefits of lean. There is a gap in the literature regarding the key factors and influences that might explain why some healthcare organizations are unable to achieve sustainable improvements with lean and why some are successful. The study utilized a flexible design using qualitative methods and multiple case studies of contemporary health systems in the United States. The goal of the study was to identify what cultural, leadership, or other systemic factors contribute to some organizations successfully achieving long-term success with lean. The researcher obtained lived experiences from 16 different lean leaders from 10 different healthcare institutions during individual interviews through a series of open-ended questions. The data obtained from the interviews was analyzed and coded. Common codes were identified across the inputs through triangulation from multiple sources and resulted in specific themes. The 10 key conclusions that resulted from these themes combine the contemporary experiences of lean leaders from health systems with successful lean management systems.

Key words: lean management system, healthcare, improvement culture, leadership
IMPLEMENTING AND SUSTAINING A LEAN MANAGEMENT SYSTEM

by

Derek A. Vandersteur

Dissertation

Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Liberty University, School of Business

May 2022

Approvals

_________________________________________  ___________________
Derek A. Vandersteur, Doctoral Candidate        Date

_________________________________________  ___________________
Brenda Palmore, DHA, Dissertation Chair        Date

_________________________________________  ___________________
Geraldine Rosol, PhD, MHA, Committee Member    Date

_________________________________________  ___________________
Edward M. Moore, PhD, Director of Doctoral Programs Date
I dedicate this dissertation to my late father, Pieter Vandersteur, who left this earth much too soon when I was only 3 years old. I also dedicate this dissertation to my beautiful wife, Rachael Lynn Vandersteur, and thank her for her patience and understanding as I pursued this doctorate. I would like to thank my manager, Vernon Alders, and my employer, ChristianaCare, for their support and encouragement over the past 4 years of this doctoral journey. In addition, I would like to acknowledge my other family members including my two children, Noelle and Jared Vandersteur, and my mother, Emily Vandersteur. Each of these supporters enabled me to achieve this goal despite the sacrifices of time and financial resources. Throughout this experience, I have felt God’s blessing through the work of all the staff and leadership at Liberty University as they seek to develop champions for Christ.
Acknowledgments

I would like to acknowledge Dr. Brenda Palmore, my dissertation chair. She has been with me throughout this doctoral journey and helped me achieve each milestone. I would also like to acknowledge my committee member, Dr. Geraldine Rosol, and Dr. Nicole Lowes, my administrative reviewer. Each of them provided necessary guidance at each key step in the dissertation process. Finally, I would like to acknowledge each of the lean leaders that participated in my interviews and provided their valuable experience to this study. Their contributions were invaluable and helped me achieve impactful results.
## Table of Contents

Abstract .............................................................................................................................. ii  
Approvals ........................................................................................................................... iii  
Dedication ........................................................................................................................... iv  
Acknowledgments ............................................................................................................. v  
List of Tables .................................................................................................................... xi  
List of Figures .................................................................................................................. xii  
Section 1: Foundation of the Study................................................................................. 1  
  Background of the Problem ......................................................................................... 2  
  Problem Statement .................................................................................................. 3  
  Purpose Statement ................................................................................................. 4  
  Research Questions ............................................................................................... 4  
  Nature of the Study ............................................................................................... 6  
    Discussion of Research Paradigms ................................................................. 7  
    Discussion of Design and Methodology ......................................................... 7  
    Discussion of Triangulation ........................................................................... 9  
    Summary of the Nature of the Study ........................................................... 9  
Conceptual Framework ............................................................................................. 10  
  Concepts ............................................................................................................. 11  
  Theories ............................................................................................................. 12  
  Actors ............................................................................................................... 14  
  Constructs ......................................................................................................... 15  
Conceptual Framework Summary .............................................................................. 16
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of Terms</td>
<td>16</td>
</tr>
<tr>
<td>Assumptions, Limitations, Delimitations</td>
<td>18</td>
</tr>
<tr>
<td>Assumptions</td>
<td>18</td>
</tr>
<tr>
<td>Limitations</td>
<td>19</td>
</tr>
<tr>
<td>Delimitations</td>
<td>19</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>20</td>
</tr>
<tr>
<td>Reduction of Gaps in the Literature</td>
<td>20</td>
</tr>
<tr>
<td>Implications for Biblical Integration</td>
<td>20</td>
</tr>
<tr>
<td>Benefit to Business Practice and Relationship to Cognate</td>
<td>22</td>
</tr>
<tr>
<td>Summary of the Significance of the Study</td>
<td>22</td>
</tr>
<tr>
<td>A Review of the Professional and Academic Literature</td>
<td>23</td>
</tr>
<tr>
<td>Business Practices</td>
<td>24</td>
</tr>
<tr>
<td>The Problem</td>
<td>41</td>
</tr>
<tr>
<td>Concepts</td>
<td>46</td>
</tr>
<tr>
<td>Theories</td>
<td>48</td>
</tr>
<tr>
<td>Actors</td>
<td>52</td>
</tr>
<tr>
<td>Constructs</td>
<td>54</td>
</tr>
<tr>
<td>Related Studies</td>
<td>56</td>
</tr>
<tr>
<td>Anticipated and Discovered Themes</td>
<td>59</td>
</tr>
<tr>
<td>Summary of the Literature Review</td>
<td>60</td>
</tr>
<tr>
<td>Summary of Section 1 and Transition</td>
<td>61</td>
</tr>
<tr>
<td>Section 2: The Project</td>
<td>63</td>
</tr>
<tr>
<td>Purpose Statement</td>
<td>63</td>
</tr>
</tbody>
</table>
Role of the Researcher ........................................................................................................ 64
Research Method and Design ............................................................................................. 65
  Discussion of Flexible Design ......................................................................................... 65
  Discussion of Multiple-Case Study ............................................................................. 66
  Discussion of Method for Triangulation .................................................................. 67
  Summary of Research Methodology ......................................................................... 67
Participants ....................................................................................................................... 68
Population and Sampling ................................................................................................. 69
  Discussion of Population ............................................................................................. 70
  Discussion of Sampling ............................................................................................... 70
  Summary of Population and Sampling ..................................................................... 72
Data Collection & Organization ....................................................................................... 73
  Data Collection ........................................................................................................... 74
  Instruments .................................................................................................................. 74
  Data Organization ....................................................................................................... 76
  Summary of Data Collection & Organization ............................................................ 77
Data Analysis .................................................................................................................... 78
  Emergent Ideas ............................................................................................................ 78
  Coding Themes ............................................................................................................ 79
  Interpretations ............................................................................................................. 79
  Data Representation ................................................................................................... 79
  Analysis for Triangulation ......................................................................................... 80
  Summary of Data Analysis ......................................................................................... 81
Reliability and Validity ........................................................................................................... 81

Reliability ................................................................................................................................. 82

Validity ..................................................................................................................................... 82

Bracketing ............................................................................................................................... 83

Summary of Reliability and Validity ......................................................................................... 83

Summary of Section 2 and Transition ...................................................................................... 83

Section 3: Application to Professional Practice and Implications for Change ....................... 85

Overview of the Study .............................................................................................................. 85

Presentation of the Findings ....................................................................................................... 86

Themes Discovered .................................................................................................................... 91

Relationship of the Findings ..................................................................................................... 117

Summary of the Findings .......................................................................................................... 121

Application to Professional Practice ........................................................................................ 123

Improving Business Practice .................................................................................................. 125

Potential Application Strategies ............................................................................................. 129

Summary of Application to Professional Practice .................................................................... 132

Recommendations for Further Study ....................................................................................... 132

Reflections ................................................................................................................................. 133

Personal & Professional Growth .............................................................................................. 134

Biblical Perspective .................................................................................................................. 135

Summary of Reflections ............................................................................................................ 137

Summary of Section 3 ................................................................................................................. 138

References .................................................................................................................................. 140
<table>
<thead>
<tr>
<th>Appendix A: Participant Consent Form</th>
<th>..........................................................</th>
<th>149</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix B: Participant Interview Questions</td>
<td>..................................................................</td>
<td>150</td>
</tr>
<tr>
<td>Appendix C: Interview Protocol</td>
<td>..................................................................</td>
<td>151</td>
</tr>
<tr>
<td>Appendix D: Lean Implementation Checklist</td>
<td>..................................................................</td>
<td>152</td>
</tr>
<tr>
<td>Appendix E: Copyright Permission to Reprint Table 2</td>
<td>.............................................</td>
<td>153</td>
</tr>
<tr>
<td>Appendix F: Copyright Permission to Reprint Table 3</td>
<td>.............................................</td>
<td>154</td>
</tr>
</tbody>
</table>
List of Tables

Table 1. The 5S Steps  ........................................................................................................................................33
Table 2. Dimensions of Lean Leadership .......................................................................................................35
Table 3. Facilitators and Barriers of Lean Implementation in Primary Care ..............................................46
Table 4. Population and Sample .....................................................................................................................70
Table 5. Concept Matrix of Lean Implementation Components .....................................................................86
Table 6. Participant Demographics ...............................................................................................................90
List of Figures

Figure 1. Relationship of Research Elements ................................................................. 11
Figure 2. Snowball Sampling Strategy .............................................................................. 71
Figure 3. Number of Years Ago – Lean Management System Started .............................. 88
Figure 4. Number of Years Ago – Project-Based Improvements Started ......................... 89
Figure 5. Number of Years Ago – Leader Started in Role .............................................. 91
Figure 6. Concept Map of Themes Discovered Through Field Study .............................. 92
Figure 7. Word Cloud for Lean Management System Implementation Approach ............ 93
Figure 8. Word Cloud for Resources Used to Implement Lean ...................................... 99
Figure 9. Word Cloud for the Role of Leadership in Implementing and Sustaining Lean .... 101
Figure 10. Word Cloud for Actions and Behaviors That Contribute to the Success .......... 105
Figure 11. Word Cloud for Organizational Characteristics Contributing to Improvements .... 109
Section 1: Foundation of the Study

Lean healthcare is a topic that has developed into a robust field of research with many books and papers being published and with it being promoted by professional organizations like the Institute for Healthcare Improvement (IHI) in the United States and the Institute for Innovation and Improvement in the United Kingdom (D’Andreamatteo et al., 2015). For lean management systems in healthcare to be effective, the importance of people and their training, as well as the development and understanding of lean principles, cannot be overstated. Leaders establish a vision for the future with corresponding goals and objectives and the staff at all levels are ultimately expected to work together to achieve these objectives. Additionally, within a lean healthcare organization, employees and leaders likewise must be developed within an environment and culture that encourages lean thinking and problem-solving every day (Henrique et al., 2020).

This first section of the paper provides foundational information about the problem that was researched including the background and purpose of the study. The research questions are presented along with an explanation of the nature of the study, the conceptual framework, definition of key terms, and assumptions. The significance of this study is also presented including the gaps that will be reduced in both knowledge and measurement of lean. Implications for biblical integration of the study are explored as well as the benefit to business practice and the relationship to the Healthcare Management cognate. An extensive review of scholarly and professional literature is presented to illustrate the connection of this research study to the existing body of knowledge.
Background of the Problem

Lean management system is a concept that has been applied to several healthcare organizations, and these organizations have demonstrated success in improving outcome measures like quality, patient safety, and cost reduction (Clark, 2016). Although many healthcare organizations have experienced success through implementing lean management systems, others have not been so successful. This scenario provides the foundation for my research study because if the results were consistently and easily achieved at each healthcare organization that utilized lean, the research problem would not exist. This suggests that certain factors and influences contribute to a successful outcome, given the various scenarios where lean management systems are implemented.

Value for the patient is a concept that is central to the endeavor of lean leaders in healthcare while they are learning how to empower their staff to achieve organizational objectives (Aij et al., 2015). Lean leaders are encouraged to go to where the work is done, where patients are cared for in hospitals and clinics, to truly understand value from the patient perspective. Processes are then evaluated from a patient perspective to identify necessary improvements. Leaders who can successfully foster a learning environment also encourage problems to be identified while supporting process improvement efforts of the organization. Leadership behaviors like this are crucial to the establishment of a lean management system, which has also been used as a building block for long-term success.

It is also necessary for teams working in a lean management system to engage in daily improvement activities. Lean leaders work with their teams to encourage local ownership of problem-solving activities (Bijl et al., 2019). This empowerment of frontline staff is a critical component of moving teams toward becoming self-managed. Leaders should support their teams
with enthusiasm, thereby achieving advances in lean management system maturity. If daily improvement is not embedded into the culture of a healthcare organization, the sustainment of a lean management system is unlikely.

**Problem Statement**

The general problem that was addressed is that healthcare organizations seeking to improve quality and reduce cost by implementing a lean management system are often unable to sustain the lean management system, resulting in the organization not achieving expected long-term improvements in hospital financial performance and clinical outcome measures. Most lean transformation efforts failed or delivered only short-term improvements largely resulting from failed leadership and a lack of involvement of frontline staff (Clark, 2016). Lean has been effectively applied in a healthcare setting to achieve improvements in efficiency, patient satisfaction, clinical outcomes, and safety with promising yet inconclusive improvements in hospital performance (D’Andreamatteo et al., 2015). Healthcare organizations often emphasize lean tool application but fail to persist with change efforts to adequately develop their frontline leaders, thereby limiting overall organizational achievement (Bijl et al., 2019). Having leaders that promote a culture of identification and implementation of improvements daily is a key success factor for lean implementation, yet creating value for the patient should ultimately be the focus (Aij et al., 2015). Healthcare organizations have turned to lean as a solution for helping them achieve efficiency, productivity, and quality of health services outcomes (Maijala et al., 2018). The specific problem that was addressed is the fact that many healthcare organizations in the United States that are seeking to improve quality and reduce costs by implementing a lean management system are often unable to sustain the lean management system, resulting in the organization potentially not achieving the long-term benefits of lean.
Purpose Statement

The purpose of this flexible design multiple case study was to fill the gap in the literature regarding key factors and influences that explain why some healthcare organizations are unable to achieve sustainable improvements through implementing a lean management system. The goal of the study was to explore lean management system implementation scenarios and seek to understand what cultural, leadership, or other systemic factors future healthcare organizations can utilize to achieve long-term success in their lean implementation efforts.

Research Questions

The research questions for this project were designed to gather the information that enabled the researcher to shed light on the problem statement based on the experiences of several healthcare institutions that have implemented a lean management system.

RQ1. What role does leadership play in implementing and sustaining a lean management system in healthcare organizations?

RQ1a. What leadership actions or behaviors contribute to the failure to sustain a lean management system?

RQ1b. What leadership actions or behaviors contribute to success in sustaining a lean management system?

RQ2. What are the key characteristics of healthcare organizations that contribute to long-term improvements in financial performance and clinical outcome measures resulting from lean management systems implementation?

RQ2a. What key characteristics contribute to healthcare organizations successfully achieving long-term improvements in performance and outcome measures?
RQ2b. What key characteristics contribute to healthcare organization failure in achieving long-term improvements in performance and outcome measures?

RQ3. How is the implementation of a lean management system different than other continuous improvement initiatives?

RQ3a. How do these differences present themselves in the ability of leaders to gain support for lean management systems?

RQ4. What cultural elements are present in healthcare organizations that achieve success in implementing and sustaining a lean management system?

The first question was open-ended to enable the researcher to determine the important roles that leaders play in U.S. healthcare organizations that implement a lean management system and work to sustain it. This question was qualitative and exploratory. The sub-questions were also open-ended and expanded upon the leader’s role to identify the specific leadership actions or behaviors that support or inhibit the implementation and sustainment of a lean management system.

The second question was open-ended along with the supporting sub-questions, which provided the researcher insight into the contributing organizational characteristics that either support or inhibit long-term improvements in financial performance and clinical outcome measures resulting from lean management system implementation. These key characteristics provide insight for future lean implementations in healthcare to know what characteristics should be modeled or developed to achieve long-term improvements in performance and outcome measures.

The third question sought information about the differences between a lean management system and other continuous improvement initiatives. Information gathered with this open-ended
question provided further color to the research findings and will assist future leaders in putting lean management systems into context with other initiatives. The differences that were identified will inform leaders what they must do differently to support a successful lean management system. Insights from this question may also help shape future lean leader development programs to ensure specific implementation tasks and priorities are, in fact, part of the development curriculum.

The fourth question sought to identify the cultural elements that are helpful to achieving success in implementing and sustaining a lean management system. Taken together, these four questions and associated sub-questions provided the researcher with a broad array of input from the study that enabled the development of solutions to the problem of healthcare organizations not being able to effectively implement and sustain a lean management system. The most significant leadership and organizational characteristics identified helped to define what a good lean management system looks like. These characteristics can also be adopted and refined by future U.S. healthcare organizations seeking to successfully implement a lean management system.

**Nature of the Study**

Healthcare organizations have been seeking to improve quality and reduce cost by implementing a lean management system since the turn of the 21st century. The varying degrees of success observed and subsequent research on this topic presented the opportunity for this research to further identify the key leadership actions or behaviors that lead to success. In addition, it was important to identify the organizational and cultural characteristics that consistently lead to the achievement of long-term improvement in performance and hospital outcome measures. This research study was designed to identify the most significant leadership
and organizational characteristics needed to guide future healthcare organizations in establishing or developing successful lean management systems. This research utilized a qualitative research paradigm with a flexible design leveraging multiple case studies.

**Discussion of Research Paradigms**

This research paradigm is both qualitative and followed a coherent qualitative framework like that which was articulated by Collingridge and Gantt (2019) to incorporate findings from similar contexts and settings of other health systems that have implemented a lean management system. My research paradigm guided my study of the key aspects of lean management in healthcare due to the contextual elements and characteristics that were obtained through multiple case studies. Additionally, data analysis procedures that were defined well and applied to the study provided results that were integrated with existing research to produce useful results with general applicability.

The multiple hospitals with which I worked provided unique instances of lean management system implementation to study. Utilizing this framework supported the use of multiple data sources to explore leadership actions and behaviors. Each healthcare institution had similar contexts as they were hospitals that had implemented lean management systems at some point in the past 10 years; however, the different leadership approaches provided options to consider for successful lean implementation. Multiple case study research in healthcare can identify consistent findings across cases that point to successful approaches (Gould et al., 2018).

**Discussion of Design and Methodology**

This study was conducted with a flexible design using qualitative methods and a multiple case study design. This method was the appropriate methodology for the study because I utilized qualitative research to obtain a contemporary, real-world perspective of the cultural elements of
successful lean healthcare organizations (Yin, 2018). Qualitative methods are effective at obtaining a rich data set from research participants that can be combined to develop themes and subthemes which ultimately point to essential considerations for successful program implementation (Jabbour et al., 2018).

Other options including fixed and mixed quantitative designs were considered for this study; however, they were not appropriate for this study given the lack of potential for experimental design elements including variables and experimentation. Rather, as described by Robert E. Stake (2010) in his description of the essence of the qualitative approach to research, this study involved personal interpretation of a robust collection of case features and unique sequences of activities that occurred in each organization and were included in the research to draw conclusions. Additionally, since this study was not proposed with a theory to be tested or variables identified upfront typified by the deductive process of quantitative studies, it was instead aligned with the inductive process where data gathered from multiple case study participants was grouped into codes, themes, and resulted in the development of relatable perspectives from the group of institutions being studied (Creswell, 2015).

The multiple-case study approach helped to identify and describe how the cultural characteristics and leadership practices at multiple hospitals contributed to the successful sustainment of a lean management system; my approach was similar to the multiple case study conducted by Christensen et al. (2017) in which they examined factors influencing states’ capacity to report children’s health care quality measures. Identifying effective practices in one hospital within a multiple case research study can be effectively demonstrated to offer as evidence for leaders at other hospitals seeking the same outcomes (Senot et al., 2016).
The problem statement and research questions indicate an assessment of multiple healthcare organizations that have sought to implement a lean management system and had time to also show sustainment and achieve improvements in hospital financial performance and clinical outcome measures. This scenario illustrates why utilizing multiple case studies and qualitative analysis was the correct methodology. A multiple-case study qualitative research paradigm was appropriate also since I used interviews of 16 leaders from 10 different health systems. I interviewed principal leaders of multiple prominent healthcare organizations that have implemented lean management systems. Interview questions were crafted to seek answers to the research questions.

**Discussion of Triangulation**

The use of multiple cases in this research project with open-ended interviews from 10 different health systems and 16 different individual perspectives provided the desired multiple sources. As posited by Yin (2018), the resulting convergence of evidence from the multiple sources of data strengthened the validity of the constructs of this study. Key findings resulted through triangulation of these multiple sources, thereby enhancing the validity of any one source for a collective result that can boldly represent findings to support the themes and outcomes of the study.

**Summary of the Nature of the Study**

This study investigated how multiple healthcare organizations successfully implemented lean management systems that resulted in a sustained improvement in performance and hospital outcome measures. Interviews were conducted with leaders from these healthcare organizations. The results from this multiple case qualitative research study enabled generalizable conclusions to support findings for application in future healthcare institutions seeking to drive improvement
in hospital performance and positive outcomes through the implementation of a lean management system.

**Conceptual Framework**

The conceptual framework for this research study illustrates the relationship between the identified foundational concepts of lean management system, value for the patient, and daily improvement activity and the actors, theories, and constructs that support the research problem. The problem of some healthcare institutions being unable to sustain a lean management system was investigated through the deep analysis of the interaction of healthcare leaders with caregivers and frontline staff as well as lean experts who guide lean management system implementations. Theories including transformational leadership, psychological flow, and authentic leadership were evaluated relative to the degree of success of a lean management system in healthcare. Finally, the degree of sustainment of the lean management systems was investigated to assess the efficacy of the efforts of lean management system implementation at the selected healthcare institutions.
Figure 1
Relationship of Research Elements

The concepts that serve as a foundation for the research project include lean management system, value for the patient, and daily improvement activity. As shown in Figure 1, these concepts are infused into the actors and theories throughout an institutional lean management journey through leadership, training, coordination, and recognition of successful outcomes. Constructs shown as key outputs include sustainment of the lean management system, as well as improved institutional quality and efficiency outcomes.

**Concepts**

The concepts that serve as a foundation for the research project include lean management system, value for the patient, and daily improvement activity. As shown in Figure 1, these concepts are infused into the actors and theories throughout an institutional lean management journey through leadership, training, coordination, and recognition of successful outcomes. Constructs shown as key outputs include sustainment of the lean management system, as well as improved institutional quality and efficiency outcomes.

**Lean management system.** Lean management system is a concept that has been applied to healthcare and has demonstrated success in improving outcome measures like quality and patient safety as well as reducing costs (Clark, 2016). This concept provides the foundation for my research study because, if the results at each healthcare institution were consistently and easily achieved, the research problem would not exist. This suggests that certain factors and influences contribute to a successful outcome, given the scenarios where lean management systems are implemented.
Value for the patient. Value for the patient is a concept that is central to the endeavor of lean leaders in healthcare who are learning how to empower their staff to achieve organizational objectives (Aij et al., 2015) through their daily work. Lean leaders go to where the work is done, where patients are cared for in hospitals, to truly understand value from the patient perspective. Leadership behaviors like this are crucial to the establishment of a lean management system, which has been used as a building block for long-term success.

Daily improvement activity. Daily improvement activity is a necessary concept for teams working in a lean management system to engage in. Lean leaders work with their teams to encourage local ownership of problem-solving activities (Bijl et al., 2019). If daily improvement is not embedded into the culture of a healthcare organization, the sustainment of a lean management system is unlikely.

Theories

Several theories are utilized to drive the change and cultural transformation that is required to successfully implement a lean management system in healthcare. Since the goal of this research study was to identify what cultural, leadership, and other systemic factors influence long-term lean implementation success in healthcare, there were a few social science theories that provided guidance to inform the study. As described by Creswell (2015), I used these theories to initiate the study and guide interview question formulation as well as guide interpretation of study results. Three important theories that are often utilized to engage leaders and caregivers during a lean management system implementation are presented here including transformational leadership theory, psychological flow, and authentic leadership.

Transformational leadership. The transformational leadership theory is integral to this study since it is closely linked to lean leadership whereby leaders utilize four dimensions of
leadership presented by Bijl et al. (2019) including idealized influence, inspirational motivation, intellectual stimulation, and individual consideration. Bijl et al. explained that lean healthcare leaders should strive to serve as role models and effectively hand over improvement responsibilities to frontline staff by motivating them to achieve higher levels of lean maturity. Lean leaders provide staff the opportunity to be innovative and creative in solving problems and provide coaching when attention is needed for individual development. This study identified leadership characteristics that lead to the successful sustainment of a lean management system in healthcare.

**Psychological flow.** Psychological flow is a theory that workers find their work rewarding when certain positive conditions exist in the workplace (Emiliani, 1998). Staff with psychological flow feel their skills match the job challenges, with clear goals and a sense of control in their work. This theory supports a work environment that encourages employee engagement in continuous improvement efforts which are integral to effective lean management systems.

**Authentic leadership.** This theory aligns well with lean leadership in that employees are genuinely engaged in improving work practices when leaders demonstrate consistent know-how (Seidel et al., 2019). Since this study sought to identify the role leadership plays in the implementation and sustainment of lean, the influence process dimension of authentic leaders was of special interest for this research. The influence of authentic leaders on the organization also helps to support self-awareness amongst employees in an organization implementing a lean management system.
Actors

The actors shown in Figure 1 represent the principal individuals who are involved in supporting the implementation of a lean management system in healthcare. Each actor has important responsibilities and expectations to fulfill during and after a lean implementation journey has been initiated in a healthcare institution. A brief explanation of leaders, caregivers, and frontline staff as well as healthcare institutions and lean experts is provided here.

Leaders. Leaders have the responsibility to provide employees with structure and tools to do their job and provide guidance regarding the goals of the organization. To be effective at leading within a lean management system, a leader’s personal attributes need to be aligned and supportive of lean principles. Lean leaders are to follow leader standard work and establish accountability for teams that report to them (Seidel et al., 2019).

Caregivers and frontline staff. This group includes include nurses, doctors, technicians, housekeeping, and others who have direct patient contact. This level of staff is encouraged to learn lean principles and apply this knowledge to solve problems through rapid cycle change and feedback in cooperation with their leaders and others, guided by lean experts (Taylor et al., 2015).

Healthcare institutions. These actors represent institutions known as hospitals and health system entities that choose to pursue lean management systems to improve patient outcomes and organizational performance (D’Andreamatteo et al., 2015). Hospitals are the acute care settings that include emergency services and surgery as well as inpatient care. Additional areas of healthcare may also be included in lean initiatives including outpatient practices, home health services, and specialty clinics.
**Lean experts.** This group may include internal staff who have been formally trained in lean principles and have experience helping other institutions implement lean. Lean expertise may also be imported using outside consultants to help train and guide leaders and to build and establish the overall lean program (Clark, 2016). Lean experts also coach and train caregivers at all levels, helping them learn and apply the lean principles and solve problems.

**Constructs**

The outcomes of all efforts associated with the lean implementation are a direct result of influence on and by actors where theories and concepts shown in Figure 1 are applied and practiced during the lean journey. The resulting outcomes include the sustainment of the lean management system as well as expected improvements in the quality and efficiency of the healthcare system. Each of these constructs represents tangible business results that can be measured and highlighted as justification for investing the time and effort in implementing a lean management system.

**Sustainment of the lean management system.** This is the primary construct for this research study. Workflows and processes are often redesigned and streamlined because of a focus on eliminating waste and overall problem solving by all caregivers. An effective method for sustaining redesigned workflows is to link these with the lean daily management system. When staff is aware that leadership cares about the outcomes, they are more likely to strive to achieve the established metrics (Hung et al., 2015). This emphasis provided by leadership contributes to the successful sustainment of lean among other factors that were identified through the research.

**Quality.** This is another construct that is often a focus of lean management system implementations. Quality in healthcare is typically associated with patient outcomes, clinical
quality, and patient safety. Solving problems in healthcare will naturally result in quality improvements that impact the patient (Hung et al., 2015). Patients that receive higher quality care are more apt to feel more positive about their experience.

**Efficiency.** This is a construct that focuses on improvement for both payers and providers. Payers are either the patients, the insurance companies, or the government program that provides the funding to pay bills that result from the provision of medical care. Many efficiency improvements result from waste reduction efforts due to problem-solving by frontline employees (Bijl et al., 2019).

**Conceptual Framework Summary**

This research study was designed to enable me to learn from the invaluable experiences of individual actors at several well-established healthcare institutions who have implemented lean management systems. Documentation of the experience of actors and investigation into theories utilized at each institution provided insight into the efficacy of the foundational concepts including lean management system, value for the patient, and daily improvement activity. Successes and challenges associated with implementing and sustaining a lean management system were identified.

**Definition of Terms**

The goal of this study was to understand the cultural, leadership, and other systemic factors that are most impactful towards achieving long-term lean implementation success. The key terms associated with this endeavor are defined below:

*Efficiency:* Although efficiency has historically focused on the efficiency of single machines, departments, or individuals, lean strategies seek a wider view that prioritizes flow efficiency focused on the needs of the customers of the organization. Patients often equate good
operational efficiency in healthcare to lower waiting times, as shown by Ko et al. (2019) in their study of operational efficiency and patient-centered healthcare.

**Healthcare organization:** This includes institutions that encompass a wide range of health-related services including clinics, hospitals (public, for-profit, and non-profit), primary care and specialty practices, and surgery centers (Henrique et al., 2020).

**Leadership:** In the context of lean, leadership becomes a practice exemplified by setting an example, empowering teams to solve problems systemically, and developing self-managing teams that actively participate in organizational change efforts (Bijl et al., 2019). As such, lean leadership is a social process guided by lean principles to continuously improve processes and performance (Seidel et al., 2019).

**Lean Leaders:** Successful leaders in lean organizations foster trust and promote the problem-solving capabilities of their staff and actively listen to their ideas to improve processes (Aij et al., 2015). Lean leaders are supported by the unique lean management system that has been developed specifically for their institution (Seidel et al., 2019). Lean leaders as coaches support their staff with well-defined goals and supportive attitudes, thereby serving as an aligning force across all activities (Solaimani et al., 2019).

**Lean management system:** A set of principles, practices, and tools that organizations utilize to enhance work processes to improve quality and efficiency (Hung et al., 2015).

**Quality:** In a clinical setting, quality often is associated with reducing errors, shortening turnaround times, and improving patient safety and clinical outcomes (Clark, 2016).
Assumptions, Limitations, Delimitations

Assumptions

Key learnings and recommendations coming out of this research can serve as a model for future lean management system implementation planners. Although each institution and scenario is unique, there may be applicable concepts that can be used as a guide for others that seek to implement lean. This research utilized input from selected actors at multiple healthcare institutions that have successfully implemented a lean management system. To achieve success in this research project, two key assumptions were made to move forward. The first assumption was that there are universal cultural, leadership, and other systemic factors that contribute to sustaining a lean management system in healthcare. These factors were assumed to be discoverable, in part, through this research in a similar way that barriers to lean implementation and sustainability were successfully discovered through an exploratory study of multiple cases of hospital emergency departments in the Brazilian healthcare system (Leite et al., 2020).

The second assumption was that I would successfully obtain permission to interview actors from each of the identified institutions. Creswell (2015) pointed out that key elements to consider including in a letter of consent should be a description of the study purpose, assurance of confidentiality, and the right to withdraw from the study if desired. This assumption proved to be a challenge as several of the identified lean leaders either declined to participate or did not respond to the email request. Therefore, to overcome this challenge I leveraged my professional network to obtain additional lean leaders to participate in the study. These permissions were important to receive so that I could access the knowledge and experience obtained by the actors during their lean management implementation.
Limitations

There is an inherent level of weakness in qualitative case studies given the subjective nature of the research conducted. Limitations of this study include a lack of generalizability of findings from the chosen case studies given the flexible design characteristics. Since findings from case study research can be limiting due to the unique combination of factors within each institution, this research study included 10 different healthcare systems to improve the relatability. One study suggested, in healthcare organizations, that leadership contributes the most to the success of lean implementation while leveraging adequate training as a catalyst (Patri & Suresh, 2018). The expectation for this study was that common factors would be identified from across the five or more healthcare systems that have achieved considerable success in implementing lean management systems, thereby increasing confidence that the conclusions drawn may be relatable to the group being studied. Other healthcare institutions seeking to implement lean management systems in the future may be able to learn valuable lessons from these findings to consider applying to their lean journey.

Delimitations

Delimitations for this study will be healthcare institutions outside of the United States and beyond the scope of the institutions that were used as case studies. Concepts or examples referenced from other institutions were identified through literature reviews and subsequent topical research and, as such, were incorporated into the research narrative as appropriate. Since the focus of this study was to identify factors that contribute to successful lean implementations, organizations that have admittedly abandoned their lean management system implementations efforts were outside the scope of this study.
Significance of the Study

Reduction of Gaps in the Literature

This study was designed to reduce the current knowledge gap in the identification and effectiveness of cultural, leadership, and other systemic factors that have resulted in sustained lean management systems of prominent, large health systems in the United States. Thus, I began with the premise that the chosen institutions had successfully implemented and sustained their lean management system. This was validated through the planned research methods. Additionally, gaps exist within the measurement framework of lean sustainment where they need to expand their classification of the implementation process from projects or departments to a deeper frontline impact of lean being embraced as a collective organizational approach to continuous improvement, understanding strategic priorities, and seeking to enhance value for the patient (D’Andreamatteo et al., 2015).

Implications for Biblical Integration

One certain earthly goal of a Christian missionary is to get to know their target people intimately so they can then show the love of God through their interactions. When approaching an unreached or desolate people group, the scripture paints an accurate picture of their reality: “What no eye has seen, nor ear heard, nor the heart of man imagined, what God has prepared for those who love him” (English Standard Bible, 2001, 1 Corinthians 2:9). Therefore, similarly for a researcher to understand phenomena described in a problem statement, the people who have experienced this most closely are those who should be studied. Research projects with phenomena to study can be likened to the unchurched people before the apostle Paul’s outreach.

The challenge of obtaining valuable input from institutions that have implemented lean can be likened to the church-planting patterns of Paul in the early church. The patterns included
Paul focusing on people who were responsive and receptive to the message, located in strategic cities in the Roman Empire, and he contextualized the gospel message to suit his audience (Alawode, 2020). Each of these approaches still required the guidance of the Holy Spirit, which can be likened to an expert church planter in this scenario. This view of church planting and the parallels to promoting a lean management system are stunningly similar. The mindset of the population can be rigid and resistant to change. However, when people are allowed to see a better way, there is a good chance of success.

A unique perspective on Mark 4: 26–27 was presented by Dr. Steve Lowe, Chair of the School of Divinity at Liberty University, regarding the work that was done by God, along with the farmer, the seed, the soil, and the act of the harvest. He pointed out that in this instance, there is a seamless connection between the present and the future. Dr. Lowe continued to illustrate that, in 1 Corinthians 15:58, the apostle Paul points out that all the labor that goes into sowing and reaping is not in vain (Lowe, 2021). The totality of the work put forth to implement a lean management system is connected to the future state including studying, researching, visiting lean hospitals, developing training materials, designing the local lean system, training, and coaching leaders and caregivers, recognizing successes. The ecological perspective of this parable is quite like the importance of the work that is done by lean leaders to bring about change in the ways of working for each caregiver and the resulting improved outcomes in a hospital setting. The effectiveness of each factor in both settings has a direct and profound impact on the outcome. Our level of understanding of the connectivity of each factor to another and the outcome will ultimately define our success.
Benefit to Business Practice and Relationship to Cognate

I developed a pragmatic approach to my research so I could be sure to obtain the most accurate picture of the factors and influences that result in measurable outcomes at healthcare institutions due to lean management system implementation. I anticipated each healthcare organization to be unique, much like unreached people groups are unique to each missionary seeking to evangelize them. Missionaries must develop unique and customized approaches to successfully reach the individual hearts and minds in their mission field. I, too, expected to have to develop unique approaches to gather data from the lean health systems identified for interviews. These health systems have experienced varying degrees of success in implementing lean, therefore serving as good research subjects in my quest to identify the factors and influences that contribute to successful outcomes.

Much like the use of church planters for expanding God’s kingdom through evangelization, each of the institutions targeted for this research project leveraged the expertise of outside consulting firms to achieve success in implementing their lean management system. I intend to share my research findings with my employer, a large non-profit health system that has been on a lean journey for about 2.5 years (since 2019). Much like Paul provided mentorship to Timothy during the growth of the early church, lean experts were also needed to provide guidance and coaching to new leaders working in a lean management system in healthcare. I intend to continue to share my expertise to implement lean management systems in healthcare settings most effectively and sustainably.

Summary of the Significance of the Study

Lean management systems have been implemented in healthcare institutions to improve outcome measures like quality, patient safety, and cost reduction. Leaders in lean organizations
must learn to lead differently. They promote concepts like *value for the patient* and encourage *daily improvement activity* and *problem-solving* by frontline staff. This research project was designed to learn from the identified healthcare institutions that have experienced various degrees of success in implementing and sustaining a lean management system. The resulting themes that were identified contributed proven success factors that will enable future organizations implementing lean to avoid various pitfalls that might otherwise inhibit the sustainment of a lean management system. Additionally, the most significant leadership and organizational characteristics of successful lean institutions were codified for adoption by future health systems desiring to implement a successful lean management system with minimal missteps along the journey.

**A Review of the Professional and Academic Literature**

This review of scholarly and professional literature provides the basis and justification for this research study by exploring the cultural, leadership, and other systemic factors that contribute to successful lean management system implementation efforts in healthcare. The topics explored through this literature review provide a historic and contemporary reference for the use and application of lean management systems in any industry as well as specifically within a healthcare setting. Business practices presented in this review provide the history and foundational concepts of lean which are necessary to understand and to illustrate the importance of leaders engaging with staff to solve problems in support of continuous improvement. A wide range of perspectives is explored to demonstrate the challenge of sustaining lean management systems in healthcare. Many healthcare organizations in the United States that are seeking to improve quality and reduce costs by implementing a lean management system are often unable to sustain their lean management system, resulting in the organization not achieving the long-term
benefits of lean. Concepts that are foundational to the project, including lean management
system, value for the patient, and daily improvement activity, are also explained.

Theories used to drive change and cultural transformation are presented along with the
identification of actors and the constructs that are impacted through the implementation of the
applicable theories and concepts. Previous research conducted by related studies is also
presented to provide some direction and focus while identifying gaps that remain unanswered.
Anticipated and discovered themes that contribute to the poor sustainment of lean management
systems in healthcare are presented. The final summary of the literature reviewed for this project
concludes that although some success has been achieved by many organizations, few studies
have been conducted focusing on the lack of sustainment of lean management systems in
healthcare. Studies that were found are presented in this review with key findings and
recommendations.

**Business Practices**

**Lean.** The business practice called lean, which is the focus of this research project, has a
well-documented history and a broad definition that is important to understand. Cusumano et al.
(2021) explained that the term “lean” was coined by John Krafcik in his master’s thesis at MIT
after visiting automakers around the world and studying their production systems. The business
practices specifically found at Toyota, which came to be known as the Toyota Production
System, are primarily where the lean practices were developed through trial and error in the
1960s and 1970s. Cusumano et al. further explained that Taiichi Ohno is recognized as the key
architect of Toyota’s unparalleled success where he developed and refined key lean concepts and
approaches including small-lot production, pull systems, and elimination of waste. Womack and
Jones (1996) claimed applicability of the following five fundamentals to every industry as the core of lean which they defined through their extensive study of the automotive industry:

First, there is *specifying value creation*, followed by *identifying the value streams* of the production process and eliminating waste. The third is *creating flow* in the production line from supplier to customer, and the fourth is *creating pull*, by allowing customer demand to be the driver. The final and most important is striving to achieve the four previous principles through a systematic approach toward *continuous improvement*. (p. 149)

Once an organization identifies what its customers value, it can then evaluate process steps to determine which ones add value and which ones do not (Costa & Filho, 2016). Emiliani (1998) explained *specifying value* by positing that a product must meet the customer expectations at the right time and cost and that many of the tasks are called waste when producing a product or service as they are of no value or interest to their customers. Hallam and Contreras (2018) described the applicability of the first principle of value creation to healthcare whereby patient value can be examined by looking at their wants and needs including the appropriate type and amount of testing.

For the second principle of identifying the value stream, Emiliani (1998) highlighted the importance of looking at activities from the customer’s point of view as it helps identify activities that add no value. Nash and Poling (2008) described Value Stream Mapping as a “process mapping technique that enables all stakeholders of an organization to visualize and understand a process” (p. 2). Hallam and Contreras (2018) explained the second principle of lean production with the guidance that a value stream in healthcare can be identified by looking at the activities that a patient experiences during an episode of care and determining whether
they add value in the patient’s eyes or not. Value Stream Mapping (VSM) is a lean tool used to identify waste in a process, to define a future state process, and during the sustainment phase to identify the best way to solve a problem (Henrique et al., 2020).

The creation of flow in healthcare can be evaluated by identifying ways to reduce interruptions or minimizing queue times for patients needing to see a doctor (Hallam & Contreras, 2018). Emiliani (1998) explained that flow in a lean system is built on the idea of one-piece flow rather than batch processing. The concept of one-piece flow is counterintuitive when compared to traditional production and processing methods, largely due to the shift in perspective from producer to the end-use customer (Emiliani, 1998).

Emiliani (1998) explained the pull concept by saying that lean producers design their operations to meet customer demand. This approach enables producers to make or provide only what is needed by the customer rather than producing based on a forecast that may change. The application of the pull concept in healthcare can relate to a provider being able to signal upstream steps from further downstream in the process (Hallam & Contreras, 2018). Goodridge et al. (2015) used pull systems to manage supplies in highly structured settings like a laboratory rather than in the more chaotic emergency department.

Perfection is an ideal state that is impossible to achieve; however, it provides an enterprise with a goal that is worth striving for (Emiliani, 1998). Hallam and Contreras (2018) provided an example of perfection in a healthcare process as being able to provide great and timely therapy that is both accurate and cost-effective. Clark (2016) explained perfection by illustrating that we strive for perfection by eliminating layers of waste, each one revealing a new layer of waste in a repeating cycle of improvement.
In addition to the manufacturing industry where it began, lean has been adapted to service industries such as banks and offices as well as the public sector and healthcare (Leite et al., 2020). The aim of the lean management system is to improve efficiency and quality (Hung et al., 2015). Hallam and Contreras (2018) posited that the lean philosophy that was successfully created, implemented, and spread throughout much of the manufacturing industry showed great promise for improving performance in healthcare; however, the unique aspects of healthcare make sustainability of a lean management system a tenuous prospect.

Beyond the physical aspects of lean related to what can be seen when implemented in a factory, service, or public entity, there must also be a parallel implementation of a lean management system that focuses on process and results (Mann, 2012). For example, a lean management system monitors a process for expected results. When these results are not achieved consistently, improvements must be identified to enable correction. Mann (2012) explained that since lean processes have fewer extra resources like capacity, space, inventory, and labor built into their systems, disciplined attention on outcomes versus targets must be maintained. The benefits obtained from physical lean changes cannot be maintained without the corresponding changes to the management system.

**Manufacturing.** Researchers of this topic routinely underscore key developments by pioneers of industry and management science, which are presented here as well for context and reference throughout this research. Before lean was developed, the enhancements to early manufacturing productivity with the development of a moving assembly line at Ford’s automobile plants are undeniable. In his *Sloan Management Review* article, Krafckik (1988) pointed out several unique characteristics of Ford’s production systems that worked well at the time but were adapted to make the Toyota Production System that he studied work even better.
For example, the span of control for workers in the Ford system was very narrow, requiring workers to perform narrowly defined tasks many times per day. Krafcik explained that the responsibility for defining and refining work standardization at Toyota was delegated to the workers performing the tasks, where autonomous teams made the necessary improvements to reach their goals. Part inventory levels that were moderate at Ford’s efficient vertically integrated plants were minimized in Toyota’s smaller facilities to accommodate their local networks of suppliers while still ensuring a continuous flow of products (Krafcik, 1988).

Before the development of lean, much of the emphasis on improvement in the early days of mass manufacturing was modeled after the scientific management methods developed by Frederick Taylor and the practices used by Henry Ford. Yamamoto et al. (2019) explained how Frederick Taylor introduced standardization and best practices when he said that managers should take worker suggestions for new methods and adopt them if they are found to be an improvement. These methods enabled significant gains in productivity through a relentless pursuit to satisfy customer demand for popular products like Ford’s automobiles (Emiliani, 1998).

Henry Ford was a proponent of cutting out waste in his product designs and processes. To ensure parts could be produced with ease, Ford ensured that standardization of parts became a central aspect of his concept of mass production, including strict specifications and measurements of quality (Yamamoto et al., 2019). After the Second World War, while rebuilding their economy with limited resources, Toyota Motor Company developed lower-cost manufacturing practices under the guidance of Taiichi Ohno and Shigeo Shingo (Emiliani, 1998).
History of lean would be incomplete without a review of the impact that W. Edwards Deming had through the methods of statistical quality control that he first taught to technical U.S. manufacturing personnel during the war effort of World War II, and later started in 1950 when he brought these and other quality concepts to Japanese management and engineers (Walton, 1990). Deming taught them how to reduce variation and defects, reduce waste, and improve productivity. His cooperative and participative form of management provided a foundation for what also became known as Total Quality Control. Another concept Deming introduced, which eventually became a foundational concept in lean improvement efforts was the Plan-Do-Check-Act (PDCA) Cycle. Walton (1990) explained its four stages succinctly: “A company plans a change, does it, checks the results and, depending on the results, acts either to standardize the change or to begin the cycle of improvement again with new information” (p. 21). Clark (2016) presented one of Deming’s first principles of quality management that leadership needs to measure what it values, meaning that key performance indicators should reflect what is also important to their customers over the short and long term such as quality, safety, delivery, cost, and morale.

Shortly after Deming first visited Japan, Joseph Juran published his first edition of the Quality Control Handbook in 1951 (Hamid et al., 2019). Juran et al. (1999) taught that special cause variation involving people doing the work may account for about 15% of quality problems whereas 85% can be attributed to quality issues within the operating system. Juran et al. (1999) described quality as “fitness for use” (p. 7.4, 21.4), suggesting that quality is defined by what the customer needs. Juran also identified quality planning, control, and improvement as three basic functions of quality management (Kumar et al., 2018).
In addition to the influence of Taiichi Ohno at Toyota, the work of Shigeo Shingo also impacted the development of a focus on wider systems of order fulfillment and culture, which are embodied in guiding principles divided into four dimensions of results, enterprise alignment, continuous improvement, and cultural enablers (Kelly & Hines, 2019). Additionally, Yamamoto et al. (2019) explained that Shingo was known for his development and adoption of single minute exchange of die (SMED) and error-proofing, which were inspired by the work of Frederick Taylor entitled *Principles of Scientific Management*.

**Influential works.** In their review of 25 years of lean literature, Samuel et al. (2015) identified Womack et al. (1990) and their book entitled *The Machine That Changed the World* as having a significant influence in popularizing the idea of lean beyond the term initially coined by John Krafcik in 1988. The performance gap they identified in their study between Japanese car manufacturers led by Toyota, and Western car manufacturers was dramatic and was too large to ignore. In addition, Womack et al. created a movement where managers, governments, and institutions took lean to a level that represented a significant shift in operations management (Samuel et al., 2015).

The results of a 4-year study by Steven Spear and H. Kent Bowen of the Harvard Business School were published in an article in the *Harvard Business Review* in 1999, providing valuable insights into the principles of design and improvement that are followed by anyone seeking to make changes to the way work is done. Through their research, Spear and Bowen (1999) identified four rules that guide the design, operation, and improvement of products and services representing what they coined as the DNA of the Toyota Production System:

1. Rule 1: All work shall be highly specified as to the content, sequence, timing, and outcome.
Rule 2: Every customer-supplier connection must be direct, and there must be an unambiguous yes-or-no way to send requests and receive responses.

Rule 3: The pathway for every product and service must be simple and direct.

Rule 4: Any improvement must be made by the scientific method, under the guidance of a teacher, at the lowest possible level in the organization. (p. 98)

Spear and Bowen (1999) further explained that by enabling frontline staff to improve their work and by pushing those decisions to the lowest level in the organization, leaders that follow these four rules can minimize chaos while promoting positive change. The rules articulate a simple form of the scientific method which can guide experimentation where work practices are constantly being refined and improved, which supports a learning organization. Even if a company does not have the four decades of history with these rules embedded into their culture, if they dedicate themselves to mastering these rules, they are more likely to have success in replicating Toyota’s DNA (Spear & Bowen, 1999). The insight provided by this article and these rules has proven to be valuable for students of lean, including myself, in understanding how Toyota was able to achieve its high level of business success.

**Other industries.** In their study of lean publications from 1987 to 2013 (Samuel et al., 2015) identified several industries and sectors where lean has been implemented including aerospace, financial services, electronics, healthcare, and public service entities in government. As lean has expanded into public service entities, a new focus has shifted to the end-user of government services rather than pushing for improvements and efficiencies internally (D’Andreamatteo et al., 2015). Therefore, although lean origins are in manufacturing, the
proliferation of lean implementations has truly transformed into a process improvement methodology that spans many industries.

The application of lean in healthcare was proposed in 1996 by Womack and Jones, and due to the rapid adoption and implementation in many hospitals and health systems since then, lean has become the most reported topic in the healthcare management literature (Aij & Teunissen, 2017). After several years of implementation and iteration within healthcare institutions and varied approaches to lean management in healthcare, Rotter et al. (2019) conducted a literature review and developed an operational definition to do the same. An organization with a lean management system includes those that have integrated a lean philosophy into their guidelines or policies that incorporate waste reduction, flow, improvement, and employee-driven improvement. Additionally, lean organizations will have a dedicated quality improvement team exemplified by at least one lean activity with lean assessment and two or more quality improvement projects (Rotter et al., 2019).

**Lean tools.** Lean implementations can be evaluated in some measure by the utilization of tools that enable fundamental continuous improvement and problem solving to occur (Hallam & Contreras, 2018). The tools Hallam and Contreras (2018) found to be used most often in lean healthcare were Value Stream Mapping (VSM), Kaizen, 5Ss, Define-Measure-Analyze-Improve-Control (DMAIC), Standard Work, and Gemba. However, it is important to note a relevant position presented by Anderson et al. (2019) that the tools can be important for supporting a systems-based approach to operations, but they are not able to stand alone without a supporting organizational culture focused on creating value.

**Kaizen.** Kaizen is a lean tool represented by a structured, systematic, participatory, and iterative problem-solving initiative that engages a team of individuals in solving problems over a
short period of days (von Thiele Schwarz et al., 2017). Kaizens are lean improvement projects that often originate from suggestions or improvement ideas by making changes to systems, procedures, workplaces, methods, or individual workstations (Lizarelli & Alliprandini, 2020). Kaizen can be used to obtain valuable employee input into work design which ultimately improves the mutual fit of the job to the person, thereby increasing job satisfaction (von Thiele Schwarz et al., 2017).

5S. 5S is a lean tool associated with workplace organization and visual management (Rotter et al., 2019). Each “S” represents a word associated with one of the five steps in the activity or 5S event. The 5Ss are used in lean as a visual management tool to organize the workplace. The steps for this methodology were summarized effectively by Clark (2016) and are presented in Table 1.

**Table 1**

*The 5S Steps*

<table>
<thead>
<tr>
<th>Step</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td><em>Sort:</em> Remove all unnecessary items and retain only what is required for the task.</td>
</tr>
<tr>
<td>S2</td>
<td><em>Shine:</em> Thoroughly deep clean the work area.</td>
</tr>
<tr>
<td>S3</td>
<td><em>Set in order:</em> Organize all equipment and consumables in optimum layout for standard work and mark positions using shadow tape.</td>
</tr>
<tr>
<td>S4</td>
<td><em>Standardize:</em> Ensure all workstations have a standard layout.</td>
</tr>
<tr>
<td>S5</td>
<td><em>Sustain:</em> Maintain and regularly audit the standard. (Clark, 2016, p. 11)</td>
</tr>
</tbody>
</table>

**DMAIC.** Six Sigma programs utilize DMAIC as the method for the improvement of products and processes principally by minimizing variation (Lizarelli & Alliprandini, 2020). Six Sigma improvement project teams are led by trained experts that follow the DMAIC problem-solving framework and are made up of individual experts in the process steps that are within the
scope of the project. Six Sigma projects typically require more training, more complex tools, and a longer execution time than lean projects, and they should be dedicated to problems that enable significant performance impact and change (Lizarelli & Alliprandini, 2020).

**VSM.** Mark Nash and Sheila Poling (2008) developed a comprehensive guide to Value Stream Mapping (VSM). First, Nash and Poling described a value stream as the flow of a process between a point of the initial request for something to the closure of that activity when the product or service is delivered. This view of the value stream opens the viewpoint of those analyzing a process to include breaking down departmental barriers and enabling everyone to see the flow of a process as well as the information required to support it. The three sections of a value stream map illustrate the process flow, information flow, and timeline. Standard icons are used to represent various tasks and functions like process, entity, inventory, flow, people, and transportation. The resulting illustrations help organizations document and communicate the current state of a process from start to finish. Subsequently, after identifying areas for improvement, a future state map can be created to show what the process would look like in the future after changes are made (Nash & Poling, 2008). This future state map becomes a goal or guide for subsequent improvement efforts.

**Kaizen.** Kaizen is a tool that represents continuous, incremental improvement events that involve multidisciplinary teams focused on specific problems to eliminate waste and improve processes (Clark, 2016). Improvements take place in areas that are identified by the team for improvement throughout the value stream and at any individual process step. The improvements represent large numbers of improvements that occur over time to optimize the value stream.

**Standard work.** Standard work is a lean tool described by Clark (2016) as one of the most important lean tools used for improving processes. Instead of simply documenting standard
operating procedures (SOPs) as a guide for how to carry out a procedure, Clark presented the benefits of using a lean visual A3 approach to SOPs where each step in a process is described with concise instructions and key quality points. The utilization of diagrams and photos helps ensure consistent training and application of the best-known practice for completing a task (Clark, 2016).

**Lean leadership.** Leading in an organization that has implemented a lean management system requires a change in thinking from traditional management approaches as well as new ways of working. Not only do lean leaders need to become knowledgeable of lean concepts, but they must learn a new way to lead that is focused on process and is supported by specific behaviors like those that Mann (2012) presented as a key to successful lean conversions and ongoing lean operations, as presented in Table 2.

**Table 2**

*Dimensions of Lean Leadership*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>For Project Implementation</th>
<th>For Ongoing Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passion for Lean</td>
<td>1. Passionate about the potential for lean to make the enterprise more successful and work more fulfilling for all involved.</td>
<td>1. Same as Project Implementation, plus:</td>
</tr>
<tr>
<td></td>
<td>2. Willing to make personal changes in one’s own work, including using standardized work for his or her own position.</td>
<td>2. Exhibits intense commitment to focus on explicitly defining processes and disciplined adherence to them.</td>
</tr>
<tr>
<td>Disciplined adherence to process-accountability</td>
<td>1. Sets expectations, regularly uses a process to track and follow up on actual accomplishment of assigned tasks.</td>
<td>1. Same as Project Implementation, plus:</td>
</tr>
<tr>
<td></td>
<td>2. Exhibits intense commitment to focus on explicitly defining processes and disciplined adherence to them.</td>
<td>2. Uses explicitly defined visual processes to track and follow up assignments and take appropriate corrective action.</td>
</tr>
<tr>
<td>Project management orientation</td>
<td>1. Prior experience in successfully implemented projects</td>
<td>1. Able to identify needed changes based on daily process data and assign small-bite daily tasks leading to successful implementation of the changes.</td>
</tr>
<tr>
<td></td>
<td>2. Uses a defined process to track performance and completion of task assignments.</td>
<td>2. Uses explicitly defined visual processes to track and follow up assignments and take appropriate corrective action.</td>
</tr>
<tr>
<td></td>
<td>3. Identifies corrective action where necessary and follows up on it.</td>
<td></td>
</tr>
<tr>
<td>Lean thinking</td>
<td>1. Understands lean concepts.</td>
<td>1. Serious about ongoing improvement based on a goal of perfection.</td>
</tr>
<tr>
<td>Attribute</td>
<td>For Project Implementation</td>
<td>For Ongoing Operations</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------</td>
<td>------------------------</td>
</tr>
</tbody>
</table>
| Ownership | 2. Has had experience applying lean concepts.  
3. Talks about and promotes a lean future state.  
4. Finds ways to apply and illustrate lean concepts in daily project work processes. | 2. Sees with “kaizen eyes.”  
3. Holds and coaches a root-cause orientation to corrective action.  
4. Has learned process improvement/problem solving methods; able to personally lead lean process improvement. |
| Tension between applied and technical | 1. Thinks and talks about the area as his or hers to lead, set direction for, change, and improve. | 1. Same as Project Implementation, plus:  
2. Eager to empower others in the area through structured ways to elicit and implement their ideas.  
3. Acknowledges and celebrates improvements made by others at all levels. |
| Balanced commitment to production and management systems | 1. Understands the need to sweat the details, as well as to get things done. | 1. Understands and respects the details behind elements of lean, such as flow, pull, standardized work, etc.  
2. Actively supports steps to upgrade performance and expose previously hidden impediments.  
3. Takes a “what can we do today” orientation to making change happen steadily, step by step. |
| Effective relations with support groups | 1. History of effective give and take with people and ideas.  
2. Evidence of process focus beyond a “hit the numbers” approach to management.  
3. Eager for greater participation by production people as well as others. | 1. History of getting things done with support from operations support groups such as engineering, quality, production control, safety, finance, HR.  
2. Incorporates support groups appropriately in plans for improvement and responses to problems.  
| Measure process separately from results | 1. Breaks the project into small steps with due dates.  
2. Establishes regular, frequent review of process misses and trends over time. |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>For Project Implementation</th>
<th>For Ongoing Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Acts to resolve problems right away as they come up.</td>
<td>3. Teaches and emphasizes cause analysis, root cause solutions, and connections with improved performance.</td>
</tr>
</tbody>
</table>

*Note.* From *Creating A Lean Culture: Tools to Sustain Lean Conversions* by D. Mann, 2012, Table 8.1. Copyright 2012 by CRC Press. Reprinted with permission (see Appendix E).

With the nine behaviors or dimensions of leadership, Mann (2012) highlighted unique behaviors required to successfully lead during a lean project implementation as well as the behaviors required to sustain an ongoing lean operation. Mann concluded that ultimate success in sustaining lean implementations is dependent upon the leader’s ability to teach, verify, and hold others accountable for upholding established lean management system practices.

**Lean healthcare leaders.** In addition to Mann’s (2012) nine required behaviors of lean leadership, it is also important to refer to the work of Aij and Teunissen (2017), who built upon the generic conceptual model of an industry-agnostic lean leadership system proposed by Dombrowski and Mielke (2013) with five leadership attributes to create a guide for developing lean healthcare leaders. The five lean leader attributes they identified were improvement culture, self-development, qualification, gemba, and hoshin kanri. Each attribute was expanded in the study and refined with corresponding attributes from their literature review of 32 articles on leadership in healthcare.

**Improved culture.** Aij and Teunissen (2017) expanded on the first lean attribute, *improvement culture*, as an important attribute for the healthcare leader to maintain including the following elements: task identity so followers can realize their contributions, daily feedback via daily management and visual control, autonomy through self-managed teams, a belief in improvement by articulating goals, and an honest approach that embraces problem-solving without blaming. Anderson et al. (2019) described the importance of a daily management system
in support of a continuous improvement culture. By fostering a safe environment for staff to raise barriers and encouraging everyone to help solve problems, Anderson et al. (2019) concluded there becomes a normalization of process improvement work by every person every day.

**Self-development.** The second lean attribute, *self-development*, means that leaders should embrace their own need to develop as a leader through either formal training, mentoring, or participation in leadership development programs (Aij & Teunissen, 2017). An important way Aij and Teunissen (2017) identified that lean leaders are developed is by using mentors or coaches to help the leader learn the new ways of working and increase their self-awareness.

**Qualification.** The third lean attribute, *qualification*, is an attribute that Aij and Teunissen (2017) found that includes empowering staff members and engaging them as owners of improvement projects. In addition, effective two-way communication is important to support qualification. They also highlighted the importance of recognizing and addressing development opportunities to effectively identify and develop talent that exists on a team (Aij & Teunissen, 2017).

**Gemba.** The fourth lean attribute, *gemba* in healthcare involves leaders going to where value is provided to patients to understand the barriers and problems that frontline staff face each day (Aij et al., 2015). This concept points to a common business practice within lean called going to the gemba. The gemba is the place where value is provided to the customer; therefore in healthcare, it is often where patients are cared for or where goods and services are prepared for delivery to a patient. The gemba walk is a practice where all levels of the organization go to where the work is done, where problems occur, so they can see for themselves and participate in the problem-solving efforts. A key to lean sustainment is having leaders go to the gemba to see barriers firsthand, so they can understand the problems better, encourage caregivers to identify
solutions, and enable them to implement those solutions (Henrique et al., 2020). Lean implementation in healthcare involves the direct engagement of frontline caregivers to identify improvements that benefit patients, staff, and the business of healthcare (Hung et al., 2015). This engagement not only draws upon the expertise of the people doing the work, but it reinforces the respect leaders have for their people and the knowledge they possess about work performed in the gemba. This perspective is flipped from traditional change management which often involves changes initiated and driven by management. Cultural change is often required to transform an organization into one that fosters leadership that understands how to support lean practices (D’Andreamatteo et al., 2015). The breadth of cultural change required to support a lean management system spans all levels of the organization from the front line to all support staff to the senior executives and board members.

**Hoshin kanri.** The fifth and final lean leader attribute, *hoshin kanri*, guides leaders to ensure goal alignment at all levels of the organization through effective, regular communication (Aij & Teunissen, 2017). Leadership attributes highlighted by Aij and Teunissen (2017) that are integral to hoshin kanri include defining and providing value for one’s team, demonstrating the principles of lean in one’s daily work, and role adaptation. Another aspect of hoshin kanri as presented by (Clark, 2016) is policy deployment, whereby structured dialogue is facilitated to ensure that alignment of strategic goals is achieved with actions at each level of the organization.

**Lean experts.** Lean leaders need role models to help them learn and adopt new leadership skills (Aij & Teunissen, 2017). Aij and Teunissen (2017) also identified the importance of having a lean expert, or sensei, available to teach, guide, and develop both leaders and workers. Henrique et al. (2020) explained that hospitals need to provide training both in the theory of lean as well as the hands-on application of lean tools under the guidance of a lean
expert. Emiliani (1998) explained that it is helpful to get people to grasp the concepts of lean when they participate in kaizen events facilitated by lean experts where lean methods are applied to a real problem. Hung et al. (2015) also highlighted the importance of providing support and coaching for frontline staff in using the tools that are learned. The caution highlighted by Clark (2016) is that many failed lean transformations result from organizations failing to change from a heavy reliance on external experts guiding the use of lean tools or not including frontline staff or managers in that work.

**Change management.** An important aspect of lean leadership is change management. The focus on continuous process improvement requires that leaders demonstrate persistence and know-how (Seidel et al., 2019). A key tool that is used in many lean organizations is the A3 method. The method utilizes a single sheet of paper to guide changes including the following components: objective, current problem, projected situation, action plan, and monitoring (Henrique et al., 2020)

**Cultural alignment.** Positive organizational culture, as found by Taylor et al. (2015), includes the following characteristics: respect and trust between colleagues at all levels, a relentless quest for excellence, teams that can focus despite the noise, a safe and non-threatening environment, recognition for good work, and promotion of values for improvement. Lean management systems require a culture that supports and encourages daily improvement activity as a routine part of the daily work of frontline personnel, which results in large, sustained improvements over time (Clark, 2016). When lean behaviors become a habitual practice of organizational culture, considerable competitive advantage is obtained (Emiliani, 1998).

Anderson et al. (2019) presented a set of principles that support a culture of continuous improvement that is based on work from the Shingo Institute. The five principles presented by
Anderson et al. include respect for individuals, leading with humility, seeking perfection, embracing scientific thinking, and focusing on the process. As leaders follow the principle of respecting all individuals, barriers will be revealed by frontline caregivers, often with potential ideas or solutions. Leading with humility is demonstrated when leaders humbly listen and learn from their team members as they seek organizational improvement. Anderson et al. further described the pursuit of perfection as being part of the culture of continuous improvement that is created when working together to solve problems. Utilizing PDCA (Plan Do Check Act) is the main approach used to guide problem-solving. Lastly, Anderson described the focus on process as the basis for standard work, which provides the foundation for further improvements over time.

**Training and development.** The importance of establishing an effective training and development program to support a lean management system cannot be overstated. Henrique et al. (2020) underscored the importance of training employees on lean techniques to sustain lean implementations and that lack of training is often highlighted as a barrier to lean implementation. Anderson et al. (2019) emphasized the importance of training and developing leaders in new thinking and behaviors. Anderson et al. further underscored the importance of both classroom training and personal coaching as the most effective way to encourage the adoption of lean by leaders.

**The Problem**

The general problem addressed in this study is that healthcare organizations seeking to improve quality and reduce cost by implementing a lean management system are often unable to sustain the lean management system, resulting in the organization not achieving expected long-term improvements in hospital financial performance and clinical outcome measures. Lean is
also considered a quality management system and is typically expected to yield a positive impact on the firm, including improving financial, quality, and operational performance (Kumar et al., 2018). Most lean transformation efforts failed or delivered only short-term improvements, largely resulting from failed leadership and a lack of involvement of frontline staff (Clark, 2016). Leaders need to shift their mindset from optimizing vertical functional silos to a broader viewpoint of optimizing the entire value stream. In doing so, the resulting improvements are more tangible to the patient through improved metrics that impact them such as patient satisfaction scores as well as reductions in error rates and wait times.

Although management experts agree that lean principles apply to manufacturing industries as well as others, complacency can inhibit the success of lean initiatives (Yamamoto et al., 2019). Yamamoto et al. (2019) further explained that the slow pace of change from the incremental continuous improvement process may seem to be too slow for many people, furthering the potential resistance to change. Therefore, Yamamoto et al. concluded that lean implementation success cannot happen without active participation and full commitment from management. Yamamoto et al. also asserted that lean can be applied anywhere. The organization and lean leaders implementing lean need to ensure team members know why it is good and explain the benefits effectively.

Healthcare organizations have turned to lean to help them achieve efficiency and productivity as well as improvements in the quality of health services outcomes (Maijala et al., 2018). Lean has also been applied in healthcare to achieve improvements in efficiency, patient satisfaction, clinical outcomes, and safety with promising yet inconclusive improvements in hospital performance (D’Andreamatteo et al., 2015). The problem of sustainability of improvements over time is highlighted by the lack of evidence of the same in healthcare
organizations. Additionally, D’Andreamatteo et al. (2015) concluded their study with a suggestion for future investigations into the sustainability of well-known lean programs that leveraged a systemic approach to lean implementation in healthcare.

Healthcare organizations often emphasize lean tool application but fail to persist with change efforts to adequately develop their frontline leaders, thereby limiting overall organizational achievement (Bijl et al., 2019). For an organization to mature its problem-solving capabilities, lean leaders need to encourage the development of frontline staff to take ownership of daily improvement activities. Toussaint and Gerard (2010) underscored the importance of leaders as mentors guiding all employees to solve problems to achieve the aims of the organization. Having leaders that promote a culture of identification and implementation of improvements daily is a key success factor for lean implementation, yet creating value for the patient should ultimately be the focus (Aij et al., 2015). The emphasis on daily improvements cannot be overstated as the ongoing support from leaders and the development and encouragement of frontline staff are essential to the maturation of the problem-solving capability of a lean healthcare organization.

The specific problem addressed is that many healthcare organizations in the United States that are seeking to improve quality and reduce costs by implementing a lean management system are often unable to sustain the lean management system, resulting in the organization not achieving the long-term benefits of lean. This topic was partially addressed by Henrique et al. (2020) through their literature review and development of a framework to assess the maturity level of lean in a healthcare setting. In their paper, they also identified key factors that influenced units at six Brazilian hospitals to sustain lean improvements including value stream mapping, the initial focus on information or material flow as opposed to patient flow, and the involvement of Information Technology personnel (Henrique et al., 2020). Although the framework is quite
useful in evaluating the sustainability of lean in hospital units in Brazil, there are many differences in health systems in other countries.

Kelly and Hines (2019) sought sustainable results from implementing a lean framework by empowering every employee in a large reagent manufacturing facility in Ireland. Kelly and Hines sought to create a sustainable lean continuous improvement culture by utilizing a Shingo approach that has four guiding principles including results, enterprise alignment, continuous improvement, and cultural enablers. The lean implementation efforts involved customizing their lean management systems to combine with their already existing corporate principles and behavioral standards, which aligned well with the Shingo principles. Departmental goals were aligned with the corporate vision and strategic goals, which enabled them to develop departmental strategy maps and balanced scorecards to enable staff visibility between their job performance and departmental strategy (Kelly & Hines, 2019). Subsequent use of leader standard work, daily team huddles, gemba walks, and kaizen problem solving resulted in significant cost savings over a sustained 8-year period. Additional improvements resulted in increased output, reduced cost, reduced defects, reduced lead times, reduced inventory, and an increase in employee morale. Reasons for their success include the development of their lean activities guided by fostering dedicated local management, building an improvement culture customized to their existing culture, enabling knowledge transfer, and empowering teams with autonomy, effective problem solving, and decision-making (Kelly & Hines, 2019). Beyond these two examples from Brazil and Ireland, it will be important to evaluate the sustainability of lean management systems at multiple levels of several healthcare institutions in the United States.

A recent study focused on the sustainability of lean in a pediatric healthcare setting by Flynn et al. (2018) provides good insight regarding the sustainability of lean from literature
reviews of lean implementations in pediatric healthcare settings in the United States, Canada, and Sweden. Implementation approaches and processes contributed to lean sustainability. Other factors including the use of multi-disciplinary-led teams, physician leads, organizational and clinical leader involvement, and use of external consultants all facilitated sustainability. Flynn et al. (2018) also found that the values of lean must make sense to the managers and staff, otherwise, sustainability will suffer. Other keys included developing and maintaining an institutional culture that consists of shared vision and values, leadership support, strong human interaction skills, and active involvement of multi-disciplinary staff (Flynn et al., 2018). Upon conclusion of their research, Flynn et al. (2018) declared a need for additional sustainability research on healthcare improvement interventions like lean to enable more effective and sustainable implementation, measurement, and reporting of these interventions.

Implementation of a system-wide lean management system in the United States in a primary care setting serving over one million patients in California provided valuable insight into key facilitators and barriers to lean transformation and optimization of outcomes (Hung et al., 2015). The goal was to improve quality and operational efficiencies with a specific focus on reducing cost. Implementations included standardizing equipment and education in patient rooms, employing co-located care dyad teams of physicians and medical assistants (MAs) to improve communication and workflow, standardizing workflows, visual displays of metrics, daily huddles, MAs as flow managers, shared management of doctor in-baskets, and redesigned call functions. The results of the implementation of lean in these primary care practices are summarized in Table 3 under three main themes that were observed and reported by Hung et al. (2015).
### Table 3

**Facilitators and Barriers of Lean Implementation in Primary Care**

<table>
<thead>
<tr>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solicitation of expertise and input from all organizational members</td>
<td>Management-driven change</td>
</tr>
<tr>
<td>Visual display of daily progress on performance metrics</td>
<td>Inadequate data collection or lack of visibility of progress</td>
</tr>
<tr>
<td>Partnered dynamic between physicians and medical assistants</td>
<td>Physician resistance to work standardization</td>
</tr>
<tr>
<td>Culture of innovation, collaboration, creativity</td>
<td>Difficulty transferring responsibilities to medical assistant as lean “flow manager”</td>
</tr>
<tr>
<td>Provider-identified opportunities for continuous improvement</td>
<td></td>
</tr>
<tr>
<td>Rapid training sessions to minimize time away from patient care</td>
<td>Lack of time for training, for absorption of new ideas</td>
</tr>
<tr>
<td>Follow-up coaching to reinforce changes made</td>
<td>Staffing, cross-coverage of patient care during lean improvement events</td>
</tr>
</tbody>
</table>


### Concepts

The primary concepts that serve as a foundation for the research project include a lean management system, value for the patient, and daily improvement activity. Each of these concepts serves an important role in the project as mutually dependent core concepts. A lean management system cannot persist without daily improvement activities being performed by caregivers and leaders guided by a relentless focus on enhancing value for their patients.
**Lean management system** is a concept that has been applied to healthcare and has demonstrated success in improving outcome measures like quality, productivity, and patient safety as well as reducing cost (Clark, 2016). Improvement with a successful lean management system is achieved by encouraging and training staff to utilize the scientific method to solve problems. Additionally, change agents with sufficient authority and lean expertise are needed to guide and coach staff in the principles and practices of lean management to transfer knowledge and support sustainment. Projects may fail without a formal assignment of a process improvement expert to teams involved with continuous improvement initiatives (Antony & Gupta, 2019). Accordingly, through this research project, I was mindful to not include healthcare organizations that only utilize lean tools to reduce waste without accompanying the tools with an appropriate change management framework. Thus, the concept of utilizing a lean management system to improve outcome measures provided the foundation for this research study because if the results at each healthcare institution were consistently and easily achieved, the research problem would not exist. This suggested that certain factors and influences contribute to a successful outcome, given the scenarios where lean management systems are implemented.

*Value for the patient* is a concept that is central to the endeavor of lean leaders in healthcare that are learning how to empower their staff to achieve organizational objectives (Aij et al., 2015). Lean leaders go to where the work is done, where patients are cared for in hospitals, to truly understand value from the patient perspective. Clark (2016) explained that lean management systems based on the Toyota Production System achieve operational excellence by eliminating waste, thereby maximizing the value provided to the customer. Clark also described the *Toyota way* as being a long-term philosophy that is based on creating value for their customers and, in turn, society at large. Additionally, Clark highlighted the five-stage
implementation model of lean by Womack and Jones where the first stage is to specify value from the perspective of the customer by obtaining the voice of the customer. Thus, lean leaders must know that the patients are their customers, and they must understand what they value or what is important to them (Maijala et al., 2018). Leadership behaviors like this are crucial to the establishment of a lean management system, making it possible for long-term success.

*Daily improvement activity* is a necessary concept for teams working in a lean management system to practice. Lean leaders work with their teams to encourage local ownership of problem-solving activities (Bijl et al., 2019). Workgroups that transition from having leaders as the problem solvers to having enthusiastic frontline staff work together to solve problems achieve higher levels of lean maturity. Engaging caregivers to identify and eliminate waste is empowering and was shown to be an important mechanism in the sustainment of lean in pediatric healthcare settings (Flynn et al., 2018). In addition to enabling frontline staff to solve problems, leaders also need to provide accountability where daily routines include following up on assigned problem-solving tasks (Seidel et al., 2019). If daily improvement is not embedded into the culture of a healthcare organization, the sustainment of a lean management system is unlikely.

**Theories**

Three important theories are utilized to engage leaders and caregivers to drive change and cultural transformation through successfully implementing a lean management system in healthcare. These theories include transformational leadership theory, psychological flow, and authentic leadership. It is purposeful to include two theories focused on leaders of a lean management system since their importance to achieving successful implementation and sustainment of a lean management system should not be understated or missed.
**Transformational leadership theory.** Noel Tichy (1986) summarized in his book, *The Transformational Leader*, seven characteristics of this type of leader:

1. They identify themselves as change agents.
2. They are courageous individuals.
3. They believe in people.
4. They are value-driven.
5. They are life-long learners.
6. They have the ability to deal with complexity, ambiguity, and uncertainty.
7. They are visionaries.

As change agents, transformational leaders need to understand how people deal with change and understand the complexities of overcoming resistance to change. As visionaries, these leaders must be able to assess the current reality and develop a vision of the desired future state. Tichy (1986) identified three principles that transformational leaders use to diagnose required change. They must first frame the problem, collect data required for decision-making, and simplify the complexities, thereby identifying the most pressing operational issues.

Transformational leadership is closely linked to lean leadership whereby leaders utilize four dimensions presented by Bijl et al. (2019) including idealized influence, inspirational motivation, intellectual stimulation, and individual consideration. Leaders with idealized influence serve as role models for others to follow. Leaders with inspirational motivation find ways to motivate their teams to get involved in a spirited way. Followers that are intellectually stimulated are more creative and offer innovative solutions to problems. Individual consideration is given by transformational leaders when they are attentive to the desire for achievement and growth of their team members. Bijl et al. (2019) concluded that there is an opportunity to further
research the link between transformational leadership theory and lean leadership. Lean healthcare leaders should strive to hand over improvement responsibilities to frontline staff to achieve higher levels of lean maturity (Bijl et al., 2019). Seidel et al. (2019) presented what they found from Stone et al. (2004) that transformational leadership theory suggests leaders influence followers through the following behaviors: articulating a clear vision, providing an explanation for attaining it, being optimistic, showing confidence in their team, and leading by example.

**Authentic leadership theory.** Authentic leadership is a theory that aligns well with lean leadership in that employees are genuinely engaged in improving work practices while leaders demonstrate consistent know-how (Seidel et al., 2019). Although completely authentic leadership may be more of an aspirational goal than a fully realized state of being, followers of authentic leaders can be inspired by their example and seek authenticity in their daily interactions. It is important to note that not all researchers are enamored with the concepts of authenticity and leadership being connected as a formal theory (Gardner et al., 2021); however, the merits of authentic leadership as a foundational theory remain compelling and useful for this research study. Frontline staff who report to an authentic leader in a lean organization tend to model the behaviors of authentic leaders including positive and supportive behaviors that are self-regulated, disciplined, and engaged. Gardner et al. (2021) concluded after years of teaching graduate-level management classes that most students embrace authentic leadership theory because they can identify leaders with whom they have worked who practice authentic leadership, and they find value in personally reflecting on how they measure up to the ideals and work to practice in their interactions.

**Psychological flow theory.** This is a theory that workers find their work rewarding when certain positive conditions exist in the workplace (Emiliani, 1998). Staff with psychological flow
feel their skills match the job challenges, with clear goals to work towards and a sense of control in their work. Academicians that have high standards of performance also experience psychological flow; however, it can be impacted negatively by anxiety and fear (Ljubin-Golub et al., 2018). At its core, however, psychological flow was shown to be negatively related to inattention, meaning that people who experience flow are less likely to be inattentive (Marty-Dugas & Smilek, 2019). This revelation may bode well for health systems seeking to reduce hospital-acquired infections or other errors potentially caused by inattention. Marty-Dugas and Smilek (2019) also identified nine facets characteristic of flow:

1. A balance between the individual’s skill and the challenge afforded by the situation
2. Clear goals
3. Immediate and unambiguous feedback
4. Focused concentration
5. A merging of action and awareness
6. Loss of self-consciousness
7. A heightened sense of control
8. Time distortion, and
9. Experiencing the activity as intrinsically rewarding. (p. 1761)

An alternate viewpoint to the nine facets also presented by Marty-Dugas and Smilek (2019) suggests that psychological flow can more simply be characterized by a single, subjective description of “deep, effortless concentration” (p. 1761). This sense of control is worth striving for in any work environment and as described should be further explored for lean implementations in healthcare. Workers who experience flow in a lean environment can leverage
this mindset and feel rewarded in their work but also be more likely to achieve better outcomes with higher attentiveness.

**Actors**

Actors represent the principal individuals that are involved in supporting the implementation of a lean management system. In this review, the actors who are most important to highlight are lean leaders, caregivers or frontline staff, healthcare institutions, and lean experts. Each actor plays a unique and important role in the successful implementation and sustainment of a lean management system in healthcare.

Lean leaders have the responsibility to provide employees with structure and tools to do their job and provide guidance regarding the goals of the company. Lean organizations require a mindset for leaders that is different from traditional leadership (Yamamoto et al., 2019). Lean leaders are to follow leader standard work and establish accountability for teams who report to them (Seidel et al., 2019). Additionally, lean leaders should guide their staff in lean activities including waste elimination, generating ideas for improvement, and problem-solving. Anderson et al. (2019) described leader standard work as “a series of activities and behaviors that keep the organization focused on solving problems that result in sustainable improvement” (p. 524). Seidel et al. (2019) point out that for lean leaders to effectively influence their staff, they must be well versed in communication, critical thinking, and have good discipline to ensure lean tasks are completed and operationalized. Successful lean leaders are effective facilitators, are supportive, and effectively mentor their staff (Maijala et al., 2018). Anderson et al. (2019) also posited that instead of solving problems themselves, they can coach their team members and develop them as problem solvers who are aligned with the goals of the organization. Lean healthcare leaders
consistently focus on enhancing value for their patients and inspire others to do the same through respect, humility, and effective interpersonal relationships (Aij et al., 2015).

Caregivers and frontline staff include nurses, doctors, technicians, housekeeping, and others that have direct patient contact. This level of staff is encouraged to learn lean principles and apply this knowledge to solve problems through rapid-cycle change and feedback in cooperation with their leaders and others (Taylor et al., 2015). In addition to the importance of learning lean principles, Taylor et al. (2015) pointed out that frontline staff also value autonomy and flexibility based on their expertise as well as trust and empowerment to encourage their innovation and creativity in solving problems.

Healthcare institutions represent institutions known as hospitals and health system entities that choose to pursue lean management systems to improve patient outcomes and organizational performance (D’Andreamatteo et al., 2015). Hospitals are the acute care settings that include emergency services and surgery as well as inpatient care, hospital pharmacies, laboratories, and radiology services. Additional areas of healthcare may also be included in lean initiatives such as outpatient practices, home health services, and specialty clinics. A recent lean literature review by Costa and Filho (2016) added new areas that have implemented lean management including ophthalmology, sterile processing, hospital laundry, pediatrics, orthopedics, and oncology. Costa and Filho (2016) also utilized a useful categorization of hospital operations mentioned by Guo and Hariharan (2012) as follows: support activities, ancillary services, clinical and therapeutic operations, hospital as a whole, and general. These categories proved to be useful in evaluating the number and characteristics of previous studies focused on lean healthcare.
Lean experts may include either internal or external staff who have been formally trained in lean principles and have experience helping other institutions implement lean. Lean expertise may be imported using outside consultants to help train staff and guide leaders and the overall program (Clark, 2016). Sustainability of lean management hinges on the ability of the hospital to effectively train staff on both theoretical and practical applications of lean concepts and tools with the support of lean experts (Henrique et al., 2020). Training and guidance are important for an organization to be able to spread the knowledge of lean management systems and tools to achieve the greatest benefit by involving a growing number of employees.

**Constructs**

Constructs include the outcomes of all efforts associated with the lean implementation and are a direct result of influence on and by actors where theories and concepts are applied and practiced during the lean journey. The three main constructs included in this research project are sustainment of the lean management system, quality, and efficiency. The importance of each of these constructs is discussed below.

Sustainment of the lean management system is the primary construct for this research study. According to Mann (2012), a lean management system consists of four interdependent parts: leader standard work, visual controls, daily accountability process, and discipline. Leader standard work provides a structured, well-defined articulation of the process tasks to be performed and at what frequency for the expected results to be obtained. Mann also illustrated that visual controls are displays of data that show the actual performance of the chosen system compared to expected results. Data collection and display are necessary for both performance improvement projects to compare baseline to improved performance (Dawson, 2019) as well as ongoing daily performance. The daily accountability process often includes a structure of tiered
daily meetings at progressive leadership levels that help ensure expected results are achieved and if not, a venue for problem-solving workgroups at each level is fostered to address discrepancies (Mann, 2012). Finally, leadership discipline is required to follow the established components of the lean management system. An effective method for sustaining redesigned workflows and process improvements is to highlight these within the daily lean management system. When staff are aware that leadership is interested in achieving the expected outcomes, they are more likely to work together to achieve the established metrics (Hung et al., 2015). This emphasis provided by leadership contributes to the successful sustainment of lean among other factors that were identified through the research.

Organizations often struggle to sustain a lean management system after the initial implementation efforts begin to wane. Anderson et al. (2019) presented useful approaches including starting with spreading problem-solving skills across the system, thereby creating engagement with staff. Additionally, Anderson et al. discussed the use of a “model cell,” which is a specific area used to pilot the use of tools, training, and test interventions in one practice or unit to refine the approaches before spreading to other parts of the organization.

Quality is another construct that is often a focus of lean management system implementations. In manufacturing settings, quality often refers to the product quality whereas in transactional settings quality typically refers to the quality of services that are provided to consumers. A recent study by Sun et al. (2014) suggested large trends over the past two decades in quality improvement publications that discuss the use of lean in healthcare. Quality in healthcare is typically associated with patient outcomes, clinical quality, and patient safety. Clark (2016) identified lean management systems that successfully improved quality by reducing errors and turnaround times in histopathology departments as well as lowering costs by
improving efficiency. Additionally, the increasing use of social media sites by patients is contributing to the necessity for healthcare institutions to be aware of and responsive to ratings and reviews from patients. Solving problems in healthcare will naturally result in quality improvements that positively impact the patient (Hung et al., 2015).

Efficiency is a construct focusing on improvement for both payers and providers. Payers are either the patients, the insurance companies, or the government program that provides the funding to pay the bills from the provision of medical care. Flow within a health system is related to efficiency, particularly regarding the reduction of patient interruptions, excess travel times, and patients having to wait too long to be seen by a doctor (Hallam & Contreras, 2018). Many efficiency improvements result from waste reduction efforts due to problem-solving by frontline employees (Bijl et al., 2019).

Related Studies

One study by Henrique et al. developed a framework to assess sustaining continuous improvement in lean healthcare. This study utilized a literature review to identify a sustainment framework with 24 critical success factors (CSFs) organized into three main pillars: People, Method, and Tools, along with a case study approach to validate the assessment (Henrique et al., 2020; see Figure 2, p. 2897). The researchers selected six hospitals as case studies to evaluate the framework.

Henrique et al. (2020) expected their framework to help sustain lean improvements in future healthcare lean management system implementations. The researchers found that hospitals with high sustainability have a fully participative board, incorporate a structured change management process, and utilize lean audit tools such as checklists and visual management boards. A key aspect of sustainability was having nurses keep visual standards and organization
on the hospital floor and managers controlling operational performance metrics that reflect strategic key performance indicators. They concluded that hospitals that continue to use the Value Stream Mapping tool with key personnel involvement had the greatest success with sustainment. Additionally, Henrique et al. also concluded that their study was the first attempt to identify key factors for lean sustainment in hospitals over the long term. The study impact is limited by the fact that the case studies only included hospitals in Brazil, which can limit the applicability to other cultures and geographical areas. Additionally, since the framework was developed with a single hospital unit as the unit of analysis, future studies with a wider aperture evaluating multiple units in a hospital or institutions with multiple sites would enable the evaluation of intra-unit, corporate, and external interactions (Henrique et al., 2020).

Hallam and Contreras (2018) conducted a literature review examining how lean was implemented in 37 empirical studies in healthcare; by analyzing the resulting outcomes, they found that lean can improve operational effectiveness, but they did not see many system-wide implementations and found minimal evidence of sustainment. They identified 15 tools in the articles and identified the percentage of articles that reported utilizing each tool. They showed how many of the 37 articles mentioned reduction of each of the seven wastes identified by Taiichi Ohno including waiting, defects, overproduction, transport, inventory, motion, and overburden. They identified 32 potential outcome measures including these top five: waiting time, length of stay, cost, improved quality, and improved satisfaction. The researchers also concluded that lean tenets apply to healthcare, with the most positive improvements in hospital stay and waiting time while the terminology used should be refined more towards healthcare. Finally, Hallam and Contreras found very little evidence in their review showing sustainability in healthcare.
Another study investigated causes and identified 20 barriers to lean implementation sustainability in public Brazilian healthcare (Leite et al., 2020). Leite et al.’s (2020) in-depth literature review and purposeful exploratory case studies were utilized to develop themes and identify the barriers. Some of the barriers identified include lack of financial resources, physician’s resistance to change, fear that lean would cause job losses, and lack of a long-term strategy. A key finding was that to be successfully adopted, lean must be adapted to the unique context where it is being implemented (Leite et al., 2020). Underlying barriers were also identified that provide added explanation of why lean may not be sustained. They included the following:

Physicians’ influence within the process, patients’ behavior in emergency areas, constraints related to resource management affecting clinical staff, the UHS model impacts on physicians’ work, the model that UHS operates creates constraints, and influence of the staff behavior as a barrier to lean. (Leite et al., 2020, p. 13)

These deeper causes are likely to constrain organizations on their lean healthcare implementation journey.

Flynn et al. (2018) conducted a realist synthesis using a context, mechanism, and outcome heuristic to develop a theory on the sustainability of lean efforts across pediatric healthcare. Proctor et al. (2015) illustrated with their research findings that sustainability of lean in healthcare is one of the least understood issues for implementation research. Their study enabled the researchers to identify how and why lean efforts in pediatric healthcare are sustainable or not. Flynn et al. found first that the sustainment of lean efforts relies on how participants assign meaning to lean by aligning their values with lean. They also found that staff engagement and empowerment were core mechanisms for sustainability. Secondly, Flynn et al. 
found that outcomes from lean implementation either help or hinder sustainment. Another way of saying this is that success breeds more success. Additional findings from Flynn et al. that were impactful to sustainability include multi-disciplinary teams, physician leads, leadership involvement, and external lean consultants. Finally, Flynn et al. concluded that given the many evidence gaps they discovered relative to the sustainability of lean, there is a distinct need for additional research into lean sustainability across different settings in healthcare beyond pediatric practices.

**Anticipated and Discovered Themes**

Anticipated themes which contribute to poor sustainment of lean management systems include leadership inadequacies, inadequate cultural integration, poor communication, insufficient training, lack of employee engagement in daily improvement, insufficient lean expertise applied, and a limited focus on lean tools versus a holistic lean approach. The chosen research method for this project was a coherent qualitative flexible design. As such, with a qualitative research study, literature is reviewed at the beginning of the study to understand the current thinking on the topic; however, additional literature can be reviewed after data collection and analysis to expand upon what is discovered (Renjith et al., 2021).

Discovered themes from the literature review resulting in ineffective lean management systems in a hospital setting include lack of commitment, fear of job losses, resistance to change, lack of resources, and lack of ownership (Leite et al., 2020). Additional barriers in the primary care setting include lack of progress visibility, lack of training time, management-driven change, and physician resistance to work standardization (Hung et al., 2015). Therefore, positive themes for successful lean management system implementations identified through this literature review include leaders going to where the work is done to see barriers firsthand, engaging frontline
caregivers in daily problem solving, utilizing change agents with authority and lean expertise to train and coach staff, leveraging transformational and authentic leadership to own accountability and discipline to sustain the lean management system. Discovered themes were expanded upon and further developed following data and analysis.

**Summary of the Literature Review**

Business practices that are required to understand and implement a lean management system in healthcare were presented in this literature review, including the five principles of lean which include specifying value creation, identifying the value streams, creating flow, creating pull, and continuous improvement (Holmemo et al., 2018). The background of lean provided in this review included the origination of lean in manufacturing and the refinement at the Toyota Motor Company. Significant contributions by the key developers of lean were presented including Frederick Taylor, Henry Ford, W. Edwards Deming, Joseph Juran, Taiichi Ohno, and Shigeo Shingo. Influential works by key contributors that helped define and develop lean were discussed and fundamental concepts were presented. The importance of lean leadership including key dimensions for both project implementations and ongoing operations was presented along with specific behaviors for healthcare leaders. Several lean tools were presented and explained. Facilitators and barriers to lean implementation in a primary care setting were presented. The foundational concepts were identified as lean management system, value for the patient, and daily improvement activity. Three important theories were presented including transformational leadership theory, authentic leadership, and psychological flow. Actors who are principally involved in lean implementations were presented including leaders, caregivers, frontline staff, healthcare institutions, and lean experts. Constructs or outcomes of lean management system implementations include sustainment of the lean management system, quality, and efficiency.
Contemporary literature sources highlighted a few studies that have evaluated lean implementations in healthcare, but very few have been conducted focusing on the lack of sustainment of lean management systems. Several studies were provided that utilized a similar approach of literature review and case study analysis to identify key findings. One study identified 25 critical success factors that contribute to sustainability and was validated through case study evaluations with five Brazilian hospital units, which may limit validity to other cultures, geographies, and clinical settings. Another study identified several findings that were impactful to lean in a pediatric practice setting, which should apply to other medical practices but would need further validation. Anticipated and discovered themes which contribute to poor sustainment and ineffective lean management systems in healthcare were presented. Finally, positive themes that promote successful lean management system implementations were summarized.

**Summary of Section 1 and Transition**

This review of recent literature demonstrates the problem that many healthcare organizations that implement lean management systems ultimately have difficulty sustaining the systems over the long term. The literature review identified foundational concepts, theories, and constructs. Related studies have identified critical success factors as well as the importance of adaptable approaches to lean implementation based on unique contexts. Answers to the research questions presented in this section will explain key aspects that lead to successful sustainment including the role of leadership, the characteristics of successful healthcare organizations, key differences between lean vs. other continuous improvement initiatives, as well as key cultural elements of success. The resulting elements of the research project framework include the foundational concepts of lean management system, value for the patient, and daily improvement
activity. These concepts support the organizational criteria that are integral to implementing and sustaining the lean management system including actors, theories, and constructs. The flexible research design and qualitative method utilizing a multiple case study design enabled me to identify cultural characteristics and leadership practices that contribute to the successful sustainment of lean management systems. The corresponding multiple interviews yielded valid themes and outcomes through effective triangulation.

The next section will expand upon the research project starting with defining my role as the researcher and the research methodology. Next, the research participants, population, and sampling will be explained. The data collection, instruments, and data organization plan will be defined. Content for the proposed project was formatted into an MS PowerPoint presentation for a 30-minute presentation of the research proposal to the Dissertation Chair and Committee Member.
Section 2: The Project

This research study investigated what factors and influences contribute to healthcare organizations in the United States successfully implementing and sustaining a lean management system, thereby improving hospital financial performance and clinical outcome measures. To further understand this research scenario, leaders and influencers within successful healthcare organizations that have implemented and sustained robust lean management systems were interviewed. This research utilized a qualitative study, with a multiple case study design, to obtain a rich data set from which success factors and influences were gleaned for validation.

This section provides the details of this research project through a discussion of the purpose of the case study project as well as the role of the researcher and participants of the study. A description of the research methodology is provided along with a detailed discussion of the flexible design, method for the research study, and triangulation method. A description of the research participants is also provided along with a discussion of population, sampling (method, frame, and sample size), and data collection. A thorough description of the data collection and organization is provided, including the data collection, instruments, and data organization. A review of the data analysis is discussed, including how emergent ideas, coding themes, interpretations, data representation, and analysis were used for triangulation. Lastly, a description of how the study ensured reliability and validity is presented as well as how bracketing was used to address any bias that could be present.

Purpose Statement

The purpose of this flexible design multiple case study was to fill the gap in the literature regarding key factors and influences that explain why some healthcare organizations are unable to achieve sustainable improvements through implementing a lean management system. Most
lean transformation efforts fail or deliver only short-term improvements largely resulting from failed leadership and a lack of involvement of frontline staff (Clark, 2016). The goal of this study was to explore successful lean management system implementation scenarios and understand what cultural, leadership, or other systemic factors future healthcare organizations can utilize to achieve long-term success in their lean implementation efforts.

**Role of the Researcher**

As the researcher, I ensured procedural reliability for this study, which means that appropriate and reliable research methods and procedures were adopted and demonstrated with meticulous documenting and reporting of data gathered from the study subjects and constructs (Kihn & Ihantola, 2015). I collected data principally by interviewing actors from the identified healthcare institutions to learn valuable insight from them regarding their experience with implementing a lean management system in healthcare. I performed a comparison of coding developed from the interview data, which helped to develop themes that enabled the triangulation of information.

It was important for me as the researcher to embrace the concept of bracketing, which involved setting aside my knowledge and preclusions to enable the themes and issues to materialize through the research conducted (Dempsey et al., 2016). Detailed and explicit notes were taken during interviews to prevent personal bias or prejudices from affecting the accuracy of the findings. It was important for me to be an active listener and to be attentive to the needs of the participants (Dempsey et al., 2016; Smith et al., 2009).

I had difficulty identifying gatekeepers to obtain access to study participants at each planned healthcare institution. I attempted to leverage existing relationships that were established between my current employer and the chosen healthcare institutions. This plan was not fruitful;
thus, I employed an alternative method for identifying enough willing interview participants by reaching out to individuals in my professional network via email and LinkedIn to lean leaders of other multi-hospital, non-profit health systems. This approach, along with snowball sampling (Figure 2), enabled the identification of 16 participants at 10 different healthcare institutions who agreed to the time required to be interviewed and participate in the study (Dempsey et al., 2016).

Research Method and Design

This study was conducted with a flexible design using qualitative methods and a multiple case study design. This method was the appropriate methodology for this study because I utilized qualitative research to obtain a contemporary real-world perspective of the cultural elements of successful lean healthcare organizations (Yin, 2018). This choice is also aligned with the increase in popularity of qualitative research due to the limitations of quantitative research in capturing the perceptions people attach to social phenomena in healthcare (Collingridge & Gantt, 2019).

Discussion of Flexible Design

Qualitative methods are effective at obtaining a rich data set from the research participants that can be combined to develop themes and subthemes which ultimately point to essential considerations for successful program implementation (Jabbour et al., 2018). Other options including fixed and mixed quantitative designs were considered for this study; however, they were not appropriate given the lack of potential for experimental design elements including variables and experimentation, which are more suited to a flexible design approach. Rather, as described by Robert E. Stake (2010) in his description of the essence of the qualitative approach to research, this study involved the interpretation of a robust collection of case features and unique sequences of activities that occurred in each organization and were included in the
research to draw conclusions. This research study was not proposed with a theory to be tested or with variables that typify a quantitative study. Rather, this study was aligned with the inductive process where data are gathered from multiple case study participants, grouped into codes and themes, and result in the development of relatable perspectives from the institutions being studied (Creswell, 2015).

**Discussion of Multiple-Case Study**

The multiple-case study approach helped to identify and describe how the cultural characteristics and leadership practices at multiple hospitals contributed to the successful sustainment of a lean management system, similar to Christensen et al.’s (2017) study of factors influencing states’ capacity to report children’s healthcare quality measures. Identifying effective practices in one hospital within a multiple case study can be effectively demonstrated to offer as evidence for leaders at other hospitals seeking the same outcomes (Senot et al., 2016). Since the research questions for this study sought to explain how the social phenomenon contributes to successful lean management system implementations as Yin (2018) describes, case study research was a relevant approach. Other study design options considered for this research project included narrative, grounded theory, phenomenology, and ethnography. Each of these options was deemed not ideal for this study, despite the significant merits of each design. Although this research might capture stories during interviews with individuals from each healthcare system, stories are not the focus; therefore, narrative research design was deemed not appropriate for this study (Creswell, 2015). Grounded theory designs are utilized to generate a theory that can be used to predict how people will behave in a given situation (Creswell, 2015). This study was not expected to develop a theory; therefore, grounded theory was not chosen. Phenomenological research focuses on a single phenomenon, and it also brackets out the personal experiences of the
actors involved, thereby making this an inappropriate design to choose for this study (Creswell, 2015). Lastly, ethnographic designs involve the researcher spending extended periods with a group to learn and document the culture of the group (Creswell, 2015). Although culture plays a pivotal role in this research, the case study approach was determined to be the best fit for this project.

The problem statement and research questions indicate an assessment of multiple healthcare organizations that have sought to implement a lean management system and had time to also show sustainment and achieve improvements in hospital financial performance and clinical outcome measures. This scenario illustrates why utilizing multiple case studies with qualitative analysis was the correct methodology. A multiple-case study qualitative research paradigm was appropriate also since I conducted interviews with principal leaders of multiple prominent healthcare organizations that have implemented lean management systems. Interview questions were crafted to seek answers to the research questions.

**Discussion of Method for Triangulation**

This research project used multiple cases with open-ended interviews with 16 different lean leaders from 10 different health systems. As posited by Yin (2018), the resulting convergence of evidence from the multiple sources of data strengthen the validity of the constructs of this study. Key findings resulted through triangulation of these multiple sources, thereby enhancing the validity of each source for a collective result that can boldly represent findings to support the themes and outcomes of the study.

**Summary of Research Methodology**

This study investigated how multiple healthcare organizations successfully implemented lean management systems that resulted in a sustained improvement in performance and hospital
outcome measures. Interviews were conducted with leaders from these healthcare organizations through interactive web-based video meetings through MS Teams. The results from this multiple case qualitative research study enabled generalizable conclusions to support findings for application in future healthcare institutions seeking to drive improvement in hospital performance and achieve positive outcomes through the implementation of a lean management system.

**Participants**

Participants in case study research, as defined by Yin (2018), are individuals from whom information is collected, usually through interviews with the researcher. Yin (2018) defined cased study participants, called informants, who also provide critical information about the case and other potential sources of evidence to check for the study. As outlined in the discussion of the conceptual framework for this project, the research locations for this project included four large, non-profit, teaching healthcare institutions that were visited by leaders of the hospital where I currently work. Existing relationships between my manager and individuals at these institutions were leveraged for initial contacts regarding obtaining interviews for the research project. Subsequent participants were identified from these initial contacts based on availability. Additional participants from six other health systems were obtained using my professional network on LinkedIn and email. As explained by Creswell (2015), the participants must have experienced the phenomenon that is being explored. In this case, the participants of this research study included key personnel at those institutions who were involved with implementing and sustaining a lean management system at each institution. Participants in this research study were selected following this criterion as they are leaders at the selected health systems that have
successfully sustained their lean management systems and demonstrated their willingness to participate in the study.

Participants were contacted initially via an email or LinkedIn message that included a brief overview of the study and a consent form (Appendix A) that requested their participation. The consent form also included a brief description of the study’s purpose, an offer and assurance of confidentiality, and the right to withdraw from the study per the recommendations from Creswell (2015). Participants that responded positively regarding their willingness to participate in the study and submit the consent form were scheduled for the initial phone or MS Teams interview.

During the interview, I sought to establish a rapport with the participant by providing a brief introduction of my personal and professional background as well as an overview of the project, including its purpose and scope. Along with the commitment to maintain the confidentiality of the participants, there was a commitment to being mindful of the time allotted for the interview and not going over unless acceptable to the participant.

**Population and Sampling**

The potential participants for a research project are often selected based on the ease of obtaining access to the desired and appropriate population (Berg et al., 2009). A population is appropriate when it is equipped to provide deep insight into the phenomenon and topic being studied. The personnel who were identified for interviews have been involved with the many aspects of designing, developing, and leading the implementation of a lean management system in healthcare. Their collective insight is what I was seeking to extract through the interview process.
Table 4

*Population and Sample*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>The population of participants for this research project included leaders involved in the implementation and sustainment of lean management systems in healthcare institutions in the United States.</td>
</tr>
<tr>
<td>Sampling</td>
<td>The sample of participants for this research project included key individuals at healthcare institutions who were invited to participate due to their involvement in the implementation and sustainment of a lean management system.</td>
</tr>
</tbody>
</table>

**Discussion of Population**

The population for this research project included key leaders and participants from 10 different hospitals in the United States that have been implementing lean management systems in healthcare over the past 15 years. According to the American Hospital Association (2021), there were 417 healthcare systems in the United States in 2019. An unknown number of these institutions that have sought to implement a form of lean management systems represent the total population. The 10 institutions selected for this study are known to have implemented lean and have experienced a considerable amount of success in doing so, as evidenced by their willingness to host and share with other institutions on-site visits so they can learn more about implementing and sustaining lean in healthcare.

**Discussion of Sampling**

The sample for this project includes participants who were appropriate for this study due to their extensive experience in implementing lean management systems in the healthcare industry. Although the size of the eligible population of participants involved in implementing lean management systems is large, the initial selection of individuals for this study was enabled by the existing connections previously established for site visits by the health system where I am employed. Additional participants were obtained by leveraging my professional network. The
sampling strategy incorporated a combination of two strategies known as convenience sampling and snowball sampling described by Berg et al. (2009). The first sampling strategy was considered convenience sampling since my organization had already established professional connections with some individuals that were leveraged for the study. In addition to the individuals already known, I encouraged the identification of other appropriate interview participants at these institutions based on their knowledge and experience in implementing lean management systems in healthcare and their connection with the original interviewees. Berg et al. (2009) purported that this snowballing strategy for sampling may be one of the best ways to identify participants who hold desired attributes and characteristics necessary for the study. Figure 2 illustrates an example of the expanding number of participants from one to seven using the snowballing strategy.

Figure 2

Snowball Sampling Strategy

The sample frame for this research project included the group of four healthcare systems previously identified in the conceptual framework plus six others identified through my professional network as research locations. The names and email addresses were utilized to contact these individuals for the planned interviews. The sample size required for this study to be truly representative of the population was dependent upon the amount of thick and rich data
obtained from the interviews. As presented by Casteel and Bridier (2021), the nature of qualitative research methods dictates that there needs to be an iterative approach to obtaining the data and to not stop collecting data until the emerging themes can be used to answer the research question(s). In a study of 55 generic qualitative design articles quoted by Casteel and Bridier (2021), it was shown that 60% of the studies had sample sizes of 20 or fewer participants, and those that leveraged individual interviews utilized a smaller number of participants due to the rich information obtained with open-ended interviews (Kim et al., 2017). Renjith et al. (2021) explained that sample sizes are not calculated for qualitative research; rather, data are collected until a point of saturation occurs. Data saturation occurs when no more new information is being uncovered, thereby resulting in redundant information (Renjith et al., 2021). An alternative perspective of saturation in qualitative research suggests that saturation should be evaluated incrementally, where additional perspectives may add to the degree of saturation rather than exceeding a fixed point of saturation (Saunders et al., 2018). Thus, this research study sought to obtain input from an appropriate amount, which was targeted at 15 to 20 participants, and ended up obtaining 16 participants from 10 different health systems.

**Summary of Population and Sampling**

The participants of this research study came from the identified population of leaders and other key personnel involved with implementing and sustaining a lean management system in healthcare systems in the United States. This study utilized both convenience and snowball sampling to obtain an adequate number of participants. The participants were asked multiple open-ended questions during interviews that were set up after initial email contacts. Subsequent analysis of the data gathered during interviews supported the development of themes and ideas that were validated and provided answers to the research questions.
Data Collection & Organization

As the researcher, I played an integral role in collecting data from multiple sources to explore the experiences and key learnings from individuals who were involved in implementing a lean management system in healthcare. Multiple case studies were leveraged, and evidence was obtained from individuals involved in each of the unique approaches to lean management implementations to gain an understanding of participant experiences. Three key principles presented by Yin (2018) help to ensure construct validity is established and that the evidence that is collected is reliable. The first principle is to use multiple sources to obtain evidence such as documents, open-ended interviews, surveys, and archival records. The use of multiple sources of evidence enables data triangulation through convergent evidence and is intended to strengthen the construct validity of the research project (Yin, 2018). The second principle presented by Yin is to create a case study database. The database is an essential component to document and organize the data that are collected from multiple case studies. The word processing tool that was used for this project was MS Excel, which enabled the capturing of notes from all interviews from each case study. These notes were then organized and categorized to support the development of themes to answer the research questions. The third principle presented by Yin is to maintain a chain of evidence, which effectively increases the construct validity of the information that is gathered. The chain of evidence enables a reader of the case study to see, in a stepwise fashion, how the findings are derived from the initial questions, following the case study, citing evidentiary sources, and populating the database. The chain of evidence principle was also followed for this project so I could efficiently trace both forward and backward through the chain of evidence to identify specific data or evidence to support research findings.
Data Collection

I interviewed principal leaders from multiple healthcare organizations who had experience with implementing lean management systems. The interview questions were designed to obtain answers to the research questions. The data collected from the multiple case studies came from the interviews of 16 lean leaders from 10 different health systems.

I performed multiple validity checks to assess the accuracy of the data interpretations. As Creswell (2015) described, three validity lenses should be considered: researcher, participant, and reader or reviewer. From the researcher’s perspective, I achieved triangulation by incorporating themes from the multiple sources from the interviews. Through this process of coding, I looked for corroborating evidence of the themes that were identified. My role as the researcher is discussed further in the Instruments section. The participant’s perspective was validated through member checking. Follow-up emails were sent out to validate the participants’ themes and stories to ensure they are an accurate representation of what was shared during the interview (Creswell, 2015). Follow-up emails were sent to all participants to ensure that the findings were accurate and to obtain feedback used to modify the themes to be more accurate. Finally, from the reader or reviewer perspective, I had key leaders who were familiar with the research topic perform a peer review of key themes, encouraging them to ask questions, challenge key themes, and help to refine the study (Creswell, 2015).

Instruments

As the researcher, I served as the inquiry instrument by setting up and conducting the participant interviews. Since I have an extensive background in implementing lean in multiple industries including healthcare, automotive manufacturing, financial services, and the defense industry, it was important to consider how this background might shape interpretation.
Acknowledging this potential bias through reflexivity enabled me to draw conclusions with more accuracy (Creswell, 2015). I developed interview questions, coordinated all the interviews, and collected and interpreted all the data. The interview questions that were used to gain insight and understanding from the participants were open-ended (Appendix B). The questions were designed to prompt the participants to give robust insight into their lived experiences from their work in implementing a lean management system in healthcare.

Initial interaction at the start of the interview included introductions and a discussion of the purpose of the study. Since an audio file was recorded during the interview and notes were transcribed, it was easy to match interview dates with files stored in MS Teams by date and time. After ensuring that informed consent had been given, I provided a basic overview of the interview, including the number of questions and how long it should take. The participant interview questions listed in Appendix B were used. These open-ended questions were designed to elicit rich details and recollections of the participant’s experience in implementing and sustaining a lean management system in healthcare. Probes such as “please explain further” and “tell me more” were used, as recommended by Creswell (2015) to elicit and either obtain additional information as needed or to have the interviewee explain an answer that was provided. An interview protocol was developed as recommended by Creswell including basic information, introduction, questions, and closing to ensure a common approach and similar execution of each interview (Appendix C). Semi-structured interviews were planned as a follow-up option to obtain additional information from the participants as needed but were not utilized. The protocol is an instrument I used to guide the interview and ensure consistent information was requested and captured from the interview participants.
The interview questions (Appendix B) were modeled closely after the research questions for this study. The first three questions enabled the interviewer to obtain and document pertinent facts regarding when the lean implementation at the interviewees’ institution began, when the interviewee became involved with the lean implementation, and a brief description of the approach that was taken to implement lean at their health system. Question 4 further served to capture relevant facts regarding the resources utilized to implement lean along with the effectiveness of each. These first four questions provided an illustrative backdrop for the subsequent Questions 5–10 that were closely aligned with the research questions.

Interview Question 5 aligned with Research Question (RQ) 1 to identify the role that leadership plays in implementing and sustaining lean. Interview Questions 6 and 7 aligned with research questions RQ1a and RQ1b to identify the leadership actions or behaviors that contribute to either success or failure of a lean management system. Interview Question 8 aligned with RQ2 to help identify the key characteristics that lead to the success or failure of long-term improvements in healthcare organizations. Interview Question 9 aligned with RQ3 and RQ3a to gain insight into how the implementation of lean management systems may differ from other continuous improvement initiatives. Interview Question 10 aligned with RQ4 to identify the cultural elements that may be present and contribute to success in implementing and sustaining lean management systems.

**Data Organization**

Performing the role as the primary instrument for this project, I completed the data collection process, applied theories and concepts, and identified common success factors of healthcare institutions that implement and sustain lean management systems. Data collected during the interviews were well organized so the information could be easily referenced and
traced including when, where, and with whom the interview was conducted or what the source of the data was (Creswell, 2015). Interview recordings were transcribed so full interview conversation text was available for coding. Data from interview transcripts and documents gathered were organized within the MS Excel database in a method like that articulated by Creswell (2015) with transcript text aligned in a column along with additional rows for codes and themes that were determined. Codes that were determined represent the main ideas conveyed by the interviewees. The tentative themes that were developed were aligned in a chain of evidence through the database with the appropriate codes and specific quotations from the transcript and notes I gathered during the data collection phase. This data organization plan was an appropriate process for the research project since multiple case studies and interviews were occurring over 5 weeks. The traceability of the origin and development of codes and themes were critical to supporting the verification of conclusions drawn from the data (Berg et al., 2009).

**Summary of Data Collection & Organization**

The purpose of this research project was to identify the key factors and influences that may explain why some healthcare organizations can successfully implement and sustain long-term success while others cannot. I collected data for this purpose by conducting interviews of actors from multiple healthcare organizations that have successfully implemented a lean management system. The collected data were organized in an Excel database where notes were organized, coded, and themes were developed to answer the research questions. Themes were identified and validated so I could proceed with the next research step of performing data analysis.
**Data Analysis**

The database is a key foundation for the analysis that was used to document and organize the volume of data generated from the research. Concerns regarding data analysis were presented by Berg et al. (2009), including data reduction, data display, as well as conclusions and verifications. Data captured from interviews, documents, and surveys were reduced and transformed as themes and patterns were identified. This activity occurred throughout the project as interview recordings were transcribed into written summaries and coding. Data displays occurred within the database through the organization of the data into tables, summaries, and proportions of terms or phrases that emerged throughout the analysis process. Conclusions and verifications began to emerge after data were collected and patterns were analyzed. Tentative outcomes were noted but also used to further reduce and analyze the data. Conclusions were verified by checking the chain of evidence to ensure the appropriate conclusions were reached. This verification effort relied upon a well-documented qualitative analysis process that can be replicated if desired and similar conclusions may be drawn by others (Berg et al., 2009).

**Emergent Ideas**

An important role for me as the researcher while collecting data in preparation for data analysis was to have a plan for how the chosen database technology would be used to identify textual data that matched codes that were initially developed. I was able to organize and parse the data and look for patterns and ideas that emerged. Key words were searched and filtered to find multiple occurrences of common terms and phrases. This approach aligns with the analytic strategy proposed by Yin (2018). As these emergent ideas were discovered or proposed based on the data manipulation that was performed, I attached notes to the codes to ensure the traceability and lineage of the idea were preserved.
Coding Themes

The process for describing and classifying data that were gathered from interview transcripts and field notes followed a process described by Creswell (2015) that involved my going through the database and coding the data. I used the codes to develop descriptions and themes that were then used to provide answers to the research questions for this project. The general flow from data to themes starts with many pages of text in the database that were segmented and coded with around 98 initial codes, reduced to 24 concepts. Additional reductions occurred after the elimination of redundancies and overlaps, leaving 10 themes that became the major headings in the project report (Creswell, 2015).

Interpretations

I utilized the codes and themes that were developed to generate assertions that represent the meaning placed on the most important findings. As Stake (2010) described, these interpretations were formed from logical extensions of conceptual relationships of the themes. Additionally, these interpretations were made throughout the qualitative research process, accompanied by thick descriptions and multiple realities influenced by my subjective role. Interpretations can be assessed for reasonableness and practicality, but they depend on the experience of the researcher and of those being studied (Stake, 2010). Since interpretations can result in incorrect conclusions if left unchecked, I followed a process of triangulation to minimize misinterpretations.

Data Representation

The coding and theme data were displayed utilizing the graphical and data summarization capabilities of MS Excel. Data displays were made possible within the database program through the organization of the data into pivot tables, including summaries and proportions of terms or
phrases derived from the analysis process. Additionally, once the themes were developed, an illustrative step recommended by Creswell (2015) was to develop a conceptual map showing how the themes were interrelated and provided insight into the phenomenon being studied. This conceptual map served as a framework to tie together the “conclusions” section of the final research project.

Beyond the visual displays and summaries of the volume of data gathered from interviews and data gathering, the analytic technique presented by Creswell (2015) called logic models was employed. The complex chain of events associated with the implementation of a lean management system in healthcare was visually displayed in a logic model. The sequence of programmatic actions and interventions was documented for each case study. This approach aligns with the program-level logic model where data from multiple case studies can be represented and analyzed to effectively compare different approaches to lean management system implementation and sustainment (Creswell, 2015).

**Analysis for Triangulation**

Utilizing multiple perspectives and sources of data for case study research is a major strength of this approach to qualitative research (Yin, 2018). The sources for this research project include open-ended interviews from 10 different health systems in the United States. The findings from each of these sources represent the convergence of evidence from all the sources, thereby strengthening the conclusions. The MS Excel database was used to analyze the data from each source across multiple case studies. The coding and themes that were generated and summarized are traceable across the chain of evidence to enable validation. I followed up with each interviewee by sharing a summary of the findings via email and asking for feedback and validation of key themes through a process called member checking (Creswell, 2015). I sought
feedback focused on whether the themes and overall account were an accurate representation of their lived experiences.

**Summary of Data Analysis**

Utilizing data captured from multiple sources and case studies, I performed coding, data visualization, identified patterns, and developed summaries and conclusions. The emergent ideas that were identified through the analysis are traceable through my codes and notes captured during interviews. The themes that were defined became the major headings in the report. The interpretation of concepts that emerged was influenced by my experience but was validated through member checking and comparison across multiple case studies. A conceptual map was used to show the interrelationship of the themes and provided new insight into the sustainment of implementing a lean management system in healthcare. A logic model was also developed to illustrate the chain of events that occur while implementing a lean management system in healthcare. Finally, triangulation was achieved by obtaining the data from multiple sources and converging to provide strong, validated conclusions.

**Reliability and Validity**

The structured research methods and procedures I followed were designed to ensure both reliability and validity of the findings. Detailed notes were taken during and after each interview. The three principles presented by Yin (2018) were followed to ensure construct validity and help ensure the evidence that was collected was reliable. The three principles are to use multiple sources, to create a case study database, and to maintain a chain of evidence. The chain of evidence strengthens the validity by demonstrating both the origin and the development of codes and themes that were used to answer the research questions.
Reliability

Lincoln and Guba (1985) first articulated the criteria for evaluating the trustworthiness of qualitative research as credibility, transferability, dependability, and confirmability. I ensured reliability in the study using several key tools. The interview protocol was developed to ensure that each interview was conducted similarly. This consistent approach to the interviews also ensured that consistent information was captured from each interview. When the results of a research study apply to other settings, populations, or contexts, transferability is demonstrated (Renjith et al., 2021). Creswell (2015) recommended using both a protocol and a database to enhance reliability. This regimented approach to the multiple case studies resulted in a repeatable and dependable process for gathering accurate representative data. Dependability, like reliability in quantitative research, relies on the assumption of repeatability and replicability of the findings of the study (Renjith et al., 2021). Dependability was also accounted for in this project using the interview protocol, transcript review, and documentation in the database.

Validity

Validity in this research study was supported through triangulation and bracketing. Triangulation came from the multiple sources of evidence leveraged in this study from the 16 open-ended interviews of leaders from 10 different health systems. These multiple sources of evidence provided multiple examples of the same phenomenon (Yin, 2018). I used member checking to enhance the credibility of the research findings by sending follow-up emails to confirm that the findings were accurate and represent the true experience of participants. Member checking enhanced the validity of the results by confirming that the results represent practical strategies they utilized in their organization (Taylor et al., 2015). High confirmability, as was expected for this qualitative research project, suggests that the findings could be similarly
confirmed or corroborated by other researchers following similar protocol and analysis approaches (Renjith et al., 2021). When new data obtained from the data sources repeated what was expressed through previous data, this signaled that I had reached data saturation (Saunders et al., 2018). Once data saturation was achieved in this project, the desired validity was obtained.

**Bracketing**

Bracketing was utilized to ensure that I did not introduced bias. I recorded interview responses verbatim as well as objectively captured observations to avoid personal bias in the findings (Dempsey et al., 2016). By objectively reviewing the data collected to determine the coding and subsequently to develop themes, I avoided biases that might have otherwise been introduced. The traceability of codes and themes back to their original notes and interviews also helped ensure bias was not introduced. The chain of evidence was maintained between raw data collected and generated themes to support the integrity and validity of the findings (Yin, 2018).

**Summary of Reliability and Validity**

The research methods and procedures needed to ensure both the reliability and validity of the project. The three principles that were key to successful outcomes in this regard were the use of multiple sources, creating a case study database, and maintaining a chain of evidence. Each of these principles provided a foundation that was bolstered using an interview protocol to ensure a consistent approach to interviews and member checking to confirm the accuracy of the findings. Validity was ensured through triangulation via multiple data sources, bracketing, and data saturation.

**Summary of Section 2 and Transition**

This research study was designed to explore the factors and influences that contributed to the successful implementation and sustainment of lean management systems in U.S. healthcare
organizations. To explore this research question, leaders and contributors to lean management systems at multiple health systems in the United States were interviewed. A qualitative multiple-case study was performed to gain insight and answer this research question. This section has outlined my role as the researcher, the research method and design, participants in the study, population and sampling, data collection, data analysis, and the reliability and validity of the research project. The findings from the data analysis are organized and discussed in the following section.
Section 3: Application to Professional Practice and Implications for Change

Overview of the Study

Many healthcare organizations that seek to improve quality and reduce cost by implementing a lean management system are often unable to sustain the lean management system, resulting in the organization not achieving expected long-term improvements in hospital financial performance and clinical outcome measures. The purpose of this study was to identify what cultural, leadership, or other systemic factors contribute to healthcare organizations successfully achieving long-term success with lean management system implementation efforts. The conceptual framework for this research study illustrates the relationship between the identified foundational concepts of a lean management system, including value for the patient and daily improvement activity as well as the actors, theories, and constructs that support the research problem.

The study utilized a flexible design, a multiple-case study approach to identify and describe how the cultural characteristics and leadership practices at multiple hospitals contributed to the successful sustainment of a lean management system. I interviewed 16 lean leaders from 10 different healthcare institutions that successfully implemented a lean management system. After a complete analysis of the resulting interview responses and a comparison to the literature review conducted, 10 conclusions were drawn as key takeaways from the study.

A concept matrix shown in Table 5 was developed from the interview responses, indicating the components of lean management systems that were implemented at each health system, listed as H1 through H10. Although this is not a conclusive list of components utilized at
each health system, these are components mentioned by each health system leader as they responded to the interview questions:

Table 5

Concept Matrix of Lean Implementation Components

<table>
<thead>
<tr>
<th>Lean System Implementation Component</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>H9</th>
<th>H10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform a cultural assessment</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Start with small lean projects</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Train teams on lean tools</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Conduct black/green belt projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Implement model areas/Value Stream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Obtain CEO support for lean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Conduct leader external lean site visits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Train leaders on lean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Implement ideas from the front line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Obtain senior leadership buy-in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Consulting group engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Strategic goal alignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Train everyone on Humble Inquiry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Build internal PI / Lean team</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Daily engagement / huddles training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Implement tiered huddling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Lean boot camp with cohorts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Build / implement accountability tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Develop A3 thinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Train leaders on A3 thinking</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Conduct leader rounding</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Coaching of leaders on huddles / gemba</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Align best practices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Capture savings of improvements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Strategy deployment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Showcase of lean projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Presentation of the Findings

The field study portion of this qualitative research study included identifying lean leaders that participated in the implementation and sustainment of lean management systems at 10 different health systems. I interviewed each leader using the same 10 open-ended questions. The
resulting data for this study included a total of 16 interviews conducted over 5 weeks. The findings are listed in this section along with an interpretation of the key themes and a visual summary of the data that made up each theme. The relationship of the findings to the research questions is included as well as the relationship to the conceptual framework, the anticipated themes, the literature, and the original problem being studied. The inductive process was used to take the data from these multiple case studies and group the data into codes and themes to develop relatable perspectives from these cases (Creswell, 2015). I identified a point of data saturation after the 16 interviews were complete as the responses were highlighting similar stories and examples provided by previous interviewees. These common themes were identified primarily through a comparison of the data and visual representations of the data in word clouds and summary tables. This convergence of evidence enabled data triangulation, providing strong validation of this research project (Yin, 2018).

The research paradigm for this study included seeking input from healthcare institutions that have implemented a lean management system in the past 10 years. The resulting healthcare systems that the interviewees came from began their implementation of a lean management system between 2.5 years to 16 years ago. The average number of years since the health systems began implementation of lean management systems was 8.4 years (see Figure 3).
Additionally, since many institutions began continuous improvement initiatives in a project-based improvement format before implementing lean management systems, interviewees indicated that nine of the healthcare institutions began this method between 6 and 32 years ago, or an average of 13.9 years prior (See Figure 4).
Figure 4

*Number of Years Ago – Project-Based Improvements Started*

The 16 interviewees represent 10 different healthcare systems that implemented lean management systems. The participants were given a number that represents both their health system (H1 through H10) and the interviewee number from that system (I1, I2, or I3). This numbering scheme enables the reader to know when input received was from the same health system or leader (See Table 6).
Table 6

Participant Demographics

<table>
<thead>
<tr>
<th>Health System # - Interviewee #</th>
<th>Number of years ago that lean started</th>
<th>Number of years ago interviewee’s role started</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1-I1</td>
<td>12</td>
<td>10</td>
<td>Lean Leader</td>
</tr>
<tr>
<td>H1-I2</td>
<td>9</td>
<td>9</td>
<td>Senior Lean Advisor</td>
</tr>
<tr>
<td>H2-I1</td>
<td>12</td>
<td>12</td>
<td>Director of Lean Strategy</td>
</tr>
<tr>
<td>H3-I1</td>
<td>7</td>
<td>12</td>
<td>Manager of Quality / Lean Leader</td>
</tr>
<tr>
<td>H4-I1</td>
<td>7</td>
<td>6.5</td>
<td>Functional Leader</td>
</tr>
<tr>
<td>H4-I2</td>
<td>11</td>
<td>10</td>
<td>Continuous Improvement Specialist</td>
</tr>
<tr>
<td>H4-I3</td>
<td>8</td>
<td>8</td>
<td>Director of Continuous Improvement</td>
</tr>
<tr>
<td>H5-I1</td>
<td>8</td>
<td>11</td>
<td>Lean Advisor</td>
</tr>
<tr>
<td>H5-I2</td>
<td>16</td>
<td>16</td>
<td>Administrative Intern</td>
</tr>
<tr>
<td>H6-I1</td>
<td>10</td>
<td>13</td>
<td>Trainer, Coach, Mentor</td>
</tr>
<tr>
<td>H7-I1</td>
<td>11</td>
<td>3</td>
<td>Senior Value Engineer</td>
</tr>
<tr>
<td>H7-I2</td>
<td>11</td>
<td>5</td>
<td>Value Engineer</td>
</tr>
<tr>
<td>H8-I1</td>
<td>3</td>
<td>1</td>
<td>Physician Leader</td>
</tr>
<tr>
<td>H9-I1</td>
<td>3</td>
<td>3</td>
<td>Director of Performance Improvement</td>
</tr>
<tr>
<td>H9-I2</td>
<td>5</td>
<td>3</td>
<td>Strategy &amp; Planning Lead</td>
</tr>
<tr>
<td>H10-I1</td>
<td>2.5</td>
<td>2.5</td>
<td>Director of Performance Improvement</td>
</tr>
</tbody>
</table>

Roles held by the leaders who were interviewed include Lean Leader, Senior Lean Advisor, Director of Lean Strategy, Manager of Quality/Lean Leader, Functional Leader, Continuous Improvement Specialist, Director of Continuous Improvement, Lean Advisor, Administrative Intern, Trainer/Coach/Mentor, Senior Value Engineer/Coach, Value Engineer/Project Manager, Physician Leader, Director of Performance Improvement, Strategy & Planning Lead, and Director of Performance Improvement (See Table 6). Based on answers provided by the interviewees, their involvement in the program was when they started in their role as a lean leader between 1 and 16 years ago, or an average of 7.8 years prior (See Figure 5).
Themes Discovered

Reviewing the input received from lean leaders who have achieved success in implementing lean management systems has yielded many similar themes to what was highlighted in the review of current literature on this topic as well as some important elements that will be illustrated in the concept map and subsequent elaboration of each theme. Themes will be presented in four main areas identified through the field study including the implementation approach, the role of leadership, resources to implement, and organizational characteristics. The important aspects of organizational culture as well as important actions or behaviors for leaders to exhibit are also presented as concepts that undergird the four main areas. These themes are illustrated in a concept map to summarize the themes in one picture (see Figure 6).
Figure 6

Concept Map of Themes Discovered Through Field Study
Implementation Approach. The implementation of a lean management system in healthcare must begin with an idea that it is a worthwhile endeavor. That idea was very likely influenced by the writings of Womack and Jones, who recommended the use of lean in healthcare in 1996, or by the many others that wrote about it in the subsequent healthcare management literature (Aij & Teunissen, 2017). The topic of how the implementation of lean was approached at each healthcare institution was explored in the case studies. A word cloud was created to summarize the input from the 16 lean leaders regarding the implementation approach at their institution (see Figure 7).

Figure 7
Word Cloud for Lean Management System Implementation Approach

Key words in the word cloud highlight themes associated with the implementation approach including coaching, focus on daily huddles, and leader rounding. These common approaches were identified as foundational for successful lean implementation. More specific coding from the interview also highlighted the importance of having a consulting partner, having
a fully supportive CEO, and enabling the measurement of improvements that are achieved with the implementation of a lean management system.

**Coaching.** The benefit of developing lean leaders using coaches or mentors was identified by Aij and Teunissen (2017) to help them learn the new ways of working within a lean management system. The important distinction between using coaches versus lean experts is that coaches seek to develop people. This point was underscored by Clark (2016) where he identified that a factor of lean failure is when organizations fail to shift from a reliance on external experts to frontline staff and managers. Leader H6-I1 from the case studies provided lived experience with this theme by explaining that they did the training, coaching, and mentoring. They were excited about getting to solve small problems in their area. They appreciated being given a voice and were encouraged to make improvements. Leader H4-I2 shared that they assigned coaches to certain strategic areas to further develop teams and their daily management system practices. Leader H1-I2 explained they assigned coaches to groups to implement the lean management system and received the dual benefit of refining the lean management system (LMS) while coaching:

We coached each group, like Primary Care Clinics and their direct team on how to use LMS and lean thinking. We built it and then experimented with real teams to figure out how to make it work, then we would deploy it across the organization. Each time we spread we learned more about what is concrete, or standard versus a by-the-book application of a tool. The standard ended up being more principle-based versus using a tool a certain way. Thus, we were able to think deeply about behaviors.

**Focus on daily huddles.** Although the literature review did not reveal many references to the use of daily huddles, this was identified as a key component of the approaches to
implementing LMS in the case study health systems. Kelly and Hines (2019) highlighted significant cost savings from the use of daily team huddles along with leader standard work, gemba walks, and kaizen problem-solving. This theme came through strong from the interviewees using daily huddles to focus on daily objectives, staying safe, and sharing vital information. According to leader H3-I1, the practice of daily huddling was so vitally important to one of the case study CEOs that she sequestered all 600 leaders in a meeting and had them watch a mock huddle. She said she wanted everyone to start huddling the next day. She wanted them to get in front of their teams and communicate important information. They were ultimately successful because the CEO was 100% invested. Another leader, H5-I1, explained how the huddles helped significantly with the speed of communication:

We do tiered huddles now. We flow information up at shift change. Nurses would say "this is our situation," and report up through the entity, to the point of about 9 am the CEO can be made aware of "anything that's going to make the paper." She counts on everyone to handle things that they can at their level.

**Leader rounding.** One of the five lean leader attributes identified by Aij and Teunissen (2017) was gemba or going where the work is done and where value is created. As Henrique et al. (2020) pointed out, having leaders go to see barriers firsthand and discuss solutions with caregivers is a key to lean sustainment. Leader H6-I1 shared that they conduct leader-layered surveys where directors would visit the huddle boards within their purview at a given frequency (monthly, quarterly) to promote engagement of leaders and awareness of team achievements as well as their challenges.

**Consulting partner.** The use of external consultants was a factor identified by Flynn et al. (2018) that contributed to lean sustainability in healthcare. If the organization does not have
significant expertise in lean, consultants are often used to train staff, guide leaders, and promote the overall lean program (Clark, 2016). In each of the case studies healthcare institutions sought the services of an external consulting partner at some point along their lean journey. Depending on the needs of the organization, they utilized consultants for a variety of tasks including those mentioned by leader H4-I3: “[Tasks] included a basic introduction to lean, study trips, training content development, and a kickoff of the value streams [model areas]. Consultant partners performed tactical leading of improvement events. In-house talent learned from the consultants.” Consultants served as lean practitioners and coaches alongside the in-house lean resources to help model areas build their daily management system as well as identify and solve problems. In many cases, consulting companies provide needed expertise while internal talent is developed or acquired, and leaders can be trained. Leader H3-I1 shared the following lived experience of using a consulting partner:

We utilized consultants to come and teach us A3 [thinking, problem-solving, strategic visioning]. We didn't have any depth of knowledge of that. Two guys came for 3 days every month and taught the class and my team watched them teach. They also taught us how to teach it. When you teach it, you have to learn it. Engaging experts, helps the executive team acknowledge that we’re going to be okay. We don't have to know how to do this all ourselves. This was very important. We used the experts to teach the internal team.

The consulting resources were also used to guide executives as they learned to lead differently. The executive coach is very helpful in guiding executives as they have the credibility to model the new behaviors that are needed from executives when leading within a lean management system. As one leader, H4-I3 shared, the executive coach would attend huddles,
setting a good example for the executives and providing support for the tiered huddle structure. He added that this turned out to be a critical success factor for their lean management system.

**CEO sets lean as an expectation.** One of the recurring and most impactful themes discovered in the field study is having the CEO of the healthcare institution establish the implementation and promotion of lean as a priority. To illustrate this, leader H4-I1 said:

It was key when the CEO said that it [lean] was important, and he wanted to see it. He wanted it reported out. He wanted to know the progress of every huddle, how and what they were doing, and what projects were being generated. He helped make it a priority, therefore everyone then said, “OK, we're in.” And the CEO holds people accountable for progress [huddle evaluations, projects generated from huddles, soliciting the CI department about a project they need help on].

Another leadership story about how their CEO established the priority of lean was shared by leader H2-I1:

Early in our lean journey, the CEO had a meeting with the executives about 18–24 months in and asked, "Are you in or not?" He said, "If you all aren't bought into this, then we're not going to do it, but I am bought in." He went around the table and asked every person there: "Are you in, or not?" Although everyone said they were in at that meeting, they lost the COO and CIO as a result within 6 months because they didn't believe in it. They chose to leave. It flips the paradigm. The leaders had those positions because they had the answers all their [working] life. Humble inquiry means you need to ask questions and let people have input. It's a very different way of leading.

The CEO should also be willing to receive feedback from the executive coach or consulting partner. Part of this includes knowing how to act when going to the gemba and
visiting huddles. Leader H1-I2 talked about his experience as a lean advisor getting to witness the CEO receive coaching from the lean expert consulting partner. He was able to be more effective as a coach for other leaders because of witnessing this. Leader H7-I1 underscored this point also by reporting that “everything starts at the top. The CEO must be fully bought in. They change their behaviors as leaders and walk the talk.”

**Enabling measurement of improvements.** The Lean Healthcare Assessment Framework by Henrique et al. (2020) identified measurement as a critical success factor for the sustainability of lean. They posited that key performance indicators are used to measure and compare current performance and target goals of an improved value stream. Similarly, leader H6-I1 discussed the importance of having metrics aligned to strategies:

We want to make sure the metrics used are important. It’s how you run your business.

We want to coach leaders on why they should have certain metrics. Look into leading measures that might be appropriate. We have strategies, system-level, and entity-level. [We] want to ensure an aligned input measure is being worked on and is aligned to an output measure. [We] also want to then ensure that they retire metrics at some point after they measure. For each one, we want to see they started at a baseline, improved, see that they met the goal and sustained for 3 months, then retired it. A metric could come back if bad performance returns.

**Resources to Implement.** The implementation of a lean management system in healthcare requires certain resources to be successful. For example, Hung et al. (2015) identified the need for resources in Primary Care to conduct rapid training sessions to minimize the time away from patient care as well as for follow-up coaching to reinforce changes made. One of the key themes from the literature review was a lack of resources (Leite et al., 2020). Therefore, case
study lean leaders were asked to define the key resources they used to implement lean at their healthcare institution. The word cloud created from leader responses highlighted common themes (See Figure 8).

**Figure 8**

*Word Cloud for Resources Used to Implement Lean*

Key words shown in the word cloud in Figure 8 highlight resources required with most case studies, including a process improvement team as well as model areas along with many other specific leaders and coaches used to engage leaders and frontline caregivers. More specifically, leaders at all levels must be trained and engaged in the work of implementing a lean management system. A review of the frequency of roles reported during the interviews yielded the most mentions for lean experts or coaches, lean consultants, executives, department leaders, directors, and frontline staff. Other roles involved with lean implementations include clinical nursing educators, project managers, data analytics, organizational development, and instructional design consultants. Leader H2-I1 highlighted the importance of identifying both clinical and non-clinical people for training. Clinical personnel were partnered with nursing
educators to help ensure the training would translate effectively to clinical processes. Leader H1-I2 also identified their central lean team consisting of industrial engineers, an instructional designer, organizational development, and people with operations experience. Leader H3-I1 identified the need for lean experts or consulting partners to give the executive team confidence that they have the appropriate level of expertise available to translate the ideals of a lean management system to their healthcare system.

**Role of Leadership.** The importance of leadership at all levels cannot be overstated. As Clark (2016) concluded, many lean transformation efforts fail due to failed leadership.

Leadership was identified as integral to each of the foundational concepts of this research project, including the lean management system, value for the patient, and daily improvement activity. Value for the patient was characterized as central to the endeavor of lean leaders as they empower their staff every day (Aij et al., 2015). Going to the gemba, where the work is done, is seen as essential to understanding value from the patient’s perspective. Similarly, lean leaders must be engaged with their teams daily to solve problems at the local level (Bijl et al., 2019). Successful lean leaders were those who foster trust, promote problem-solving, and actively listen to their ideas to improve processes (Aij et al., 2015). Additionally, lean leaders must learn to lead differently. As Mann (2012) illustrated, the nine behaviors of leadership include having a passion for lean, establishing accountability, project management, lean thinking, ownership, practical application of concepts, commitment to management systems, effective relations with support groups, and measuring process separate from results. The key themes identified through the case study discussions about the role of leadership were to attend huddles, perform rounding, remove barriers, and maintain accountability. These themes are displayed in the word cloud shown in Figure 9.
Attend huddles. Leader H4-I3 identified the engagement of leaders as a critical success factor. They attend huddles, model the appropriate behaviors, and underscore the use of the tiered huddle structure. They engage with the team and review the huddle boards. A robust program of leaders attending huddles was reported by leader H3-I1:

We built accountability tools for the executive leader and the huddle board owner to provide a monthly score on how they were doing with their huddle board. The leader was to go and sign that paper. We called it a 3R: Are your metrics up to date, are they meaningful, when was the last time you changed your metric, and we came up with a score. This was very helpful. We also developed gemba cards for the leaders. All 110 departments got distributed to the executive team. They were assigned four observations on a gemba card every month. So, once a week they had to go to someone else's department at huddle time. We also sent one of the PI team with the executives and
performed coaching at the elbow with the leader as they went to gemba. The frontline caregivers had never seen the “suits” at a huddle before at 7 am.

To assist their leaders in learning this behavior, senior leaders play a major role in demonstrating the behaviors they want to see. H2-I1 underscored the importance of leader engagement by visiting the visual management huddle board because “people are motivated by what their one-up leader expects of them. If the leader doesn't expect it, then they realize it’s not important and it goes by the wayside.”

**Perform rounding.** In addition to attending huddles, leaders are also encouraged to round to engage with caregivers, learn about challenges, and recognize team achievements. Leader H4-I3 shared his perspective of this activity:

Leadership rounding, going to the gemba. . . . This was done in groups and small teams which promoted consistent learning. Additionally, the visibility of leaders going to gemba and looking at huddle boards, asking questions about improvement projects helped to reinforce with the staff that these things were important.

Establishing the expectation of leader rounding is very effective when underscored by the CEO. Leader H2-I1 recalled a scenario where the CEO wanted to promote leader rounding:

The CEO reached out and asked me to see if Vice Presidents were in their offices during the "no meeting" zone. This was a time from 8–10 am when they were supposed to be going out and rounding. The CEO said if the leader was in there, he wanted me to take them up to a nursing unit. If the leaders don't round, then the next-level leaders won't round. When we implemented the use of visual management for rounding, we could see who was doing it and who wasn't. The first thing the CEO would say when visiting a unit
or department was to ask to see their huddle board, to see what they're working on. He wanted to have someone explain the huddle board to him, and not the leader.

This level of involvement and accountability from the senior leader sets the expectation of leader rounding and affects all levels that they need to be doing the same. The leaders don’t even have to attend a huddle to determine huddle effectiveness. H5-I1 shared that their CEO set the expectation that all teams would huddle, so the SVPs made a point of huddling:

If the huddle boards are done well enough, they can see the evidence of the huddles by looking at the board. Their big role is to ensure expectations are clear and that everyone understands them. They further demonstrate this by following up and walking around. They can tell if things aren't being elevated or issues aren't being addressed. They’ll know the huddles aren't being effective by what they see.

**Remove barriers.** Teams that are empowered to solve problems will often discover roadblocks or barriers preventing them from achieving goals or reaching daily objectives. Leader H8-I1 explained that leaders are key in this process. Once problems are prioritized, resources can be allocated to solve them and ultimately remove the barriers. Leader H4-12 discussed how his leaders became involved: “They had to learn and be a good listener to the team to help remove barriers. [They would ask:] What can I do to help with the situation you have?”

**Maintain accountability.** As identified by Seidel et al. (2019), lean leaders are expected to establish accountability for teams that report to them. Both daily routines as well as following up on assigned problem-solving tasks are examples of the types of accountabilities needing lean leader attention. Similarly, Mann (2012) identified the attribute of accountability, or disciplined adherence to process, as a key to successful lean leadership. Leader H3-I1 described that “accountability tools and coaching at the elbow with the leader made all the difference. Leader
standard work didn't help. When the CEO asked for the completed gemba cards to be turned in to the executive huddle, that worked.” Not only is accountability a good attribute for lean leaders, but this can also be enhanced using accountability tools. For instance, leader H3-I1 shared her institution’s use of gemba cards, which are small cards that get marked up when a leader visits a huddle board in their area of responsibility. These cards get turned in at the executive level and posted on a visual management board. This board shows not only how well huddles in one’s area are performing, but also indicates whether the executives are visiting huddle boards in their area or not. This form of accountability promotes adherence to expected behaviors as well as a sense of competition amongst leadership peers.

**Actions and behaviors by leaders that contribute to success.** The concept of value for the patient has been identified as imperative for lean leaders to understand and embrace as they implement and sustain a lean management system (Maijala et al., 2018). Transformational leaders provide additional motivation by articulating a clear vision with an explanation, optimism, confidence, and leading by example (Seidel et al., 2019). The case study leaders provided many specific examples of actions and behaviors by leaders who contribute to success with lean management systems, which are illustrated in the word cloud in Figure 10.
Go to the gemba, ask questions, use humble inquiry, and learn about issues. Going to the gemba was identified as key to lean sustainment for leaders to better understand problems frontline caregivers are dealing with daily (Henrique et al., 2020). D’Andreamatteo et al. (2015) also underscored the importance of this activity in shifting the culture toward supporting lean practices. As leaders learn to lead differently within a lean management system, humble inquiry is a critical building block of success. Anderson et al. (2019) included leading with humility among the five principles that support a culture of continuous improvement. The attitude of humility enables leaders to show respect while working with frontline staff in solving problems. Leader H1-I1 listed humble inquiry along with three other key behaviors of coaching, using visual management tools and walking around, or leader rounding. Leader H2-I1 explained how his health system fostered humble inquiry:
We went through a course called Humble Inquiry since we're not supposed to have all the answers. Our job was to help people identify the answer by coaching them. We learned and used humble inquiry to help people find the answer to their problems. We taught a lot of people, from the administration down to the front line the concepts of humble inquiry. We didn't say, "Why didn't you think about this?" Rather we said, "What do you think?"

Another leader, H7-I2, explained humble inquiry this way:

They embrace visibility. If they surface a “rock in the shoe,” they help fix it in the moment, with humility and ownership. This makes them human and down to earth. This opens the door for more improvements and opportunities. Also, they demonstrate it by just randomly dropping in on huddles because they care about this stuff.

Leaders that embrace and demonstrate this behavior of humility and vulnerability can also be seen as courageous. Leader H9-I2 described a way to demonstrate and achieve this behavior:

This takes courage, such as choosing to put huddle boards in areas where problems and metrics (e.g., patient falls) are visible to anyone. Utilize an executive sensei that can work with the executive leadership team to guide their behaviors on go-sees.

**Be curious.** Another behavior that leaders exhibit in successful lean management systems is being curious. This is a useful approach when looking at the current state of a process. Leader H5-I2 described the benefits of this where people on the team can explain their portion of the process to enable everyone to understand their challenges. Curious leaders do not pretend to have all the answers; rather, they should practice patience and allow people to discuss the barriers they are facing.
**Actions and behaviors by leaders that contribute to failure.** In as much as it is valuable to know what actions and behaviors lead to success in lean implementation, it is equally important to be aware of the actions and behaviors that have been known to contribute to failure. The resulting action and behavior summary statements include both those to avoid and those to be sure to do. The theme with the greatest number of mentions by lean leaders from the case studies was related to the A3 problem-solving approach. Failure can result from implementing improvement ideas without involving the front line, thereby missing opportunities to train and coach staff. The other aspect of this behavior is when leaders simply choose not to utilize the A3 method for problem-solving and thereby forego both the scientific method as well as engaging frontline staff. Leader H2-I1 provided a personal experience with this behavior:

Some leaders grew tired of doing A3s. Even though the A3 is just a sheet of paper to use a common language to do rapid cycle PDSA, find the root cause, and give choices for solving the problem. I remember specifically two VPs that were tired of doing A3s. However, the CEO reminded them that we utilize A3s for solving a problem. The CEO asked “How are you going to deal with your problem? The A3 is the scientific method with PDSA. You can't just go in and mandate someone do something if you don't know [whether] it’s going to work or not. So, what are you going to do?” This stymied their debate and they decided to continue [doing] A3s.

Other actions or behaviors identified through the case studies that leaders can commit and which lead to failure include attempting to use the problem-solving process when the solution is already known, working on projects that lack alignment to departmental goals, and simply opting out of problem-solving efforts. In some cases, like the one shared by leader H9-I2, leadership changes could be necessary:
Not understanding or accepting that their behaviors also must change. It's not just a rubber stamp endorsement. They need to lead differently. Going from a white coat leadership to a more servant leadership style. Some leaders just don't fit in this type of organization. It takes courage from other leaders to recognize this. Develop them, when possible, but if not, you help them move on to something with a better fit.

Similarly, when leaders disengage in the process, it will certainly fail. Specific examples of this from the case studies include senior leadership changes without a transition plan or simply losing momentum during the transition as well as a general lack of the following: leadership presence, senior leader engagement, leader participation, ownership, follow-up, coaching, and psychological safety.

Organizational Characteristics. Although much of this study has been focused on the sustainment of the lean management systems in healthcare, the general problem to be studied also includes the inability of many institutions to achieve associated long-term improvements in financial or clinical outcomes. Case study lean leaders were asked to share organizational characteristics that enabled their success in corresponding financial or clinical improvements. The subthemes discovered during the field study and shown in Figure 6 (Concept map) include the CEO linking lean to desired outcomes, establishing a process focus, utilizing data-driven solutions, ensuring savings calculations are performed, and leveraging best practices. The resulting word cloud shown in Figure 11 illustrates the coded feedback from the case study interviews:
**Figure 11**

*Word Cloud for Organizational Characteristics Contributing to Financial or Clinical Improvements*

---

**CEO linking lean to desired outcomes.** This theme was best exemplified by leader H4-I1 in discussing how the CEO made lean a priority by driving teams to focus on improving processes that are linked to outcome measures:

[We had] true north goals for hospital-acquired infection. He planned to improve it using lean and fix the processes involved that make it difficult for people. It’s a philosophy change . . . that we fix things or improved any metric with lean. We felt that we were up on the medicine, but not on the process. We know how to insert a foley catheter, but how do we ensure that the person doing the insertion knows how to do it? Do they have everything to eliminate or reduce the risks? We changed the process to improve.

In addition to setting corporate goals, organizations that leverage leaning management systems to achieve outcome measures align their improvement work to categories or domains of metrics as illustrated by leader H3-I1:
As clinicians, they didn't think about the money aspects. When we moved to LMS and we had our [four] domains: Quality, Access, Finance, People. All your metrics had to be aligned to one of those [four] domains. [We would say:] Did you know that every time we have an HAI [Hospital Acquired Infection], that costs us $X0K? Do you know every time we have a Readmission it costs $X? When the CEO pointed out the five pillars, it got Finance [staff] out in front of everyone. OT [overtime] hours, how many times did you not take your lunch break and we paid you for the 30 minutes? Although we didn't always show dollar signs, we got them to understand the financial issues.

**Utilizing data-driven solutions.** Another key organizational characteristic is that successful lean leaders are intentional about building the capability for obtaining and utilizing data to drive improvement. Leader H9-I1 explained the approach at her institution:

The ability to have benchmark and performance data for obtaining clinical quality outcomes [is key]. The ability to have a focus and align resources and people helps with financial performance. We can pivot action to where the greatest problem is. We have a culture of high performance, and they love to see green. This drives action in performance. People want to set targets and succeed. Annual planning systems and processes contribute to the alignment of the organizational goals and what does it mean for me and my department? The data piece with the ability to set targets and have the data to Pareto [prioritize based on highest frequency of occurrence] and identify the opportunities has helped from a performance perspective.

**Ensuring savings calculations are performed.** Another fundamental organizational characteristic is having the infrastructure in place to be able to calculate the amount of hard and soft savings associated with improvement efforts. Leader H4-I2 described it with this example:
Through the pre-op redesign, [and] pre-admission testing, we saved patients and families an additional visit to the system (patient experience satisfier). Some were helping define expansion needs more accurately. System improvements included workflow optimization savings (better productivity numbers). We had a simple method of calculating hard versus soft dollar savings. Hard dollars were run by Finance [staff], in partnership with the Continuous Improvement office. The soft savings were with Finance, but we calculated using a template [showing] how to approach it.

It is also important that the savings do not become the driving force toward improvements as this can foster bad habits. The savings is an outcome worth measuring to highlight successes, but it should not be the sole purpose of improvement efforts. Leader H2-I1 explained how savings measurement is used to drive improvements:

Instead of giving people a target savings number, we said that we help them come up with ideas. If their idea doesn't work, don't penalize them. We have an open report out every month. If it's not going well, the administration can ask the Humble Inquiry questions: Are you working on the right things? Tell me more about that, what's happening? How can we help? It goes from having a desperate search to do it, to an approach where we're there to help and we have other resources available to help you.

**Leveraging best practices.** It is also important to have the healthcare institution get and stay connected to other healthcare institutions that are also utilizing lean as a continuous improvement strategy. Leader H1-I2 described how they engaged with others:

When it came to connecting with other professionals in the discipline, outside collaboration was huge for us where we had a monthly sharing session with Palo Alto Medical Foundation that was organically created. Also, networking opportunities would
come up. This was an expectation that every Lean Specialist [would] participate in those network events [conference or learning activity]. This built confidence in us when we were meeting with others in other care systems that were trying to do the same thing. Also, getting a CEO of one care system connected to another helps to sell the value of lean. This was powerful.

**Difference between lean versus other continuous improvement initiatives.** Although there are some similarities between lean and other continuous improvement initiatives that may have been implemented in the past at most healthcare institutions, there are a few key differences that need to be understood by leaders to be successful. Key differences to be highlighted include the concept that lean is behavioral-based, engages the frontline caregivers, and is coach-led versus expert-led. As a comparison, Six Sigma, which follows the DMAIC (Define, Measure, Analyze, Improve, Control) problem-solving framework, requires an expert black belt to manage a project and utilize a range of statistical tools to analyze data to reduce variation, with minimal involvement of frontline staff.

**Behavioral-based.** Although lean is an evolution of the PDSA (Plan Do Study Act) cycle, it is more systemic. As leader H3-I1 explained, with lean, they did not have to unlearn anything:

You still must know what you're fixing. You need some data around it. Then you go try something and see if it works. Understanding it was an evolution of PDSA was helpful. Making sure that it was a systemic and systematic change helped. . . . The difference was that we have executive leadership support that said, "Yes, we're going to do this as a system and we're doing it big bang." It's fine that you don't get trained for a year because you work in IS [Information Systems]. We still expect you to participate in this continuous improvement. It's not a project or a model. Rather, it is who we are.
Lean requires a change in culture that moves the organization towards principle-based behaviors. Leader H1-I1 provided his perspective on this:

To have lean in place, you have to change the culture. You need to adopt some new collective habits. The way we design the management system is key. It is designed to drive collective behaviors that are principle-based [like focusing on the process, creating flow, leading with humility, etc.]. All these principles support the behaviors, underneath the management system to exhibit collective behaviors that define the new culture. Lean is a principal-based approach, we use it to redefine the culture.

**Engages frontline caregivers.** Problem-solving is performed at the local level with collaboration from supporting staff such as Quality as described by leader H4-I3:

Where can we collaborate instead of getting in each other's way? We were successful in maintaining respect for people, regarding how management engages with frontline staff. Quality has had a stigma of being a policing organization that we go to when there's a problem. We had to shift to an attitude of "we're here to help." Quality is the responsibility of each department and associates in the department.

**Coach-led versus expert-led.** Improvement is achieved in a lean system with the help of coaches instead of experts coordinating projects to solve problems. Leader H2-I1 provided his perspective on this characteristic:

We were never the people that come and worked on your problem. Our role is to help you identify your current state. What is your risk? What is your opportunity? Let's do some research. You just have a Quality department that has been doing PDSA for all these years, but why hasn't it spread to the other departments? It's because that is what they
do . . . they're the experts. We didn't go in as owners. We go in as coaches, but you own your problem.

**Cultural elements that contribute to success.** Lean can thrive in a healthcare organization when leaders and caregivers are developed within a culture and environment that promotes daily problem-solving and lean thinking (Henrique et al., 2020). Without the daily improvement mindset being embedded into the culture, lean sustainment will prove to be difficult. As posited by Aij et al. (2015), having leaders promote this culture of daily improvement is a key success factor for lean implementation. Clark (2016) also underscored the importance of daily improvement activity which leads to sustained improvements over time. Additional cultural elements identified through the case study interviews include accountability tools, empowered staff, focus on process, leader buy-in, and patient focus.

**Accountability tools.** Setting targets for leaders and groups can be an effective method to accomplish objectives. Leader H3-I1 described how her health system used them:

>The accountability tools were key. We are very competitive. . . . Frontline leaders became engaged in owning their problems, their solutions, and their departments. This was very different from having your director solve problems for you or telling you how to do it.

The use of the accountability tools was helpful.

These accountability tools are only effective when leaders use them. Leaders holding other leaders accountable and promoting the competitive spirit enable the sustainment of the lean management system.

**Empowered staff.** Leaders that encourage their staff to engage in problem-solving have an easier time leading because the staff is willing to solve many of their problems. Aij et al. (2015) pointed out that leaders who learn how to empower their staff effectively also leverage the concept of value for the patient as a guiding principle in solving problems. Empowering staff
to systematically solve problems in a self-managed way supports organizational change (Bijl et al., 2019). Leader H7-I2 underscored this point when he said, “[Creative solutions are] only happening in areas where there is leadership support to be creative and to speak up.”

**Focus on the process.** The culture of continuous improvement presented by Anderson et al. (2019) included a focus on the process along with respect for individuals, leading with humility, seeking perfection, and embracing scientific thinking. This is the basis of standard work, which enables ongoing process improvements. As leader H2-I1 pointed out, leaders should utilize humble inquiry and seek what it was about the process that failed. Another example that demonstrates this mindset in terms of process and experimentation instead of blaming came from leader H5-I1:

[We’re] beginning to think in terms of process and experimentation rather than finding who to blame and fix. Rather, it becomes, "Where did our process break? Where was the drift?” and "What can we try to see if it gets better?" Changing the vocabulary begins to change the mindset. We talk about "acting our way to a new way of thinking."

It can help to think of the distinction between people and process like leader H5-I2 stated:

We're improving the way the work is done, engaging people that are the most knowledgeable about what is happening and how to improve it. Psychological safety is important. You need to be able to have a conversation at the lunch table with frontline workers. Lean can help broker conversations and relationships. You need a culture that values people. There are two pillars: People and process. Culture, it’s the people that function within the process.
**Leader buy-in.** When leaders are invested in the value of lean management systems, there is less resistance to change. The most important leader to have invested in the value of lean is the CEO. As leader H2-I1 shared:

The CEO was very [invested] from the get-go. If you don't have that, it's never going to work. [The] top must support it for lean to work. Although it's a bottom-up methodology, the top must support it and reinforce it.

The leadership buy-in must be validated, and leaders need to be willing to change the way they lead. Leader H3-I1 shared that an effective way to obtain the buy-in is for the leadership team to gain a good understanding of the lean management system principles through training, site visits, and study, then ask them if they want to implement a lean management system. Gaining leadership commitment with a full understanding of what they are agreeing to is important. Leaders that understand what is being asked of them will realize they need help. As leader H9-I2 pointed out, when people value the work of the Process Improvement department, there is a pull for their assistance.

**Patient focus.** Creating value for the patient should be the ultimate focus of the improvement efforts (Aij et al., 2015). Value stream mapping in healthcare is most often focused on the flow of the patient through the process. Leader H4-I1 explained that the “connection to a purpose” that persisted in their health system helped to connect everything they did and had a direct impact on their patients. This “set the stage for why we need to be as cost-effective as possible.” Leader H4-I3 also underscored the importance of patient focus: “The small organization-feel, focused on the patients, stuck with them culturally so this helped maintain the focus on the patient once teams were formed.”
Relationship of the Findings

How findings relate to the conceptual framework. The conceptual framework of this research study has three main components including actors, theories, and constructs supported by three fundamental concepts of lean management system, value for the patient, and daily improvement activity. The findings provide significant color and clarity to each of these fundamental concepts. Although there is some variation in the definition of what is considered a lean management system, there are many fundamental components that were included in the interviews.

Lebanish management system. The fundamental aspects of lean management systems found through the interviews align well with the definition provided by Hung et al. (2015), which is a set of principles, practices, and tools that organizations utilize to enhance work processes to improve quality and efficiency. To understand how each healthcare organization achieved success with its lean management systems, I explored key aspects of its implementation approaches. The findings identified the importance of CEO support, utilizing a consulting partner, providing coaching support, measuring improvement, and encouraging leader rounding. The resources identified as critical for implementation include the actors as defined in the framework of leaders, frontline staff, and lean experts, but also emphasized the importance of leveraging process improvement experts as coaches and focusing their efforts in model areas to serve as examples for the institution. The research findings highlighted the importance of leaders learning a new way to lead with specific new behaviors and actions.

Value for the patient. In the same way in which Aij et al. (2015) underscored this concept as the ultimate focus of healthcare leaders and staff, the leader interviews offered stories and examples concurring with this. The patient focus guides much of the improvement activities
from value stream mapping to gemba walks. This concept was also highlighted as a cultural element that contributes to success. Leaders H4-I1 and H4-I3 from the same healthcare institution highlighted how they emphasized the patient when striving to make improvements, calling it a “connection to a purpose.”

**Daily improvement activity.** This concept was emphasized as a key cultural element that contributes to successful lean management systems. Leaders must promote daily problem-solving with their teams (Henrique et al., 2020). The interaction of healthcare leaders with frontline staff and lean experts was explored. The business rhythm of huddling daily with the local teams provides a consistent venue for the escalation of problems so they can be solved (Bijl et al., 2019). As leader H5-I1 explained from their experience:

We created a self-perpetuating and self-supporting system, which included daily huddles.

We built a support network around daily problem solving, the elevation of issues through the daily huddle, the application of A3 thinking, the use of standard work to identify waste and variation/deviations and supporting this through management behavior.

**How findings relate to the anticipated and discovered themes.** The anticipated themes from the perspective of this researcher included leadership inadequacies, inadequate cultural integration, poor communication, insufficient training, lack of employee engagement in daily improvement, insufficient lean expertise applied, and a limited focus on lean tools versus a holistic lean approach. The findings provided several themes and characteristics from the case study organizations that have successfully implemented lean management systems at their healthcare institutions. The role and importance of leadership were clearly defined in the findings from the CEO-driven priority and accountability to leaders rounding, attending huddles, and removing barriers. The cultural integration aspects were explored, and key themes address this
through alignment with lean to outcomes, maintaining focus on value to the patient and a process focus, utilizing data-driven solutions, best practices, and calculating savings of measured improvements. Potential communication and employee engagement issues were largely addressed through the emphasis on daily huddles, leader rounding, as well as the underlying cultural focus areas of empowering and engaging frontline staff. Lastly, the anticipated themes of insufficient training and lean expertise relate directly to the use of a consulting partner and the process improvement team as coaches for leaders, model areas, and frontline staff.

Each of the discovered positive themes was also brought up by leaders during the interviews. These themes include leaders going to the gemba, engaging frontline staff in daily problem-solving, utilizing lean experts to train and coach, and incorporating accountability and discipline to help sustain the lean management system. These themes were identified and expanded upon through the analysis of feedback received during the field study.

**How findings relate to the research questions.** The findings addressed each of the research questions in significant detail. The extent to which each question was addressed will be shown here. The first research question sought to identify the actions or behaviors of leadership that contribute to success or failure in implementing and sustaining a lean management system in healthcare organizations. Consistent responses from case study leaders discussed the importance of leaders going to the gemba to engage with their staff, using humble inquiry to learn about issues they are facing, and helping them solve problems. Humble inquiry was a prevalent theme that encourages frontline caregivers to be open to leaders, lean experts, and consulting partners.

The second research question sought to identify the key characteristics that contribute to healthcare organizations either successfully or unsuccessfully achieving long-term improvements in performance and outcome measures. The lean leaders underscored the preeminent importance
of having the CEO fully invested in lean, including establishing linkages between lean and the desired outcomes. Focusing on driving improvements in processes using lean management systems ultimately yielded desired improvements in the associated outcome measures. These leaders also promoted the use of data-driven solutions and ensured savings calculations were performed to highlight the successes of their organizational improvement efforts.

The third research question sought to identify differences between the implementation of a lean management system and other continuous improvement initiatives. The significant differences identified include the fact that lean is fundamentally behavioral-based and seeks the engagement of frontline staff in problem-solving. The change in culture for lean to work utilizes the principles of focusing on the process, creating flow, and leading with humility. The improvements are also achieved with the help of coaches in the work of brainstorming with frontline staff to identify solutions. When caregivers understand that leaders are in it together and want to help them make change for the better, the level of engagement increases substantially.

The fourth research question sought to identify the cultural elements that are present in healthcare organizations that achieve success in implementing and sustaining a lean management system. As the results from the third question suggest, lean leaders described a positive culture for lean to thrive when daily problem solving and lean thinking are embedded into the way leaders engage with their teams. Other key cultural elements contributing to success with lean include the use of accountability tools where frontline leaders own the problems in their departments. Along with the accountability is having empowered staff who are engaged in solving problems locally and asking for help when needed. Other key principles that were also identified and explained include focus on process, leader buy-in, and patient focus.
How findings relate to the research problem. The specific problem being studied was that many healthcare organizations in the United States seeking to improve quality and reduce costs by implementing a lean management system are often unable to sustain the lean management system, resulting in the organization potentially not achieving the long-term benefits of lean. The findings relate to the problem being studied in several important ways. Since the literature review was based upon articles that were published in the past 5 years, the knowledge base from which to draw initial answers to the research questions was inherently 1 to 10 years earlier than that depending on the original data used for each literature source. Therefore, it was vital for this project to obtain input from contemporary leaders in healthcare that have been intimately involved in the implementation and sustainment of lean management systems in healthcare more recently. The inherent relevance of their recent experience brings the findings of this research study to the forefront of consideration for healthcare leaders of today. The goal of the study was to use the multiple case study findings to better understand the cultural, leadership, and other systemic factors to achieve success in future implementations of lean management systems in healthcare.

Summary of the Findings

These conclusions are drawn from the findings first illustrated in the concept map of themes as well as the subsequent analysis of codes resulting from the interview responses. The interview responses provided answers to the original research questions as well as relevant contextual experiences that shaped these conclusions beyond the original themes which emerged from the literature review. The following 10 conclusions represent concepts that achieved sufficient saturation to be considered common themes across all the data collected in this study:
1. The CEO must set the lean management system as a priority and expectation of all leaders, thereby having all leaders buy in and actively participate.

2. Identify and utilize a consulting partner to leverage their expertise in helping leaders lead differently.

3. Leaders must go to the gemba, where the work is done, and perform leader rounding to engage with their staff.

4. Humble inquiry is a critical building block of success upon which all interactions should be based. Focus on the process instead of the person when solving problems.

5. Value for the patient should be the focus of healthcare leaders and staff, resulting in patient focus as a priority.

6. Coaches are used to develop lean leaders and frontline staff.

7. Daily problem solving is promoted through daily huddles and the application of A3 thinking.

8. Leaders attend huddles to engage their caregivers, support their improvement efforts, and remove barriers.

9. Establish and maintain accountability to ensure lean behaviors are adhered to by all leaders and teams.

10. Enable measurement of improvements in achieving outcome targets and associated savings.

These 10 key conclusions address the problem of healthcare institutions being unable to sustain a lean management system. The conclusions combine contemporary experiences of lean leaders from healthcare organizations that have been actively and successfully implementing lean management systems with recent peer-reviewed literature on this topic. The list represents
characteristics of a robust lean management system that can be used to drive positive outcomes and continuously improve results.

**Application to Professional Practice**

The research questions for this project were designed to gather the information that would enable me to shed light on the problem statement based on the lived experiences of 16 healthcare leaders who were involved with implementing a lean management system in a multi-hospital health system. The findings are presented relative to previous research on the topic with highlights indicating salient differences and key characteristics for leaders. This subsection explains how the findings from the research project can be applied to professional practice to successfully implement lean management systems in other multi-hospital health systems.

This study focused on obtaining multiple perspectives from leaders specifically related to the approach that was taken to implement a lean management system, including the resources required to accomplish the implementation. Additional questions focused on learning about the role leadership played as well as specific actions and behaviors exhibited by leaders that either helped or hindered the implementation efforts. Leaders discussed organizational characteristics that contributed to the success or failure of long-term improvements in outcomes or savings. They also provided insight regarding how the lean implementation may be different than other continuous improvement initiatives. Lastly, influential cultural elements that contributed to the success of lean implementation and sustainment were also discussed.

In terms of the approach to implementing lean, the importance of coaching was highlighted by the study. Coaches help leaders learn a new way of leading and teach them how to apply lean thinking in their work area. Coaching also helps process improvement groups refine their approach for wider application across the organization. The practice of daily huddles was
highlighted in nine out of 10 health systems represented in the interviews. Not only is huddling an integral business rhythm that incorporates alignment of individual teams to corporate goals but also encourages vital communication and problem-solving at the local team or department level.

To establish lean as a priority, interviewees asserted the CEO needs to set lean as an expectation for all leaders. This unwavering commitment helps to ensure buy-in from all leaders and establish the expectation for participation in practices including daily huddles and leader rounding to the gemba. Along with CEO support, it was most common amongst the case study health systems to seek a consulting partner to provide expertise, guidance, and coaching for leaders at every level. Once the knowledge and capabilities are established in-house, then consulting resources can be replaced by internal lean practitioners. In addition to the consulting partner, the key roles engaged in implementing lean include leaders at all levels, both clinical and non-clinical frontline caregivers, as well as internal lean experts or coaches and executives.

Organizational characteristics that contribute to improved outcomes include the CEO linking lean to strategic goals and objectives. Similarly, the use of data to drive improvement is a key capability to develop and leverage. The data infrastructure is critical to support the measurement of improvements and the calculation of savings. Data should be used along with the comparison to other lean institutions utilizing lean to leverage best practices.

The research identified three main differences between lean versus other continuous improvement initiatives. These differences are important to understand when introducing lean so that effective messaging can be developed and used during implementation. Lean is a behaviorally based system that is built upon principles including having a process focus, creating flow, and leaders leading with humility. Teams are engaged to solve their problems by applying
these behaviors with leaders in support of frontline caregivers with the guidance of coaches.

Foundational aspects of organizational culture that should be present or fostered for successful lean management system implementations include daily problem solving, empowered staff, leader buy-in, focus on process, accountability tools, and patient focus.

Improving Business Practice

My goal and expectation for this study was to use this multiple case study to identify the cultural, leadership, and other systemic factors that future leaders can focus on as they prepare to successfully implement a lean management system. The 10 key conclusions that were identified are a combined result of the extensive literature review that was conducted as well as the thorough analysis of the data collected through the interviews with 16 experienced lean leaders. Although not meant to be a conclusive list of lean management system components employed by each health system, the list of 10 key conclusions provides characteristics of robust lean management systems that are used to sustain ongoing positive organizational outcomes and improved results.

CEOs must set the lean management system as a priority. One of the strongest themes coming from the multiple cases studied was that the long-term sustainability of a lean management system hinges on the CEO being fully supportive. To reap the benefits associated with lean and promote the long-term sustainability of a lean management system, priority is established and maintained through executive leadership commitment. Senior leaders need to understand lean and engage with teams at local huddles through leader rounding and going to the gemba. As an example, H2-I1 shared the story of how their CEO underscored the importance of using A3s and the scientific method to solve problems rather than simply dictating certain changes be made without thorough analysis being completed. CEOs link lean to their desired
outcomes, which means they understand that utilizing lean practices like focusing on improving processes can effectively lead to improving clinical outcome measures. Equally important to obtaining top leadership support is maintaining that support through establishing intentional and effective transition plans that ensure new executive leaders understand, appreciate, and value the key components of lean management systems.

**Utilize a consulting partner.** Depending on the level of lean expertise available in the organization at the beginning the lean journey, the consulting partner can fill the gap to provide the lean expertise to train staff if needed as well as coach leaders to a new way of leading. It is important to identify and choose a consulting partner that is willing to learn the culture of the organization so the lean training and overall lean program can be adapted to the learning style. Consulting partners work alongside internal staff to teach lean concepts and tools, model behaviors such as A3, coaching and humble inquiry, and provide executive coaching during activities such as going to the gemba and visiting huddles. The level of consulting partner involvement can lessen over time as internal expertise is built up and the lean management system matures and becomes part of the organizational identity and way of operating.

**Leaders go to the gemba and perform leader rounding.** Gemba visits by leaders should become a regular activity that leaders embrace, and frontline caregivers come to expect. As leader H2-I1 explained, the expectations and actions of leaders weigh heavily on staff perception of the importance of daily habits such as huddling and leader rounding. Leaders that go to the gemba must do it with an attitude of humility and respect for staff. It is important that leaders engage with staff, leveraging humble inquiry by asking questions and seeking to understand, rather than having all the answers. Additionally, leaders need to actively engage with
teams as they seek to understand challenges, learn about their local improvement projects, and recognize accomplishments.

**Base all interactions on humble inquiry, focused on process.** This research study found a distinct emphasis on basing interactions on humble inquiry. Leader H2-I1 described it as a very different way of leading, one in which leaders ask questions and let people have input when solving problems. Rather than blaming people when something goes wrong, leaders are encouraged to find a breakdown in the process. Humble inquiry enables a leader to engage people who are closest to the process. This focus on process is a key aspect of the change in culture that is required for lean to be successful.

**Maintain patient focus as a priority.** Focus on the patient is a key cultural element of a lean organization as it reminds everyone that the ultimate purpose of their work is to provide excellent care for the patients that they serve. The findings of the study underscore the position of Aij et al. (2015): creating value for the patient should be the ultimate focus of improvement efforts and solving problems. Value for the patient was identified as one of the three fundamental concepts of this study along with lean management system and daily improvement activity.

**Use coaches to develop leaders and staff.** Developing people to learn new ways of working and thinking is best performed by coaches. This study highlighted the importance, identified by Clark (2016), of shifting from relying on external lean experts to frontline staff and managers. Applying this in healthcare means that if one engages consultants to teach and coach, do it with the intention of developing in-house resources so they can take over these responsibilities over the longer term. Utilizing coaches to train and mentor teams and leaders is also a key difference of lean when compared to other continuous improvement methodologies that often rely more on experts to do the problem solving. Leader H4-I2 emphasized that the
cycle of training and coaching is fulfilled when leaders coach their departments on lean management principles.

**Problem solving through A3s and daily huddles.** Lean organizations learn how to problem solve using A3s, often with the help of a consulting partner. The use of A3s was the most common theme identified in this study, suggesting widespread acceptance and use of this method for problem solving. As leader H3-I1 explained, the consultants share practical experience of solving problems with A3s as well as teach classes and coach others to build up internal expertise. Leaders promote the use of A3 thinking as a standard method to communicate and document problem solving that is occurring in their area.

**Leaders attend huddles and remove barriers.** Leaders interviewed for this study find the engagement with staff through regular huddles to be a critical success factor in sustaining lean. Upon review of a summary of the findings, leader H4-I2 underscored the importance of teaching and coaching daily management principles to leaders across the organization, which leads to effective huddles. This includes curriculum on how to engage staff in daily huddles, better facilitation, and providing understanding of what issues need to be raised. Leader H8-I1 explained, once teams successfully identify barriers, leaders can help solve the problems by appropriately allocating necessary resources. Additionally, some barriers require escalation to identify and allocate cross-functional resources.

**Establish accountability.** Accountability can be established in many areas of lean management systems, but it is best established with CEO support for holding leaders accountable for rounding, attending huddles, and actively removing barriers. Accountability tools can effectively establish expectations and leverage the competitive nature of senior leaders when compared to other areas in the organization. Leader H2-I1 pointed out the importance and
effectiveness of leaders modeling desired behaviors. Upon review of a summary of the study findings, leader H4-I2 emphasized that a true sense of leadership accountability is fostered through gemba rounding and enabling teams to escalate to leaders via huddles.

Measure improvements and savings. In order for teams and leaders to establish targets, current performance levels must be known. The study findings underscore the importance of identifying appropriate input and output measures to be able to measure the success of any team. The study further supports the promotion by Henrique et al. (2020) that measurement is a critical success factor for sustainability of lean. Measures are also used to guide the collective efforts of an organization around strategic priorities. Leader H6-I1 emphasized the importance of coaching leaders so they understand what to measure and why. Aligning teams and departments around the achievement of key metrics is a very effective method to drive improvements. In addition to working towards achievement of desired levels of process performance, financial impact can also be determined so the quantification of savings can be shared and recognized as a measure of success.

Potential Application Strategies

Upon reviewing the findings from this research study, any healthcare organization that is preparing to implement a lean management system or desiring to refine their current approach based on these findings can utilize the following as a guide for application. The application strategies that follow align closely with the topics presented in the concept map earlier (see Figure 6). The narrative portion of this section should be reviewed, then the table in Appendix D can be utilized as a checklist to facilitate planning of the lean management system implementation efforts.
**Implementation approach.** The implementation approach that has achieved measurable success includes, as a cornerstone, a supportive CEO that ensures buy-in from all levels of leadership and establishes accountability mechanisms to monitor progress. Another key step is identifying a consulting partner that can provide guidance and assist with training, coaching, and overall lean management system promotion. To demonstrate impact, the organization needs to enable measurement of improvements by identifying baseline measures and targets. One aspect of lean versus other continuous improvement methods is that lean will utilize coaching to develop people rather than leading problem solving with experts alone. Daily huddles are a business rhythm that is implemented with a tiered structure to support escalation of barriers and rapidly solving problems. The last strategy to establish is leader rounding, which is used to promote leader awareness and engagement with frontline staff.

**Role of leadership.** The expected role of leadership is to engage and empower staff every day to solve problems. Activities include attending huddles to ensure appropriate metrics are in use, encouraging problem solving, and recognizing team and individual successes. Leaders also perform rounding to ask questions and seek to understand challenges that frontline caregivers face every day. Leaders engage with teams by removing barriers that they identify and allocating resources to help solve problems. Lastly, leaders need to maintain accountability with teams for conducting effective huddles and ensuring that rounding is taking place. Accountability tools are often used to set targets and promote competition to engage teams.

**Plan for lean resources.** A plan is necessary to identify, allocate, and train resources needed to implement and sustain lean. If not already existing in the organization, a process improvement team that includes lean experts and coaches is needed. Leaders are key resources to train on how to apply A3 thinking to solve problems. Other roles required for implementing
lean include support personnel such as clinical nursing educators, organizational development, and instructional design consultants. Finally, organizations often identify model areas or value streams to initiate lean improvements, which serve as examples for the institution and enable piloting of lean concepts for wider application.

**Organizational characteristics.** The organizational characteristics that should be fostered and developed include a linkage of lean to strategic priorities by the CEO, thereby emphasizing the use of lean to achieve organizational goals. If not already existing, the organization must establish or develop resources required to utilize data-driven solutions. This enables the setting of targets and monitoring of progress throughout an initiative life cycle. Organizations utilize savings calculations to highlight successes of lean improvements but do not use this as a driving force for change. It is also important to identify and foster relationships with outside entities that promote the use of lean to build confidence, understanding, and share best practices. A good way to promote lean is to include visits by senior leaders to other similar healthcare institutions that have achieved measurable success with lean.

**Actions and behaviors for lean culture.** A successful lean culture is promoted when the following actions and behaviors are exercised:

- ensure leader buy-in from all levels
- go to the gemba to ask questions and to learn
- establish and maintain a focus on enhancing value for the patient
- practice humble inquiry in all interactions
- be curious when looking at a process
- focus on fixing process problems rather than blaming
- ensure that frontline staff is involved in problem solving
- empower staff to solve problems

Summary of Application to Professional Practice

The recommended application strategies listed in the previous subsection are based on the findings of this study of lean leader lived experiences and are designed to enable a healthcare organization to implement a lean management system that will sustain itself so that anticipated long-term improvements in hospital performance can be achieved. The dissemination of the findings and recommendations from this study should include senior leaders, lean practitioners, and CEOs of healthcare organizations contemplating the use of lean management system to improve outcomes. Anyone who is involved in implementing a lean management system can benefit from the years of experience and positive results represented by these findings.

Recommendations for Further Study

This study focused on the lived experiences of lean leaders who were involved in the implementation and sustainment of a lean management system in healthcare. Other areas that should be studied based upon the findings from this study include a very focused study that would identify the motivating factors for CEOs to become interested in supporting and embracing the use of a lean management system in healthcare. Since a key theme of this study included the CEO setting the lean management system implementation as a priority, it would be very beneficial to identify and understand the motivating factors for CEOs to reach that conclusion. A qualitative study focused specifically on the lean journey from the CEO’s perspective would prove to be very useful in promoting future lean management system implementations. Results from this proposed study would be a good complement to the current study to provide additional opportunities to share these findings with new healthcare institutions desiring to implement lean management systems.
Reflections

This topic of implementing and sustaining a lean management system in healthcare was of particular interest due to my background and current position. I have over 32 years of experience implementing lean at organizations in multiple industries including automotive, industrial products, financial services, the defense industry, and healthcare. I currently work for a multi-hospital non-profit health system that is about 2.5 years into their lean journey. The topic chosen for this research project was picked for the distinct purpose of my organization being able to benefit from the findings. Since I hold a position as an internal lean expert and consultant, I can leverage the findings to help guide my organization, thereby benefitting from the results much sooner than the general population that might choose to read this research project.

The anticipated themes of the study included leadership inadequacies, inadequate cultural integration, poor communication, insufficient training, lack of employee engagement in daily improvement, insufficient lean expertise applied, and a limited focus on lean tools versus a holistic lean approach. Additionally, discovered themes from the literature review suggested challenges with lack of commitment, fear of job losses, resistance to change, lack of resources and lack of ownership (Leite et al., 2020). Also expected from a primary care perspective were lack of progress visibility, lack of training time, management-driven change, and physician resistance to work standardization (Hung et al., 2015). It is interesting to note that very few of these were reported as they are explanations for failure to sustain lean. The most accurate expectation was leadership inadequacies, which were addressed significantly with the findings focused on the role of leadership, the importance of leader rounding, and the preeminent importance of CEO support. The application of lean expertise was also quite accurate, as the findings highlighted the importance of leveraging a consulting partner as well as developing lean
experts and coaches to further the development and lean knowledge of caregivers at all levels. The positive themes identified in the literature review regarding leaders engaging frontline caregivers in daily problem solving as well as leveraging lean experts to coach and train staff were both found to be relevant and important.

**Personal & Professional Growth**

My growth through this project has been a result of the extensive literature review I conducted, which enabled the establishment of a solid foundation of previous research that had been performed prior to this project. It became important to be mindful of the context in which the previous research studies had been performed, as well as the scope and breadth of each study. Since emphasis was on multi-hospital, non-profit health systems, I had to be cautious about incorporating findings from entities that are very different because the context of the study can introduce bias. Conducting the research utilizing interviews of contemporary lean leaders from similar healthcare institutions provided an excellent opportunity to compare findings from the literature review to real world scenarios. Lean leader responses to the interview questions provided significant new themes for future lean management system implementations to consider.

The potential for researcher bias was minimized by leveraging input from 10 different contemporary health systems and 16 different leaders. I used the same set of questions for every interview and recorded the answers in a database that enabled the development of codes and themes from the raw interview responses. The themes emerged from the responses as I analyzed the input provided by the multitude of leaders, which enabled the triangulation of common themes.
Since this research project was the first major project I had conducted, the entire process has been a learning experience and a time for personal and professional growth. Developing research skills and receiving guidance from the dissertation chair and committee members has enabled me to achieve a personal goal of writing a significant piece of literature that may serve a valuable purpose for others in this industry. Gaining the knowledge required to write a paper at the doctoral level required commitment and allocation of personal time beyond what was initially anticipated; however, as I reflect on the experience, it has been worth it. I have confidence moving forward that will enable me to continue writing and contributing to this body of knowledge.

**Biblical Perspective**

The pursuit of valuable lived experiences from experienced lean leaders proved to be a considerable challenge for this researcher. I had planned on interviewing several lean leaders in healthcare that had previously been visited by my manager; however, most were unwilling to participate in the research study. The assumption that established relationships would enable expedient interviews was faulty. After the Liberty University Institutional Review Board (IRB) approval for the study was obtained, I was unable to engage with eight out of 10 lean leaders contacted. This became a significant roadblock to overcome in the project and began to negatively impact the project timeline. In much the same fashion as church planters and evangelists must overcome challenges in reaching busy people that have their own agendas and busy lives, I had to get creative and remain persistent. The apostle Paul exhorted his people, “Therefore, my dear brothers and sisters, stand firm. Let nothing move you. Always give yourselves fully to the work of the Lord, because you know that your labor in the Lord is not in vain” (*English Standard Bible*, 2001, 1 Corinthians 15:58). I was encouraged by this exhortation.
and developed an alternative strategy to obtain lean leaders to interview. Similarly, the encouragement from the apostle Paul was also vital during this challenging period: “I press on toward the goal to win the prize for which God has called me heavenward in Christ Jesus” (English Standard Bible, 2001, Philippians 3:14). A revised strategy for reaching lean leaders proved to be effective. I contacted individuals through professional networks via LinkedIn and email and was able to obtain 16 lean leaders for personal interviews. The snowball sampling technique (Figure 2) was employed and resulted in several lean leaders being referred for interviews.

The resulting interviews yielded over 450 minutes’ worth of interviews with lean leaders at similar healthcare institutions, providing a glimpse into the lived experience of each lean leader as they recounted the approach taken to implement lean at their health system. Given all this content, I was able to effectively investigate the sustainment of lean management systems in healthcare. In keeping with the biblical perspective presented earlier in this paper, the concept of reaping and sewing was evident given the results of this study. Persistent effort by lean leaders to train and coach staff in lean principles can result in sustainable lean systems. We can have similar confidence with our persistent efforts to implement lean systems in a similar way to when Paul encouraged the Galatians with these words, “Let us not become weary in doing good, for at the proper time we will reap a harvest if we do not give up” (English Standard Bible, 2001, Galatians 6:9). The unique approaches that each lean leader took in implementing lean management systems were quite like the church-planting efforts of Paul in the early church. Each community that was targeted by the early church planters was approached uniquely by early church leaders. Similarly, the 10 health systems followed unique paths toward lean management system implementation.
Summary of Reflections

The concept matrix illustrates the variation of lean management system components that were implemented at each health system. It is important to note that none of the health systems are presented as perfect execution of lean management system implementation; however, the collective view of approaches presented in this study provides robust content from which to model a future lean management system in healthcare. Each healthcare system is unique; therefore, the journey for lean management system implementation will be different for each one. A review of this matrix provides a good point of reference to compare what other health systems have utilized along their lean journey.

The 10 conclusions presented here are key takeaways from the study and represent collective wisdom and shared experiences of lean management systems from 16 contemporary health system lean leaders combined with recent peer reviewed literature on this topic. Each of the 10 conclusions provide a point of reference from the vantage point of a successful lean management system. The conclusions are listed here as questions for self-reflection purposes:

- Has your CEO set the lean management system as a priority?
- Have you selected a consulting partner?
- Are your leaders going to the gemba and performing leader rounding?
- Do you base all interactions on humble inquiry, focused on the process?
- Do you maintain patient focus as a priority?
- Are you using coaches to develop leaders and staff?
- Do you perform problem solving using A3s and daily huddles?
- Do your leaders attend huddles and remove barriers?
- Have you established accountability for lean activities?
Are you measuring improvements and savings?

Future leaders seeking to implement lean management systems at their health system should utilize the Implementation Strategies (Appendix D as a guide for planning their lean management system efforts. Upon self-assessment against the components of the four sections including implementation approach, the expected role of leadership, the identification of resources, and the organizational characteristics, a unique implementation journey can be developed for the organization. This implementation journey can then be followed by the lean leaders with confidence as it is based upon the collective experience of many individuals who have been down the same path and who have achieved measurable success for their efforts.

**Summary of Section 3**

This section provided a brief overview of the problem that was studied along with the purpose and conceptual framework of the study. The scope of the study was also presented, including the number of leaders and healthcare institutions that were interviewed as part of the field study research. A resulting concept matrix (Table 5) summarized the components utilized by each of the lean system implementations discussed during the interviews. The study findings addressed the four research questions that were designed to achieve the goal of the study, which was to explore lean management system implementation scenarios and seek to understand what cultural, leadership, or other systemic factors future healthcare organizations can utilize to achieve long-term success in their lean implementation efforts. Field study data were obtained by interviewing 16 lean leaders from 10 different healthcare institutions that have implemented lean management systems. A concept map was developed that illustrated the four major thematic areas resulting from triangulation of the findings from the multiple case studies. Each of the themes that was identified was explained in detail in the presentation of the findings.
Multiple ways in which the findings from the research project can be applied to professional practice were discussed. Examples of application topics include the importance of coaching, daily huddles, CEO support, and utilizing a consulting partner. 10 key conclusions were identified from a combination of the extensive literature review conducted and an analysis of the data gathered from the field study interviews. An extensive discussion about each conclusion was completed to provide context and explanation of each one. Recommendations for further study focused on identifying motivating factors for CEOs to become interested in supporting and embracing the use of lean management systems in healthcare. Additionally, reflections of the research project relative to my personal and professional growth were discussed. Finally, a detailed discussion was provided that relates a biblical perspective to the research project and connects the work discussed to a Christian worldview.
References


https://doi.org/10.1002/aorn.12723

https://doi.org/10.1002/nur.21743


https://doi.org/10.1108/00251749810239504


https://doi.org/10.1016/j.leaqua.2021.101495


https://doi.org/10.1371/journal.pone.0206676


https://doi.org/10.1108/IJHCQA-02-2017-0023


https://doi.org/10.2478/orga-2019-0011


https://doi.org/10.1080/00207543.2020.1743892


https://doi.org/10.1080/14783363.2016.1171705


Lowe, S. (2021). *You are investing in the Kingdom* [Foundations of Faith video series, New Creation – Part Two]. https://watch.liberty.edu/embed/secure/iframe/entryId/0_p88agn85/uiConfId/39820581/pbc/101177581


Appendix A: Participant Consent Form

This consent form is used to gain agreement for participation in a research study being conducted by Derek Vandersteur, a doctoral candidate in the School of Business at Liberty University.

Overview: The purpose of this study is to identify what cultural, leadership, or other systemic factors contribute to healthcare organizations achieving long-term success with lean management system implementation efforts.

Expectations: By participating in this study, each participant will take part in an interview via telephone or MS Teams with 10 open-ended questions that will seek to understand details about their experience in implementing a lean management system in healthcare. The interview will be recorded in order to enable accurate transcription and documentation of the responses. Participants will also share pertinent documents that may assist in illustrating and exemplifying the responses provided to the questions. Each interview will be scheduled for a 60-minute timeslot.

Confidentiality: The information gathered by the researcher for this study will be kept private, which means that participant identification will be blinded such that it will not be traceable to a specific participant. The records will be stored on the researcher’s secure MS One Drive account, which is password protected and backed up securely.

Right to Withdraw from the Study: If a participant chooses to withdraw from the study, they simply need to contact the researcher via email or phone (shown below). Any data provided by the withdrawn participant will be removed from the study and deleted.

Contact Information:

  Researcher- Derek Vandersteur  
  Dissertation Chair- Dr. Brenda Palmore

Statement of Consent:

I have reviewed this consent form and understand what is being asked of me to participate in this study. I have been given the opportunity to ask questions and received adequate responses.

With my signature below, I consent to participate in the study, and I also agree to allow my interview to be audio recorded.

Signed: ________________________________  Date: __________________
Appendix B: Participant Interview Questions

1) When did the implementation of lean begin at your health system?

2) When did you begin working on the implementation of lean at your health system and what was your role?

3) Can you describe the approach that was taken to implement a lean management system at your health system?

4) What were the key resources your organization used in implementing lean? Can you rate the effectiveness of each resource type?

5) What role does leadership play in implementing and sustaining your organization’s lean management system?

6) What actions were taken or behaviors exhibited by leaders that contributed most to your organization’s success in sustaining the lean management system?

7) What actions were taken, or behaviors exhibited by leaders led towards failure in sustaining the lean management system?

8) What characteristics of your healthcare organization contributed most to the long-term improvements in financial performance and clinical outcome measures?

9) How would you describe the difference in how the lean management system was implemented when compared to other continuous improvement initiatives implemented at your healthcare organization in the past?

10) What cultural elements of your healthcare organization do you think contributed to achieving success in implementing and sustaining a lean management system?
Appendix C: Interview Protocol

Interview Basics:

Date of Interview: ___/___/___  Interviewer:______________

Time started: ______  Interviewer Role:__________

Location of interview: ________________  Interviewee:______________

Location / name of interview recording file: ___________________________

Introduction:

- Researcher introduction
- Explain the purpose of the study
- Verify / Obtain informed consent
- Explain structure of the interview, including audio recording and note-taking
- Provide opportunity to ask questions

-----------------------------------------------

- Ask interview questions 1-10

-----------------------------------------------

Closing of the interview:

- Thank the interviewee for their time and participation in the research study
- Emphasize the commitment to confidentiality
- Notify interviewee of potential for follow-up and/or validation sessions
- Inform interviewee of method for sending out study results
Appendix D: Lean Implementation Checklist

**Lean Management System Implementation Strategies**

1. **Implementation approach**
   a. Ensure CEO is supportive, ensures buy-in and establishes accountability for progress.
   b. Identify a Consulting partner that can provide guidance and assist with training, coaching and overall lean management system promotion.
   c. Enable measurement of improvements by identifying baseline measures and targets to demonstrate impact.
   d. Utilize coaching to develop people rather than leading problem solving with experts alone.
   e. Implement daily huddles with a tiered structure to support escalation of barriers and rapidly solving problems.
   f. Establish leader rounding to promote leader awareness and engagement with front line staff.

2. **Articulate the expected role of leadership to engage and empower their staff every day to solve problems.**
   a. Attend huddles to ensure appropriate metrics are in use, encourage problem solving and recognize successes.
   b. Perform rounding to ask questions, seek to understand challenges.
   c. Remove barriers that teams identify and allocate resources to help solve problems.
   d. Maintain accountability for conducting effective huddles and ensuring that rounding is taking place. Use accountability tools to set targets and promote competition to engage teams.

3. **Establish a plan to identify, allocate and train resources needed to implement and sustain lean.**
   a. Process improvement team which includes lean experts and coaches.
   b. Leaders at all levels learn to apply A3 thinking to solve problems.
   c. Support personnel including clinical nursing educators, organizational development, instructional design consultants.
   d. Identify model areas or value streams to initiate lean improvements and serve as examples for the institution and pilot lean concepts for wider application.

4. **Organizational characteristics to foster and develop**
   a. Leverage CEO linkage of lean to strategic priorities thereby emphasizing the use of lean to achieve goals.
   b. Establish or develop resources required to utilize data-driven solutions. Enables to setting of targets and monitor progress throughout an initiative life cycle.
   c. Utilize savings calculations to highlight successes of lean improvements but not as a driving force for change.
   d. Identify and foster relationships with outside entities that promote the use of lean to build confidence, understanding, and share best practices. Include visits by senior leaders to other similar healthcare institutions that have achieved measurable success with lean.

**Actions/behaviors to promote a successful lean culture**
- Ensure leader buy-in from all levels
- Go to the gemba to ask questions and to learn
- Establish and maintain a focus on enhancing value for the patient
- Practice humble inquiry in all interactions
- Be curious when looking at a process
- Focus on fixing process problems rather than blaming
- Ensure that front line staff is involved in problem solving
- Empower staff to solve problems
Appendix E: Copyright Permission to Reprint Table 2

Dear Mr. Derek Vandersteur,

Taylor & Francis Group LLC - Books has approved your recent request. Before you can use this content, you must accept the license fee and terms set by the publisher.

Use this link to accept (or decline) the publisher's fee and terms for this order.

**Request Summary:**
Submit date: 01-Jun-2022
Request ID: 600082468
Title: Creating a Lean Culture
Type of Use: Republish in a thesis/dissertation

Please do not reply to this message.

To speak with a Customer Service Representative, call +1-855-239-3415 toll free or +1-978-646-2600 (24 hours a day), or email your questions and comments to support@copyright.com.

Sincerely,

Copyright Clearance Center
Appendix F: Copyright Permission to Reprint Table 3

Thank you for your order!

Dear Mr. Derek Vandersteur,

Thank you for placing your order through Copyright Clearance Center’s RightsLink® service.

Order Summary

Licensee: Mr. Derek Vandersteur
Order Date: Jun 1, 2022
Order Number: 5320560221832
Publication: Quality Management in Health Care
Title: Implementing a Lean Management System in Primary Care: Facilitators and Barriers From the Front Lines
Type of Use: Dissertation/Thesis
Order Total: 0.00 USD

View or print complete details of your order and the publisher's terms and conditions.

Sincerely,

Copyright Clearance Center

Tel: +1-855-239-3415 / +1-978-646-2777
customercare@copyright.com
https://myaccount.copyright.com