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Strategies for Improving the Process of Lean Implementation in Health Care

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Abstract

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MBA, University of Ottawa, 2006

BScN, The University of Western Ontario, 2001

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The Canadian health care system is a complex system under pressure due to an aging population. The annual health care budget has decreased, posing challenges for health care administrators. The purpose of this qualitative study, which was grounded in Deming's total quality management system framework, was to explore strategies 6 health care managers used to implement Lean initiatives to reduce health care costs in the province of Ontario, Canada. Data were collected through semistructured interviews and analyzed in accordance with Yin's approach, which includes compiling data, disassembling, reassembling, and interpreting data, and drawing conclusions. Four themes emerged from data analysis: the review of operational processes can reduce health care costs, specific management skills can reduce health care costs, employee engagement can have a positive impact on health care costs, and alignment can have a positive impact on health care costs. Findings from this study may contribute to positive social change by providing health care managers with successful strategies to improve operational processes and reduce health care costs, increase patient safety, and reduce negative patient outcomes. The results further contribute to positive social change by highlighting the importance of having employees participate in process improvement, which may improve employee and patient satisfaction in the community.

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Dedication

I dedicate this study to my parents, Rachel and Gilbert Boudreau, as well as to my husband, Silver Buckler, all of whom supported me throughout this educational process. I also dedicate this study to my late grandmother, Jeanne Raby Boudreau, who shared her passion of education and learning with me from a young age. Without the presence and support of these people throughout my life, I could never have achieved this dream. I thank you and will forever be grateful for your love, patience, and support.

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Section 1: Foundation of the Study

Background of the Problem

The health care system in North America is complex due to elevated costs and an aging population with multimorbidities (Aij & Teunissen, 2017). Such complexity involves multiple external stakeholders and intertwined processes, generating minimal flexibility to empower change (Blackmore & Kaplan, 2017). To increase efficiency and decrease costs while meeting patient expectations, health care administrators have focused on quality improvement initiatives (Allen, 2016). Nonetheless, health care costs continue to rise, with minimal quantifiable data showing that quality improvement initiatives reduce operating costs (Moraros, Lemstra, & Nwankwo, 2016).

There is evidence, however, that shows that the application of Lean methodology facilitates quality improvements in health care. Lean methodology is a promising strategy for enabling process efficiency while eliminating process waste (Kovacevic, Jovicic, Djapan, & Zivanovic-Macuzic, 2016). Lean methodology originated in the manufacturing sector to increase both value and process efficiency from the customer perspective (Poksinska, Fialkowska-Filipek, & Engström, 2016). Health care administrators who have applied Lean in health care have demonstrated value by reducing wait times, decreasing operational process times, and increasing patient satisfaction (Jayasinha, 2016). Specific factors influence the results of Lean implementation, including organizational culture, managerial leadership, and communication (Lee, McFadden, & Gowen, 2016). In this study, as part of an exploration of quality improvement initiatives,

I focused on the strategies used by managers to improve the implementation of Lean in health care.

Problem Statement

Quality improvement initiatives are increasingly necessary for reducing operating health care costs, while supporting increased demands for patient care and safety (Goodridge, Westhorp, Rotter, Dobson, & Bath, 2015). Although patient demand within the Canadian health care system increased between 2012 and 2016, the annual health care budget growth for hospitals decreased from 4.2% to 2.5% (Canadian Institute of Health Information, 2016). The general business problem was the inability of health care managers to implement Lean initiatives to reduce health care costs. The specific business problem was that some health care managers lack strategies to implement successful Lean initiatives to reduce health care costs.

Purpose Statement

The purpose of this qualitative single-case study was to explore the strategies health care managers used to implement Lean initiatives to reduce health care costs. The target population was six health care managers who had demonstrated successful implementation of Lean initiatives in an acute care hospital located in the province of Ontario, Canada. The contribution to positive social change may include knowledge on how to address the increase in demand, while also increasing patient safety and reducing negative outcomes to patients. Positive patient outcomes could result in patients being discharged from the hospital sooner to return safely home to their families and communities.

Nature of the Study

I considered three research methods: qualitative, quantitative, and mixed methods. I chose a qualitative research method to explore the behaviors and attitudes associated with Lean in health care. Rosenthal (2016) noted that researchers who apply qualitative methods seek to understand human conduct associated with a specific topic by analyzing interpretive data. In contrast, researchers who apply the quantitative method often use statistical equations to test hypotheses and confirm relationships (Zyphur & Pierides, 2017). The mixed research method includes both qualitative and quantitative elements (Tonkin-Crine et al., 2016). To explore Lean in health care, I did not apply statistical equations to investigate relationships or test hypotheses; therefore, quantitative and mixed-methods research were inappropriate for the study.

Various research design types can be used in qualitative studies. For this study, I considered single case-study, ethnography, focus group, and narrative designs, ultimately selecting a single case-study design. Researchers who apply a case-study design achieve a detailed perspective on a group of individuals that can be used to explore and explain the chosen research topic (Harrison, Birks, Franklin, & Mills, 2017). Using ethnography, the researcher is able to connect with a group of individuals in a community to explore their everyday lives (Trnka, 2017). Ethnography was inappropriate for this study because of my focus on managers' perspectives of business strategies. Researchers conducting focus groups are highly dependent on the interactions of group members to find answers to the research questions (Rosenthal, 2016). Because I was not interested in examining group interactions, I did not use a focus group in this study. Researchers who apply

narrative designs often emphasize the story of a single person in a holistic manner (Nolan, Hendricks, Williamson, & Ferguson, 2017). The narrative design was unsuitable for this study because I wanted to obtain multiple perspectives on the study topic. For this reason, I opted to apply a single-case design to a chosen group of health care managers, focusing on the topic of implementing Lean in health care.

Research Question

The research question I sought to answer was: "What strategies do health care managers use to implement successful Lean initiatives to reduce health care costs?"

Interview Questions

To collect information on the experiences of health care managers and Lean initiatives, I conducted semistructured interviews using the following questions:

1. As a manager, what strategies do you apply to implement Lean initiatives?
2. How do you ensure the implementation of Lean initiatives reduces costs?
3. What strategies do you use to influence the implementation of Lean initiatives?
4. What strategies do you use to sustain Lean initiatives once implemented?
5. When implementing Lean initiatives, how do you align the vision of the organization to the needs of patients?
6. What additional information about Lean implementation would you like to provide?

Conceptual Framework

For the conceptual framework for this study, I chose the total quality management (TQM) framework created by Deming (1986). TQM concerns specific elements, including employee and customer satisfaction, continuous quality improvement, and visionary leadership (Chiarini & Vagnoni, 2017). Researchers who use TQM apply a plan-do-study-act approach to quality improvement to highlight the commitment and visionary leadership of management (Deming, 1986). Visionary leadership includes management's capability to create and lead the vision of the organization while redefining the needs of customers (Chiarini & Vagnoni, 2017). Leaders who implement the TQM framework with visionary leadership and continuous process improvements may be able to repair an unproductive, ineffective, and wasteful health care system (Wiler et al., 2017) through reduced costs, increased productivity, and greater patient safety (Chiarini & Vagnoni, 2017). Furthermore, managers' implementation of Lean initiatives in health care provides them with insight on leadership and continuous quality improvement researchers have found. According to Wiler et al. (2017), application of the TQM conceptual framework supplements various process improvement methodologies such as Lean and Six Sigma, strengthening the principles of project management, leadership, and change.

Operational Definitions

Following are definitions of terms associated with Lean methodology and Lean initiatives that appear in the study:

Added value: Added value is the end product of an efficient process in health care, resulting in reduced wait times and increased patient safety (Colldén, Gremyr, Hellström, & Sporraeus, 2017).

Flow: Flow is the efficiency of the process flow, with a focus on adding value to specific activities associated with process time (Tay, 2016).

Gemba: Gemba is the process of leaders visualizing the area of work in which they produce and create value (Aij & Teunissen, 2017).

Lean: Based on specific principles and tools, Lean is a methodology used to increase efficiency and value within a process and eliminate excessive process steps (Boronat, Budia, Broseta, Ruiz-Cerda, & Vivas-Consuelo, 2018).

Rapid improvement event or *Kaizen*: A rapid improvement event (or Kaizen) is an intensive intervention with various group members applying Lean tools to review activities to remove waste (Sari, Rotter, Goodridge, Harrison, & Kinsman, 2017).

Value-stream mapping: Value-stream mapping is a graphical and analytical Lean tool providing a visual representation of process flow, mapping each step from the beginning of the process through the delivery of the product or service (Kovacevic et al., 2016).

Waste: Waste refers to any step or activity that does not provide added value or satisfaction from the patient's perspective (Cheung, Goodman, & Osunkoya, 2016).

Assumptions, Limitations, and Delimitations

Assumptions in research are beliefs held by the researcher that are necessary to conduct a study and interpret the results (Saunders, Lewis, & Thornhill, 2016).

Limitations are issues within the context of a study that may limit or impact research results (Queirós, Faria, & Almeida, 2017). Delimitations are the scope of the research, which can impact the course of the outcomes (Holloway & Galvin, 2016). Below are the assumptions, limitations, and delimitations of this study.

Assumptions

By definition, a research assumption is a presumed social perspective or reality created by the researcher (Saunders et al., 2016). One assumption in this study was that participants would be honest and transparent in providing information. I also assumed individuals would be comfortable answering questions without worrying about breach of confidentiality. Another assumption was that all documents reviewed would be precise, up-to-date, and complete. Without belief in these assumptions, I would be unable to trust my findings, analyze data, and interpret results.

Limitations

Limitations are potential weaknesses within the context of the research that can impact a study's findings and results (Queirós et al., 2017). The primary limitation of this study was the small sample size of six health care managers who had demonstrated successful implementation of Lean initiatives in an acute care hospital. The level of experience and success of implementation could have varied among participants and may have limited the research results.

Delimitations

Holloway and Galvin (2016) described delimitations as the limits and boundaries of the research which have an impact on the research findings. A delimitation of the study

was that I selected a specific research population of clinical health care managers, therefore omitting other managers and health care professionals, who may have provided different insights on the study topic, from participating in the study. The limited sample size of six health care managers was also a delimitation of the study, as was the fact that all six managers were employed by one institution. The inclusion of more participants and/or participants from different hospital settings may have yielded different responses. In addition, the target population was located within a specific acute care hospital in the province of Ontario, Canada, thus producing another delimitation. These elements may have affected the research findings and outcomes of the study.

Significance of the Study

The research findings of this study could be of value to business leaders in health care settings by contributing knowledge about successful continuous improvement initiatives. In more than 70% of U.S. hospitals, the application of Lean principles is an important component of corporate strategy (Shortell, Blodgett, Rundall, & Kralovec, 2018). Applying Lean principles enables health care managers to understand the causes of operational waste and seek opportunities for process improvement (Goodridge et al., 2015). Study findings may provide managers with insight they can use to better implement Lean principles and promote efficiency in health care.

The contribution to positive social change includes providing a window into how to address the increase in demand for quality health care, while also increasing patient safety and reducing negative outcomes to patients. Health care managers may use this study's findings to identify strategies for supporting successful Lean initiatives in health

care. Findings from this study could also lend support for the inclusion of Lean process elements in health care. These elements include best outcomes for patients, increased patient satisfaction, and recognized opportunities for improvement (Goodridge et al., 2015). Achieving all three elements may help promote positive social change, as patients might benefit from efficient operational processes with safe and effective patient care.

A Review of the Professional and Academic Literature

The purpose of this doctoral study was to explore the strategies health care managers used in implementing Lean initiatives to reduce health care costs. One tool to understand this topic was a review of scholarly literature. The literature review and evaluation included analysis and synthesis of themes found in past research. Different sources provided an in-depth understanding of the implementation of Lean; these sources included peer-reviewed articles, scholarly journals, academic books, and other literature.

In this section, I describe the organization of the literature review and discuss the strategies applied for searching the literature. This examination includes a comparison and contrast of the study's conceptual framework of TQM, as well as an exploration of alternate theories of transformational leadership, organizational decision-making framework, and realist theory. The comparison and contrast of how Lean is derived from TQM was an integral part of the conceptual framework. Lean originated from the process improvement principles of TQM focused on encouraging leadership and change management principles (Wiler et al., 2017). Common themes within the literature on Lean implementation in health care follow, including Lean in health care, the complexity of health care, organizational culture, leadership, and cultural transformation.

Organization of the Review

The literature review discussion begins with an analysis of the TQM framework, which was the conceptual framework for this study. The review consists of four theories: TQM, transformational leadership, an organizational framework for decision-making, and the realist approach. I provide a brief appraisal of the history of Lean methodology, focusing on the transition of Lean manufacturing to the health care sector. I also review common themes in the application of Lean methodologies in health care, including Lean principles, the complexity of health care, organizational culture, leadership and Lean, and cultural transformation. A comparison and contrast of different research studies follows for each theme.

Academic Literature

Key word searches associated with the topic of Lean methodology in health care included *Lean*, *health care*, *healthcare*, *quality improvement*, *Lean initiatives*, *Lean Six Sigma*, *continuous quality improvement*, *process improvement*, *Lean tools*, *Lean process initiatives*, *Lean cost*, *Lean leadership*, and *Lean in health care*. For the initial search, I used the databases of Walden University Library, followed by Google Scholar searches to locate possible missed articles. Key word searches of the databases BioMed Central, CINAHL and MEDLINE Simultaneous Search, CINAHL Plus, Cochrane, MEDLINE, Dissertation and Theses at Walden University, Education Source, National Center for Health Statistics, PubMed, ProQuest, and SAGE yielded 134 articles and documents, while Google Scholar searches produced an additional 37 articles associated with Lean in health care. Of the 171 sources referenced in this document, 159 have publication dates

between 2015 and 2018, demonstrating that 93% of sources were published within 5 years of study completion. Of the 171 articles used in this literature review, 146 were peer-reviewed, which is equivalent to 85%.

Total Quality Management

Based on Japan's total quality control movement (Chiarini & Vagnoni, 2017), Deming (1986) developed the TQM framework, which focuses on integrating quality management systems and leadership. In developing the framework, Deming linked TQM to the need for visionary leadership (Chiarini & Vagnoni, 2017). The framework includes specific elements deemed essential to quality improvement, including customer satisfaction, continuous process improvement, employee satisfaction and education, commitment from leaders and management, and visionary leadership (Deming, 1986). Deming emphasized that visionary leadership is the opportunity for management to create, apply, and lead the organization's vision on a long-term basis, focusing on the requirements of customers and not the controls of management (Chiarini & Vagnoni, 2017). The transition of TQM from the manufacturing to the health care sector provides an opportunity to focus on patient needs, comparing and benchmarking metrics to enable continuous process improvement by ensuring a high level of patient care while decreasing the occurrence of medical errors (Mosadeghrad, 2015).

According to Chiarini and Baccarani (2016), combining TQM with Lean implementation allows for increased patient satisfaction; decreased wait times and patient errors; and increased empowerment, communication, and employee team building. Mosadeghrad (2015) noted that the most important elements of TQM in health care are

employee and customer management, review processes, and leadership. In one study, managers in hospitals found visionary leadership from senior management an essential requisite for successful continuous quality improvement in their organizations (Chiarini & Baccarani, 2016). Mosadeghrad suggested an association between the low success rate and a low level of employee engagement and participation, lack of management systems, and few strategies to support quality improvement.

Alternative Theories

Transformational leadership theory, the organizational framework for decision-making, and realist theory offer complementary or alternative perspectives on the TQM framework applicable to the implementation of Lean in health care. Transformational leadership aligns with TQM because of its emphasis on the need for visionary leadership; in turn, the organizational framework for decision-making and the realist theory both provide an alternate view to TQM and Lean in health care.

Transformational leadership. The theory of transformational leadership is related to TQM and Lean methodology in health care. Burns (1978) identified the function of leadership as individuals utilizing the reasons and motives of followers to attain the objectives of both groups of stakeholders. Burns found leadership to be dissimilar to power, as leadership is indivisible from the needs of followers. Van Rossum, Aij, Simons, van der Eng, and ten Have (2016) posited that transformational leadership could contribute to the capacity of change in health care by combining the top-down leadership of senior management, team leadership of frontline employees, and flexibility in the work environment. Furthermore, ten Have, ten Have, Huijsmans, and van der Eng

(2015) emphasized that transformational leadership can enable the state of change of an organization by aligning vision, ambition, and change capacity. Applying transformational leadership to Lean implementation can intensify the focus and energy of the organization; this facilitates the organization's capacity to transform while concentrating on the entire health system versus employing a siloed approach (van Rossum et al., 2016).

Organizational framework for decision-making. Developed by Thompson and Tuden (1959), the organizational framework for decision-making is an alternate theory to TQM and transformational leadership. Thompson and Tuden found two elements that influence organizational decision-making: goal ambiguity with the missing common vision of employees, and the uncertain cause and effect of factors and relationships between them (as cited in Simons, Benders, Bergs, Marneffe, & Vandijck, 2016). They also found that organizations that experienced ambiguity and uncertainty of results and outcomes were difficult to manage. Other researchers have concluded that, for decision-making to support change, leaders must recognize that inspiration influences change (Simons et al., 2016). Inspiration can enable employees to decide by imagination instead of making decisions by judgment, computation, or compromise (Thompson & Tuden, 1959).

Applying decision-making frameworks in health care is essential when organizations focus on improving patient safety and quality of care (Simons et al., 2016). Decision-making frameworks in the quality improvement decision-making process minimize influential factors such as organizational culture, past experiences, and status of

employees (Holden, Eriksson, Andreasson, Williamsson, & Dellve, 2015). According to Thompson and Tuden (1959), to increase the success of the decision-making process within quality improvement, organizational leaders must minimize organizational ambiguity and attain consensus among employees. In one study, combining quality improvement methodology and an organizational framework for decision-making did not eliminate ambiguity within health care organizations; however, improvements in processes were apparent (Simons et al., 2016). The ambiguity may result from the adaptable, flexible, and multidimensional structure of process improvement methodologies such as Lean (Langstrand & Drotz, 2015). Simons et al. emphasized that even within an ambiguous environment, leaders implementing a decision-making framework increased employee participation in the decision-making process, transparency, and common visions between health care professionals.

Realist theory. The realist theory is a divergent perspective, with realism based on actual social and physical domains that have an impact on reality, allowing increased understanding of the factors and mechanisms that cause and support change (Goodridge et al., 2015). Pawson and Tilley (1997) developed the realist theory, focusing on a perspective of realism. Inherent in the realist theory is the presumption that program implementation challenges a theoretical perspective of what factors and mechanisms are causing change (Goodridge et al., 2015). Mechanisms affect the resources that are integrated to a specific program, impacting the behaviors and reasoning of the program members (Pawson & Tilley, 1997).

When a researcher applies a realist evaluation to quality improvement initiatives such as Lean in health care, the objective is to predict how specific change activities will function and how different mechanisms can support organizational change (Goodridge et al., 2015). Officials in the province of Saskatchewan applied quality improvements using Lean methodology, exploring how specific activities and change impacted health care delivery and patient-centered care (Saskatchewan Health Quality Council, 2015). In combining the realist theory with Lean initiatives in health care, researchers validated that creating a culture of leadership and capacity must precede any other changes seen in a systematic perspective (Goodridge et al., 2015).

Many Lean principles in health care come from the manufacturing sector, specifically the Toyota production system (Simon & Houle, 2017). Deming (1953) helped develop Lean thinking, management principles, and Lean techniques. Management applied Lean principles to the automotive production line processes, emphasizing a structured and standardized process approach to process improvement (Goodridge et al., 2015). Since the 1950s, many automotive sectors have seen the application of Lean management principles (Simon & Houle, 2017). In 1990, Womack, Jones, and Roos (1990) introduced the term *Lean manufacturing*, which appeared in a second publication on Lean philosophy in 1996 (Womack & Jones, 1996). Ten years after the introduction by Womack et al., leaders of the service sector became interested in Lean; their investments in Lean were shown to increase value for customers, leading to the transition of Lean into health care (Daultani, Chaudhuri, & Kumar, 2015). Managers

sought to apply Lean to address a lack of patient-centeredness in care and long-standing issues with process inefficiencies (Goodridge et al., 2015).

Since 2005, leaders of health care organizations have invested in Lean methodology to decrease process waste and increase internal processes and efficiencies (Daultani et al., 2015). Although originating in the manufacturing sector, Lean is an appropriate problem-solving tool to increase performance in most business sectors, according to Montella et al. (2017). The application of Lean principles in the health care sector is associated with increased process quality, increased patient flow, and decreased wait time (Doğan & Unutulmaz, 2016).

Although Montella et al. suggested that Lean can add value in any field, others have criticized the methodology due to its origins in manufacturing (Chiarini & Baccarani, 2016; Costa, Filho, Rentes, Bertani, & Mardegan, 2017). Blackmore and Kaplan (2017) emphasized that because patients are not objects, Lean is not appropriate in health care. Agarwal, Gallo et al. (2016) reported similar findings, suggesting Lean in health care has fundamental differences in comparison to the manufacturing sector. In the manufacturing sector, the customer focuses on the end product; in health care, the customer is the patient, and the patient is present throughout the process as an active participant (Agarwal, Agarwal, Parashar, & Kapadia, 2016).

Lean Principles in Health Care

Lean methodology principles are important in the implementation of Lean in health care. Five elements are necessary for successful Lean implementation in the service sector: defining the level of value by the customer, identifying the value process

and removing all waste, maintaining continuous movement throughout the process, pulling the product throughout the phases, and managing the process until perfection (Womack, 2002). Applying Lean principles produces different methods and ways to improve any process toward attaining a point of perfection (Wong et al., 2016).

In health care, the application of Lean principles boosts flow efficiency for patients, creating added value for activities while focusing on operations and throughput, Tay (2016) reported. Applying Lean principles is appropriate to decrease waste and identify opportunities for increased efficiencies in operational processes (Boronat et al., 2018; Cromwell, Chiasson, Cassidy, & Somers, 2018). Booker, Turbutt, and Fox (2015) argued that Lean is an opportunity to simplify the patient process within hospitals by focusing on activities that add value for patients with minimal process waste. Lean can provide opportunities for the review of processes as well as hierarchal horizontalization, including the standardization and protocols and decreased variability in processes (Boronat et al., 2018). Rosso and Saurin (2018) identified the risk of standardization of Lean principles in health care, including the presumption that compliance with Lean principles is dependent solely on the motivation of employees. According to van Leijen-Zeelenberg et al. (2016), employees need time to become comfortable with Lean principles and change their perceptions. Hihnala, Kettunen, Suhonen, and Tiirinki (2018) asserted that an in-depth understanding of Lean principles was necessary to apply Lean effectively. According to Edelman, Hamaekers, Wolfgang, Buhre, and van Merode (2017), individuals should not be discouraged by failed Lean initiatives in health care, as Lean principles support the idea of attempting new initiatives, thereby allowing change

processes to occur. To facilitate change, process waste reviews and tool applications should be part of Lean principles.

Managers can apply Lean in support of Lean principles by reviewing process waste. Lean is foundational in providing a high level of patient services in a complex environment while reducing waste and barriers within processes (Blackmore & Kaplan, 2017; Hihnala et al., 2018). Successful application of Lean in health care organizations often comes from analyzing process flow and reviewing present and future state processes (Agarwal, Gallo et al., 2016). According to Edelman et al. (2017), common themes of waste within operational processes included high inventory levels, overproduction, waiting, correcting errors, processing, and transportation.

Various Lean tools support process improvement, showing the versatility of Lean. Dobrin, Dinulescu, and Dima (2017) suggested that value stream mapping enabled the exploration of present state and future state processes. Jayasinha (2016) that found the Lean spaghetti diagram tool allowed for the calculation of employees' wasted steps. Dobrin et al. encouraged the 5 Whys technique to understand root cause, with the 5S technique focused on inventory waste. Idemoto, Williams, and Blackmore (2016) noted that root cause analysis provided clarity of the variabilities and delays in the processes. Researchers highlighted going to the Gemba (going to the source) as one of the most critical Lean tools for it encourages leaders to be physically present where the work occurs in order to understand operational processes and implement change (Aij & Teunissen, 2017; Karel, Delisle, Anagnostis, & Wordell, 2017). Kovacevic et al. (2016) shared a different perspective, emphasizing the importance of Lean tools most applicable

to health care: Kaizen events, value stream mapping, and management of visual techniques. Rosso and Saurin (2018) asserted that applying any choice of Lean tools may reduce wasteful processes, although there is a risk waste will be transferred from one operational process to another. In comparison, Hihnala et al. (2018) identified the application of Lean as having an objective of decreasing waste; however, removing all waste within complex processes is not always possible. Fournier and Jobin (2018) noted that Lean tools are challenging to implement in an uncertain and complex environment with both a high level of patient involvement in care, as well as a diverse and autonomous workforce that takes part in the decision-making process.

Complexity of Health Care

Aij and Teunissen (2017) found an association between increased health care complexity, cost, and an aging population with greater multimorbidity. External stakeholders that allow minimal flexibility to accommodate change contribute to health care complexity (Blackmore & Kaplan, 2017). As noted by Fournier and Jobin (2018), the complexity in health care and the implementation of Lean in hospitals is challenging and has debatable value.

An economic crisis in health care has led to reduced financial budgets, encouraging greater efficiency with fewer resources within a complex system (Chiarini & Baccarani, 2016). Inefficiencies often result from duplication of services with limited cross-boundary communication within hospitals (Agarwal, Gallo et al., 2016; Mazzocato, Stenfors-Hayes, von Thiele Schwarz, Hasson, & Nyström, 2016). Allen (2016) emphasized that patient processes are complex and continuously changing trajectories

within a siloed environment of limited communication. According to Wong et al. (2016), due to the complexity and asymmetry of information, frontline employees in hospitals are no longer able to solve issues without support from management. The complexity of health care is due to low levels of predictability and delays within hospitals, with high process variability (Idemoto et al., 2016).

Process variability and frequent errors in health care organizations include missing patient data, misplaced documents, and misdiagnoses (Barnabè, Giorgino, Guercini, Bianciardi, & Mezzatesta, 2018). Process variability and errors stem from unpredictable processes with missing internal control mechanisms, such as documentation duplication and missing equipment (Naidoo & Mahomed, 2016). A cross-functional perspective on complex process variability is necessary to understand the impact of proposed change (Rubenfire, 2017; Stelson, Hille, Eseonu, & Doolen, 2017). With each change, leaders must analyze the contextual factors of the environment to understand how they can impact processes and patient flow (Hung, Gray, Martinez, Schmittdiel, & Harrison, 2017). Within hospitals, process duplication results in high levels of inefficiency and increased wait periods (Agarwal, Agarwal et al., 2016). Wong et al. (2016) noted a lack of standardization of care between health care professionals negatively affects patient flow, with an increased confusion of roles, inconsistent practices, and rework.

Process standardization provides a high level of reliability in hospitals yet reduces the ability to meet the specific and unique needs of patients (O'Reilly et al., 2016). Information flows in an analogous way, following a process that can create waiting

periods for patient care (Henrique, Rentes, Filho, & Esposto, 2016). Walker, Kappus, and Hall (2016) suggested every organization must assess and evaluate patient flow on a regular basis to determine specific needs and priorities for change. When evaluating patient flow, individuals can support process improvement through data review. Although essential for process correction, continuous process data review is not always available (Boronat et al., 2018). Harrison et al. (2016) emphasized the need for information technology to support quality improvement initiatives with information systems and real-time data.

Cromwell et al. (2018) and Stelson et al. (2017) shared the need for hospital administrators to focus on higher efficiency and reduced complexity while demonstrating fiscal responsibility. Applying operating cost reduction efforts to quality improvement initiatives is possible; however, few researchers have quantified actual data (Moraros et al., 2016). Jorma, Tiirinki, Bloigu, and Turkki (2016) found that 90% of hospital administrators neither measured nor calculated the cost savings of their Lean application. In one of the very few municipalities to do so, Saskatchewan, Canada, leaders undertook provincial Lean implementation, calculating the total cost of Lean implementation and the return on investment (Moraros et al., 2016). Determining the cost of quality improvement with clear, measurable financial outcomes is limited in many Lean implementations, with data to confirm the added value of Lean in health care often missing (Jorma et al., 2016).

There is also a need for scientific research and skills to verify the effectiveness and performance of Lean initiatives in health care (Blackmore, Williams, Ching, Chafetz,

& Kaplan, 2016). Also, few researchers have applied research principles and a scientific lens on process improvement initiatives (Moraros et al., 2016). Applying research principles to process improvement will enable exploration of additional complexities of health care, including funding, access to care, and patient needs (Blackmore et al., 2016).

Organizational Culture

The application of Lean in health care has increased efficiency, productivity, and patient flow (Wong et al., 2016). Focusing on efficiency in hospitals may increase quality of care, in addition to safety and efficiency within processes and a positive impact on the workplace and patient safety (Holden et al., 2015; Magalhães, Erdmann, da Silva, & Santos, 2016). Costa et al. (2017) found that leaders implementing Lean initiatives delivered a positive impact to patient safety with decreased patient wait time and cost, creating a source of energy in the workplace when implementing quality improvement initiatives. If applied systematically, Lean initiatives can produce positive results, with increased efficiency in operations and modifications in the organizational culture and a focus on workplace and patient safety (Harrison et al., 2016).

Hospital organizational culture is deep-rooted in operational processes, including previously developed guidelines, checklists, and protocols (Allen, 2016; Mosadeghrad, 2015). To modify the organizational culture of hospitals, administrators must divide quality improvement initiatives into small projects with frontline employees, encouraging daily huddles and communication between employees to review key performance indicators (Simon & Houle, 2017; Valsangkar, Eppstein, Lawson, & Taylor, 2017). Managers should view quality improvement initiatives as an endeavor to develop a

practice of organizational change, with employees seen as belonging to a collective group (Allen, 2016). According to Goodridge et al. (2015), failed quality initiatives occur when there is limited understanding of the present organizational culture, along with a sole focus on process outcomes.

The implementation of quality improvement initiatives can successfully influence organizational change and efficiency in many health care environments (Castaldi, Sugaro, Kreps, Cassidy, & Kaban, 2016). These environments include specific areas and procedures in hospitals in which systemwide Lean implementation can positively influence patient flow and process efficiency, such as the emergency department, transition of care into an inpatient unit, and patient admission and discharge processes (Walker et al., 2016). Montella et al. (2017) found that systemwide Lean implementation resulted in decreased wait times as well as reduced length of stay for admitted patients. Kovacevic et al. (2016) obtained similar results, noting increased coordination and transition of care into inpatient units after Lean implementation, and an increased patient flow within the hospital. According to Castaldi et al., Lean implementation allowed greater efficiency with increased coordination of the operating room by reducing patient turnover time, resulting in significant cost savings for the organization. Researchers also noted that applying systemwide Lean implementation in hospitals increased efficiency through patient admission and discharge process alterations, with inpatient hospital stays reduced from 6.3 days to 5.7 days (Kovacevic et al., 2016).

Leaders can enable specific elements to facilitate change within the organizational culture of hospitals, with a focus on positive patient outcomes, safety, and quality of care

(Blackmore & Kaplan, 2017; Colldén et al., 2017). To improve patient safety and quality of care, hospital administrators can apply Lean initiatives to reduce readmission rates and decrease errors (Goodridge et al., 2015). Other opportunities to reduce adverse patient outcomes include applying Lean initiatives to ensure frontline staff wash their hands, validate patient identification bands, and provide patient safety brochures (Moraros et al., 2016). According to Simons et al. (2017), implementing Lean in hospitals decreased the number of adverse patient outcomes by nearly half over a 5-year period. Reducing adverse patient outcomes includes elevating quality of care for patients, a principal focus when implementing successful Lean initiatives with smooth transitions, short wait times, and evidence-based practices (Colldén et al., 2017).

Successful implementation of Lean initiatives can have a positive impact on efficiency and workflows, and will likely increase positive patient experiences and satisfaction (Agarwal, Agarwal et al., 2016). For patient satisfaction to occur, organizational leaders applying quality improvement initiatives must better understand the needs and values of patients (Jayasinha, 2016; van Leijen-Zeelenberg et al., 2016). There are conflicting results in Lean implementation and patient satisfaction. Some hospitals that applied Lean initiatives have found higher patient satisfaction levels (Branco, Wicks, & Visich, 2017; Rotteau et al., 2015); however, other hospitals that have applied the same Lean initiatives did not experience an increase in patient satisfaction levels (Dunsford & Reimer, 2017; Poksinska et al., 2016). The mixed results of patient satisfaction and Lean correlation may be due to the value within the system not being in line with patient standards, or not necessarily noticeable to patients (van Leijen-

Zeelenberg et al., 2016). According to Blackmore and Kaplan (2017), a reason for the mixed results is that tools measuring the experience of patients in health care are not perfect and can produce errors in measurement, which could be a reason the tools may not return positive results. Another reason for mixed results includes frontline employees resisting the Lean initiatives and not applying the changes to their daily work (Allen, 2016). Resisting Lean initiatives in the workplace occurs because of skepticism and doubt resulting from past failed experiences; however, with time, employees had higher satisfaction levels after Lean implementation (Rotteau et al., 2015).

Employee satisfaction and Lean implementation are associated with increased employee engagement, connection to a need and purpose, opportunities for development and professional growth, as well as the increased positive environment with patient flow (Harrison et al., 2016; Hung et al., 2017; Nazarali et al., 2017). Other factors may impact employee satisfaction and Lean implementation. Holden et al. (2015) noticed employees in higher-acuity departments, such as critical care, responded more positively to Lean implementation than those in smaller, lower-acuity hospitals. Other elements impacting employee satisfaction during Lean implementation include the perception of increasing responsibilities and workload, as well as the expectation of extra work outside regular work hours (Goodridge et al., 2017; Stelson et al., 2017; van Leijen-Zeelenberg et al., 2016). Wells, Coates, Williams, and Blackmore (2017) also emphasized that with process improvement initiatives, employees may notice other process issues needing repair, which can lead to higher levels of dissatisfaction and despair along with reduced leadership.

Leadership and Lean

Associated with increased Lean implementation success, the application of strong leadership qualities is essential for robust strategic planning and organizational performance (Goodridge et al., 2015; Mosadeghrad, 2015). Patri and Suresh (2018) suggested that to implement Lean successfully, leaders need to boost their leadership by encouraging collaboration and addressing false perceptions individuals may have about Lean. Leaders can also demonstrate their leadership with communication and flexibility, as well as performing a high level of prework to prepare frontline employees for Lean implementation (Hung et al., 2017; Monroe-Wise et al., 2017). Preparing frontline employees for process improvement includes sharing values and vision, promoting legal and ethical behaviors, communicating openly, and focusing on performance (Chiarini & Vagnoni, 2017). Hung et al. found leadership facilitated Lean implementation, with leadership style of leaders significantly impacting the outcome.

Different leadership styles contribute to successful Lean implementation. Transformational leaders can create inspiration and flexibility among the workforce by supporting a strong foundation for Lean principles (van Rossum et al., 2016). Visionary leaders may facilitate Lean implementation by creating clear objectives when developing educational opportunities for employees (Patri & Suresh, 2018). Servant leaders, in turn, can increase empowerment, respect, and individual leadership while attaining customer satisfaction (Aij & Rapsaniotis, 2017).

Senior management teams are an essential element in supporting the implementation of Lean initiatives (Blanchard & Rudin, 2016; Chiarini & Baccarani,

2016). According to Barnas (2018), leadership begins with the chief executive officer (CEO) promoting a vision and strategy that offers a clear purpose to guide the senior management team. Similarly, Rotteau et al. (2015) found that when CEOs promoted Lean as an organizational priority, Lean became a priority within the organization. Top-down leadership is necessary to support and ensure clear communication of expectations and goals (Chiarini & Baccarani, 2016; Enright, 2015). The level of success with Lean implementation rests on the commitment of senior management teams (Gupta, Kapil, & Sharma, 2018; Harrison et al., 2016; Wong et al., 2016). In supporting and prioritizing Lean, senior management must ensure visibility and support by going to the Gemba to understand the operational processes (Edelman et al., 2017; Rubenfire, 2017).

There is a need for senior management to understand Lean principles and to be educated in Lean (Centauri, Mazzocato, Villa, & Marsilio, 2018). Goodridge et al. (2015) found that, on average, only 30% of senior management teams are knowledgeable in Lean principles and have participated in Lean leadership education. Understanding the principles can lead to removal of barriers, including a previous lack of financing to support projects and the need to hire Lean consultants to develop expertise within the organization (Harrison et al., 2016; Stelson et al., 2017). Members of senior management need to champion technological information systems to enable data collection and support strategic decisions concerning efficiency and organizational productivity (Mazur, Johnson, Pooya, Chadwick, & McCreery, 2017; Mosadeghrad, 2015; Walker et al., 2016). To support leadership and Lean in hospitals, senior management should create a

chief experience officer position as part of the executive team, focusing on Lean implementation and patient experience to support cultural transformation (Bees, 2017).

Cultural Transformation

The application of quality improvement initiatives can provide an opportunity for cultural transformation within health care organizations. Managers generate such a transformation by creating a shared vision of quality improvement initiatives, building capacity by education and leadership training, implementing Lean in all departments, and transferring knowledge and information to others (Hassanain, 2017). When hospital leaders implement Lean principles, they reveal a focus on improving the culture within the organization by creating a shared vision and commitment, aligning all work to center on patient care and satisfaction (Aij & Rapsaniotis, 2017). DiGioia, Greenhouse, Chermak, and Hayden (2015) found that once employees viewed the process from the patient perspective, they felt a sense of urgency to change, thus supporting cultural transformation. When employees focused on and embraced the patient perspective instead of the inpatient unit perspective, quality improvement occurred (Mazzocato et al., 2016).

Lean implementation also encourages staff buy-in, identifying a need to improve and support change for patient care (Jayasinha, 2016). As Matos, Alves, and Tereso (2016) found, the application of Lean principles allowed employees to shift their focus from the needs of the physician to the needs of and the value to the patient. As Lean allows for an increased understanding of patient needs, leaders can implement processes to support consistent delivery of appropriate services, creating a shift from a provider-

centric model to a patient-focused model (Wong et al., 2016). Lean also creates opportunities for frontline employees to develop their values concerning team dynamics. Lean implementation is a facilitator in increasing teamwork with improved collaboration and coordination of efforts in developing a shared vision and values (Centauri et al., 2018; Coury et al., 2017; Jorma et al., 2016). Van Leijen-Zeelenberg et al. (2016) found that Lean allows employees to create an environment where creativity, transparency, and vulnerability to change in discussions and meetings are acceptable. Agarwal, Gallo et al. (2016) emphasized changes in team values included flexibility and openness to change with Lean. Hung et al. (2017) found that frontline employees share values of empowerment in their work autonomy level, authority, and professional identity. Empowerment occurs when individuals have time to think about their work, entrusted with the power and authority to make changes in their work environments (Wong et al., 2016).

Application of Lean principles and initiatives allows frontline employees to become engaged and take part in the decision-making process (Agarwal, Agarwal et al., 2016; Naidoo & Mahomed, 2016; Roszell & Lynn, 2016). Centauri et al. (2018) believed employee engagement included a bottom-up approach to quality improvement. Employees' feelings of engagement and empowerment resulted from increased decision-making in patient care (Allen, 2016). Esteves, Azevedo, and Brójo (2016) found that Lean provided an opportunity to empower managers to create and support changes within their departments. To support change, managers must let go of project ownership and

allow employees to take ownership, thereby promoting an environment of mutual trust (Aij & Teunissen, 2017; Naidoo & Mahomed, 2016).

Ownership by managers encourages employee autonomy to pilot and implement ideas in their immediate realm of control (Mazzocato et al., 2016). Gathering and reporting data can also provide a source of motivation for employees, which subsequently supports Lean principles (Rees & Gauld, 2017). Other factors supporting Lean implementation are professional autonomy and collaboration among team members (Magalhães et al., 2016; Mosadeghrad, 2015; O'Reilly et al., 2016).

According to Wong et al. (2016), managers need to be patient with employees while cultural transformation takes place. Leaders can contribute to employee motivation and buy-in by providing dedicated time for process improvement, allowing frontline staff time to be away from the bedside to reflect on process designs (O'Reilly et al., 2016). Esteves et al. (2016) highlighted that low employee availability to participate in Lean initiatives increased resistance to change. Resistance to Lean occurs when solutions fail to include daily tasks completed by frontline employees (Allen, 2016). Jorma et al. (2016) identified resistance to Lean as individuals' resistance to change their ways of working, inertia, fatigue, and lack of education on Lean principles. Patri and Suresh (2018) emphasized the need for leaders to educate employees on Lean principles to remove past perceptions, thus allowing for reduced integration of process improvement within the team. Also, engaging physicians in quality improvement processes is essential, though challenging (Gold et al., 2016).

Lean initiative implementation in health care has had minimal to no impact on physician satisfaction and engagement levels (Holden et al., 2015; Simons et al., 2017). Physicians also contribute to Lean implementation resistance (Jorma et al., 2016). Physician resistance manifests with high skepticism levels and low participation levels, thereby negatively impacting Lean implementation (Hung et al., 2017). This may be the result of governance structures, as physicians are independent contractors and not hospital employees (Fournier & Jobin, 2018; Hung et al., 2017). A common theme was physicians' concern that Lean implementation could impact their authority, identity, or autonomy (Ashok, Hung, Rojas-Smith, Halpern, & Harrison, 2018). Rutledge and Martin (2016) noted Lean is not a tool to replace the science of medicine; rather, it is an opportunity to decrease variation and waste. Rotteau et al. (2015) emphasized the need to engage and empower physicians from the beginning of the process, as they can lend credibility to the Lean process and influence other physicians. Hung et al. suggested physicians need robust evidence demonstrating Lean effectiveness, without which they will be skeptical of expected results. Increased buy-in may come about from various factors, such as implementation of best practices and process redesign (Bradywood, Farrokhi, Williams, Kawalczyk, & Blackmore, 2017). The increased skill and competence of managers can also increase physician buy-in (Ashok et al., 2018).

The implementation of Lean initiatives can produce increased communication between frontline staff (Basta et al., 2016; Boronat et al., 2018; Cromwell et al., 2018; Goga et al., 2017). Allen (2016) noted that patient care is intense, knowledge-focused work, with the sharing of knowledge the most challenging aspect. Communicators can

demonstrate care by creating positive interpersonal relationships with patients, reflecting the values of the patient (Dunsford & Reimer, 2017). The application of Lean principles, such as standardized work, facilitated better communication (Goga et al., 2017; O'Reilly et al., 2016). Idemoto et al. (2016) posited that a standardized process increased process transparency. Lean tools boosted communication; for example, tools such as patient information boards allowed visualization of patient status, creating opportunities for patient care and delay reduction (Cromwell et al., 2018). Daily huddles formed an environment encouraging discussions between employees and health care professionals (Rubenfire, 2017).

Rotteau et al. (2015) identified face-to-face discussions and sharing feedback with employees on a regular basis as the most effective strategies to increase communication and participation. However, standardization of communication messages and tools can create perceptions of decreased autonomy of health care professionals (van Leijen-Zeelenberg et al., 2016). O'Reilly et al. (2016) found communication standardization to be the most challenging element in Lean implementation, because health care professionals take pride in personalized patient communication which, if removed, could cause feelings of being unvalued. Van Leijen-Zeelenberg et al. noted that although Lean tools increased communication, the standardization of processes and discourse reduced professional autonomy levels. Communication standardization requires the flexibility and understanding of both patients and employees, as the needs of one person may not be the same as another (O'Reilly et al., 2016).

Communication between managers and leaders often provides increased support and higher motivation levels when implementing Lean initiatives (Stelson et al., 2017). Communication can foster an environment of change, along with increased knowledge and trust (Aij & Teunissen, 2017; Hung et al., 2017). According to Blanchard and Rudin (2016), communication may also enable an environment of friendly competition and accountability between colleagues. Managers and leaders can have a positive impact on Lean initiatives by providing clear and specific messages to employees, increasing performance and accountability while developing and sustaining positive relationships (Aij & Teunissen, 2017).

Employee education and learning opportunities enable Lean implementation (Boronat et al., 2018; Chiarini & Baccarani, 2016; Gold et al., 2016; Mosadeghrad, 2015; O'Reilly et al., 2016). Education transforms a culture of quality improvement, as employees have the skills to apply knowledge and change the organization (Edelman et al., 2017; Major & Huey, 2016; Wong et al., 2016). As observed by Patri and Suresh (2018), education has a significant impact on professional culture within health care, especially for employees who believe standardized patient care is impossible. According to Gold et al., education on Lean principles increased employee confidence while participating in quality improvement projects, as most applied and attained their project goals. Boronat et al. emphasized that education also provided alignment for multidisciplinary professional teams, allowing employees to work in the same direction with the same tools. O'Reilly et al. advocated that educating employees supported Lean implementation by allowing them to problem solve, create new projects and initiatives,

and develop accountability for change and empowerment. Education is an essential component of creating a culture in which management and employees can govern processes, enhance practices, and support supply and demand (Mosadeghrad, 2015; Savage, Parke, von Knorring, & Mazzocato, 2016).

The Lean methodology includes terminology that can be complicated and confusing for employees (Stelson et al., 2017). Therefore, making available Lean coaches to offer support and guidance can be helpful for an organization to achieve quality improvement success (Allen, 2016; Cheung et al., 2016). Barnabè et al. (2018) confirmed that role-playing and Lean simulation facilitated performance and application of Lean principles while supporting high levels of autonomy in decision-making. Workshops can also increase understanding of process standardization, as well as the need to decrease variability within processes (Patri & Suresh, 2018; Roemeling, Land, & Ahaus, 2017). Minimal education on Lean is a barrier to implementation (Hihnala et al., 2018). Goodridge et al. (2017) found that more than 75% of health care professionals employed in organizations with Lean principles had neither sufficient Lean education nor adequate resources to support implementation.

Health care professionals need to receive quality improvement education within their educational curricula (Yang et al., 2017). Magalhães et al. (2016) suggested health care curricula such as nursing include Lean thinking and principles, continuous quality improvement, inventory management, negotiation, and complexity science. Flynn, Scott, Rotter, and Hartfield (2016) supported this perspective and emphasized the need to recognize quality improvement professionals, including nursing clinical scientists, in

health care improvement sciences. Sustaining gains after Lean implementation in health care may be difficult (Castaldi et al., 2016; Enright, 2015; Hassanain, 2017). Creating data reports and performance reviews on a regular basis is essential to support the sustainability process (Agarwal, Agarwal et al., 2016; Klein & Khan, 2017; Sisler et al., 2017). Amaratunga and Dobranowski (2016) recommended data collection at three stages: pre–, mid–, and post–Lean implementation. Both Klein and Khan and Sisler et al. found that allowing Lean team employees to deliver monthly performance reports to stakeholders reinforced the sustainability of change; developing specific metrics to view efficiency and progress supported employees in understanding added value for patients (Agarwal, Agarwal et al., 2016; Amaratunga & Dobranowski, 2016; Barnas, 2018; DiGioia et al., 2015; Edelman et al., 2017; Mazur et al., 2017; Valsangkar et al., 2017). With minimal technological support to collect data, employees often conduct manual audits (Gupta et al., 2018). The manual collection of data is difficult for employees, who may see the process as cumbersome and laborious (Coury et al., 2017; Edelman et al., 2017).

Ashok et al. (2018) found measuring the impacts and outcomes of Lean initiatives in an objective manner to be a complex endeavor. The comparison of data, metrics, and benchmarking with other organizations provided managers and employees a stimulus for sustainability (Boronat et al., 2018; Roszell & Lynn, 2016). Walker et al. (2016) emphasized the need for real-time data with trending on a monthly basis to support sustainability. Employees require education and training for Lean initiatives to succeed (Matos et al., 2016; Nazarali et al., 2017). Encouraging employees to adopt a high level

of involvement in Lean initiatives can impact retention and sustainability (Agarwal, Agarwal et al., 2016). Continuous communication between employees, patients, and management is needed to sustain change (Jayasinha, 2016; Mazzocato et al., 2016; Wong et al., 2016). Evaluating the level of capacity and behavior for change within an organization enables increased opportunity for sustainability (Stelson et al., 2017; van Rossum et al., 2016). The implementation of Lean initiatives needs to be part of daily activities (Flynn et al., 2016; Lennox, Maher, & Reed, 2018). Management accountability and leadership were essential in increasing sustainability and change for Lean implementation in health care (D'Andreamatteo, Ianni, Lega, & Sargiacomo, 2015; Mutwiri, Witt, Denysek, Halferdahl, & McLead, 2016; Rotteau et al., 2015; Wong et al., 2016). There is a need to rely on external support systems, such as Lean coaches and external financing, to allow the maintenance of Lean initiatives in health care (Costa et al., 2017). Moraros et al. (2016) emphasized that, with the increased complexity and difficulty in collecting data to confirm if Lean is a useful methodology in health care, an important question arises: Do health care leaders continue to invest in Lean methodology, or is Lean deflecting a viable long-term solution within a broken health care system?

There is added value in combining Lean methodology with other models or frameworks, which can enhance a systemwide transformation to support quality improvement in health care (Centauri et al., 2018; Daultani et al., 2015; Mahajan, Islam, Schwartz, & Cannesson, 2017; Meisami, Deglise-Hawkinson, Cowen, & van Oyen, 2018). Daultani et al. found Lean can combine with other methodologies such as Six Sigma, the theory of constraints, TQM, and Agile. Centauri et al. noted that combining

Lean methodologies with other models or frameworks may enable the identification of different variables to support efforts to create quality improvement within health care. Lean and Six Sigma complement one another and appear to provide the most significant impact and results (Agarwal, Agarwal et al., 2016; Cheung et al., 2016; Jayasinha, 2016; Tehrani, Lehman, Ganai, & Desai, 2016; Walker et al., 2016). Lean centers on waste reduction and quality care issues; therefore, the method cannot help confirm statistical control or decrease variation, both of which Six Sigma does (Silver et al., 2016). Lee et al. (2016) noted that facilities designated as academic teaching hospitals tend to combine Lean and Six Sigma to achieve a common goal: eliminate waste while enabling the highest possible level of efficiency (Improta, Cesarelli, Montuori, Santillo, & Triassi, 2017).

Health care organizations that implement Six Sigma and Lean together have demonstrated higher fiscal and performance levels than those applying Six Sigma without Lean (Lee et al., 2016). Together, Lean and Six Sigma facilitate increased patient flow in hospital processes (Agarwal, Agarwal et al., 2016; Walker et al., 2016) and clinical redesign of patient care, along with positive patient outcomes (Jayasinha, 2016). The combination of Lean and Six Sigma can improve process efficiency while increasing patient safety, providing cost containment and greater organizational responsiveness to process barriers (Cheung et al., 2016). Sirvent et al. (2016) suggested health care managers introduce Lean and Six Sigma as continuous process improvements in hospitals, limiting the bias that exists due to the initiatives' roots in the manufacturing sector. Even so, hospital administrators implement Six Sigma more often than Lean due

to Lean's intensity and association with the manufacturing sector. In addition, the cost of implementing Lean is higher than Six Sigma (Lee et al., 2016).

Organizations can also combine Lean with other methodologies, such as just-in-time and TQM (Al-Hyari, Abu Hammour, Abu Zaid, & Haffar, 2016; Dobrin et al., 2017). Daultani et al. (2015) found that 52% of hospitals combined Lean with a second methodology, most frequently just-in-time (32%), Six Sigma (20%), TQM (nearly 11%), simulations (6%), and Agile (1.5%). According to Al-Hyari et al., implementing Lean principles with just-in-time and TQM in health care produced better performance by way of greater patient satisfaction, reduced financial costs, and increased quality of care. Health care administrators combining Lean with just-in-time principles reduced waste by decreasing overproduction and deepening the focus on patients' needs and demands (Dobrin et al., 2017).

The Lean methodology is complementary to business process management initiatives (Hassanain, 2017). According to Edelman et al. (2017), Lean can provide added value to different sectors of business, such as project management. The Leadership Education Advocacy Development Scholarship (LEADS) program helps with leadership development, resilience engineering, and any other research-based approach to quality improvement (Blackmore et al., 2016; Mutwiri et al., 2016). According to Rosso and Saurin (2018), combining Lean and resilience engineering allows for increased process analysis, supporting a high level of system redesign. Applying mathematical modeling and engineering principles in conjunction with Lean can also increase patient flow by

calculating the optimum number of high-risk patients to critical care units and low-risk patients to inpatient units (Meisami et al., 2018).

DiGioia et al. (2015) found that coupling Lean and patient- and family-centered care provided a humanized approach with a focus on similar elements: patient experience from the patient's perspective, patient and family engagement within the process, and barriers within patient processes. Also, combining Lean and evidence-based clinical care pathways enabled increased communication between health care providers, a clearer focus on evidence-based practices, and process standardization (Bradywood et al., 2017). Hospital administrators can apply, measure, and document specific quality process metrics while implementing evidence-based practices (Hassanain, 2017). When applied to quality improvement, evidence- and research-based approaches gave initiatives a better chance of reaching their full potential (Blackmore et al., 2016).

Crema and Verbano (2017) emphasized the importance of combining Lean and Choosing Wisely methodologies to remove wasteful and potentially harmful tests, ensuring ethical and fair utilization of medical resources. The American Board of Internal Medicine Foundation supports Choosing Wisely methodology to assist health care providers in reducing testing deemed to provide minimal value and possible harm to patients (Levinson et al., 2015). The methodological pairing facilitated the attainment of similar objectives, including reduced process waste, improved patient processes review, and more efficient resource utilization (Crema & Verbano, 2017).

Irrespective of the chosen methodology, combining Lean with other methodologies provides a systemwide view of processes, identifying variables to support

continuous quality improvement initiatives within hospitals (Centauri et al., 2018). According to Hasle, Nielsen, and Edwards (2016), coupling Lean with various methodologies encourages a specific focus on social structures within organizations, along with foundational values to achieve the full potential of patient care. The application of multiple methodologies creates value for hospitals, enabling adaptive systems to support partial redesign with organization-based processes and manufacturing-based elements (Mahajan et al., 2017).

Transition

In Section 1, I focused on the foundation of the study. This includes the purpose of the study, in which I explored the strategies health care managers apply in implementing Lean initiatives to reduce health care costs. The description of the nature of the study provided information on the application of a qualitative research method within a single-case study. I reviewed the research question and interview questions, along with the conceptual framework, operational definitions, assumptions, limitations, and delimitations, to allow an in-depth understanding of the study.

The significance of the study includes why the findings may be of value to the study of business and contribute to social change. Included in the discussion of the TQM framework, along with three alternative theories, was a review of complementary or alternative theories to the implementation of Lean in health care. Through an academic literature review, along with the analysis and synthesis of themes found in past literature and research, I undertook an extensive exploration on the topic of Lean in health care.

This included a review of Lean principles in health care, the complexity of health care, organizational culture, leadership and Lean, and cultural transformation.

In Section 2, I present information on the project, including the role of the researcher, participants, research method, and design. A discussion on population sampling and ethical research appear, along with a review of the data collection instruments, data collection technique, data organization techniques, and data analysis. The study's validity and reliability will be confirmed. In Section 3, I present the findings of the study, including reviewing the research question and identifying and analyzing themes from research findings. I also provide information on how the findings may impact Lean application to professional practice of business in health care and for social change. I conclude with recommendations for action and further research, and reflect on the doctoral study process within the Doctor of Business Administration (DBA) program at Walden University.

Section 2: The Project

In this section, I discuss the project component of this research, as well as present the strategy for collecting and analyzing data while maintaining academic rigor. I reaffirm the purpose statement, discuss the roles of the researcher and participants, and describe the research method and design. Section 2 includes an exploration of the different research elements, such as population sampling and ethical research, followed by a review of the data collection instruments and techniques, including data organization techniques. Also discussed is the process for data analysis to demonstrate reliability and validity of results.

Purpose Statement

The purpose of this qualitative single-case study was to explore the strategies health care managers used to implement Lean initiatives to reduce health care costs. The target population was six health care managers who had demonstrated successful implementation of Lean initiatives in an acute care hospital located in the province of Ontario, Canada. The contributions to positive social change may include knowledge on how to address the increase in demand, while also increasing patient safety and reducing negative patient outcomes. Positive patient outcomes could result in patients being discharged from the hospital sooner to return safely home to their families and communities.

Role of the Researcher

As the researcher in this study, my role was to extract detailed and rich information from individuals' past experiences (Percy, Kostere, & Kostere, 2015). My

goal was to understand the attitudes and experiences of participants by asking how, what, and why questions (McCusker & Gunaydin, 2015; Sutton & Austin, 2015). I was the primary data collection instrument in the study as I sought to understand the past experiences of health care managers and the strategies they applied to implement Lean initiatives to reduce health care costs. To collect information from health care managers who met the specified criteria, I conducted semistructured interviews comprised of preplanned questions based on the literature and my understanding of the topic. Conducting semistructured interviews with open-ended questions allows for more exploratory queries (Percy et al., 2015). I developed interview questions that supported the research question and allowed room for exploration and information volunteered by participants (Appendix A). Before conducting any interviews or gathering any data, I first obtained authorization from the Walden University Institutional Review Board (IRB) approval number 01-16-19-0672648. Upon obtaining IRB approval, I scheduled interviews with participants and moved forward with the data collection process.

The role of the researcher is to remain neutral while exploring and understanding the participant's perspective (Sutton & Austin, 2015). Researchers must practice active listening during the data collection process, using open-ended questions without a trace of presumption and building a trusting relationship with participants (Castillo-Montoya, 2016; Patton, 2015). Researchers also need to be aware of and sensitive to moments of silence during the interview, allowing both participant and interviewer time to reflect on the discussion (Bengtsson & Fynbo, 2018). I respected and did not judge participants as I sought to explore and understand their experiences implementing Lean methodology

within the hospital setting. I also embraced pauses as I monitored both verbal and nonverbal participant behavior.

My obligation as a researcher was to remain objective, unbiased, and cognizant of any personal assumptions or thoughts that may have impacted my findings. I achieved this by maintaining a high level of awareness and reflection both before and during the data collection process. The qualitative researcher's role is to elicit emerging themes from all participants while interpreting their responses to the questions (Percy et al., 2015). Following data collection, I analyzed the information, searching for themes and patterns. To categorize and code collected data, I used NVivo, a software program available for researchers (Langham et al., 2016). Qualitative researchers employ NVivo to segregate collected data and facilitate the coding of various themes (Langham et al., 2016).

An important role of the researcher is to maintain high ethical standards by ensuring professional and academic competency; this is achieved by displaying accuracy, credibility, and consideration for all participants (Yin, 2017). Because I am a health care professional who has applied Lean principles in health care, I know the importance of ensuring an unbiased data collection process. Accordingly, I conducted the study in an acute care hospital at which I was not employed, where I was unknown and unfamiliar with all potential research participants.

Throughout the data collection process, researchers must adhere to the ethical principles and guidelines specified in the *Belmont Report* (National Commission for the Protection of Human Subjects and Biomedical and Behavioral Research, 1978). The

Belmont Report outlines research ethics and limitations, such as respect for individuals, fairness and justice, and beneficence (National Commission for the Protection of Human Subjects and Biomedical and Behavioral Research, 1978). Researchers follow these principles by obtaining informed consent from all participants, maximizing benefit and minimizing risk, and ensuring a fair sample selection process (National Commission for the Protection of Human Subjects and Biomedical and Behavioral Research, 1978). As a rule, prior to conducting any research activity, researchers should perform a review to ensure the protection of all human participants (National Commission for the Protection of Human Subjects and Biomedical and Behavioral Research, 1978). Individuals should not be subject to negative consequences from the data collection process, including consequences from participation or any emotional or physical disadvantage (Saunders et al., 2016). My role as researcher was to review the *Belmont Report* and ensure compliance with all ethical principles stipulated therein.

Conducting qualitative research may present issues concerning how close the researcher is to the topic; however, the use of specific strategies can decrease the potential for bias (Birt, Scott, Cavers, Campbell, & Walter, 2016). Researcher bias occurs when personal experiences and views influence the study's design, data collection, or findings (Galdas, 2017). To increase the credibility and trustworthiness of findings, researchers can implement techniques such as triangulation, extended observations, peer debriefing, and member checking (Guba, 1981). Transferability improves with the use of comprehensive note-taking and other techniques to ensure deep and thick accounts of

findings (Lincoln & Guba, 1985). Dependability and confirmability increase with in-depth auditing by the researcher (Guba, 1981).

I used specific strategies to avoid bias and enhance the trustworthiness and rigor of the research findings, including compiling field journals, triangulating data collection, debriefing, and member checking. Field journals incorporate three types of notes: daily activities, a reflective journal, and field notes (Amankwaa, 2016). Methodological triangulation includes the use of various sources to achieve saturation while studying several levels of a similar phenomenon, ensuring data collection that is deep and rich (Fusch & Ness, 2015). Debriefing involves researchers communicating their findings with colleagues and peers (Amankwaa, 2016). Member checking, a process by which researchers engage study participants in verifying data analysis, is a critical technique in ensuring study credibility (Guba, 1981; Lincoln & Guba, 1985).

According to Amankwaa (2016), developing an interview protocol increases a study's rigor and trustworthiness. Use of an interview protocol impacts the sequencing of interview questions and the clarity and precision of questions by providing a specific process for how to conduct the interview (Patton, 2015). Castillo-Montoya (2016) noted that interview protocols are appropriate for qualitative research with semistructured interviews and, further, the quality and reliability of collected data. Therefore, I devised an interview protocol prior to beginning the study (Appendix B).

Participants

The participants I interviewed were acute care hospital managers who had implemented Lean initiatives in the workplace to reduce health care costs. By clearly

defining the characteristics of a population meeting the eligibility criteria to participate, the researcher can minimize ambiguity and increase rigor and trustworthiness of research findings (Demir & Ercan, 2018). Identifying the eligibility criteria and specifics of the population also reduces ambiguity within participant selection (Lockwood, Munn, & Porritt, 2015). Eligibility criteria for study participants included being a health care manager of any age or gender with a professional health care designation, such as nursing or allied health. In addition, participants must have had a minimum of one year's experience in applying Lean principles within an acute care hospital, and participated in Lean education provided by their organization or an external resource.

Because access to health care organizations can be difficult, contacting health care administrators and physicians to discuss a potential study may support research entry (Høyland, Hollund, & Olsen, 2015). Creating a professional and trusting relationship with individuals and organizations by ensuring transparency of the research process is essential (Potter, 2018). To solicit interest from participants, I sent a professional letter of introduction to the Vice President of Clinical Services outlining the purpose of my study, as well as explaining the study and the reasons the acute care hospital was of interest. I shared the added value to the individuals for participating in my research, as well as the study's potential contribution to the hospital as a whole. Upon acceptance by the organization, I worked with the appointed clinical research lead and complied with all internal hospital processes, as well as those of Walden University. I made myself available to discuss any questions the organizational leaders may have had concerning the research study.

To facilitate a trusting relationship with the organization, I remained transparent in providing information on the research objectives and maintaining participant confidentiality. Establishing a professional relationship with participants means ensuring there are no previous personal or professional associations, along with providing documentation highlighting the voluntary nature of participation and the ability at any time to withdraw from the study (National Commission for the Protection of Human Subjects and Biomedical and Behavioral Research, 1978). Clear alignment between participant characteristics and eligibility criteria ensures appropriate participant selection (Lockwood et al., 2015). Applying the eligibility criteria supported the alignment of the research question and participant characteristics and ensured appropriate sample selection. For this study, I aligned the potential participants and eligibility criteria to the research question, focusing on strategies used to implement Lean initiatives to decrease health care costs. The eligibility criteria included interviewees who would provide information on their experiences with implementing Lean in health care.

Research Method and Design

Three research methods are available: qualitative, quantitative, and mixed methods. I chose a qualitative research method to explore the behaviors and attitudes associated with Lean in health care. Both the research method and research design were essential elements of the study.

Research Method

Researchers who apply qualitative research methods seek to explore the lived experiences of individuals by asking why and how questions about specific phenomena

(McCusker & Gunaydin, 2015). In the framework of qualitative research, the words individuals use to relate their experiences, including the language's subjective sense and meaning, shape the data collected by researchers (Lockwood et al., 2015). A qualitative researcher focuses on how individuals interpret the world, their perception of events, and their understanding of a specific topic (Rosenthal, 2016). In contrast, quantitative and mixed methods researchers focus on causal relationships, emphasizing statistical analysis and numerical values (Zyphur & Pierides, 2017). Quantitative researchers derive meaning from data, analyzing findings through the application of diagrams and statistical tools; qualitative researchers focus on words, collecting information, identifying themes, and conceptualizing findings (Saunders et al., 2016). Researchers who use mixed methods apply both qualitative and quantitative elements (Tonkin-Crine et al., 2016).

Because I explored the behaviors and attitudes of health care managers, I selected a qualitative research method for the present study. As I was not investigating any causal relationships by applying statistical equations, quantitative and mixed methods research would not have supported the research question for this study; therefore, I rejected them in favor of qualitative research.

Research Design

The research design is a single-case study with semistructured interviews, which allowed for an in-depth exploration of health care managers on the topic of implementing Lean in health care. Researchers conduct a single-case study to enable a comprehensive and exhaustive investigation of a research question (Percy et al., 2015). Researchers can explore actual experiences while leveraging the richness of a person explaining his or her

life experiences in a specific setting and context (Yin, 2017). Case study researchers explore a phenomenon, focusing an individual's lived experiences (Ridder, 2017). To explore events from participant and group perspectives, case studies are often appropriate for explanatory and descriptive intentions (Yin, 2017).

I considered and rejected other research designs for this study. Since I focused the study on groups of individuals to better understand their culture within their daily lives, ethnography would not have been appropriate (Trnka, 2017). Researchers use ethnography to focus on the cultural characteristics of groups, with minimal emphasis on the sociocultural aspect of the issue over time (Percy et al., 2015). The use of a narrative design often emphasizes the story of a single person in a holistic manner; as such, this design was not fitting (Nolan et al., 2017). I also found grounded theory and phenomenology not suitable for the study. Grounded theory is appropriate for applying data collected from individuals to create a theory that explains the events over time; phenomenological researchers, on the other hand, look at the internal process of actual lived experiences, not their external context (Percy et al., 2015). I also rejected focus groups, which are dependent on interactions between individuals to answer research questions (Rosenthal, 2016). Therefore, I utilized a single-case study design to explore the implementation of Lean in health care among a chosen group of health care managers.

In a qualitative study, data saturation occurs at the point when any additional data gathered would provide minimal insight, with no new themes emerging (Fusch & Ness, 2015; Saunders et al., 2016). Triangulation, a process by which a researcher draws upon

multiple evaluation sources to augment and confirm understanding, is an important component of achieving data saturation. Allowing multiple independent sources to interpret findings promotes validity through different views on the same issues (Saunders et al., 2016). Although achievable through interviews, saturation is dependent on available resources, as the number of participants may vary based on study methodology and design (Fusch & Ness, 2015). After I administered semistructured interviews to six health care managers, I then ensured triangulation of various independent sources to increase the validity of data analysis and results. This reduced the risk of personal bias and increased the rigor and trustworthiness of the findings.

The application of member checking can support data saturation by allowing triangulation of information, increasing the validity and reliability of interpretation (Birt et al., 2016; Castillo-Montoya, 2016). In member checking, each participant reviews the researcher's interpretation of the interview, and then confirms, modifies, and/or validates the information with the interviewer (Harvey, 2015). To attain data saturation, I applied member checking after transcribing each interview, providing participants with a written summary of the information they shared and asking them to review and validate my interpretation for each question. I made adjustments and modifications for each question, as needed, until the participant confirmed each response was accurate and reflected our discussion. Member checking continued until no new information or themes appeared, at which point I deemed the process complete, reducing the risk of personal bias and increasing the rigor of the research findings.

Population and Sampling

The population under study was managers who had applied Lean initiatives in health care, with a sample size of six participants. The proper sample size within a qualitative study is the number that satisfies both the researcher and the research questions (Malterud, Siersma, & Guassora, 2015). Although qualitative researchers can apply various sampling parameters to determine sample size, identifying the exact number of participants needed to attain saturation is difficult (Hennink, Kaiser, & Marconi, 2016). The sample size is often dependent upon the research design and purpose, the specific characteristics of the chosen population, and the resources available (Malterud et al., 2015). In addition, sampling a smaller number of participants allows for an in-depth and rich collection of data and information (Gentles, Charles, Ploeg, & McKibbon, 2015; van Rijnsoever, 2017).

I used purposeful sampling for the study. When applied to qualitative research involving individuals with similar experiences, purposeful sampling leads to the collection of consistent and cohesive data and information (Poksinska et al., 2016). Purposeful sampling is a nonprobability procedure for sampling, as researchers apply their own judgment in choosing the cases that will comprise the sample (Saunders et al., 2016). In purposeful sampling, the researcher identifies the specific characteristics potential participants need to participate in the study (Poksinska et al., 2016).

Data saturation occurs when no new themes emerge, despite continued data collection (Fusch & Ness, 2015). The member checking process contributes to data saturation by elevating the quality of the collected data, ensuring reliable and trustworthy

results (Birt et al., 2016; Castillo-Montoya, 2016). Member checking allows participants to not only confirm their interpretations of interview questions, but to reflect on past experiences, thus enhancing the data collection process (Harvey, 2015). Therefore, to attain data saturation, I applied member checking to this study.

The participants I interviewed were acute care hospital managers who had implemented Lean initiatives in the workplace to reduce health care costs. The criteria for inclusion being a health care manager with a professional health care designation, such as nursing or allied health. In addition, participants must have had a minimum of 1 year's experience in applying Lean principles within an acute hospital, and to have participated in Lean education provided by their organization or an external resource. Upon obtaining organizational permission, I sent an invitation to participate to all eligible employees, with eligibility determined according to these criteria. Members of the qualified population received an invitation to take part in the study, which clearly stated that participation was voluntary. Once participants expressed interest following the initial invitation, I confirmed their participation and scheduled an interview. I also ensured signed informed consent from participants, after which I scheduled and confirmed via e-mail the interview date and time.

The interview setting is an important element to consider when scheduling interviews. According to Dikko (2016), providing a quiet, yet comfortable environment for research participants is an important aspect when organizing interviews. The interview setting should be a location participants can easily access, with minimal noise to enable concentration and recording (Saunders et al., 2016). Interview settings not only

need to be in a comfortable location, but also in an area where there is a high level of security for the research participant (Oltmann, 2016). To ensure an appropriate setting, I asked research participants to select a location that was comfortable and safe, with minimal distractions.

Ethical Research

From both legal and ethical perspectives, obtaining informed consent for research involving live persons is imperative (Grady, 2015). This is a component of demonstrating respect for human participants, allowing them to knowingly take part with full awareness of the voluntary nature of their participation, their role in the study, and participation risks, if any (Regmi et al., 2017). In obtaining informed consent, researchers must share the details and purpose of the study, solicit voluntary participation, ensure confidentiality and privacy, and apply any precautions necessary to protect vulnerable individuals or groups (National Research Council, 2003). Informed consent gives potential participants the information necessary to decide if the study is compatible with their interests, and to determine if they demonstrate the capacity to comprehend and consent to participation (Grady, 2015).

Prior to conducting any research on human participants, researchers must first obtain approval from an IRB (Yin, 2017). Therefore, I followed the Walden University IRB approval process before reaching out to administrators at the chosen acute care hospital. Upon receiving notice of IRB approval, I contacted the organization to obtain a list of employees. I then sent an invitation to participate to managers who met the designated criteria. Once they confirmed their interest via e-mail, I sent selected

participants an informed consent form that included all information necessary for them to make a voluntary decision to participate.

Individuals had the power to voluntarily and independently decide to take part in the study, with no pressure or control by the researcher (Regmi et al., 2017). In informed consent forms, researchers should clearly state that taking part in the study is voluntary and participants are free to withdraw at any time without consequence (Grady, 2015). The invitation to participate in research provided clear information on how to withdraw from the study at any stage in the process. If individuals desired additional information, they could either contact me directly via e-mail or discuss participant rights privately with the Research Participant Advocate at Walden University by calling (612) 312-1210. All information of agreement and participation appeared in the informed consent form.

As an acknowledgement of their participation, I shared a $10 Tim Hortons gift card following the semistructured interview. Possible gifts to research participants in a study may include a token of appreciation or compensation for the participant's time (Bernstein & Feldman, 2015). While such gifts are acceptable, they must be appropriate to the design of the study, sensible and fair to the population, and not excessive (Polacsek, Boardman, & McCann, 2016).

Protecting and safeguarding the identity of research participants is an important requirement for the researcher, as a breach of confidentiality could have a negative impact on participants (Turcotte-Tremblay & Sween-Cadieux, 2018). Researchers can implement specific strategies to ensure confidentiality, such as using codes rather than names to identify research participants, securely storing password-protected data in a

locked location, and destroying all research materials after the designated retention period (Doody & Noonan, 2016). To ensure ethical protection and confidentiality of the participants in my study, I used alphanumeric identifiers in lieu of names and password-protected all electronic files. I will maintain the information in a locked room for 5 years, securely storing all data to ensure participant confidentiality. I will also destroy all information after that time, further protecting the identity and information of participants.

Data Collection Instruments

I was the primary data collection instrument in this case study, using semistructured interviews and open-ended questions (Appendix A) to gather information. Interviews provide an opportunity to explore different issues important to the interviewee, encouraging the verbalization and sharing of diverse perspectives (Cridland, Jones, Caputi, & Magee, 2015). A semistructured interview is a conversation about specific themes that, depending on the flow of conversation, can include generalized or specific information on topics of study (Saunders et al., 2016). Administering semistructured interviews involves using predetermined questions, with the flexibility to seek clarification or ask follow-up inquiries to increase researcher understanding (Percy et al., 2015). All semistructured interviews followed the interview protocol for data collection (Appendix B). Applying an interview protocol during the interview process can help researchers with the sequencing of questions, supporting the data collection process (Castillo-Montoya, 2016). Sharing the interview protocol with participants at the start of the interview enabled them to follow the series of interview questions.

Integrating multiple sources of evidence in case studies produces a higher level of quality than using a single source (Yin, 2017). The use of secondary information sources such as survey and data reports contribute to the confidence of research results (Saunders et al., 2016). Other secondary sources include documentation, archival information and records, interviews, direct and participant observations, and physical evidence and artifacts (Yin, 2017). For this study, secondary evidence included archived public records and annual reports published by the Ontario Ministry of Health and Long-Term Care, Canada NRC Piker, and the Canadian Institute for Health Information. These three sources document hospital yearly objectives, funding and organizational performance, benchmarking against other hospitals, quality improvement plans, and patient satisfaction data.

I utilized member checking to increase the reliability and validity of data collection. Member checking can boost the credibility of interpretation and reliability of results (Lincoln & Guba, 1985). Member checking allows researchers to validate their interpretation of interviews by seeking to confirm, modify, and verify results (Birt et al., 2016). Member checking also provides an opportunity to obtain additional participant insight by discussing and exploring the synthesized information (Harvey, 2015). The process of member checking fell within the interview protocol (Appendix B), and took place once the interviews were complete. I distributed a written interpretation of the information discussed to each participant, who then reviewed and validated the interpretation for each question, proposing modifications and adjustments, as needed. The

process of member checking continued until participants confirmed that the interpretation of all questions was accurate.

Data Collection Technique

Following IRB approval came participant solicitation via a letter of interest, which I e-mailed to all managers within the chosen acute care organization. Individuals who replied to the e-mail and confirmed their interest received an informed consent form to review and complete. Next, I performed data collection by means of semistructured interviews and a review of archived public government documents, in accordance with the interview protocol (Appendix B). The objective of the interviews and document reviews was to answer the research question: "What strategies do health care managers use to implement successful Lean initiatives to reduce health care costs?" I confirmed the interviews by e-mail and scheduled them based on participant availability. According to Oltmann (2016), research participants prefer to make informed and reflective decisions on their availability when scheduling interviews. Flexibility in choosing the interview date and setting allows participants to make an appropriate choice for their particular needs (Dikko, 2016; Saunders et al., 2016).

While collecting data, researchers must integrate multiple forms of information and avoid personal bias (Yin, 2017). Triangulation decreases research bias, allowing the researcher to incorporate different sources of evidence with various data collection techniques (Amankwaa, 2016). By this token, I applied various data collection techniques and confirmed evidence from multiple sources, including semistructured interviews, interview protocols, journaling, audio recording, and member checking. In a

semistructured interview, participants share their perspectives via an open conversation, choosing to include additional information as they wish (Percy et al., 2015; Saunders et al., 2016). Utilizing interview protocols can increase the rigor and trustworthiness of data collection while enabling increased focus (Amankwaa, 2016; Castillo-Montoya, 2016). Through journaling, the researcher creates audit trails to note the various data collection steps, as well as to compile notes and observations (Lincoln & Guba, 1985). By using both audio recording and note-taking during interviews, researchers can document both verbal and nonverbal responses (Oltmann, 2016). Finally, the use of member checking lends increased reliability and credibility to the interpretation of collected data (Lincoln & Guba, 1985).

There are limitations to data collection techniques. Interviewing participants about sensitive topics can reduce their propensity for honest and thorough information-sharing (Oltmann, 2016). Although researchers may use interview protocols to provide a framework for the dialogue, they cannot determine precisely where the interview will lead, what the participant will explore, or how long the discussion will last (Patton, 2015). Accurate journaling and note-taking depend on the researcher's awareness, including perceptions and observations (Amankwaa, 2016). Managing data and interview recordings is challenging for researchers, who often face a substantial amount of data to organize, summarize, and interpret (Ngulube, 2015). Member checking increases the risk of participants losing interest, due both to the time required to review the interview summary and the need to consent again prior to such review (Birt et al., 2016).

To apply member checking to the study, I provided participants via e-mail a summary of my understanding of their responses. Participants confirmed by e-mail if my synthesis was accurate, if any information was missing, or if modifications were needed. I was also available by telephone to review their information and discuss anything participants may have liked to add (Appendix B).

Data Organization Techniques

Researchers can protect study participants by planning, securing, and organizing collected data, as well as utilizing pseudonyms to ensure confidentiality (Saunders et al., 2016). Researchers need to be responsible with research data, which can represent individuals and impact lives (Barocas, & Selbst, 2016). According to Zook et al. (2017), even data that does not include specific information about people can affect individuals in unexpected ways, including stigmatization and categorization. To maintain confidentiality, I secured all electronic data, audio files, and scanned notes and journals in a password-protected electronic vault. I organized the data with the use of alphanumeric identifiers in lieu of names and password protected all electronic files. I scanned field notes and saved them in various electronic file folders, which I have also stored in a password-protected electronic vault on an external hard drive, locked in a separate room in my home. I will maintain the electronic information in a locked room for 5 years, securely storing all data to ensure participant confidentiality. NVivo documents and data from NVivo also reside in the electronic vault, with all paper copies scanned electronically and placed in a locked room. To ensure participant confidentiality, I have used alphanumeric identifiers for all documents, thereby masking identifying

information. After the required data retention period of 5 years, I will erase all electronic files.

Data Analysis

The process of analyzing qualitative data is likely the most significant part of the research process, as this is when the researcher makes sense of the collected data (Ngulube, 2015). The data analysis process includes exploring, analyzing, synthesizing, and transforming data to answer the research questions (Saunders et al., 2016). In analyzing data, triangulation may occur in four areas: data, investigation, theory, and methodology (Patton, 2015; Yin, 2017). Triangulation involves utilizing various data sources within the same study; investigation triangulation incorporates numerous investigations (Joslin & Müller, 2016). Triangulation theory is the application of several perspectives and theories within a single study; in comparison, methodological triangulation requires the use of different methods (Patton, 2015). Methodological triangulation for this study included conducting the interviews and reviewing public records and annual reports. Two separate data collection processes within the research design approach are required for methodological triangulation (Yin, 2017). Methodological triangulation allows for the cross-checking of consistency, thereby increasing the credibility of findings and reducing bias within the research (Joslin & Müller, 2016).

Specific researcher steps within the data analysis process include compiling data; disassembling, reassembling, and interpreting data; and drawing conclusions (Saunders et al., 2016; Sutton & Austin, 2015). Organizing and transcribing interview data while

acquiring a greater understanding of the collected information are components of data compilation (Castlebury & Nolen, 2018). Within this study, I audio recorded semistructured interviews, later transcribing them in an organized manner to ensure an accurate reflection of the conversations. Upon completion and transcription of each interview, I utilized member checking with each participant, distributing a written interpretation of the information shared during the interview. The participant reviewed and validated the interpretation, proposing modifications and adjustments as needed to more accurately reflect the discussion. The process continued until the participant was satisfied with the information. Secondary sources of data collected came from Canada NRC Piker, the Canadian Institute for Health Information, and the Ontario Ministry of Health and Long-Term Care, organizations which provide such information as hospital yearly objectives, quality improvement plans, funding and organizational performance, patient satisfaction data, and benchmarking against other hospitals.

In disassembling data, the researcher asks specific questions of the data, such as what, who, where, when, why, and how, performing data analysis through examining and comparing information (Yin, 2017). As part of the coding process, I sorted categories and sequences into codes and labels for data compilation and disassembly. Sequencing of themes and labels came from ensuring the inclusion of all data from the primary and secondary sources in the Microsoft Excel spreadsheet. I used NVivo to facilitate data analysis in the coding process, as the software program provided another means to analyze information output and identify any patterns arising from the data (Ngulube,

2015). Although a computer program may assist in organizing data, the researcher's mind, not the software, powers the process of data analysis (Castlebury & Nolen, 2018).

Reassembling data occurs when various codes lead to specific themes aligned with the research question (Saunders et al., 2016). By clustering codes together into themes, researchers can restructure the data and reassemble the information in various levels of granularity (Castlebury & Nolen, 2018). In this study, I reassembled data in a Microsoft Excel spreadsheet, using methods such as tables and documentation for the interpretation of and conclusions from results. Providing a structured approach with the reported research findings facilitates clear, yet concise communication of research results (Yin, 2017). Data interpretation should be broad and generalized, and answer the research question in a well-defined manner (Castlebury & Nolen, 2018).

Data interpretation and conclusions were important elements in the analysis. To ensure the analysis of reliable data, I applied member checking to the collected data, validating material with research participants. As noted by Birt et al. (2016), member checking elevates the quality of the data collected and ensures reliable and valid results. The member checking process should produce the appropriate interpretation of collected data and accurate analysis of information. As supported by Yin (2017), data interpretation is dependent on the rigor of the researcher, with the analysis and interpretation of collected data enabling conclusions within the research. From the interpretation and conclusions of data, the researcher should be able to synthesize the lived experiences of the research participants (Sutton & Austin, 2015).

To draw conclusions on the data, Yin (2017) emphasized the opportunity for researchers to provide an academic contribution with the findings of the study. Data conclusions are reinforced by direct quotes from research participants, and included in a research document in accordance with academic principles and guidelines (Sutton & Austin, 2015). As noted by Yin, the use of graphics and charts can allow greater understanding of data conclusions. To support the conclusions of my research, I incorporated direct quotes from the research participants, followed academic guidelines to complete the presentation of findings, and created tables and charts to represent the findings. I compiled the key themes found in the literature review, the conceptual framework of the study, and the research question. Key themes in the literature review included Lean principles in health care, complexity of health care, organizational culture, leadership and Lean, and cultural transformation. The conceptual framework I chose for this study incorporated the TQM framework founded by Deming (1986), with a review of complementary and alternative theories, including transformational leadership, organizational framework for decision-making, and the realist theory. A single research question guided data collection: What strategies do health care managers use to implement successful Lean initiatives to reduce health care costs?

Reliability and Validity

Evaluating the reliability of findings helps researchers ensure the integrity of the research methods and results (Noble & Smith, 2015; Yin, 2017). To demonstrate rigor within research findings, reliability and validity of research methods must be significant and worthy (Amankwaa, 2016; Morse, 2015). Research findings need to be reliable,

trustworthy, applicable, consistent, and neutral (Lincoln & Guba, 1985). To enable trustworthiness of results, the researcher should achieve dependability, credibility, transferability, and confirmability (Guba, 1981).

Reliability

Qualitative research has reliability if the same findings and conclusions would be found upon the study's replication by different researchers (Yin, 2017). Achieving reliability means presenting dependable research findings, with minimal error or bias (Noble & Smith, 2015). Utilizing member checking within qualitative research is one means of achieving dependability (Lincoln & Guba, 1985). Providing an audit trail of research documentation increases the dependability of results, ensuring quality within the research design (Yin, 2017). Dependability comes from maintaining transparent documentation and descriptions of the research process, from the preliminary stages of research, through the applied methods and the presentation of findings (Noble & Smith, 2015). To ensure dependability and reliability in this study, I implemented a number of procedures, including conducting member checking each research participant for interviews; audio recording all interviews and creating transcripts; maintaining a personal journal to document interviews; keeping audit trails for all research stages, including data process, analysis, and interpretation; and documenting any issues or barriers throughout the research processes. Member checking is also a method to improve dependability and reliability of research findings. As noted by Birt et al. (2016), the member checking process raises the quality of collected data by validating the researcher's interpretation, therefore increasing the dependability and reliabity of collected data.

Validity

Valid and dependable results reinforce the value of research (Lincoln & Guba, 1985). Ensuring validity promotes the quality and trustworthiness of research findings (Amankwaa, 2016). Researchers can take actions to increase trustworthiness, heightening the credibility, transferability, dependability, and confirmability of findings (Guba, 1981).

Credibility. Activities such as triangulation and member checking can extend the credibility and validity of results (Lincoln & Guba, 1985). Applying triangulation within qualitative research strengthens the research accuracy and validity of measurements (Yin, 2017). Triangulation allows researchers to boost credibility by drawing upon multiple sources of evidence to study a single phenomenon (Jick, 1979). Researchers demonstrate consistency of results by applying methodological triangulation, using different techniques to cross-check findings (Birt et al., 2016). Therefore, to ensure the credibility of results, I utilized methodological triangulation by cross-checking two sources of data: information collected from the interviews and material from secondary sources. The secondary sources were public records and annual reports published by the Ontario Ministry of Health and Long-Term Care, Canada NRC Piker, and the Canadian Institute for Health Information. I also applied member checking of the interpreted data and applied the interview protocol (Appendix B). This ensured I accurately incorporated the participants' viewpoint.

Transferability. Including a rich description of all research elements heightens the transferability of results (Lincoln & Guba, 1985). The researcher can compile these descriptions by noting the setting and location of research, research climate, participants

involved, approach and attitudes of participants, and reactions during data collection that may not be captured on the audio recording (Amankwaa, 2016). Journaling and preserving documentation to create a rich description of the research process are means to promote transferability (Lincoln & Guba, 1985). Future researchers can then determine if findings may be transferable to another environment (Amankwaa, 2016). Therefore, to support the evaluation by future researchers, I maintained all documentation and data collection journaling, as well as a detailed research process, in a descriptive and rich fashion. I strictly followed the data collection and data analysis process and used the interview protocol (Appendix B) with each research participant to ensure transferability. The purpose of providing a rich description of the research elements is to ensure the transferability of the study results, allowing future researchers to decide if the results apply to later studies.

Confirmability. Researchers should take action to ensure confirmability. In compiling an audit trail, the researcher establishes a transparent account of the different stages and steps within the research process (Lincoln & Guba, 1985). Essential to the confirmability of results are documenting and reporting all information on data collection, documentation reduction and analysis, data reconstruction, process notes, and research instruments (Halpern, 1983). Applying triangulation with various sources of data within the investigative process leads to confirmability (Amankwaa, 2016). Reflexivity involves documenting all decisions and research processes, promoting the construction of knowledge and information (Lincoln & Guba, 1985). Keeping a journal of decisions and research processes gives researchers the reflexivity of their own biases and perspectives

(Amankwaa, 2016; Noble & Smith, 2015). Accordingly, to elevate the confirmability of research from this study, I implemented journaling, reflexivity, and triangulation. Ensuring an in-depth inquiry during the interview process by documenting research findings enhanced confirmability, as did applying member checking with all research participants.

Data saturation. Data saturation occurs when there is redundancy in additional data, thus providing no new information or insights (Gentles et al., 2015; Saunders et al., 2016). Achieving saturation within the data collection process boosts the validity of results (Lincoln & Guba, 1985). Fusch and Ness (2015) emphasized that data saturation can occur through the interview process; however, the exact number of research participants varies between studies. To achieve data saturation, I continued to interview research participants until no new themes appeared. According to Harvey (2015), member checking can facilitate data saturation by confirming the interpretation of findings and providing a reflective process for research participants, leading to the collection of richer data. I therefore used the member-checking process to increase the quality of the data collected, enabling a process of reflection and heightened research findings to support data saturation.

Transition

Section 2 featured a review of the project plan for the study, which included a discussion of the data collection process and data analysis while upholding academic rigor within the research methodology. A review of the purpose statement, role of the researcher, participants, and research design followed. An examination of different

research elements, such as population sampling and ethical research, data collection instruments, data techniques, and data organization, appeared in this section. In Section 2, I also detailed specific research techniques applied throughout the study to reinforce reliability and validity of results.

Findings from the qualitative research study appear in Section 3, along with a discussion of their application to professional practice, implications for social change, and recommendations for action. I provide a list of recommendations for future research to align with the potential for improved business practices. Before concluding Section 3, I reflect on my experiences of the doctoral study process within the DBA program at Walden University.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative single-case study was to explore the strategies health care managers used to implement Lean initiatives to reduce health care costs. To collect information on the experiences of health care managers regarding Lean initiatives, I conducted semistructured interviews with six health care managers who successfully implemented Lean in health care. The analysis of qualitative data entailed reviewing primary sources of data, including interview transcripts, and utilizing member checking with each research participant. Also reviewed were secondary sources of information, including yearly operating costs, employee satisfaction scores, patient satisfaction scores, quality improvement plans, and organizational performances. Through the application of methodological triangulation, I identified four themes: (a) the review of operational processes can reduce health care costs, (b) specific management skills can reduce health care costs, (c) employee engagement can have a positive impact on health care costs, and (d) alignment can have a positive impact on health care costs. In this section, I present the findings of the study as well as consider the application to professional practice and impact on social change. I also discuss recommendations for action and further research, reflect on the doctoral study process, and provide a conclusion to the study.

Presentation of Findings

The single research question for the qualitative single-case study was: "What strategies do health care managers use to implement successful Lean initiatives to reduce health care costs?" To answer the research question, I conducted interviews with six

health care managers who demonstrated the successful implementation of Lean initiatives in an acute care hospital located in the province of Ontario, Canada. Participants were eligible to participate in the study if they met the following requirements: had been a health care manager in a hospital for the past year, had applied Lean principles in an acute care hospital, and had a professional designation and participated in Lean education sessions in the past. Table 1 provides a summary of the participants' eligibility to participate in the study. I assigned alphanumerical codes to all participants from P1 to P6 to protect their identities.

Table 1

Summary of Participant Codes and Eligibility

	Percent (%)					
Requirement	P1	P2	P3	P4	P5	P6
Manager for past year	100	100	100	100	100	100
Applied Lean principles	100	100	100	100	100	100
Professional designation	100	100	100	100	100	100
Lean education	100	100	100	100	100	100

I utilized both Microsoft Word and NVivo to assist in transcription and data analysis and applied the member checking process with participants to ensure accuracy. Applying methodological triangulation and data analysis, I identified four themes related to health care costs: the review of operational processes, specific management skills, employee engagement, and alignment.

Theme 1: Review of Operational Processes

All participants in the study mentioned reviewing operational processes to remove duplication and waste to reduce health care costs. The participants discussed reviewing operational processes and patient flow by applying Lean tools and methodology to support process improvements. Agarwal, Gallo et al. (2016) found that the increase of operational efficiencies within hospitals can decrease health care costs by eliminating redundant processes, thereby streamlining patient processes and workflows. Three subthemes emerged from analysis of the semistructured interviews and methodological triangulation: (a) removing waste and exploring opportunities, (b) breaking barriers and silos, and (c) adapting and sustaining process improvements.

Waste and opportunities. Reviewing operational processes to decrease duplication or extra steps is related to the implementation of Lean tools within hospital inpatient units. According to study participants, reviewing the processes created a structure in which employees and management could assess procedures while exploring opportunities for quality improvement initiatives and cost savings. Quality improvement initiatives can have a positive impact on the cost of service delivery and increase the quality of care provided to patients (Montella et al., 2017). According to Cromwell et al. (2018), applying Lean principles to processes within health care can decrease waste and increase operational efficiencies. Table 2 provides key terms relating to process waste and improvements for all interviews. Combined, the frequency of terms referring to process waste and improvement equaled 4.22% of all participant responses. The focus for managers to reduce health care costs was removal of process waste and opportunities.

Table 2

References to Waste and Improvements

Reference	Frequency	Weighted percentage	Similar words
Initiatives	91	1.01	initiatives
Improvement	62	0.75	improve, improved, improvements
Cost	56	0.68	costing, costs
Process	56	0.68	processes
Reduce	21	0.25	reduced, reducing
Opportunity	20	0.24	opportunities
Waste	19	0.23	wastes, wasting
Overtime	18	0.22	overtime
Money	13	0.16	–

All six managers cited the need to review the operational process to create process improvements initiatives that support efficiencies. P1 mentioned applying Lean tools to review the use of supplies and remove unused products. P1 explained that the cost of supplies on the unit had decreased, ensuring supplies were in the right place at the right time for nurses to provide patient care. P2 shared a similar experience as a manager examining a process and completing a Lean ticket on the Lean huddle board. Together, the team questioned the operational process and discovered it to be overly laborious. As P2 related, “It was just a process that we did that was old school and nobody ever

questioned.” P2 applied Lean tools to operational processes, mapping each step to remove waste. The outcome was removing a recurring cost of $500 for a procedure that occurred an average of 245 times per year, resulting in $122,500 annual savings to the organization. P4 and P5 emphasized the opportunities afforded by the application of Lean tools. This is the reason Lean works, P4 stated: Employees and managers together can question an operational process, analyze the issue, and then apply Lean tools to streamline the process. P5 had similar experiences when applying Lean tools to review processes and eliminate wasteful processes, noting that waste eliminated from operational processes produces a decrease in costs. P5 included examples of applying Lean methodology and tools to decrease overtime costs for the inpatient unit. In addition, P5 was able to decrease overtime costs of frontline staff by $200,000 by applying a PDSA process, including how management approved overtime.

To further understand the impact Lean implementation had from 2013 until 2016, I reviewed internal hospital documents on financial operating costs. Figure 1 provides an overview of the total cost of salaries and benefits for 10 inpatient units that participated in Lean implementation. From fiscal year 2012–2013 until 2016–2017, there was a cost decrease in salaries and benefits for the combined expense of management and operational support and unit-producing personnel. However, in 2017, salaries and benefits grew due to the implementation of a new hospital initiative, requiring an increase in the number of health care professionals within the hospital. A total of 10.5 full-time equivalents increased the financial cost of the organization to support this new initiative.

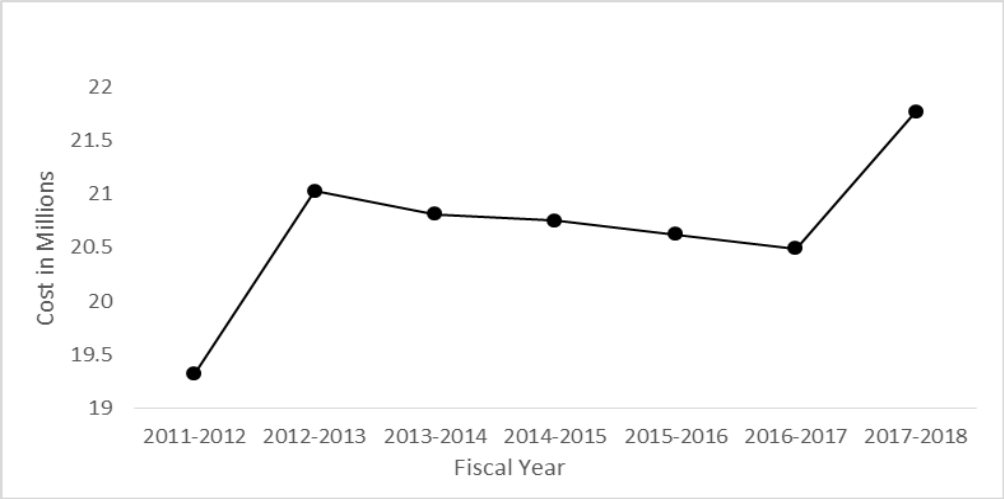

Figure 1. Total cost of salaries and benefits.

My review of internal hospital documents revealed pertinent information about the total cost of supplies and expenses. During the implementation phase of Lean in the 10 inpatient units, a constant decrease of costs appeared from fiscal year 2012–2013 to 2015–2016, with a slight increase in 2016–2017. In 2017–2018, the implementation of a new hospital initiative required an increase of supplies and expenses.

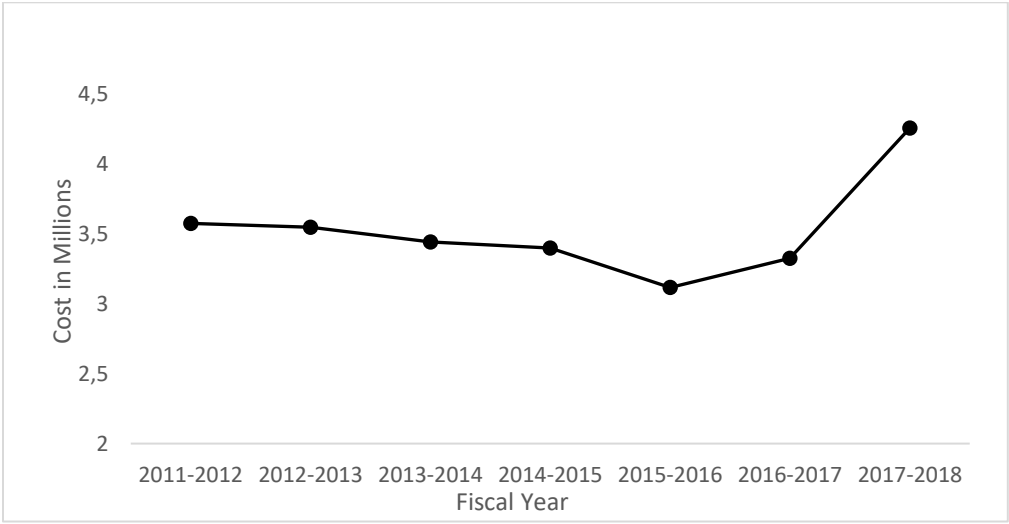

Figure 2. Total cost of supplies and expenses.

Breaking barriers and silos. Applying various Lean tools to review operational processes leads to the breakdown of barriers and operational silos to reduce costs. Applying Lean methodology can improve process efficiency while creating greater organizational responsiveness to process barriers, as well as cost containment (Cheung et al., 2016). Simon and Houle (2017) argued that the application of Lean methodology with frontline employees not only allows a reduction in work but encourages frontline staff to engage with other departments and various interprofessional teams. Table 3 reveals specific terms in reference to process barriers and silos for all participants. The frequency of the terms applied by participants was 5.24% combined.

Table 3

References to Barriers and Silos

Reference	Frequency	Weighted percentage	Similar words
Work	205	2.47	worked, working, works
Unit	82	0.99	units
Team	52	0.63	teams
Data	26	0.31	–
Problem	26	0.31	problems
Issues	23	0.28	issue
Barrier	15	0.18	barriers
Blame	6	0.07	blaming

When discussing process barriers and silos, P4 and P6 shared that applying Lean tools and reviewing operational processes can reduce costs by allowing various departments to work together for a common goal. P6 stated that Lean tools allowed different departments to meet and discuss and review processes. P6 said the act of reviewing processes together created holistic solutions not just for one department but for all, breaking the barriers and silos. Highlighting the importance of involving all stakeholders and always including frontline employees in the process review, P6 said, "I think Lean brings people together." Similarly, P4 found applying Lean tools allowed employees to participate in different Lean initiatives on the various department units they supported. P4 encouraged employees to problem-solve and review processes as interdisciplinary teams, breaking silos by participating in various Lean activities throughout the hospital. P4 said, "I do encourage [employees] to attend different Lean huddles during the week, because there are some issues that might affect them, as well."

P2 found added value in overcoming silos and working with various stakeholders when applying Lean tools and reviewing processes. The participant shared an example in which frontline employees reviewed an operational process without including the other stakeholders. With various changes and initiatives, the operational improvements varied and the performance metrics fluctuated between 40% and 70%, with the employees unable to stabilize the process. After P2 started to involve other departments and stakeholders in the operational process review, the processes stabilized at 95% within months. P5 felt the inability to change the process barriers and silos suggests there is a need to reflect and review the process goal. P5 explained it was easy to give up when

faced with barriers and silos; it was, however, important to reflect and question if the teams worked together and gave the Lean initiative a fair chance. Working together and breaking departmental silos, P6 related, provides opportunities to view the process from another perspective. P6 explained that meeting with stakeholders, mapping a process, and understanding the processes in all different areas is an added value, creating opportunities for teamwork and ensuring the new Lean process will work for all involved. P5 added that working together is necessary to break silos, stating, "You don't give [employees] the option to abandon the goal; you give them the option to change the barriers." Working together while focusing on process improvement without blame added value to Lean initiatives.

P3, P4, and P5 used the word *blame* when discussing barriers and silos. Because the perceived tendency in health care is to blame other departments for issues and problems, P5 emphasized that managers must reiterate to frontline employees that blame is not an option, as it creates fighting and divisions. P5 said, "This is not about blame; let's look at our process. It's always keeping them refocused on the process, not the individual." P3 emphasized the importance for managers to get frontline employees to remove blame and refocus on the needs of the patients. P4 shared that when blame surfaces and employees become frustrated, going back and reviewing the data is essential. Use of data, P4 explained, could support understanding processes and breaking barriers and silos. With similar experiences, P5 asserted that showing the data to frontline staff and stakeholders allows everyone to see if the process is working. P5 said, "If

everyone is agreeing with you, you are not challenging yourself and not making any improvements."

Adapting and sustaining. Managers can adapt Lean tools to support the review of operational processes. Creating a level of adaptability and flexibility can promote sustainability of process improvements. Agarwal, Gallo et al. (2016) found specific factors that supported the sustainability of process improvements, including being flexible with frontline employee suggestions, and modifying tools and projects to sustain change. Table 4 provides words relating to adapting and sustaining process improvement initiatives. The frequency of the terms equals 2.63% of all participants' responses.

Table 4

References to Adapting and Sustaining

Reference	Frequency	Weighted percentage	Similar words
See	71	0.86	–
Change	53	0.64	changed, changes, changing
Audit	32	0.39	audited, auditing, audits
Sustain	18	0.22	sustainability, sustained
Solutions	15	0.18	solution
Visual	13	0.16	visualize, visually, visuals
Flexibility	8	0.10	flexible
Adjust	7	0.08	–

Most participants mentioned adapting tools to support daily continuity of the Lean methodology. P1, P3, and P6 stressed the importance of adapting Lean tools to create flexibility and adaptability with frontline employees. P6 mentioned that managers need to be flexible in terms of the frequency of Lean huddles and the times of day the huddles should occur. There are standards, however, as huddles must fit with inpatient unit and employee needs. P3 supported this same approach, relating that adapting Lean tools can allow more creativity, removing repetition in the message and/or the risk of being mundane. P5 suggested management be open and responsive if there are things frontline employees want to include in Lean huddles to make them more meaningful. P1 spoke of the necessity to adapt discussions at Lean huddles based on which employees were present. Adjusting Lean huddle discussion content became a strategy to get the most out of people and make the content different and interesting. Adapting other Lean tools can also add value to managers. As P3 explained, there is a continuous need to adapt Lean tools to ensure that the content of Lean huddles or status exchanges reflects the operational goals and information needed. Without adapting tools to operational needs, said P1, tools become repetitive and no longer useful.

All participants highlighted specific Lean tools to ensure initiatives were working and sustaining change. P3 commented that sustaining a process is all about creating standard work documents for employees to follow, and then auditing that employees are applying the process. P4 emphasized the necessity of applying the kamishibai Lean tool after the implementation process to obtain a visual confirmation of upholding the standard work or process. P3 shared a similar perspective, identifying kamishibai as an

audit tool, with managers asking employees at Lean huddles to review together the visual tool and explain how they applied the standard work and validated the process. P4 included the added value of auditing in an unpredictable manner by arriving at the inpatient unit, taking a standard work document, and asking a random frontline employee to walk them through the process and to complete the kamishibai tool on the Lean huddle board. As P4 elaborated, "We sustain by adapting and auditing. When dealing with the kamishibai tool, visualizing the opportunities for improvement can be helpful." P3 related, "When we have a bunch of red on the kamishibai, we ask why. What is wrong with the process or standard work?"

Even though participants deemed the kamishibai audit tool important, involved personnel did not always complete it. Despite this, P5 mentioned that some managers within the organization do implement kamishibai to sustain change. P5 explained that, often, managers tend to validate process sustainability with employees at Lean huddles in 3 to 6 months. P2 said, "I am not going to say that kamishibai occurs enough, because we are always focused on the new improvements coming forward by employees."

Links to the literature. Participants agreed that applying Lean tools does provide reduced costs in health care. As hospitals are complex environments with diverse operational process, Lean methodology can decrease inefficiencies and reduce costs (Goodridge et al., 2015). Dunsford and Reimer (2017) emphasized that Lean can support the removal of waste in processes, which affects both cost and time savings and benefits patient care. Applying Lean tools for process improvements can decrease costs for treatments, hospital stays, supplies, and fixed assets (Chiarini & Baccarani, 2016). Sari

et al. (2017) suggested there may be added value in applying Lean initiatives in specific areas with higher returns on investment identified by measurable data and process metrics throughout the health care system. Lean may create a sense of empowerment for managers, allowing them to enact and create change in their work environments while removing barriers and wasteful processes impacting costs (Esteves et al., 2016). Agarwal, Gallo et al. (2016) emphasized that once Lean initiatives are implemented, it is necessary to continuously monitor the process and make changes as needed to facilitate sustainability of change. However, sustaining change in a complex environment may be intricate and difficult, requiring other methods to maintain change on a long-term basis (Barnas, 2018). Walker et al. (2016) emphasized that enabling sustainability of results and continuous monitoring requires including various stakeholders and interprofessional teams.

Links to the conceptual framework. The conceptual framework of TQM is in alignment with the findings of this study. Within the TQM framework is an emphasis on the need to integrate quality management systems to support process improvement (Deming, 1986). Quality management systems such as Lean methodology highly simplify the patient process through the system while removing various types of waste, including rework due to errors with a reduction of cost (Chiarini & Baccarani, 2016). The TQM framework begins with a point of logic that combines both the manager's leadership with a plan on how to create change to support increased performance (Mosadeghrad, 2015). Within TQM are two categories: social-soft, focusing on resources and people, and technical-hard, concentrating on production and continuous process improvement for

increased performance and cost avoidance (van Schoten, de Blok, Spreeuwenberg, Groenewegen, & Wagner, 2016). Findings are therefore consistent with the TQM framework, which is the conceptual framework for this study.

Theme 2: Management Skills

All participants shared the benefits of applying specific management skills to enable process improvement for reducing health care costs. Hung et al. (2017) emphasized that when employees faced change and uncertainty with a new workflow, managers who encourage and influence employees have increased chances of successful Lean implementation and cost reduction. Analysis of the semistructured interviews and methodological triangulation revealed two subthemes: (a) consistency and structure and (b) communication and vision.

Consistency and structure. Establishing an environment allowing consistency and structure is an important management skill to reinforce quality improvement and reduce operating costs. Management can support consistency and structure within operations with the use of Lean tools in their daily management activities. The application of Lean principles can provide increased consistency in a systematic manner to solve complex issues and problems (Cromwell et al., 2018). According to van Leijen-Zeelenger et al. (2016), factors that increase successful Lean implementation include applying a structured framework to problem-solving while creating an environment of consistency and change. In Table 5, the frequency of the terms referring to consistency and structure combined equaled 2.72% of all participant responses.

Table 5

References to Consistency and Structure

Reference	Frequency	Weighted percentage	Similar words
Managers	128	1.55	manage, management, manager
Standard	49	0.59	standardize, standards
Consistency	19	0.23	consistent, consistently
Role	12	0.14	roles
Structure	11	0.13	structured, structures
Schedule	7	0.08	schedule, scheduling

Participants emphasized that consistent application of Lean tools increased the culture of process improvement and cost reduction. P1 shared that consistency in problem-solving with frontline employees encouraged process improvement and the questioning of operational processes. With Lean huddles occurring only two to three times a week for 15 minutes at a time and Lean leadership meetings taking place monthly, P3 noted that only 10% of frontline employees can participate in Lean huddles due to shift work. Therefore, the participant stressed the importance of not missing any huddles, as this Lean tool involves frontline employees and not management.

The subject of time constraints often arose when discussing consistency and application of Lean tools. When faced with unpredictable events, P1 and P2 mentioned that Lean huddles ensure managers' presence on the inpatient units to validate the activity

of the unit. P1 explained that, although managers at times cancel Lean huddles due to exceptional and unpredictable situations such as a code blue (an emergent situation where a patient is in cardiac arrest), they should validate the activity before doing so. Also, in the event Lean huddles cannot occur at the scheduled time, said P2, they should take place later during the day. Along these lines, P5 mentioned that some days, Lean huddles are not possible due to overcapacity and acuity of patients. To adapt to these situations, the team will take 15 minutes to work on a specific process improvement task such as auditing a standard work process. In this, the manager is supporting a consistent messaging that Lean initiatives and process improvement are always important, even in overcapacity mode. According to P3 and P4, when managers are absent or on vacation, it is important for them to have previously designated someone to lead the huddle. P3 and P4 felt assigning a replacement to lead the huddle occurred most of the time.

Participants shared that Lean methodology implementation had given structure to their role as a manager. P1 felt the Lean methodology and tools provided clear expectations of managers' roles and work, giving them a reason to be on an inpatient unit concentrating on process improvements, which provided greater focus and structure. Having worked as a manager without Lean and now with the Lean tools, P4 emphasized they could no longer work without it. P4 related more quickly accomplishing process improvement initiatives that derived from frontline staff, saving time and money by providing a daily structure of work to complete. P1 and P5 also shared how Lean tools gave structure to daily operations. Noting the application of Lean tools allows managers to remain on track with the tools necessary to stay focused and work with frontline staff,

P1 said, “Lean was important and gave me structure to figuring out where I had to prioritize my time.” All participants shared the importance of trusting the process of applying Lean tools and creating structure in their managerial roles.

Communication and vision. All participants mentioned the importance of communicating with employees to support the process improvement initiatives and vision of the organization. According to Fournier and Jobin (2018), if the vision from managers is neither communicated nor clear, issues surrounding leadership emerge, leading to the lack of employee communication and support. Table 6 reveals words and key terms relating to communication and vision from all interviews. The combined frequency of terms referring to communication and vision equals 2.64% of all responses.

Table 6

References to Communication and Vision

Reference	Frequency	Weighted percentage	Similar words
Talk	59	0.71	talked, talking, talks
Questions	54	0.65	question, questioned
Support	33	0.40	supported, supporting, supportive
Benefit	20	0.24	benefits, benefitting
Discussion	22	0.27	discuss, discussed, discusses, discussing
Information	22	0.27	informed
Decide	8	0.10	decided

All participants stressed the importance of managers' communication skills to support employees within the process. P3, P4, and P5 mentioned the need for managers to share quality improvement initiatives with individuals and teams. P3 related the need for continuous communication with frontline employees to ensure they understood the intent of process improvement and the Lean methodology, which was to streamline and standardize processes to reduce operating costs. P4 explained that, at Lean huddles, it is important to openly communicate and discuss with frontline employees the necessity of their input and their voice. P5 said, "It took about a month with positive reinforcement at the Lean huddles saying 'this is really good for you,' because they don't know what is expected of them. They had to trust me and communication really helped with that."

Three participants—P1, P4, and P5—communicated the benefits and vision of participating in Lean initiatives, stressing the importance of managers continuously coaching employees. Such communication encourages staff involvement, as frontline employees better understand the reason for Lean initiatives. P4 noted that asking for employee input instead of telling them how to do the work is imperative, coaching them to look beyond the benefits as an outcome of a single Lean initiative. P3 said, "If you use strong communication skills with your staff, it will help them understand where you are going so they can recognize that they are actually part of the solution."

P5 emphasized the importance of communicating with employees who are resisting change and the Lean methodology, especially with regard to expressing the need for extensive conversations to explain the vision and goal. Further, it is important to speak with employees whose engagement is low, as perhaps the way they work is no

longer the way the hospital operates. P4 emphasized how changing the communication strategy with discouraged or unengaged employees can help, depending on if the employee is open to share. If not, the manager should alter the strategy, including more open-ended questions to encourage employee input. P2 had similar experiences and said, "You need to effectively communicate with them, so you really need to explain to them what it is you are trying to achieve."

Many participants emphasized that communicating the vision is important for employees to understand the reasoning behind the work, with P1 and P4 supporting the use of visuals for employees to picture the vision. P1 found posting organizational priorities at the top of the Lean huddle board was an effective strategy in creating a clear vision and goal. P4 noted that making a clear picture for frontline employees entailed posting the hospital vision on the Lean huddle board, clearly identifying how each improvement initiative contributes to the vision.

Links to the literature. The participants shared that lending constancy and structure to the application of Lean methodology and initiatives provided a standardized problem-solving process. In addition, addressing problem-solving process issues can provide opportunities for reducing process costs and waste, two elements aligned with current literature. According to Cromwell et al. (2018), applying Lean principles provides increased consistency to solve complex issues and problems in a systematic manner. Wong et al. (2016) noted that the lack of standardization and consistency in processes could negatively affect workflows and role confusion, creating rework situations.

According to Hihnala et al. (2018), Lean methodology allows for greater clarity and structure in manager roles and responsibilities, an important element to prevent managers from becoming discouraged by the ambiguity of their role and accountability for specific activities (Goodridge et al., 2015). Mazzocato et al. (2016) argued that communication with frontline employees is essential to support and sustain change and results. The success of Lean methodology is dependent on manager leadership, as managers need to communicate when status quo is no longer accepted or appropriate (Wong et al., 2016). To encourage staff to participate and engage in the process of Lean, leaders must communicate and provide transparency in the reason for change fostered in an environment supporting process improvements (Hung et al., 2017). Coury et al. (2017) emphasized that communicating and applying Lean tools with frontline employees created a shared vision and goals. Lean methodology contributes to increased communication, vision, and cost reduction by concentrating on process improvements and developing specific managerial and leadership skills (Aij & Rapsaniotis, 2017). Communicating clear objectives, vision, and common goals increases Lean implementation success, creating a culture of employee engagement (Harrison et al., 2016).

Links to conceptual framework. The conceptual framework of TQM includes specific elements that support a structured and consistent approach to continuous quality improvement (Chiarini & Vagnoni, 2017). With the TQM approach, managers apply the plan-do-study-act approach to problem-solving, creating structure and clarity of management roles (Deming, 1986). Situations that cause TQM and Lean implementation

failure are those with limited clarity of roles and a lack of collective agreement on vision and goals (Chiarini & Baccarani, 2016). The TQM underscores that Lean tools enable structure and support for managers in their daily operations.

According to Wiler et al. (2017), applying the TQM conceptual framework supports other structural approaches to problem-solving and process improvements, such as Lean methodology, project management, change, and leadership. The TQM approach highlights the need for visionary leadership from management, including the ability to communicate and lead the organizational vision while validating customers' needs (Chiarini & Vagnoni, 2017). Applying both continuous process improvement and visionary leadership can support the removal of wasteful and inefficient processes (Wiler et al., 2017). As stated by Chiarini and Vagnoni, Lean is derived from TQM, with application of both methodologies adding value in the health care system by reducing operating costs, boosting productivity, and increasing patient safety. The application of communication and vision enables managerial leadership, supporting Lean initiatives in health care.

Theme 3: Employee Engagement

Research participants found employee engagement in process improvement supported the reduction of health care costs. According to Centauri et al. (2018), encouraging participation in the implementation of Lean initiatives demonstrates to frontline staff that they are the ones driving problem-solving, which subsequently increases employee engagement and decreases costs. Hung et al. (2017) emphasized that Lean initiatives supported increased employee leadership and engagement, connecting to

the needs and purpose of the organization and professional growth. Two subthemes emerged from analysis of the semistructured interviews and methodological triangulation: (a) autonomy and empowerment and (b) employee recognition.

Autonomy and empowerment. All participants emphasized the importance of enabling employee engagement, fostered by employee autonomy and empowerment, in impacting process waste and costs. According to Magalhães et al. (2016), Lean methodology reduced ambiguity within the workplace, increasing employee autonomy and empowerment to review and change patient flow. Table 7 provides specific terms relating to autonomy and empowerment for all interviews. The frequency of terms referring to autonomy and empowerment combined equals 3.08% of all responses.

Table 7

References to Autonomy and Empowerment

Reference	Frequency	Weighted percentage	Similar words
People	85	1.03	peoples
Engagement	40	0.48	engage, engaged
Leaders	32	0.39	lead
Coaching	30	0.36	coach
Leadership	28	0.34	–
Opportunity	20	0.24	opportunities
Learn	14	0.17	learned, learnings

Participants emphasized the need to invest in people and employees to attain maximum autonomy and support process improvements. P1 stressed the importance of allowing employees autonomy in their work, promoting a culture endorsing employees to problem-solve and find solutions to process issues. P3 found that encouraging employees to complete opportunity improvement tickets and post them on the Lean huddle board further encourages individual autonomy. As P4 noted, employees who are supported by their managers become autonomous in identifying process opportunities, therefore impacting morale and employee engagement. P4 said, "When managers provide support and coaching, employees feel like they are being involved in the change process and feel they are making an impact for the greater good of patient care." P3 shared that, often, managers can identify employees who are passionate and engaged, demonstrating autonomy by volunteering to participate in Lean initiatives and communicating with teams for input and the importance of process improvements. As P5 emphasized, always providing solutions to employees on how to fix the problem is not the way to invest in a culture of process improvement. Allowing individuals some freedom to feel confident in talking and reflecting with others creates levels of autonomy and empowerment. P5 added, "If employees are always being told what to do and how to do it, not only will they become reliant on the manager, but employee satisfaction scores will not be good. Managers need to coach, not fix."

P1, P2, P4, and P5 identified the need to empower frontline employees with constant reassurance and support to develop future leaders. P5 shared that many employees seek affirmation and empowerment that they are good in their roles. P4 related

situations in which employees were unsure how to present ideas to their peers; however, when provided with encouragement and support by managers, they felt empowered to make changes, and then even more changes. P1 and P5 explained how managers could feel overwhelmed by the number of Lean huddle initiatives employees can have at the same time, noting that there comes a time when employees need to feel empowered and become leaders, as well. Specifically, "There was a point where I realized [the employees] needed to be leaders, too," P1 said. "I need them to lead some of these opportunities and I will be the coach. I will get them to lead [the Lean initiative] and I will help them work through the details."

Lean tools also support empowerment, creating an environment of engagement. P2 shared that employees can complete a Lean huddle process opportunity ticket at any time, subsequently discussing it with their team and deciding on next steps. P5 mentioned there are times where managers need to empower employees to make the best decisions for themselves, elaborating, "Sometimes as a manager you need to say 'this is what we are doing; this has been really successful in our environment and I am sorry it doesn't seem to be working for you." P5 discussed the importance of providing guidance for employees by asking, "'Is there anything I can do to help with that?' Because this is our new reality now and this is how we function." P5 emphasized the need to communicate the importance of the Lean methodology by adding, "Things change in our career and, you know, if you need to be somewhere else, then there are other organizations [that] may not practice the same ways we do, and feel free to explore those areas." Some employees might leave the organization, noted P1, P2, and P5; however, many will stay

and become empowered upon realizing they are in control of making a positive difference in their workplace.

Organizational culture can also support employee empowerment. All participants mentioned the importance of frontline staff voting on organizational priorities. P4 offered, “Once a year, the management team gets together and develops our new quality improvement projects. “Once we have decided what this should be,” the participant continued, “managers present it to their employees and let them vote on which driver can have the greatest impact on patient care.” P3 echoed the need to allow employees to be part of the decision process, having frontline staff guide management on prioritizing action items according to how they can contribute to the greater organizational goals. P1 and P5 emphasized that once employees understand they are part of the solution, not the problem, they become engaged in providing the best patient care possible. P2 and P3 related that allowing employees to make decisions sends a strong message to the organization and creates a change in culture.

Recognition. Many participants emphasized the need to recognize and celebrate continuous quality improvement success within the organization. According to Sisler et al. (2017), allowing frontline employees to share their process improvement initiatives with stakeholders strengthens their engagement and sustainability of change. Supporting change sustainability involves recognizing employees in a public forum for their commitment and work toward process improvements, which can have a positive effect on not only the employee, but also the organization (Boronat et al., 2018). Many participants mentioned finding the time to recognize and celebrate milestones. Table 8 provides

specific key terms related to recognition for all interviewees. The frequency of terms combined equals 3.01% of all participants' responses.

Table 8

References to Recognition

Reference	Frequency	Weighted percentage	Similar words
Staff	167	2.02	–
Celebrate	24	0.29	celebrated, celebrating
Frontline	24	0.29	–
Involve	22	0.27	involved, involvement
Recognized	12	0.14	recognize, recognizing

P1, P4, and P6 revealed how specific Lean tools such as the Lean huddle board gave employees the chance to recognize each other for their work and positive contributions on a weekly basis. P2 shared that many employees perform above expectations and should receive recognition for their dedication by peers and management. P1 and P5 mentioned the importance of recognizing and celebrating milestones and changes in process improvement, as this creates a positive environment of satisfaction and accomplishment. As P5 stressed, without recognizing and celebrating efforts, people will stop investing in change, thus reducing employee engagement. P3 and P6 highlighted the importance of allowing employees to showcase their work and contributions to organizational goals and priorities. To do so, managers can organize

various “report out” sessions, where frontline employees present their Lean process improvement initiatives to a mixed audience of peers, physicians, managers, and senior management. P3 and P6 emphasized that presenting process improvement initiatives allows employees to understand how every individual is contributing to the greater goal, thereby creating empowerment and engagement. P6 said, “It was powerful seeing frontline employees present their Lean initiatives. It builds enthusiasm of being involved in quality improvement [and] impacting the whole system.”

A review of internal documents on employee engagement scores confirmed that since the implementation of Lean methodology in 2016, there has been a continuous increase in employee engagement scores. Figure 3 provides an overview of different elements the hospital measures to validate employee engagement on a regular basis. The overall employee engagement was 44% prior to Lean implementation, 66% post–Lean implementation, and 75% in 2018.

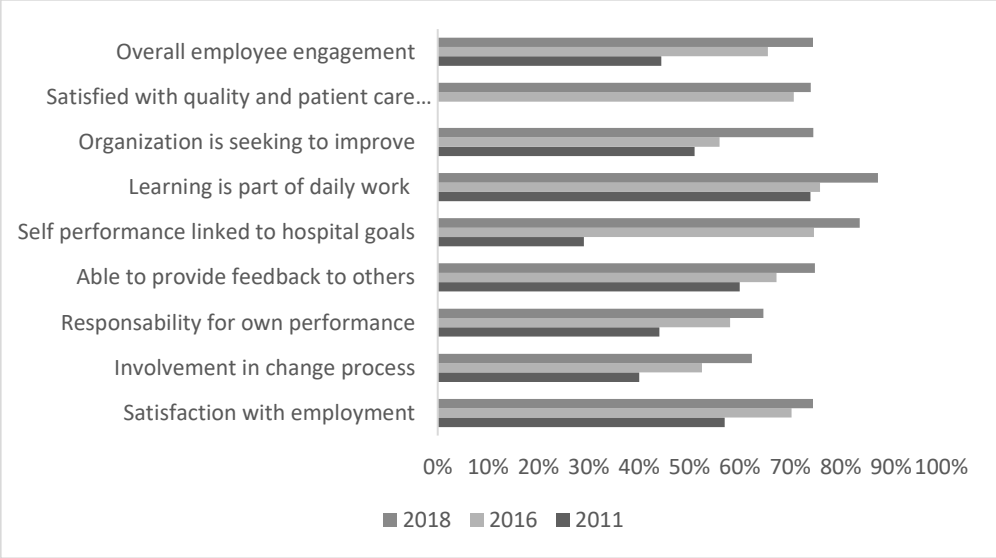

Figure 3. Employee engagement scores.

Links to the literature. Participants shared that Lean methodology and applying Lean tools supported employee engagement by fostering autonomy and empowerment while recognizing and celebrating success. These findings align with the current literature on the implementation of Lean methodology. According to Hung et al. (2017), Lean initiative implementation supports increased leadership and employee engagement, allowing individuals to connect to the needs and purpose of the organization, encouraging professional growth. Doğan and Unutulmaz (2016) noted that Lean initiatives can increase health care system efficiency through a review of operational processes, thus leading to reduced costs and expenditures, boosting employee morale, and creating a work environment supporting greater levels of patient care. Mosadeghrad (2015) emphasized that Lean initiatives create a culture of teamwork with an emphasis on employee participation, thereby empowering employees. According to Wong et al. (2016), empowerment and engagement occur when people are given time to think about their work, with the power and authority to identify and remove waste within their work processes. Recognizing process improvement contributions has a positive impact on employees, patients, and organizations (Boronat et al., 2018).

Links to conceptual framework. The conceptual framework for this study supported the information shared by participants. According to Chiarini and Baccarani (2016), TQM focuses on the development of leadership and vision, enabling a culture of communication and empowerment of frontline employees. Mosadeghrad (2015) emphasized how developing future leaders by autonomy and empowerment enables employee engagement, participation, increased levels of management systems, and

various strategies for quality improvement. Factors that decrease process improvements from a TQM perspective include minimal communication and low levels of recognition and visionary leadership (Chiarini & Baccarani, 2016). TQM supports continuous process improvement with the combination of employee pride and satisfaction, leadership, and self-improvement to enable cultural transformation (Deming, 1986).

Theme 4: Alignment

Research participants commented on the importance of organizational alignment when discussing how Lean could have a positive impact on health care costs. According to Rotteau et al. (2015), added value comes from senior management creating process initiative alignment of corporate priorities between middle managers and the senior management team. Following the analysis of semistructured interviews and methodological triangulation, two specific subthemes emerged: (a) organizational priorities and (b) the role of senior management and Lean expertise.

Organizational priorities. Participants often mentioned the alignment of focus and efforts regarding organizational priorities. Applying Lean principles by management can support employees in understanding the organizational goals when faced with multiple and competing priorities in health care (Cromwell et al., 2018). As emphasized by Boronat et al. (2018), aligning organizational priorities for continuous process improvement increases the sustainability of results, allowing improvements and achievements of chosen objectives. Table 9 provides an overview of key words related to organizational priorities for all interviews combined, equaling 2.87% of all participants' responses.

Table 9

References to Organizational Priorities

Reference	Frequency	Weighted percentage	Similar words
Patients	78	0.94	patient
Drivers	44	0.53	driver
Focus	32	0.39	focused, focuses, focusing
Help	31	0.37	helped, helpful, helping, helps
Hospital	31	0.37	hospitals
Align	22	0.27	aligned, aligning, aligns

All participants shared the importance of aligning their inpatient units' process improvement initiatives with the priorities of the organization. P1, P3, and P4 related aligning initiatives to the organization's pillars as well as to its True North metrics. P1 said, "Having pillars and True North metrics really helps me streamline things so you are not working on a hundred different things; it really puts focus on it." P3 and P4 explained the need to understand the organizational priorities, also known as pillars of the organization, which then allows managers to communicate and align frontline Lean initiatives to organizational goals. P3, P4, and P6 stressed the importance of asking questions to ensure employees understand the alignment of their work with the goals of the organization. P4 shared that all Lean initiatives deemed to be cost savings are always linked to the organization's priorities and the True North hospital metrics. P3 said, "For

example, staff engagement: Globally, the whole hospital is working on this, so with my employees I talk about how what we are working on is impacting the actual driver." P3 further explained, "We try to do this every few weeks so they get comfortable with what the focus of the whole organization is." P6 said, "We do a lot of discussion about True North metrics, applying data and aligning all work with the vision, mission, and strategic plan of the hospital."

P2, P3, P4, P5, and P6 emphasized the use of data and metrics on scorecards for each inpatient department aligning with the goals of the organization. According to P3, all inpatient units have their own scorecards with both driver metrics and watch metrics. Also incorporated into the scorecard, according to P2, are audits using Lean tools such as kamishibai, which managers discuss with employees at monthly Lean leadership meetings. The scorecard metrics stem from compiled data specific to each inpatient unit and manager. P3 remarked, "It is all about the data. As managers, we look at our incidences, critical injuries, and there are multiple things. But once a month, we review our scorecards and see what is working and what is not." P6 shared that when managers have specific scorecard metrics, they are able to align all their operational work and use of Lean tools to the priorities of the organization. P5 said, "At Lean huddles, the process opportunity tickets have [organizational priorities] on them, so when someone brings a new idea, we always say how is this going to impact quality and safety and family-centered care." Once they have identified worthwhile process opportunities, P5 explained, "We enforce it all the way through at our unit leadership meetings, and the scorecards have to have at least one metric under each one of those categories. That is our

alignment." P6 emphasized the importance of measuring data and scorecards not only at a department level, but also a corporate one. P6 said, "One important employee survey question is 'Do you understand the goals of the hospital?'" This question is important, as P6 explained, "We sort of say True North metrics are the goals of the hospital and do you [the employee] understand how your department aligns to support the success of the goals of the hospital?"

Every participant noted that all organizational priorities were focused on patient care and patient satisfaction. Many participants shared the use of suggestion boxes upon patient discharge to gain feedback from patients and families. P2 and P3 mentioned discussing patient feedback at Lean huddle boards with employees, which will either create a process improvement ticket or recognition to employees for their work. P2 and P3 also identified patient advisors as important elements in aligning organizational priorities to patient needs. P3 said, "We had a patient advisor sit and participate in our discussions at Lean leadership meetings and Lean huddles. We are really open with this individual, and they provide us with their perspective on when they were a patient." Patient advisors can be volunteers who collaborate with management by sharing and providing solutions from the patient's perspective. Lean managers invite patient advisors to continuous process improvement initiatives, allowing their voice to be heard. P3 stressed that including the patient's perspective in process changes can increase process improvement and patient satisfaction. P2 mentioned that patient advisors are important stakeholders and should be included in most decisions that impact patient care.

Participants emphasized a focus on patient care and patient experience inherent in all Lean initiatives. Figure 4 provides an overview of patient satisfaction scores since the implementation of Lean methodology in the hospital. Data came from the Canadian Patient Experiences Reporting Services through CIHI, complied from the NRC Picker. Patient satisfaction scores have all improved since the implementation of Lean in 2016, with overall patient satisfaction increasing 6% from 2016 to 2018.

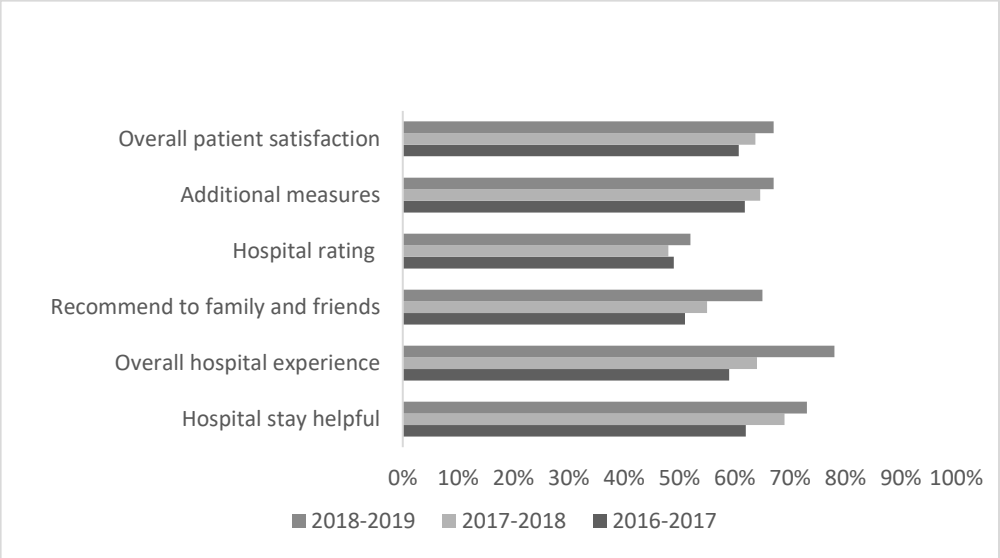

Figure 4. Patient satisfaction scores.

Senior management and Lean expertise. Participants identified the role of senior management and Lean expertise in creating a culture change to support Lean methodology implementation and sustainability. According to Barnas (2018), Lean transformation begins with a CEO with a vision and strategy creating a clear purpose for senior management. The role of senior management is essential in not only supporting Lean implementation, but also influencing the organizational culture to support Lean initiatives and streamline the flow of hospital patients (Blanchard & Rudin, 2016). Table

10 provides key words that relate to senior management and Lean expertise combined, equaling 2.13% of all participant responses.

Table 10

References to Senior Management

Reference	Frequency	Weighted percentage	Similar words
Strategies	74	0.89	strategy
Leadership	28	0.34	–
Senior	20	0.24	–
Lead	18	0.22	leading, leads
Challenge	12	0.14	challenged, challenges
Director	9	0.11	directors
Accountable	8	0.11	accountability
Decision	7	0.08	decisions

All participants mentioned the important role of senior management in supporting Lean initiatives in their organization. The alignment of organizational priorities coupled with the support of senior management provided a strong Lean culture of process improvement. P6 said, “They [senior management] believe in our system and our CEO believes in this system, so they are very supportive.” In illustration of this, P6 continued, “So [senior management] are constantly reinforcing the message with their directors, like all the way through, to say ‘this is the way we do business,’ and it isn’t an option not to

participate." P2, P3, P4, and P5 emphasized the added value in allowing managers and frontline staff to participate in deciding which priorities could have the greatest impact on the organization's goals. P3 said, "The thing that makes the biggest change in our culture is the discussions amongst the management teams and senior leaders to decide on priorities." These are well-attended events, as P3 explained: "We literally had a room filled with all types of issues from frontline employees, and then everyone had to vote on where the highest priorities we from our own department perspective." P1 shared the importance of senior management understanding the reality of operations on inpatient units, allowing senior management to make decisions aligned with the realities of frontline operations. P2 emphasized the important role of senior management in Lean implementation and how their support places focus on aligning priorities and accountability. P5 shared that senior management emphasized to all stakeholders that Lean methodology is the way process improvement is done in the organization, creating accountability and commitment.

Ensuring stakeholder engagement and participation is essential for senior management success with Lean implementation. P2 said, "Senior leadership have regular meetings with physicians to support Lean in our organization. I believe that this has had a significant influence on this group." P5 had a similar experience, sharing, "Senior management is getting better and better as we go along. I have actually seen physicians lead Lean initiatives. Now senior management has done a lot to bridge that gap and so has the Board." P6 emphasized how important the role of senior management is, saying, "The strong messages from senior management with stakeholders helps." To illustrate the

point, P6 continued, “It’s not the person in the middle saying ‘this is what has to happen.’ It’s actually the top saying ‘this is the way we are doing things now and it’s a must-do.’”

All participants noted the importance of senior management to fund internal Lean expertise in the organization. P2, P4, and P6 identified how the presence of a Lean coach provides constant support for managers, enabling the change in culture. P2 said, “I think that, honestly, the key to driving Lean is to have a really good Lean coach.” P2 and P4 shared that a Lean coach provides alignment between senior management and managers, attending many management meetings and some senior management meetings. Without a Lean coach to ensure scheduling and execution of Lean huddles and providing help with data compilation and charts, said P3, Lean methodology would not be successful. As managers, there is not always enough time to do all the data compilation, which is why having a Lean coach attend Lean huddles and Lean leadership meetings creates a team approach and project support, according to P4. P6 said, “The Lean coach is a person who is the expert and gives us confidence and helps us connect the dots. So, if a new department is having issues or questions, the Lean coach can share examples from other units and how others have overcome challenges.” In sum, P6 declared, “A Lean coach is the person who connects the dots for [managers].” All participants agreed on the importance of constant support from the Lean expert, acknowledging that if senior management did not believe in Lean methodology, they would not invest in a full-time resource to work solely on Lean methodology. P4, P5, and P6 highlighted that, with internal Lean expertise, it is possible for Lean implementation to reduce health care costs; however, supporting growth requires initial investments.

P5 stressed that sometimes managers try too hard to convince frontline employees of the added benefits of saving money. P5 also mentioned the importance of not marketing Lean to frontline employees as a methodology to reduce health care costs, as the unit budget is not their priority; patient care and safety are. P6 said, "Investing in Lean experts is essential to our growth and will reduce health care costs. However, when we started implementing Lean, we did not want [employees] to think it was all about cost reduction." P6 emphasized the intent of Lean implementation: "We really wanted them to focus on spending more time with the patient, supporting patient-centered care, quality, safety, and staff engagement. We thought that if we really tapped into those elements, the rest would come together, which it did."

Links to the literature. Participants emphasized the important role of senior management to create alignment of organizational priorities and support cultural change. These findings echoed the roles of senior management when implementing Lean methodology as outlined in current literature. Walker et al. (2016) argued that senior management support and leadership is the most important factor in Lean implementation, as this group has the power to provide funding and eliminate barriers. According to Rotteau et al. (2015), visibility and constant support from senior management teams are essential, providing alignment of corporate priorities between midmanagement and senior management. According to Gupta et al. (2018), senior management teams supporting Lean methodology will increase opportunities for process improvement and patient satisfaction. Rubenfire (2017) also heralded the importance of senior management presence, as senior management need to understand Lean transformation and remain open

to the change process. Bees (2017) emphasized the need to create chief experience officers in the senior management teams, focusing discussions on process improvement and providing a clear message of the importance of Lean. When the CEO prioritizes Lean, Lean becomes a priority throughout the organization (Rotteau et al., 2015).

Links to conceptual framework. The conceptual framework for this study supported the findings shared by participants. Applying TQM and Lean methodology requires a top management sponsor to deploy process improvement methodologies with visionary leaders who can enlighten others (Chiarini & Baccarani, 2016). Successful TQM is dependent on the ability of all management levels to create and align a vision, subsequently planning and then leading the organizational changes needed for success (Mosadeghrad, 2015). The role of senior management and its implication in steering committees is essential to support TQM at all stages, aligning the organizational mission and values with the principles of TQM (Chiarini & Vagnoni, 2017). Senior leaders who demonstrate leadership and involvement in developing and implementing a system of quality management techniques are essential to TQM, inspiring and driving the change of quality improvement and supporting the culture of continuous quality improvement (Mosadeghrad, 2015). Visionary leadership from senior management is one of the top prerequisites necessary for Lean implementation impacting health care costs (Chiarini & Baccarani, 2016).

Applications to Professional Practice

The results of this study provide in-depth insight into the strategies managers apply to implement Lean initiatives to reduce health care costs. Strategies shared by

participants demonstrated a positive impact on various elements, such as financial operating costs, patient satisfaction, and employee engagement. By applying various strategies, managers can enable a culture of process improvement impacting not only operating costs, but increased patient safety and positive experiences. By removing process waste, patients may experience lower wait times and faster turnaround for care and discharge. According to Goodridge et al. (2015), applying Lean methodology helps health care managers understand the causes of operational waste and seek opportunities for process improvement.

Findings from this study illuminated some of the various tools, skills, strategies, and support managers need to create an environment of process improvement. This information may help health care managers and senior leaders contemplating the implementation of Lean in their organization. This study also revealed how health care managers can positively impact patient quality of care and employee satisfaction by empowering frontline employees to create change in their work environment. The roles and visionary leadership of managers and senior management are essential elements to support organizational change. With focused intent on process improvement, health care organizations may invest funding in support of their patients' needs and demands.

Implications for Social Change

The findings of this study may contribute to positive social change by inspiring health care leaders to seek opportunities for improving operational process and reducing health care costs. By reducing costs, health care professionals and leaders can focus on investing in patient care best practices, increasing patient safety, and reducing negative

patient outcomes. Findings from this study support the importance and value of frontline employees and the role managers and management can have on patient care. Allowing frontline employees to participate in process improvement enables management and frontline staff to collaborate to implement solutions for patient care. By working together toward a common goal, not only will employees feel empowered to create change, but managers may see the difference they can make in people's lives. Empowering both employees and managers may also increase job satisfaction and healthy work environments, promoting teamwork and reducing stress levels. Patients and members of the community can benefit in such areas as best outcomes for care, increased patient satisfaction, and commitment to quality of care. The implications for social change include efficient operational process with safe and effective patient care.

Recommendations for Action

Health care managers and senior management can use strategies identified in this study to integrate Lean and process improvement into their corporate goals. Also provided may be specific strategies to enable and strengthen process improvement with frontline employees. Some specific recommendations that may be useful for other health care organizations include: (a) dedicate specific funds to support health care managers in implementing Lean methodology, (b) focus on providing value and support to health care managers who are new to process improvement, (c) celebrate important milestones and successes attained by employees and managers, (d) communicate to all stakeholders the added value of process improvement, (e) value and emphasize the importance of giving frontline employees a voice and empowering and developing future leaders, (f) provide

education opportunities to develop leadership skills and management competencies to support present and future leaders, and (g) ensure CEO commitment and buy-in to support continuous process improvement as a cultural and organizational priority.

Other managers in various roles and sectors who are seeking to implement process improvement strategies may also find value in these results. I plan to communicate the findings of this study through various forums, such as conferences and educational sessions focused on Lean and continuous process improvement in health care. In addition, I would like to disseminate the study's results through publications and literature, supporting present and future researchers.

Recommendations for Further Research

The purpose of this qualitative single-case study was to explore the strategies health care managers use to implement Lean initiatives to reduce health care costs. Applying methodological triangulation and data analysis, I identified four themes impacting health care costs: (a) the review of operational processes, (b) specific management skills, (c) employee engagement, and (d) alignment. The focus of the study was on strategies managers use to reduce health care costs by applying Lean methodologies.

The study had two limitations, the first being a small sample size of six health care managers who have demonstrated successful implementation of Lean initiatives in an acute care hospital. The second was that the level of experience and success of implementation may have varied across participants and thus produced limited results.

The following are recommendations for additional research:

1. There was a limitation of a small sample size of six health care managers with different levels of experience and success. I recommend future researchers include larger samples of health care managers in both community and tertiary hospitals having different levels of experience with Lean success. With a greater sample size, the outcomes and findings may be different.
2. Another limitation of this research was its design as a qualitative single-case study. As hospitals have numerous factors that impact Lean initiatives, I recommend a quantitative or mixed methods study to calculate the yearly cost savings with the implementation of Lean methodology in health care.
3. The focus of this study was on the strategies health care managers use to implement Lean initiatives to reduce costs. I recommend future researchers focus on the strategies health care managers apply to sustain Lean initiatives in health care. The results may be beneficial for health care leaders to better understand and plan sustainability efforts post–Lean implementation.
4. In addition, this study focused on health care managers who have successfully implemented Lean in inpatient units. I recommend future researchers include all health care managers within hospitals who have implemented Lean in health care. The strategies of health care managers in hospitals who have implemented Lean and provide services to inpatient units may be different than those of health care managers within inpatient units.
5. Researchers may wish to explore other factors and/or programs that support and enable process improvement methodologies such as Lean. I did not

explore the factors and/or programs that had an impact on the implementation of Lean. Future researchers may provide some information on how different programs support or thwart Lean implementation in health care.

6. Another limiting factor of this study included focusing on health care managers. I recommend conducting a qualitative single- or multiple-case study with senior management personnel who have successful implemented Lean in health care.
7. I focused on strategies for successful implementation of Lean but did not explore strategies managers apply to reduce resistance to change in health care. Therefore, continuing to explore strategies managers or senior management use to reduce resistance to change, focusing specifically on frontline employees and/or physicians, could be a focus of future research.

Reflection

The doctoral study process has allowed me to understand and appreciate the value of research in process improvement and academia. Prior to commencing this journey, I could neither imagine nor comprehend the dedication and mental fortitude it would take to complete. This journey has allowed me to understand how significant research is with operational issues in health care, and how researchers are important in moving forward with process improvement strategies. I can now appreciate the importance of each individual in a health care system who can have a tremendous impact on providing safe and quality care to patients. I also appreciate and understand how different and various elements in health care build on one another, creating synergy and change. The presence

of managers with visionary leadership has become a fundamental element in Lean and process improvement. There is no substitute for the strong commitment of employees, managers, and senior management. Lean and other process improvement methodologies are only viable solutions if the infrastructure exists to support the organizational change. With a strong infrastructure supporting process improvement, it may be possible to fix a broken and inefficient health care system.

Conclusion

The purpose of this qualitative single-case study was to explore the strategies health care managers use to implement Lean initiatives to reduce health care costs. I conducted semistructured interviews with six health care managers. By applying methodological triangulation and data analysis, I identified four themes impacting health care costs: (a) the review of operational processes, (b) specific management skills, (c) employee engagement, and (d) alignment. Each theme aligned with current literature and the conceptual framework of TQM in process improvement.

The findings of the study confirmed that managers do use specific strategies to reduce costs when applying Lean methodology in health care. Lean methodology provides added value by streamlining and standardizing health care processes while reducing operational waste. Lean methodology enables employee participation and collaboration in process improvement, impacting employee and patient satisfaction scores. Organizational alignment and visionary leadership coupled with Lean methodology reduce cost, improve operational processes, increase patient safety, and reduce negative patient outcomes.

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Appendix A: Interview Questions

1. As a manager, what strategies do you apply to implement Lean initiatives?
2. How do you ensure the implementation of Lean initiatives reduces costs?
3. What strategies do you use to influence the implementation of Lean initiatives?
4. What strategies do you use to sustain Lean initiatives once implemented?
5. When implementing Lean initiatives, how do you align the vision of the organization to the needs of patients?
6. What additional information about Lean implementation would you like to provide?

Appendix B: Interview Protocol

Interview Protocol	
What You Will Do	What You Will Say: Script
Introduce the interview and set the stage.	Hello. My name is Nathalie Boudreau and I am a doctoral student in the Doctorate of Business Administration program at Walden University. Thank you for taking the time to participate in the study called "Strategies for Improving the Process of Lean Implementation in Health Care." Please note the interview will be recorded and is confidential.
• Watch for nonverbal cues. • Paraphrase, as needed. • Ask follow-up probing questions to get more in-depth responses.	1. As a manager, what strategies do you apply to implement Lean initiatives? 2. How do you ensure the implementation of Lean initiatives reduces costs? 3. What strategies do you use to influence the implementation of Lean initiatives? 4. What strategies do you use to sustain Lean initiatives once implemented? 5. When implementing Lean initiatives, how do you align the vision of the organization to the needs of patients?

	6. What additional information about Lean implementation would you like to provide?
Wrap up interview and thank participant.	I would like to thank you for time and participation in the study.
Schedule and confirm a date when the participant will receive follow-up member checking via e-mail.	I will review the recording of the interview we have completed today. In the following days, I will provide you with a summary of my comprehension of your answers for each question. I will ask that you confirm by e-mail if the information is accurate and correct. You will be able to confirm if I have missed any information or to add any additional information.
Follow-up Member Checking	
Ensure member checking by sending an e-mail to participants with a summary of their responses.	I have reviewed the recording of the interview; below is a summary of my comprehension of your answers from the recorded transcripts. Please confirm by e-mail if this information is correct for the following questions. Please let me know if I have missed anything and if there anything you would like me to add. 1. Question and succinct synthesis of the interpretation – perhaps one paragraph or as needed.

	2. Question and succinct synthesis of the interpretation – perhaps one paragraph or as needed. 3. Question and succinct synthesis of the interpretation – perhaps one paragraph or as needed. 4. Question and succinct synthesis of the interpretation – perhaps one paragraph or as needed. 5. Question and succinct synthesis of the interpretation – perhaps one paragraph or as needed. 6. Question and succinct synthesis of the interpretation – perhaps one paragraph or as needed.