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The Relationship Between Hospital Leadership Activities and Clinical Quality Outcomes in Iowa

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Walden University
2016

Abstract

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MHA, Des Moines University, 2001

BS, Luther College, 1994

Dissertation Submitted in Partial Fulfillment

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Doctor of Philosophy

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Abstract

The Centers for Medicare and Medicaid Services have been working with hospital networks across the United States to improve health care through education and training on clinical best practices and leadership frameworks. Some organizations have failed to reach the high-quality standards of care expected and have adverse patient care outcomes. The purpose of the study was to determine the relationship between leadership actions, funding type, and clinical care outcomes in participating Partners for Patients hospital programs in Iowa. The secondary variable data were provided from a Partnership for Patients contractor, through the Centers for Medicare and Medicaid Services Organizational Assessment Tool. Multiple linear regression analyses were used to determine the relationship between the leadership actions, funding type, and the clinical quality outcomes of catheter-associated urinary tract infections, central line associated bloodstream infections, falls with injury, and venous thromboembolism. The findings demonstrated no statistically significant relationships between leadership actions, such as completing a leadership checklist, incident dashboard, and board involvement in decision making, and the specified clinical care outcomes. There was a statistically significant relationship between leadership actions of completing a root cause analysis for incidents, federal funding type, and the clinical quality outcomes of falls with injury and venous thromboembolism. The results of this study will be shared with Partnership for Patients program leadership to positively impact patient care. The results may be useful as organizations continue to implement best practices to reduce medical errors, save cost, and increase patient safety.

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Dedication

This dissertation is dedicated to all the individuals who have assisted and supported the work including the healthcare providers across Iowa. It is dedicated to the individuals in the hospitals across Iowa who work day and night to provide quality of care to each and every patient that enter into our organizations and put their trust of health and healing in our hands.

Acknowledgments

I would like to acknowledge my family and friends for their continuous support of my study and work for my doctorate. My friends were always there to listen to me and provide ongoing support to keep moving forward. The following dissertation work comes with the acknowledgement that my family has spent countless days without me participating in the evening and weekend events as well as without a kitchen table. I would like to say thank you for their ongoing support and encouragement to reach such a goal.

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Chapter 1: Introduction to the Study

Introduction

In 2011, Centers for Medicare and Medicaid Services (CMS) launched the Partnerships for Patients program to focus on acute healthcare system's quality care (Centers for Medicare and Medicaid Services, n.d.). The Partnership for Patients (n.d.) created a campaign of 26 Hospital Engagement Networks across the United States to focus on improving care in 10 clinical care areas. The program's goal was to make healthcare safer by producing a 40% reduction in preventable hospital-acquired conditions and a 20% improvement in readmission care transitions (CMS, n.d.). During the program, each Hospital Engagement Network was challenged with collecting data on 10 quality-of-care measures applicable for the hospitals and surveying leadership and board of director engagement activities (CMS, n.d.). One of these Hospital Engagement Networks was located in the state of Iowa and included all the hospitals across the state (Iowa Healthcare Collaborative, 2015).

In this study, I focused on the four commonly collected clinical quality measures among all hospitals in the state of Iowa and examined why some Iowa hospitals were highly ranked prior to the CMS programs and continued to improve while other hospital organizations did not improve. The four patient safety measures that I studied were the occurrence of catheter-associated urinary tract infection (CAUTI), central line associated bloodstream infection (CLABSI), venous thromboembolism (VTE), and injury from falls.

Background

The Institute of Medicine (2001) described the state of healthcare in the United States as a system that has more medical errors in organizations than are reported publically. The current system of healthcare fails to deliver high quality of care to all that seek the services and errors are all too common in the system that is poorly designed, ill-equipped to change with the technology, delivery is too complex or slow, workers are in a shortage, and as a result the care is not safe (Institute of Medicine, 2001; Schuster, McGlynn, & Brook, 1998). The Centers for Disease Control and Prevention (2015) described one type of significant hospital acquired infections that can possibly be prevented is catheter associated urinary tract infections (CAUTI). These are infections involving the urinary systems and are associated with the prolonged use of the urinary catheter (Center for Disease Control and Prevention, 2015).

The Centers for Disease Control and Prevention (2015) also described central line associated bloodstream infections (CLASBI). CLASBI affect the bloodstream and are introduced to the bloodstream as the catheter is inserted into a major blood vessel and used during procedures, or when the area around the insertion site is cleaned (Yokoe, et.al. 2014). Venous thromboembolism (VTE) is a clot in the bloodstream often in the lower leg and the risk to the patient is the potential for the clot to release and travel to a major organ such as the lung, heart, or brain (Centers for Disease Control and Prevention, 2014). The final measure included was the number of patient falls that occur in hospital organizations. Patient falls are reported as a common determining factor for preventable

injury, harm, and even injuries that lead to fatalities (Williams, Szekendi, & Thomas, 2014).

Leadership has been one of the contributing factors for the development of organizational goals including the improvement of clinical quality of care (Taylor, 2012). Aarons, Ehrhart, Farahnak, and Sklar (2014) stated that "climates should support effective and continued evidence based practice implementation and sustainment" (p. 268). Aarons et al. (2014) and Bohan (2014) discussed the positive impact to leadership outcomes on implementation of strategic based goals in healthcare organizations and how some actions contributed to the success in the organization. Bohan (2014) acknowledged that the impact of leadership on the essentials of patient care goals was missing stating strategic alignment and clear associations between their actions and outcomes. Corley (2015) examined improvements in hospital-associated infections (e.g., CAUTI and CLABSI) and noted improvements in hospital-acquired conditions compared to the reported baseline of measures; the CDC was supportive of the improvements in hospital acquired infections from 2008 to 2013, yet did not discuss the causes for these improvements.

Pronovost and Jha (2014) criticized the Partnership for Patients (CMS) study design was weak, lacked transparency, and data evaluation methods made it difficult to determine the real impact of the program for the health systems. The implication of this article highlighted the concern from thought leaders that the Partnership for Patients program was not cost effective and the impact of the program has been questioned (Pronovost & Jha, 2014). In this study, there was an attempt to analyze the leadership

activities conducted during the performance period, and could have a relationship with the clinical quality outcomes. To date, no authored research studies have been completed specific to the Iowa hospitals, focusing on investigating the relationship between the occurrence of leadership activities and the CMS Partnership for Patients program outcomes (quality of care measures).

Problem Statement

The problem addressed in this study was a lack of knowledge about whether actions taken by hospital leadership supporting the Partnership for Patients and the Hospital Engagement Network campaign improved patient care and quality of clinical outcomes across the state of Iowa. This study was specifically designed to investigate whether there was a relationship between the hospital organizational leadership actions undertaken during the campaign and the clinical quality patient outcomes. Currently, CMS provided organizations with more incentives, such as the Partnership for Patients and the Hospital Engagement Network campaign, and this study was a contributing factor to the value or benefit of the past programs (M. Nuget, personal conversation, September 23, 2016). This funding will support another three years of the Partnership for Patients program (M. Nugent, personal conversation, September 23, 2016).

The CMS developed a public-private partnership with hospital groups across the United States called the Partnership for Patients (Centers for Medicare and Medicaid Services, n.d.). The Partnership for Patients program had three main elements: hospital engagement partnership (Hospital Engagement Networks campaign), community care transitions, and patient and family engagement. The focus of this study was to contribute

to the work and social change that was completed over the past two years through one of the elements of the program of the Partnership for Patients (Centers for Medicare and Medicaid Services, n.d.), the Hospital Engagement Network. The CMS program's stated purpose was to address the need for better quality, lower cost, and improve transparency in the health services across the United States ("Partnership for Patients," n.d.). The effects of this study were categorized into three focus areas: the role of leadership, the effect of the campaign (i.e., the impact to quality of care/services), and social change.

Purpose of the Study

Prior literature indicated that some health care thought leaders believed that the CMS Partnership for Patients program was not cost effective that were provided and the impact of the program has been questioned (Pronovost & Jha, 2014). In this dissertation study, I analyzed the leadership activities conducted during the performance period and that have a relationship with the clinical quality outcomes. Prior to this study, no studies had specifically examined Iowa hospitals and focused on investigating the relationship between the occurrence of leadership activities and the CMS Partnership for Patients program outcomes (quality of care measures).

Research Question and Hypotheses

Research Question: What is the predictive relationship between hospital funding source, the occurrence of hospital leadership activities (safety checklist, creating a dashboard, board involved in decision making, root cause analysis), and clinical quality outcomes (fall rates, venous thromboembolism, catheter-associated urinary tract infections, and central line associated bloodstream infections), as measured by the

associated Partnership for Patients (Centers for Medicare and Medicaid Services) criteria?

- **Null Hypothesis (H_0):** There is no statistically significant predictive relationship between hospital funding source, the occurrence of hospital leadership activities (safety checklist, creating a dashboard, board involved in decision making, root cause analysis), and clinical quality outcomes (fall rates, venous thromboembolism, catheter-associated urinary tract infections, and central line associated bloodstream infections), as measured by the associated *Partnership for Patients* (Centers for Medicare and Medicaid Services) criteria.
- **Alternative Hypothesis (H_A):** There is a statistically significant predictive relationship between hospital funding source, the occurrence of hospital leadership activities (safety checklist, creating a dashboard, board involved in decision making, root cause analysis), and clinical quality outcomes (fall rates, venous thromboembolism, catheter-associated urinary tract infections, and central line associated bloodstream infections), as measured by the associated Partnership for Patients (Centers for Medicare and Medicaid Services) criteria.

Theoretical Framework

The goal-path and transactional theories of leadership activities were the underlying theory in the Partnership for Patients (CMS) leadership survey and framed this study. The Organizational Assessment Tool (survey), conducted by the Hospital Engagement Networks during the Partnership for Patients program, was a set of questions

that directly related to the setting and communication of goals by leadership and the ability for the organization to meet those goals.

Goal-Path Theory

Goal-path theory defines a leader as someone who assists employees through the maze of complex processes to create a desired and valued outcome (Shriensheim & Neider, 1996). Goal-path theory addressed the leader's ability to clear obstacles in the work setting and provided structure for the tasks and hope that it increases motivation for the employees (Dinh et al., 2014). The goal-path (or path-goal) theory described a strong relationship between the leader and those that they lead and this relationship often creates a high rate of satisfaction (Shriensheim & Neider, 1996). According to House (1971), goal-path theory stated that leadership can influence employees through having them understanding the work and goal, the path to travel to accomplish these goals, and reducing road blocks all by allowing the employees to gain from personal satisfaction. This theory stated that additional strengths exist when leaders provide structure for goal attainment to their employees and employees report positive satisfaction and demonstrate strong performances (Shriensheim & Neider, 1996). By reducing areas where there can be confusion and ambiguity, the negative aspects of a situation, lack of control, and leadership dependence are reduced (House, 1971).

Goal-path theory recommends adapting to situational followers and environmental factors (Luna, 2009). There is evidence that goal-path theory was a foundational or contributing model for many other leadership models, including transactional leadership. Luna (2009), Schriesheim and Neider (1996), and Schriesheim,

et al. (2006) argued that some or all of the concepts of goal-path theory provided foundational groundwork for later more developed models such as situational, transactional, and transformational leadership theories.

Transactional Theory

Transactional leadership is defined as an exchange between leaders and members that provides resources and rewards for goals (Appelbaum, Karasek, Lapointe, & Quelch, 2015). Appelbaum et al. (2015) stated that transactional leadership provides structure and reward, managing goal completion among followers to produce highly desirable and effective performance results in an organization. According to Melvyn et al. (2011), transactional leadership is a style that focuses on creating an interaction or an exchange between leader and follower to reach a common vision or mission. One of the key elements of transactional leadership is trust in the relationship between the leader and follower and the leaders/followers in a trust relationship will aspire to a collective purpose and mission of change (Robinson-Hickman, 2010). This theory is consistent with the Hospital Engagement Network continual improvement or cycle methods to drive non-value activities or waste out of the process (Center for Medicare and Medicaid Services, 2011).

Nature of the Study

I utilized incorporated a quantitative, nonexperimental, evaluation design with correlational analyses of secondary data. This study design was appropriate given the nature of the independent and dependent variables and the research question. The independent covariables were the leadership survey responses for the questions that

related to goal setting (checklists), communication of goals via a dashboard, goal review and board decision making, and funding sources which were collected during the Partnership for Patients program (Iowa Healthcare Collaborative, 2014). Also, independent variables included the federal funding type (payment) for the hospital organization as determined by the federal designation of Critical Access or Urban (Department of Health and Human Services, 2014). The Iowa Healthcare Collaborative was the contractor for the Partnership for Patients – Iowa's Hospitals Engagement Network and completed the leadership survey as part of the Partnership for Patients program (Iowa Healthcare Collaborative, 2014).

The Iowa Healthcare Collaborative, during the Partnership for Patients program, had access to each dependent variable result and data collected (Iowa Healthcare Collaborative, 2014). Each dependent variable was a clinical quality outcomes measurement as described by the CMS Partnership for Patients quality of care measures (Centers for Medicare and Medicaid Services, 2014). Specifically, the dependent variables were the outcomes of the clinical quality of care measures for fall rates, venous thromboembolism rates, catheter-associated urinary tract infections, and central line associated bloodstream infections.

The analysis was completed using a cross-sectional correlation design to study the relationship of the independent variables to the dependent variables/outcomes. This study examined the relationship between variables for data that has already been collected (secondary survey data) through the Center for Medicare and Medicaid Partnership for Patients program (Center for Medicare and Medicaid Services, 2011 and Iowa Healthcare

Collaborative, 2014). I used an ex-post facto (retrospective cohort) design because the study was after the intervention and participants were not be assigned to a certain group, control or experimental, in alignment with Field (2013) and Walden University (2014). The correlational statistics were used to describe the relationship between two more variables (or scores) both independent and dependent which is the focus of the research problem, research question(s), and population group (Field, 2013). Relationships were determined by conducting a multiple linear regression analyses to determine the correlation between the independent variables and each dependent variable (Field, 2013).

Definitions

The terms and phrases were used throughout the dissertation study and terms or phrases are defined as follows:

Clinical outcome measures: The dependent variables (outcome measures) were in an ordinal design (linear statistics) as the number of falls during the hospital stay, the occurrence of catheter-associated urinary tract infections (CAUTI), central line associated bloodstream infections (CLABSI), falls or venous thromboembolism rates (VTE) associated with the practices during the inpatient stay. These measures were defined by the CMS as clinical best practice processes for anticipated best outcomes for patient care (Centers for Medicare and Medicaid Services, n.d., and 2011).

Demographic information: Demographic information on each participating organization (hospital) was collected during the Partnership for Patient/Hospital Engagement program (Iowa Healthcare Collaborative, 2014). The Iowa Healthcare Collaborative collected the demographic information of name, date, zip code, region of

hospital (federal designation of rural or urban), hospital type, hospital identifier (such as National Provider Identifier – NPI; Iowa Healthcare Collaborative, 2014 and Center for Medicare and Medicaid Services, 2011). The use of the collected demographic information was used as an independent co-variable during the study focusing on the size of the organization in the classification of their federally designated criteria of Urban (including referral) or Rural (Critical Access Hospitals).

Hospital Engagement Network: The CMS developed 26 network areas across the United States to roll out the Partnership for Patients program (Centers for Medicare and Medicaid Services, 2011). These networks were initiated through a grant funding program where organizations work to implement the best practice related to patient safety, conduct training programs, provide technical assistance, track and monitor progress as quality measurements, and identify high performing hospitals to serve as national role models (Centers for Medicare and Medicaid Services, 2011). The focus of this study was to contribute to the work and social change through one of the elements of the program of the Partnership for Patients (Centers for Medicare and Medicaid Services, n.d.), the Hospital Engagement Network.

Leadership actions and funding source: This study utilized secondary data that had been collected prior to this study. The data type for analysis of the independent variables was through a leadership survey (Organizational Assessment Tool) in nominal form (questions are of yes/no design) and the funding type was categorized for size as *Critical Access*, *Urban*, or *Other*. Participating hospitals in the Hospital Engagement Networks provided information on funding type, setting goals, level of leadership

support, and accountability through communication (Centers for Medicare and Medicaid Services, 2011). According to Field (2013), each one of the leadership questions acted as an independent variable and each were used in a cross-sectional analysis to its relationship with the dependent variables (quality outcome measures). The leadership survey reflected data on their behaviors for strategy implementation (independent variables).

Organizational Assessment Tool (OAT): The tool that was used to collect the independent variable is the Organizational Assessment Tool (OAT*;* Econometrica, 2014). The leadership survey, OAT, was created by a Center for Medicare and Medicaid contractor as the National Content Developer (Econometrica). The OAT, created by the National Content Developer (Econometrica) was used by all of the national Hospital Engagement Networks, including network in the state of Iowa (Center for Medicare and Medicaid Services, 2011). The leadership survey was sent to all participating hospitals in the state of Iowa during the engagement assessment by the collecting agency (Iowa Healthcare Collaborative – Hospital Engagement Network for Iowa).

Partnership for Patients. The CMS developed a public-private partnership with hospital groups across the United States called the Partnership for Patients (Centers for Medicare and Medicaid Services, n.d.). The Partnership for Patients program had three main elements, concentrating on hospital engagement partnership (Hospital Engagement Networks campaign), community care transitions, and patient and family engagement (Centers for Medicare and Medicaid Services, n.d.). The CMS program's purpose was to

address the need for better quality, lower cost, and improve transparency in the health services across the United States (Centers for Medicare and Medicaid Services, n.d.).

Publicly reported data. The outcomes of the clinical care measures (dependent variables) were measured by publicly (hospital) reported data. Publicly reported data were defined as data collected or submission activity completed by the hospitals, self-reported, over the CMS Partnership for Patients program period. All data were previously collected; therefore, this study used secondary data for these organizations.

Assumptions

The assumptions of the study included decisions regarding the use of secondary data. I decided to use secondary data that was collected during the Partnership for Patients program because of the focus on both leadership actions and quality of services (care) in hospital organizations. The first assumption was that there may be a relationship between leadership actions, funding source, and quality of care or all of the data that was collected during the program. There were limited published works regarding the outcomes of healthcare quality and the relationship to leadership actions or payment systems. However, part of the guidance from Partnership for Patients administration to leadership during the program, was to continue to communicate about the quality of care and set measurable goals for each measure.

The secondary data included all self-submitted data from the hospitals in the state of Iowa. With the secondary data set there was an assumption that the information provided was truthful and represented actual outcomes within the organization and no information was falsified or omitted because of undesirable outcomes. During the data

collection process each organization gave the authority to the Chief Executive Officer and primary quality leader to submit data on behalf of the organization, the assumption with the individual providing the information was that they had authority to provide the data and the knowledge of the Partnership for Patients program measures and submission (personal conversation, M. Nugent, March 8, 2016). There was also an assumption that every organization supplied the entire set of variables during the data collection procedures. Data cleaning was completed in the data analysis procedures where needed according to sound research methods of coding missing data and removing incomplete submissions.

Scope and Delimitation

The scope of the study was defined by the secondary data collected from the hospital organizations and leadership in the state of Iowa. The study was designed for analysis of hospital level data and did not include patient level identifiers or patient health information (private health information). The secondary data were collected during the final two year data reporting period and includes the leadership organizational assessment results. This study did not investigate the methods in which the leadership implemented the program; however, more concentration on leaderships' actions to guide, sustain, or improve the Partnership for Patients program's outcomes. A delimitation of this study was my decision to focus on four of the 10 quality patient care outcomes measured during the Partnership for Patients program. I determined that four of these variables would be applicable to my research focus while the remaining six outcome measures would not. This was determined based on the most applicable dependent variables for all

of the population and sample in the study. An additional delimitation was while the OAT contains 156 individual questions, I focused on the results of the leadership action questions as the other questions were specific to clinical care. Finally, in this study, I did not investigate the methods in which the leadership implemented the program; rather focused on their actions to guide, sustain, or improve the program's outcomes.

Limitations

There were two anticipated limitations for the reliability and validity of the data collection tool used by the primary data source and the rate of return in the independent variable. The limitations included restricted reliability and validity testing of the OAT (survey) prior to the use of such tool. In addition the leaders that completed the assessment tool could have had a bias answering the questions more positively than actually evidenced in their organization. Other limitations of the study could include the unconscious bias for leadership actions and the impact on clinical outcomes. The studies that have been reviewed were limited to statistical relationship or impact of leadership on employee behaviors to the outcomes of organizational success. This study could introduce potential bias for a relationship between leadership actions or funding source and the improvement of clinical quality of care. Recommendations of future research were provided following the analysis to demonstrate more direct or indirect prediction of the variables.

Significance

One of the purposes of this study was to determine the relationship between the program, leadership qualities, and the clinical outcomes of the patients of participating

institutions. As hospitals continue to strive to achieve better patient outcomes, this research can contribute to the positive social change of understanding how leadership actions and funding relates to these outcomes. To date, there appears to be a gap in the literature focusing on improving quality of care outcomes (measures) with specific statistical analysis on the patients for the State of Iowa as a whole for Quality Improvement. Others examined leadership activities for the healthcare organization and authors stated that there may be a relationship to this value to outcomes but not specifically to patient care (Buchner, Schreyogg & Schultz, 2014). The impact of this study on social change was to continue to contribute to the theory of how leadership actions and funding sources may correlate to or have a relationship on improving patient care in hospital organization. As organizations continue to grow aware of the value of leadership's actions with employees it is more important to evaluate for effectiveness and value to the patients including the value through experience with the care they received (Goodrich & Opelka, 2015). The results of this study could be a contribution to the field by determining how important leadership activities and funding sources are to the possible relationship with the quality core measures. I anticipate that the results of this study could be used to gain leadership commitment and support for leadership actions, which focus on quality care improvement.

Summary

Over the prior years, hospitals have focused on improving the quality of care and improvement of the services which they provide to the patient (Institute of Medicine, 2001). The hospitals in the State of Iowa have consistently performed near the top of the

state rankings from the World Health Organizations ("*State Rankings for Healthcare*", 2014). The purpose of this study was to discover the relationship between these set CMS patient quality outcomes and the hospital leadership actions and payment systems in Iowa hospital organizations. Since seminal publications have identified that healthcare organizations have challenges with quality of care outcomes; leadership within these organizations continued to ask what has contributed to the quality of care (Pronovost & Jha, 2014). The challenge exists to discover why some hospitals performed at the top of quality rankings within the Partnership for Patients (CMS) program and was there a predictive relationship to the payment systems and leadership actions.

Chapter 2: Literature Review

Introduction

Several sources have estimated a large number of deaths in the United States due to medical errors. The Agency for Healthcare Research and Quality (2015) estimated as many as 44,000 deaths annually in the United States due to medical errors in hospital organizations. Zineldin, Zineldin, and Vasicheva (2014) further estimated as many as 195,000 deaths annually caused by medical errors such as hospital-acquired infections and preventable injuries. Initiatives from agencies such as the Institute for Healthcare Improvement and Agency for Healthcare Research and Quality have attempted to create buy-in and implementation of clinical best practice in healthcare organizations (Wang et al., 2014; Zineldin, Zineldin, & Vasicheva, 2014). Wang et al. (2014) noted that improvements surrounding increased efforts and a quality focus in hospitals have created awareness across the United States for the need for better quality of care in hospitals.

Several U.S. state and local organizations have been engaged in creating a focus on quality improvement in healthcare and have had varying success (Iowa Healthcare Collaborative, 2011). Some areas of the country have pockets of care where the quality exceeds the national average, such as in Iowa, where healthcare quality services are often ranked near the top (tenth in 2014) of the Commonwealth Fund's list for quality of care (Radley, McCarthy, Lippa, J. Hayes, & Schoen, 2014; World Health Organizations, 2014). It was not clear prior to this study why some states, such as Iowa, have higher clinical quality of care outcomes and if these are related to the attributes of organizational leaders in the area of healthcare management and performance. Mah'd Alloubani,

Almatari, and Almukhtar (2014) suggested that organization leadership could be one of the most critical factors to an organization's success, citing leadership actions such as setting goals and training individuals for success as translating into improved worker performance and organizational outcomes. This study was therefore designed to examine the actions of leadership as a potential influence on quality of care outcomes.

The effect or implication was to address the concern from some thought leaders that the CMS, Partnership for Patients program was not cost effective and the impact of the program has been questioned. Pronovost and Jha (2014) stated the Partnership for Patients (CMS) study design was weak, lacked transparency, and used data evaluation methods that made it difficult to determine the real impact of the program on health systems. The current state was that CMS may provide organizations with more incentives, such as the Partnership for Patients and the Hospital Engagement Network campaign. The problem was whether the actions taken by hospital leadership to support the Partnership for Patients and the Hospital Engagement Network campaign had an impact on patient care outcomes across the state of Iowa. Therefore, this study was designed to investigate whether there is a relationship between the hospital organizational leadership actions undertaken during the campaign and the clinical quality patient outcomes.

Major sections of this chapter include a focus on the literature in the areas of hospital clinical care and leadership behaviors. There are five major sections of the chapter with subsections that continue to expand on the main section. The first main section includes the literature introduction and problem statement with current literature

synopsis. The second section describes the literature search strategy, which includes the inclusion of databases and search engines, search terms, and scope of literature. The third section includes the literature focusing on the theoretical foundation for the study, including supporting theories, their sources, assumptions, application, rationale for the theory, and relationship of the theories to the problems statement. The fourth section discusses the key variables with relationship of the literature to the methods, variables, and research question. The final section includes a summary of the literature, the final theme in connections to the research questions, gaps in the current literature, and a preview of the methods chapter.

Literature Search Strategy

Databases utilized included Academic Search Complete, Business Source Complete, EBSCO Host, Med-Line with Full Text, NHS Economic Evaluation Database, Ovid Nursing Journal Full Text, ProQuest Central and Health and Medical Complete, and PubMed, Sage Premier. These were chosen for the topic specific needs of the study and for the desire for scholarly peer reviewed information. Search terms that were used included: *Catheter-Associated Urinary Tract Infections (CAUTI) protocols, Centers for Medicare and Medicaid Service and Partnership for Patients, CMS Triple Aim, Central Line Associated Blood Stream Infections (CLABSI) protocols, clinical guidelines, falls, goal-path leadership, healthcare outcomes and Iowa, Hospital Engagement Network, Leadership and Outcomes Leadership Engagement, Partnership for Patients, transactional leadership,* and *Venous Thromboembolism (VTE) protocols*.

The scope of the literature review includes both current literature and seminal literature because of the needs of the study. The literature was collected from several different periods depending on the focus and the guidelines for quality research design. Seminal research, as defined as literature published 10 or more years' prior, was critical to use as background material and highlighted the topic's impact through peer-reviewed studies. This study was grounded in the work that others had already created a foundational knowledge.

The current literature was considered from material that was from 2010 to 2013 and then again from 2014 to present. These years were specifically chosen because of the problem statement and the variables for the study. Many of the 2015 articles comprise preliminary efforts to address the identified gap in the literature concerning the effects of the program on the clinical quality of care in hospitals across the county.

Theoretical Foundation

The theoretical bases for this study were from two leadership theories: goal-path theory and transactional leadership theory. Goal-path leadership engaged in behavior that rewards employee behaviors based on achievement of a goal (or behaviors) set by leadership (Schriesheim et al., 2006). Leaders' behavior in the transactional style can include controlling processes, organizing the work for the employees, and short-term planning for action plans (Howell & Avolio, 1993; Humphreys, 2005).

Goal-Path Theory

Goal-path theory was founded in the early 1970s by Evan and House (Schriesheim et al., 2006). House (1996) stated that leadership behaviors are motivational

when they increase the effort of the subordinate, such as coaching, guiding, and support productive behaviors. Rewards and motivational actions can be simple things such as comments, thank you notes, or setting a measureable goal (or actions that make up a goal) for the department or organization, so that individuals have a strong influence in achieving the steps (House, 1996). House (1996) also stated that increased employee satisfaction is positively related to effective performance when the leadership behaviors are complementary to the environment including level of authority, type of supervision, and linkages between goals and behaviors. The leadership in these organizations should set a goal to achieve and then work to create steps (with reward) that the individuals can follow to the end (House, 1996).

Goal-path theory outlines how leadership can employ personal pay offs, can clarify goals, reduce roadblocks, and increase opportunities for satisfaction. House (1971) described goal-path theory as one in which external rewards (financial, promotions, assignments, growth, and development) are closely linked with the goals of work and how the work should be accomplished. House (1971) also stated that goal-path leadership can be accomplished by when subordinates have the ability to influence the goal, exercise control to reduce stress, and are supported through reducing barriers. Leaders who demonstrate this theory have trait that are often more directive, supportive, involved in the suggested actions, and participative in the decision-making. Leaders who apply goal-path theory often provide specific direction, information, and allow for easier, more satisfying work, to be completed (House, 1971). Goal-path theory as a basic functional approach to leadership aims to provide an environment for an employee that encourages

them to be motivated to perform at high levels (Schriesheim & Neider, 1996). This figure summarizes the leadership styles of goal-path theory.

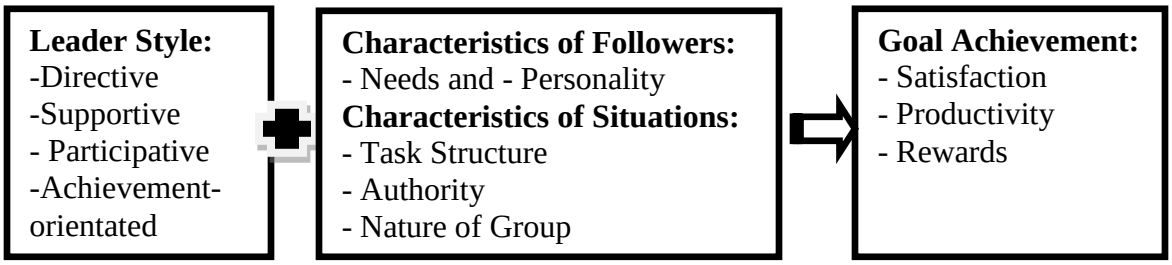

Figure 1. A diagram showing the progression outlined in House's goal-path theory

Transactional Leadership Theory

Transactional leadership was first supported in literature in the 1940s by Max Weber and again in the 1970s by Bass (Howell & Avolio, 1993; Humphreys, 2005). Bass' description of transactional leadership was one where leadership provided something of value to the employee, rewards for performance, and provided support (Lowe, Kroeck, & Sivasubramaniam, 1996). Other researchers have focused on transactional leadership, which leads to transformative leadership (Howell & Avolio, 1993; Humphreys, 2005). Antonakis and House (2014) reviewed the effectiveness of the transformational and transactional theory related to the behaviors of leadership and power of formal authority and responsibility for the organization's accomplishments. They determined that there were mixed results for the relationship between actions and outcomes and a core set of behaviors needed to be explored further.

Transactional leadership also displays a preference for risk avoidance, pays attention to efficiency, and is similar to leadership member exchange relationship; they pay attention to detailed and short-term goals, rules, and procedures (Bass, 1985; Craen

& Cashman, 1975, as cited by Lowe, Kroeck, and Sivasubramaniam, 1996). The application of transactional leadership was seen in organizations where leaders work with the employees to define what would motivate them to achieve goals and still work within the constraints to obtain the best possible outcome by reducing the risk. Transactional leadership can be defined in the organization as responsive to the employee, keeps the culture in the status-quo, create reward and punishments, and will motivate by using employees self-interest (Bass, 1985). Leaders also use project management techniques (standard work) to create efficient process and planning to exchange positive behaviors or actions with personal rewards or incentives and do not make many efforts for employee creativity and innovation for process re-design (Tyssen, Wald, & Spieth, 2012).

The negative assumption with the transactional leadership is that if used exclusively leader can be seen as one who is motivated by position, power, personal incentives, and trapped in politics (Antonakis & House, 2014). Overall, the themes from the transactional leadership theory are demonstrated when leadership creates a relationship with employees based on an exchange of the goal for the customer; this creates support for this goal to be reached (Antonakis & House, 2014).

Relationship of Theoretical Frameworks to Study

Both goal-path and transactional leadership are the two main theories that were utilized in this study. Creating organizational goals and providing assistance where needed for goal achievement will be leadership behaviors questioned in the leadership survey and are topics supported by the two theories (Shriesheim & Neider, 1996). Wong and Cummings (2009) studied the influence of leadership behaviors on the outcomes of

employee trust and the financial outcomes of the organization and determined that the leadership behaviors do have an effect on the financial outcomes of the organization. These behaviors supported the actions of the employees and created a system for which outcomes are praised. Both leadership styles supported the outcomes of the organization and the outcomes of improvement of clinical care are the variable in question for this study.

One of the applications for the study was the use of goals and communication of these goals. Goal-path was related to this study in that the leadership actions, which were surveyed in the Partnership for Patients program closely mirrors the actions of leadership surveyed. This setting and communication of these goals reflected in the data source survey (OAT) to healthcare organization are reflective of the goal-path theory. Shriesheim and Neider (1996) focused on the application of such goals in organizations with favorable outcomes or results. There was a gap of recent literature linking the Partnership for Patients program with the results of applications for goal-path theory. The past application of the theory is indication of linkage to positive outcomes for organizations with goal-path leadership.

The foundational goal-path and transactional leadership theories have been in the literature less recently but authors have noted that these theories have been foundations for new more modern theories (Dinh et al., 2013). Tyssen, Wald, and Speith (2013) addressed transactional leadership in projects related to outcomes. Effective leadership was important for ensuring the success of organizations, even in temporary programs such as the Partnership for Patients. These authors discussed how transactional leadership

focused on these task-orientated exchanges of action and reward of followers and leaders, which is closely related to the leadership actions studied in this current research (Tyssen, Wald, and Speith, 2013). Goal-path theory was closely related to Transactional theory as they both focus on the goals or tasks and where the leader exchanges and even bargains for necessary motivation to purse a goal. Transactional leadership provides rewards that were found to result in positive effects for limited duration programs and specific goals (Tyssen, Wald, & Speith, 2013).

Some authors did not support the efficacy of goal-path and transactional leadership styles. Bohan (2014) studied the influence of leadership and the effect on quality and safety and determined that there were limited findings in the study on the outcomes of the organization based on the leadership style. They noted that there was minor support for leadership to continue to have positive engagement may influence quality and safety outcomes. This was one example that may indicate the limitation in the effectiveness of the leadership style in relationship to the improvement of clinical quality outcomes.

Literature Review

Healthcare organizations have been under pressures for reducing the medical errors and activities that lead to harm since the highlighted activities in the late 1990s. In 1999 and 2001, the Institute of Medicine released two reports that focused on the need to reduce the incidence of patient harm in hospitals across the United States (Institute of Medicine, 2001). The Tax Relief and Healthcare Act of 2006 mandated a report from the Office of Inspector General (OIG) on the number of events in United States healthcare

organizations that should never happen or occur to a patient (Levinson & General, 2010). This request also supported that there should be connection to such events and the amount of payment related to the care during or after these events and potentially reduce payment (Levinson & General, 2010).

In 2008, the OIG reported up to 13.5 million Medicare beneficiaries have experience events of harm (Levinson & General, 2010). One of the measures of the report found that hospital care following an unexpected or harmful event can estimate up to $324 million in October 2008 or a yearly cost of $137 billion in fiscal year 2009 (Levinson & General, 2010). This type of report related to the staggering amounts of harm and the cost associated created a federal focus on changing the healthcare system within the United States. One of the federal supported efforts was engaging the leadership within the healthcare organization for a change in behaviors and financial support and partnership for change.

Organizational Leadership

Researchers who have focused on leadership styles have supported the principle that these actions can guide and support engagement by the staff have the best outcomes in the organization (Toussaint & Berry, 2013; Dinh, Lord, Gardner, Measure Linden, and Hu, 2013; Birasnav, Goel, & Rastogi, 2012). Birasnav, Goel, & Rastogi (2012) found that transactional leadership style has produced better performance in the organization if leaders engage other in the development of goals, used different techniques to improve knowledge in employees, and create trust. These behaviors are similar to the actions studied in this present study. Dinh, Lord, Gardner, Measure Linden, and Hu (2013)

discussed how each of the leadership theories have been studied for effectiveness and emergence within the literature. Dinh et al. (2013) demonstrated positive outcomes for the organization and they overwhelmingly supported the foundation of a performance oriented, engaged leadership supporting the goals of the organization or program path.

Leadership is often looked to set goals and role model behaviors in organizations and create positive cultures. Toussaint and Berry (2013) discussed the importance of leadership guiding the organization with goals and setting the mission. They also discussed the critical nature of transparency and communication of goals with and from the Board. Toussaint and Berry (2013) stated that the board is critical for being knowledgeable and supportive when organizations are face with poor outcomes. One way to create this knowledge is communication and demonstration at meetings (Toussaint & Berry, 2013). Both of these considered statements (leadership setting goals and the Board involvement) were components of the leadership actions (independent variable) that are in this proposed study. The OAT was the survey tool in the used by the data source to record these leadership actions of goal setting and board communication (Centers for Medicare and Medicaid Services, n.d.). This positive support for the actions of leadership in relationship to improved quality outcomes for one organization was discussed in the use of goal oriented leadership (Toussaint & Berry, 2013; Dinh, Lord, Gardner, Measure Linden, and Hu, 2013; Birasnav, Goel, & Rastogi, 2012).

Researchers have focused on the relationship between leadership actions, organizational payment, and outcomes (Buchner, Schreyogg & Schultz, 2014; Nichols & Cottrell, 2014; Gantz, Sorenson, & Howard, 2003). Nichols and Cottrell (2014) studied

the different traits in leadership related to the perceived desirability of the traits. They supported that some traits, such as trustworthiness and task-focused, are more desirable traits in high-level leadership and this desire does affect the organizational outcomes (Nichols & Cottrell, 2014). Discussed traits were trust, intelligence, and focus on personal success as key indicators for high performance organizational outcomes (Nichols & Cottrell, 2014). One action that was considered is the communication of goals. Gantz, Sorenson, and Howard (2003) supported that leadership must create a collaborative relationship in mutual beliefs, vision, participation in planning and priority of measure to achieve quality patient safety outcomes. Buchner, Schreyogg and Schultz (2014) found that active board setting strategy could generally improve hospital performance. Boards should be involved in strategy setting for hospital and collaborative and empowerment is critical (Buchner, Schreyogg, & Schultz, 2014).

Organizational Leadership Theory

Backstrom, Ingelsson, and Wiklund (2011) suggested that the work environment has to become more creative to make it possible to meet the demands from the customer. DePoel, Stoker, and Van der Zee (2014) discussed the relationship between leadership styles (transformational leadership and participative leadership) and the outcomes of the organization (performance). This relevance exists because of the type of analysis and study that was performed which are similar to the completed study. It is anticipated that the methodology and methods for this study was a correlational design statistically investigative the relationship between two or more variables. A predictive relationship determined with a multiple linear regression analysis to determine the odds ratio and

correlations between the variables (Field, 2013). They conducted a multilevel analysis with both leadership styles as variables (independent variables) and a dependent variable of organizational performance (satisfaction and commitment). This study also included a regression analysis to test the hypotheses of how the leadership style has a positive or negative relationship to the outcomes.

Quality in Healthcare

Over the last 20 years, healthcare organizations have attempted increase the activities related to quality improvement and patient safety practices in the services that are delivered (Buchner, Schreyogg, & Schultz, 2014; Classen, et.al., 2011; Cohn, 2015). Regulators, payers, and patients are increasingly requiring healthcare organizations to implement changes to the system to improve the safety and quality of care provided (Øvretveit, et.al, 2011). Øvretveit, et.al (2011) studied whether contextual factors (defined as electronic medical record or the size of the organization) influence the patient safety practices. They did not investigate the leadership factors that may influence the safety practices and did not find an affirmative link between their defined contextual factors and the implementation of safety practices.

Kaplan, Brady, Dritz, Hooper, Linam, Froehle, and Margolis (2010) suggested that there was fair association between leadership for quality, structure, implementation, and motivation for change (goals) with quality program success. They suggested in their findings that there was an identified weakness in the current body of literature related to quality improvement research and how to effectively transform healthcare quality, role of

leadership in improvement, and the development of interventions for change (Kaplan, Brady, Dritz, Hooper, Linam, Froehle, & Margolis, 2010).

Finally, Lee et.al (2012) studied the relationship between external policies related to payment incentives and the implementation of clinical best practices for infection rate reduction (clinical quality best practices). They found that there was not a set of patients that benefited from the implementation of the financial policy change (Lee, et.al, 2012). They suggested that as the CMS "impose greater financial penalties on hospitals that perform poorly on these (quality) measures, careful evaluation is needed to determine if the programs work" (Lee, et.al, 2012, p.1429). For example, researchers who studied catheter-associated bloodstream infections and catheter-associated urinary tract infections had no evidence of measureable effects or positive outcomes based on the payment received (Lee, et.al, 2012). These researchers have set the stage and environmental foundation for future studies and have indicated where there is a gap in present studies. Further efforts in the areas of relationships between leadership behaviors, payment methods, and healthcare quality outcomes would provide valuable connection and impact to future research for changing the healthcare environment (Lee, et.al, 2012).

Leadership and Healthcare Quality

The value of healthcare comes for patients and the assumption that the care that they will receive is going to be safe, timely, appropriate, and error free (Schyve, 2009). The Joint Commission for Hospital Accreditation, one of two organizations who survey and accredit healthcare organizations for quality, address the importance of leadership with quality stated that organizational leadership is critical to organizational success and

they must work together to achieve the organizational goals (Schyve, 2009). The Joint Commission has supported the idea of leadership and governance responsibilities for the mission of healthcare organizations and has employed measures to ensure a culture. They stated that "culture that fosters safety and quality, planning and provision of service that meets the needs of the patients, availability of resources for providing care, sufficient number of competent staff and other care providers, and ongoing evaluation and improvement of performance" (Schyve, 2009, p. 3).

Toussaint and Berry (2013) stated that value for the healthcare patient is defined as the quality of the services divided by the cost of the services. The mission of many healthcare organization leaders have been attempting to drive healthcare quality to meet the standard of best practices and challenged to drive out the cost because of decreasing reimbursements (Toussaint & Berry, 2013). Standard practices in healthcare organizations, including the leadership behaviors, should continue to drive the work practices to learn what is contributing to the best outcomes within the organization and then deploy this standard across the organization.

The implementations of these practices have been slower than most expected from the Institute of Medicine report (Hayes, Batalden, & Goldmann, 2015). A further level of quality cannot be achieved by just continuing to stress the current system and expect different outcomes; leaders must also respond in their behaviors and the methods in which they lead (Hayes, Batalden, & Goldmann, 2015). Employees of healthcare organizations have been asked to continually implement new standards focusing on quality and evidenced-based practices, such as healthcare acquired infections, to prevent

errors, and all of these guidelines to make healthcare safer has actually made the work much harder (Hayes, Batalden, & Goldmann, 2015). Hayes, Batalden, and Goldmann (2015) recommended that leaders need to take "a more careful assessment of the task and processes associated with the change initiatives, the time and resources needed to plan and effectively implement any of the added work assignments" (p. 101). Toussaint and Berry (2013) stressed that these standard leadership behaviors, such as goal setting, communication and deployment of quality mission, drove the understanding and common practice for the employees of the organization resulting in better quality of care outcomes.

Leadership has been defined as the behaviors and traits that a person demonstrates to create a relationship or actions. The leadership behaviors have been studied in relationship to such behaviors and leadership (Baysak and Yener, 2015). Baysak and Yener (2015) studied the relationship between leadership behaviors and stress levels due to goal attainment. They found that leadership style does have an effect on the outcomes of the organization, specifically their support and reduction of stress due to external regulations and pressures. Leaders can use influence of their words to create motivation and actions. Policy leaders are often the leaders that set these external pressures due to the nature of the patient safety efforts (Baysak and Yener, 2015). Leadership with strong values, assumption, belief and expectations about their environment can establish clear goals and work procedures for employee contributions. The opportunity for this study is to explore if these leadership behaviors have a positive or negative relationship on the

outcomes of the organization. I did not focus on the specific ideals or values; however, I studied the behaviors related to influence and motivation for the patient safety goals.

Programs that Support Quality

There have been other national campaigns that have supported the quality of care practices but the Partnership for Patients campaign was the first to implement changes related to all healthcare stakeholders including the healthcare organizations and payment systems (Centers for Medicare and Medicaid Services, 2014). By changing the influence on all parties to change in the same direction the campaign was held to the goals of having a 40% reduction in hospital-acquired conditions and other preventable conditions (Centers for Medicare and Medicaid Services, 2014). With the campaign came three major components of the Centers for Medicare and Medicaid Innovation Center including the financial investment for implementation of best clinical practices, federal partnership alignment, and as many outside partnerships as possible (Centers for Medicare and Medicaid Services, 2014).

The efforts of such a national focus are supported by studies conducted by organizations such as the Office of the Inspector General (OIG) that provide evidence that 13% of hospitalized Medicare beneficiaries experience an adverse (unexpected outcome or harm) event (Levinson & General, 2010). As a results of this comprehensive effort, 80% of the hospitals across the United States committed to reporting 11 different quality of care measures, funded through the Hospital Engagement Networks during 2012 to 2014 (Centers for Medicare and Medicaid Services, 2014).

Government policy actions, such as the Partnership for Patients, have focused on making hospital care safer, more reliable and less costly and did so by engaging leader ship in the quality improvement activities in their organization (Centers for Medicare and Medicaid Services, n.d.). Researchers for healthcare quality improvement programs, including the impact of the Partnership for Patients, questioned implementation of the clinical best practice, leadership activities, and payment mechanisms for healthcare organizations (Pronovost & Jha, 2014). They stated that the Partnership for Patients participants did not have complete pre and post measurements that were consistently defined, they questioned the design (randomization and control groups), measures, and validity of the initial studies with the program (Pronovost & Jha, 2014). Pronovost and Jha (2014) suggested that given the amount of money spent and the hours dedicated to the quality improvement program, the current literature and study has failed to support the relationship between the outcome of the Partnership for Patients program and the sustainable results in healthcare quality. In contrast, researchers have found that leadership behaviors or actions do have an impact on the outcomes or results of organizations (Luna, 2009; Melvyn, Hamstra, Yperen, Wisse, and Sassenberg, 2011).

In 2014, CMS produced a summary of finding that supported the activity and support of the Partnership for Patients (Centers for Medicare and Medicaid, 2014). The authors discussed that even with the focus areas of patient harm one of the critical factors to the hospitals success was the engagement of leadership with the Partnership for Patients improvement measures and the amount of support for data (outcome) measures submitted (Centers for Medicare and Medicaid, 2014). The Centers for Medicare and

Medicaid Services (2014) report on the benefits of the Partnership for Patients strong inference to positive results were inconsistently presented in the report as stated

> Since hospital payment policies and other U.S. Department of Health and Human Services program that played an important role as part of the Partnership for Patients campaign were in place and making change over time, it is not possible at this time for the evaluation to identify the portion of these harm reduction and saving... (p. 2).

However, there is a present gap in the literature which supports the involvement of leadership in quality improvement program, connections to the relationship between the leadership behaviors surveyed and the clinical care outcomes related to the guidance of the Partnership for Patients program.

Independent Variables for Study

One of the two sets of independent variables for this study included the leadership actions surveyed in the healthcare organizations through the OAT. Authors have addressed the effectiveness of the transaction type leadership, including Antonakis and House (2013). My study addressed the instrumentation to determine leadership style; however, Antonakis and House (2013) addressed some points that are critical for this study. Antonakis and House (2013) discussed that management should continue to improve their actions and the style of leadership does have a positive effect when guidance is task orientated, with simple feedback and coaching. These behaviors were similar to the behaviors surveyed in this study.

Another independent variable is the federal funding type or payment system for each of the organizations involved in the study. In the state of Iowa, hospitals funding type happen to be in one of three types of systems. The first two types, Prospective Payment System (PPS) and Rural Referral, are actually funded in the same manner where they are paid based off of predetermined rate adjustments for quality (Department of Health and Human Services, 2013). For the focus of this study these two types of organizations were considered "Urban". The other type of payment system or organization category for this study was considered Rural, or commonly called Critical Access Hospital (CAH; Department of Health and Human Services, 2013). There are specific criteria to be certified as a CAH including rural location, primary and emergent services, have less than 25 inpatient beds, low length of stay for acute illnesses, and located in a state that has a rural health plan (Department of Health and Human Services, 2013). Medicare and Medicaid payments for CAH are not subject to the same payment type as urban facilities and CAH are paid for inpatient and outpatient service at 101 percent of reasonable costs (Department of Health and Human Services, n.d.). In the state of Iowa there are 118 hospitals, of which 86 are CAH, and for the Partnership for Patients program all hospitals (urban and CAH) did committed to participate in 2011 (Iowa Healthcare Collaborative, 2014).

Cohn (2015) reported that data that was collected by the Department of Health and Human Services (CMS) since 2010, demonstrated that the 2014 figures a decreased rate of hospital-acquired conditions by 17% and bloodstream infections fell by 50% linked to the implementation of the clinical best practices supported in the Partnership for

Patients. Pronovost and Jha (2014) continued to challenge if the Partnership for Patients program did improve the quality of care. They questioned the Partnership for Patients program for the amount of money invested as the clinical measures were still being developed with the problems still continuing to exist in 2014. This also suggests for my study that the outcomes of the clinical quality of care measures (Partnership for Patients program) are provided as clinical guidelines or recommendations. My study did not investigate the approach used to apply the measure and may indeed be limited or benefited by the organization's application of the measures or the ability to successfully integrate the best practice into clinical care. These results continued to be reviewed and studied for more impressions on the impact of the program.

Dependent Variables for Study

The rates of medical errors or adverse events for healthcare organizations were the operation definition of the dependent variable for this study. The impact quality improvement activities on the clinical quality of care were used for the dependent variable in this study. Literature related to the hospitals quality outcomes have been addressed since 1999 when the Institute of Medicine (2001) presented *To Error is Human* which underscored the need for improvement in the US healthcare system (Agency for Healthcare Research and quality, 2013). Ouslander and Shutes (2015) stated the CMS "Triple Aim" and Partnership for Patients had goals of reducing hospital readmission and hospital-acquired conditions, such as infections and harm, resulting in reduced complication, morbidity, mortality and healthcare cost of up to and estimated billions of dollars over the next few years.

The Centers for Medicare and Medicaid Services (2010) determined that best clinical quality of care and the methods for the organizations to implement effective, safe and high quality of care were published as Clinical Best Practice protocols with the goal of changing medical practices and healthcare organizations. Reflected in this study were the clinical outcomes, or the dependent variables, produced by healthcare organization across the state, specifically during the Partnership for Patients program years of 2012 to 2014 (Centers for Medicare and Medicaid Services, 2014). Stated that if the clinical best practices guided and provided by the Centers for Disease Control and Prevention hospitals could provide safer, higher quality of care, these would create a system for preventing may hospital acquired injuries and possibly patient fatalities (Centers for Medicare and Medicaid Services, 2010).

The dependent variable is further defined by the outcomes of clinical practice for patients in healthcare organizations and in study's authors have discussed the urgency or need for such an improvement program. Levinson and General (2010) discussed how current healthcare organizations are still studying the improvement methodologies which may have a relationship to or support clinical best practice. They stated that 13% of Medicare patients suffer an adverse event while hospitalized and an additional 13% suffered an event that caused harm. This supports the theory that organization that focus on improvement methods, including implementation of clinical best practices, demonstrate improvement in outcomes. Other researchers have determined that there are a few best practices that could lay a foundation for better health outcomes. Chilingerian (1995) determined the top 36 clinical best practices for acute hospitals systems to

implement in order to reduce the cost of medical care and ultimately provide the highest level of care possible for the patients. These researchers have supported that the Partnership for Patients program has foundational support for the focus areas of improving clinical quality of care.

There are four specific best practices defined in the dependent variable. These clinical areas were falls, patient hospital acquired infections from urinary and bloodstream catheters, and venous thromboembolism (Centers for Medicare and Medicaid Services, 2014). Chilingerian and Sherman (2011) published best practices including the prevention of hospital associated infections (CAUTI and CLABSI), venous thromboembolism, and patient falls. They explained what was expected in the implementation of clinical best practice. Everhart, Schumacher, Ducan, Hall, Neff, and Short (2014) focused on specific implementation of clinical best practices such as investigated determinates or indicators of fall rates in patients who were suffering from acute illness. They found that hospitals with lower fall rates demonstrated more evidence of clinical best practice implementation. Additionally supporting the implementation of these clinical best practice guidelines as reported in the dependent variable in this study.

Most of the clinical best practices are not manually reported in the hospital organizations. Garrido, Kumar, Lekas, Lindberg, Kadiyala, Whippy, Crawford, and Weissberg (2014) discussed how the dependent variables, such as Venous Thromboembolism, are collected in these organizations through organizations electronic health records. Most organizations do not have fully automated reporting for these data yet most of the information is stored in the electronic health record and must be manual

abstracted (Garrido et al., 2014) Garrido et al. (2014) reported that this lack of automation created an inefficient step to the work, creating the possibility that care may not be accurately reported. This could create a study limitation to fully study the relationship of action on the dependent variable.

Summary and Conclusions

Quality improvement in the healthcare organizations continues to be a focus of both private initiatives and federal regulations and initiatives. Ryan and Mushlin (2014) discussed that the full effects of the Accountable Care Act and the full effect on patient care, safer organizations, and cost reductions are still to be determined. This study focused on the quality outcomes in healthcare organizations across Iowa and the relationship to the federal funding sources and leadership activities. The World Health Organization (2014) provided a listing of states and the analysis of their quality of care based on quality, satisfaction, patient safety, and cost of care. The state of Iowa continues to rank at the top in the areas of quality and safety. This aspect of the quality improvement efforts of organizations was examined for influence on the outcomes by comparing the healthcare outcomes/result to the federally designated funding and leadership actions.

Ryan, Harris, Mattox, Singh, Camp, and Shirey (2015) had two major themes that were critical for the study. After 15 years from the report from the Institute for Medicine (2001) stated that healthcare is still struggling to improve outcomes and control costs (Ryan, Harris, Mattox, Singh, Camp, & Shirey, 2015). Lack of implementation, dissemination, quality improvement standardization and buy-in strategies may have been

factors in the lack of effectiveness (Ryan, Harris, Mattox, Singh, Camp, & Shirey 2015). These challenged factors were all potentially overcome in the Partnership for Patients program from 2012 to 2014. Their literature review and analysis completed for years of 2009 to 2014, presented themes and supported leaders' communication of clear goals and significance of the change. These actions are imbedded characteristics of leadership as the transformational theory presented (Ryan et al., 2015). These statements continue to support the proposed independent variable. This contextual background of this literature justifies the rational for the independent and dependent variables and provides a prior approach to the analysis of a similar problem statement to the proposed research.

There was a gap in literature, qualitative and quantitative analyses for the Partnership for Patients program. As Pronovost and Jha (2014) questioned the efficacy of the Partnership for Patients program and the amount of impact that the program may have had on the healthcare delivery system is still yet to be discovered. To date there was significant gap in literature investigating the different states or groups that participated in the Partnership for Patients program and the quantitative analysis of the outcomes. There was no literature discussing the impact of the program in the State of Iowa. The literature that was present was used to address the operational definition of the variables within the study or set a foundation for the study to discover the relationship between these variables within the program. The discovery of such an influence, continued to address the gap in literature regarding the impact, relationship, and even the key components to practice implementation.

Literature theory supported the groundwork of leadership action to organizational outcomes; yet, missing was the link to clinical quality outcomes in healthcare. Methods demonstrated my focus on relating these leadership actions to the clinical care outcomes or results, which overall address the goals of improving healthcare outcomes or quality. Studying the relationship provided one more link between the theory of organizational leadership and the actions impact on organization performance outcomes. The results of this study continued to support the Triple Aim of healthcare to increase value, decrease the cost, and improve the quality.

Chapter 3: Methodology

Introduction

In 1999 and 2001, the Institute of Medicine released two reports that focused on the need for reduction in patient harm in hospitals across the United States (Agency for Healthcare Research and Quality, 2013). These created awareness surrounding the need for better quality of care in U.S. hospitals and resulted in initiatives from agencies such as the Institute for Healthcare Improvement and Agency for Healthcare Research and Quality (Agency for Healthcare Research and Quality, 2015). The Partnership for Patients program was created to create a focus on the reduction of medical errors and deaths related to preventable medical defects (Agency for Healthcare Research and Quality, 2015), and due to the success of the programs the program has continued to be funded in 2015 and 2016 (M. Nuget, personal conversation, September 30, 2016). These initiatives were put in place to attempt to create buy-in and implementation of clinical best practice in healthcare organizations (Wang et al., 2014; Zineldin, Zineldin, & Vasicheva, 2014). The purpose of this study was to investigate potential relationships between leadership behaviors and clinical quality of care outcomes by analyzing the relationship between the quality of care, in the State of Iowa, and the leadership actions, considering the hospitals funding designations.

This study required a specific research design and rationale for sound analysis of secondary data. These following sections include the study's variables, research design and rationale, methodology, validity threats including ethical concerns, and summary.

These sections allowed for sound design to produce quality study research methods and results.

Research Design and Rationale

Variables

The independent variables for this study were five questions from the Organizational Assessment Tool (OAT) from the Partnership for Patients program (Econometria, 2013). The first four independent variables were survey questions that elated to the leadership actions focused on the guiding the organization during the Partnership for Patients program period. The complete set of questions from the OAT can be found in the Appendix A and are defined later in the chapter. The fifth independent variable was the hospital payment designation from the U.S. federal government.

Iowa has two main reimbursement or hospital funding types in the state. The first is Prospective Payment System (PPS), which is a fixed payment model from Centers for Medicare and Medicaid Services (CMS) and other insurance organizations for a patient's acquired charges no matter the severity or cost to the hospital (CMS, 2015). The second designation for Iowa hospitals is Critical Access Hospital (CAH), which are at or below 24 beds in size and have a payment model of cost of services plus one percent (Department of Health and Human Services, 2014). The dependent variables were four patient safety, or clinical care measures, in which data were collected for the occurrence of these outcomes during the Partnership for Patients program (CMS, n.d.). The independent and dependent variables for the study included the measures stated in Table 1. These variables were defined as preventable harm to patients during a hospital stay and

the goal of the Partnership for Patients program was to reduce these occurrences to zero (CMS, n.d.).

Table 1

Independent and Dependent Variables and Codes

Variable	Code
Independent Variables	
Hospital Payment	Payment
Leadership uses safety Checklist at meetings	Checklist
Leadership creates a safety Dashboard for goals	Dashboard
Leadership involves the Board in safety Decision Making	Decisions
Leadership determines Root Cause was due to communication	RCA
Dependent Variables	
Catheter-Associated Urinary Tract Infection	CAUTI
Central Line-Associated Blood Stream Infections	CLABSI
Injuries and falls from immobility	Falls
Venous Thromboembolism	VTE

Research Design

The research approach was a quantitative study with a nonexperimental evaluation design and correlational analyses conducted utilizing secondary data. I specifically analyzed cross-sectional data to determine the relationships between the independent and dependent variables. This type of research design is commonly used to investigate the relationship between variables for data that has already been collected (secondary survey data) (Field, 2013). The data were secondary data provided by the Iowa Healthcare Collaborative, as they were the data collection contractor for the Partnership for Patients program (Iowa Healthcare Collaborative, 2014). The analysis of the data resulted in an improved understanding of the relationship between Iowa Hospital leaders' actions, federal funding designation, and healthcare outcomes.

The purpose of a quantitative correlational research design was to seek determination if the independent variable is related to the dependent variable(s) but cannot establish causation (Brink & Wood, 1997). This study design was chosen because of the nature of the independent and dependent variables and the research questions.

The use of the design can be called ex-post facto (quasi-experimental) because the study was also after the intervention (ex-post facto) and participants were not be assigned to a certain group--control or experimental (Field, 2013). For the purpose of this study, the population was not split into a control group because the relationship between funding type (payment system) and the dependent variables can be studied. The correlational design used to determine the relationship between two more variables (or scores) both independent and dependent variables was the focus of the research problem, research question(s), and population group, in alignment with Field (2013). By using this type of study, it was possible to conduct statistical analyses to calculate relationship between the variables (leadership behaviors, hospital payment and clinical quality outcomes) and relates these variables to a hypothesis for study. This research design allowed for the study to continue addressing the needed quality improvements in healthcare organizations across Iowa and employed statistical procedures to measure a theory (leadership theory).

Other quantitative research designs, such as a descriptive (case study), semi-experimental or experimental (which provide a quantitative or numeric description of attitudes or opinions) were not applicable because of the population and the use of secondary data in a nonexperimental design. A pre-/post-experimental design was not

appropriate because the hypothesis did not call for the investigation or change of the variables over time or before and after the Partnership for Patients program. For example, in an experimental design, the population may need to have a control group for the study. In this case, the population remained as one group so as to study the relationship of the payment system and the clinical quality outcomes (dependent variables).

There were no anticipated time or resource constraints in the study's data retrieval or effects on design methodology. The study used secondary data that has been collected prior to this study by the data source. The design included a nonexperimental use of secondary dataset; therefore, the time and resources required to recruit, participate, and collect that were not applicable. The data source was prepared to support the study with data sharing and took limited resources (time) on the behalf of the data provider. The data provider had already signed a data use agreement, reducing the time constraints for approvals.

The use of a quantitative, nonexperimental design was determined because of the research question, the type of variables, and the use of secondary data. It would not be ethical to conduct a true experimental design to limit or restrict care provided to a patient in an acute care organization (Frankfort-Nachmias & Nachmias, 2008). Variables were collected as they occurred, post program implementation (intervention), and studied to determine if there was a strong or weak relationship between these disparate variables.

Methodology

Methodology section covered the population, sampling, procedures, and data collection processes for the completed study.

Population

The target population for this study consisted of the acute care hospitals in the State of Iowa. The current number of hospital organizations is 118 and all organizations were included in this study. The study could have a finite population; however, the outcomes may lead to behaviors that could transfer other management, potentially assisting in the measureable success of the organization. The potential size of the study was a purposeful convenience sample and was able to reach all of the hospitals. All hospitals that reported were included; however, if a feasible sample size with an acceptable standard error and the selection of the size of the sample was based on a probability sample design (Frankfort-Nachmias and Nachmias, 2008). This population and size was feasible because of the current relationship with the hospitals thought the Iowa Healthcare Collaborative and the Iowa Association for Hospitals, which allowed the access to the data. It is also assumed that the sampling of the population continued to represent all hospitals of the United States. In general, the 118 hospitals of the state of Iowa are consistent in size, scope, and services with the entire population of U.S. hospitals.

Sampling & Sample Procedures

Sampling strategy. The sampling strategy for this study was a purposeful convenience sample. A purposeful convenience sample is a study in which the participants are not selected based on any sort of predetermined variables, the participants are easy to access, and are available because of geographic location (Frankfort-Nachmias and Nachmias, 2008). This sampling strategy seemed to be within the cost, time, and

manageable limits. The largest factor for the hospital in the state of Iowa to be selected was the convenience of location and the ability to access these organizations from the researcher's fund and location. Based on the power analysis, I attempted for a minimum sample of 88 hospitals that are currently serving the residents of Iowa in the rural settings defined as the critical access hospitals. This sample was based on the power analysis to produce a minimum, yet the study did use all useable data in the secondary database from the instrumentation.

Other sampling techniques that were considered included quota samples and probability sample designs. Quota samples could be used with a sample that as similar to the large populations (Frankfort-Nachmias and Nachmias, 2008). In this study, the population was the entire hospitals within the state of Iowa, and the sample was nearly the entire population versus, in a quota sample, the population would be much larger. Probability sample designs, such as random samples and stratified samples, are used with the samples need or have the likelihood to represent the entire population (Frankfort-Nachmias & Nachmias, 2008). Again, this study used the entire set of Iowa hospitals as the population and a sampling was not needed for representation

Power calculations. According to Burkholder (2012), there are three different sampling calculations that need to be completed for the sample size of a multiple regression. First, Statistical Power and the accepted value for the power or probability was .80 (80%) (Buchner, Faul, & Erdfelder, n.d.; Burkholder, 2012). The second is Alpha, and the standard practice is .05 for most psychological research (Burkholder, 2012). However, Trochim, Donnelly, and Arora (2016) stated that for a more rigorous

test the calculation of .01 alpha (statistical significance) should be used for calculations. The third factor for calculations is the effect size or calculation of Cohen's d, which studies the difference between the two groups, and preferred to be between .50 and .80 (Burkholder, 2012). Burkholder (2012) also stated that where there is very limited research, for example the leadership behavior and the relationship to clinical outcome comparisons, research should follow the average of the Cohen's d of .65. By using the tables for Required Sample Size (Research Advisors, 2006) with a power of .80 (alpha = .50) and an average effect size of .65 the sample size would be 24 of the hospitals in the sample size. By using the G-Power Analysis of Buchner, Faul, and Erdfelder (n.d.), the calculations demonstrated a power of .80, alpha of .01, and effect size at .15 (or 85%) the total necessary sample size was calculated to 88 participating hospitals. This study continued to strive for the sample size of the 88 hospitals from the state of Iowa for the more rigorous testing.

Procedures for Archival/Secondary Data

Recruitment procedures. All of the Iowa hospitals have been participating in the CMS Partnership for Patients (n.d.) data collection effort for over two years and reporting information to the Iowa Healthcare Collaborative or national publicly reported entities (Iowa Healthcare Collaborative, 2014). The Iowa Healthcare Collaborative had been collecting information for the Partnership for Patients program since 2012 with the goal of continuing to review and analyze the data for driving performance in the state of Iowa.

Participation procedures. For the last two years, measurements for this study have been collected over the course of the Iowa Partnership for Patients program, called

the Iowa Hospital Engagement Network (Iowa Healthcare Collaborative, 2014). The Iowa Healthcare Collaborative was the contractor for the Partnership for Patients, Iowa's Hospitals Engagement Network and completed the leadership survey as part of the Partnership for Patients program (Iowa Healthcare Collaborative, 2014) and hospitals have had the option to submit data for clinical quality measures. Independent co-variables include the funding type for the hospital organization as determined by the federal designation of Critical Access or Urban (Department of Health and Human Services, 2014).

During the Partnership for Patients program the Iowa Healthcare Collaborative organization collected independent variable data from Hospitals across the state of Iowa with the leadership survey, OAT, instrument in nominal form (questions are of Nominal or Ordinal design) and the funding type was be categorized for size as Critical Access or Urban (See Table 2). The leadership survey, OAT, which was created by a Center for Medicare and Medicaid contractor as the National Content Developer (Econometrica) for the purposes of assessing participating hospitals in the Hospital Engagement Networks, in the area of setting goals, level of leadership support, and accountability through communication (Centers for Medicare and Medicaid Services, 2011).

The clinical quality outcomes (dependent variables) as described by the CMS Partnership for Patients quality of care measures were also collected over the program from 2012 to 2014 (Centers for Medicare and Medicaid Services, 2014). Part of the Partnership for Patients program was to complete an agreement document with each of the participating hospitals involved in the Hospital Engagement Network, which agreed

that the data would remain confidential, as the organizations where asked to submit the results of the leadership survey at the beginning of the program and then on-going clinical quality outcome results.

Data collection. The research question for this study was to investigate the predictive relationship between hospital funding source, the occurrence of hospital leadership activities (public commitment, setting organizational quality goals, and goal review), and clinical quality outcomes (defined prior) as measured by the associated Partnership for Patients (Centers for Medicare and Medicaid Services) criteria. The hypothesis was that there is no (null) or is a (alternative) statistically significant predictive relationship between hospital funding source, the occurrence of hospital leadership activities (public commitment, setting organizational quality goals, and goal review), and clinical quality outcomes.

Most of the secondary was used in this study was originally collected by the Iowa Healthcare Collaborative for the Hospital Engagement Network's Partnership for Patients program (Centers for Medicare and Medicaid Services, n.d.; Iowa Healthcare Collaborative, 2014). The leadership survey was sent via email to all participating hospitals in the state of Iowa during the engagement assessment by the Iowa Healthcare Collaborative, the collecting agency, prior to my study beginning of the Hospital Engagement Network for Iowa starting in 2014 (Iowa Healthcare Collaborative, 2015).

The use of the collected demographic information was used as independent variables including the size of the organization in the classification of their federally

designated criteria of Urban (including referral) or Rural (Critical Access Hospitals). The dependent variables (outcome measures) were in an ordinal design (linear statistics) as:

- Venous Thromboembolism rates (VTE) associated with the practices during the inpatient stay,
- the number of Falls with injury,
- the occurrence of Catheter-Associated Urinary Tract Infections (CAUTI), or
- the occurrence of Central Line Associated Blood Stream Infections (CLABSI).

The outcomes of the clinical care measures (dependent variables) were gathered from different sources:

- Venous Thromboembolism (VTE) – publicly, hospital-reported data;
- Falls data – either the Iowa State Inpatient Database (SID; data source) or national contract databases; and
- Catheter Associated Urinary Tract Infections (CAUTI) and Central Line-associated Bloodstream Infection CLABSI – the Centers for Disease Control – National Healthcare Safety Network (CDC-NHSN).

Publicly reported data, in the context of this study were defined as data collected or submission activity completed by the hospitals, self-reported, over the CMS Partnership for Patients program period. All data collected were previously completed; therefore, this study used secondary data for these organizations.

Permissions for access. Access to this secondary data set was granted by permission from the leadership of the Iowa Healthcare Collaborative organization (data source). This permission to use the data were granted in written from and be

accompanied by a written contract between researcher and the data source. Appendix B and Appendix C contains the contractual letter and agreements for data and material use. According to the appropriate timeline the data set was sent, via secure data transfer of encrypted email, from the data source. The data were collected at the individual hospital level; however, the hospital's identification information was de-identified. Identifiable information for the hospital would include name, address, personnel names, or other tax/ identification numbers. Data reports contained de-identified organization name via code, indication of urban or critical access funding source, leadership survey results, and nominal results from the last report of clinical care outcomes.

Reputability of sources. This source of secondary was the only and most reputable data source because of the nature of the data and the only organization that would have access to the retrospective leadership assessment related to the Partnership for Patients program. The data source was selected to complete such data collection of both independent and dependent variables through a rigorous selection process for the Hospital Engagement Network by the Centers for Medicare and Medicaid Services (2011). Data for the study remained de-identified throughout the study with only a unique identifier for each of the hospital organizations. There was an assigned code for the independent variables and dependent variables.

The Iowa Healthcare Collaborative is a nongovernmental contract for the Partnership for Patients program; however, they have had a relationship with the healthcare community in Iowa since 2006 when it was created with the mission to drive the quality of healthcare across the state. The Iowa Healthcare Collaborative has

implemented and tested several other national quality initiatives including the Institute for Healthcare Improvement (Iowa Healthcare Collaborative, 2011). The Iowa Healthcare Collaborative had been collecting quality of care measures or outcomes through these national programs since 2006, reporting measurements, and a mission to improve the healthcare across Iowa. The independent variables, including the funding type for the hospital organizations, were determined by the federal designation of Critical Access or Urban (Department of Health and Human Services, 2014). This variable be indicated in the data source provided by the Iowa Healthcare Collaborative with the type of Federal funding source indicated as either urban (prospective payment system) or critical access (fee-for-service).

Instrumentation

Organizational Assessment Tool. The leadership survey, OAT, was created by a Center for Medicare and Medicaid contractor as the National Content Developer (Econometrica) for the purposes of assessing participating hospitals in the Hospital Engagement Networks, in the area of setting goals, level of leadership support, and accountability through communication (Centers for Medicare and Medicaid Services, 2011). The data type for analysis of the independent variables was through this leadership survey, OAT, instrument in nominal form (questions are of yes/no design) and the funding type was categorized for size as Critical Access Hospital or Urban (see Appendix A). The leadership survey was sent to all participating hospitals in the State of Iowa during the engagement assessment by the collecting agency (Iowa Healthcare Collaborative – Hospital Engagement Network for Iowa). According to Field (2013) each

one of the leadership questions act as an independent variable and each used in a cross-sectional analysis to its relationship with the dependent variables (quality outcome measures). The leadership survey reflected data on their behaviors for strategy implementation (independent variables).

The OAT did have some potential instrumentation biases. It was created for the CMS use during the Partnership for Patients program and was specifically designed with the leadership initiatives that the organizations were encouraged to implement in their organization. The assessment tool was not a published peer reviewed tool, yet it was created by the research center for purposes of the program (Econometrica, 2013). There is limited evidence for creation of the OAT with the reliability testing and instrument validity.

Reliability testing information was not able to be obtained from Econometrica. It was not possible to obtain the testing information, specifically reliability and validity testing from the content creator, Econometrica, due to contract relationships with the CMS (M. Sheppard, personal conversation, February 19, 2016). According to Econometrica director this information was not released to the Partnership for Patients contractors or the public, it was only released to CMS in their final report (M. Sheppard, personal conversation, February 19, 2016). Due to this limitation in publicly reported information, data in this study, the OAT survey, was subject to testing for internal consistency (reliability). This was determined because of the lack of evidence from the creator of the tools for the survey development used during the data collection a

Cronbach's alpha test was conducted on the questions from the OAT that was used in this study.

Other control methods would have increased the strength of the study and decreased the limitations of the study, such as asking for other influential leadership behaviors (content validity), running a control group to determine the predicted results (empirical validity), and comparing to the framework of other validated leadership theories (construct validity). The strongest of these validity measures is the construct validity because the leadership theories have been seen as foundational behaviors through many other studies. By asking for open-ended questions at the end of the survey this may have determined some of characteristics of leadership that would influence the behaviors. However, this challenges the study to determine the themes and quantify the subjective information.

Operationalization

The independent variables for the study included five questions from the OAT. The independent variables were either the federal payment designation or the four questions that relate to the organization's leadership actions related to the quality outcome measures. These independent variables were reported in the OAT and were all dichotomous and categorical variables. The first independent variable included the funding or payment system for the hospital. The funding payment system code was "payment" and the data type was nominal defined as urban or Critical Access Hospital. As cited earlier the urban organizations were considered Prospective Payment System reimbursement with a fixed payment model (Centers for Medicare and Medicaid

Services, 2015). The Critical Access Hospital payment type is a model that is for organizations designated in limited service areas, with less than 24 acute care beds, and has a 101% reimbursement of reasonable costs (Department of Health and Human Services, 2014). The remaining four independent variables were questions from the OAT regarding leadership actions that promote, guide, or use patient safety/quality lead actions within their organization. The questions in Table 1 demonstrated the actual questions from the OAT survey to hospital leadership. The questions from the OAT survey focused on the use of data and communication of goals related to the clinical quality outcomes and patient safety measures in the Partnership for Patients program (Centers for Medicare and Medicaid Services, 2013). The independent and dependent variables and their respective coding with data type are listed below in Table 2.

Table 2

Questions From the Organizational Assessment Tool (Independent Variables)

Leadership Questions	Coding	Data Type
Region (Funding Payment System; Question #4)	Payment	Nominal (Urban, CAH)
Does hospital leadership use a checklist to assess the priority of safety on strategic agenda of senior leadership team, high-level operational meetings, and board meetings? (Question #26)	Checklist	Nominal (yes, no)
Is there patient safety incident dashboard for communicating risk management and lessons learned information to senior management, the Board of Directors, and hospital staff? (Question #85)	Dashboard	Nominal (yes, no)
Are the Board and Governing Body activity involved in risk management and patient safety decision making? (Question #88)	Decision	Nominal (yes, no)
Did your hospital have an event requiring a root case analysis in the last two years where the root cause was determined to be lack of proper and timely communication between staff? (Question #102)	Root Cause	Nominal (yes, no)

The dependent variables were measures from the Partnership for Patients program and include Hospital Acquired Infections, Thromboembolism, and falls during an acute stay. The dependent variables were the occurrences of the clinical outcomes in the patient population receiving services at the participating organizations. The dependent variables were ordinal and defined as the number of occurrences (continuous) in the reporting period. The definitions for each of the dependent variables were from clinical best practice and implementation of practices to reduce harm in healthcare organizations (Centers for Medicare and Medicaid Services, 2011).

Table 3

Occurrence of Clinical Quality Outcomes (Dependent Variables)

Variable	Coding	Data Type
Catheter-associated urinary tract infections	CAUTI	Ordinal (number of occurrences)
Central line associated blood stream infections	CLABSI	
Falls with injury during hospital stay	Fall	
Venous Thromboembolism rates	VTE	

Variable scale & scores. The scales for each of the independent variables were nominal or ordinal in type and were presented in a categorical and continuous manner for analysis. The dependent variables were all ordinal in type and can range from zero (did not occur) to unlimited occurrences. Each of the scores were either yes/no (categorical) or a whole number (of occurrences in a continuous series).

Variable measurement. The calculation included both *t*-tests and multiple regression tests for each of the variables. There was a *t*-test for each of the independent variables related to each of the dependent variables to analyze if there is a difference between the impacts of the independent variable on each of the dependent variables. A

multiple (linear) regression was completed for the independent variables to each of the dependent variables.

Data Analysis Plan

Analysis software. The data analysis plan was to receive the data from the source organization and place all data in a secure external non-networked drive. The participants (organization) confidentiality remained intact as the participating organizations were not identified in the release of information (data). Then the data were entered into the SPSS (version 21) software for analysis. The independent and dependent variables were coded as stated earlier. The data, through the SPSS program, was then analyzed through a series of multiple regression tests between the multiple independent and each dependent variable to predict their predictive relationship. Each independent variable group (leadership actions and payment system) was related to each of the dependent variables through the multiple regression tests.

Analysis software & cleaning. Analysis was completed in statistical software, SPSS, with the latest updates and version for data entry and comparisons. Descriptive statistics, including means and standard deviations, were completed prior to the data analysis for fit and normal distributions. When determined there was unacceptable or data that had missing values it was cleaned for data integrity in the results. Data was cleaned if there were missing fields (non-reported results) for some of the variable entries. If data happened to be missing from the original data set, cleaning was attempted in order to be resolved. Also if data results were determined to be representing other demographic elements, it was determined to be removed from the analysis.

Research question - Null Hypothesis (H0): There is no statistically significant predictive relationship between hospital funding source, the occurrence of hospital leadership activities (safety checklist, creating a dashboard, board involved in decision making, root cause analysis), and clinical quality outcomes (fall rates, venous thromboembolism, catheter-associated urinary tract infections, and central line associated bloodstream infections) as measured by the associated Partnership for Patients (Centers for Medicare and Medicaid Services) criteria.

Alternative Hypothesis (HA): There is a statistically significant predictive relationship between hospital funding source, the occurrence of hospital leadership activities (safety checklist, creating a dashboard, board involved in decision making, root cause analysis), and clinical quality outcomes (fall rates, venous thromboembolism, catheter-associated urinary tract infections, and central line associated bloodstream infections) as measured by the associated Partnership for Patients (Centers for Medicare and Medicaid Services) criteria.

Statistical testing. Multiple tests were conducted to study the relationship between the leadership behaviors and the performance within the clinical quality outcomes. The statistical testing plan for each of the variables presented in this study included both multiple linear regression tests and *t*-tests. There were a series of multiple regression tests for analysis of the leadership actions and federal payment type (independent variables) to analyze their relationship to each of the dependent variables. Therefore a series of multiple regression tests with the models of independent variables to individually predict the relationship to each of the dependent variables. These tests were

appropriate for the data because the dependent variables are ordinal (number of occurrences), there are several independent variables used, and the test indicated which are the best predictors (California State University, Northridge. (n.d.). There were a series of *t*-tests to analyze the difference between the four leadership questions and the payment type to each of the clinical quality outcomes based on the *t*-test. The *t*-tests, within the linear regression analysis, determined the degree of slope for the regression analysis and determine the strength of the relationship between the independent and dependent variables (Frankfort-Nachmias & Nachmias, 2008).

Interpretation. There was an inclusion of co-variates for the independent variables to be included in the study to determine influences on quality outcomes. The results listed and displayed on regression charts for support for either the null or alternative hypotheses. Finally, a presentation of the information in table form to compare the different range of relationship between the predictor and criterion variables.

Threats to Validity

To determine the strength and limitations of the study, threats in instrumentation were considered first. There are strengths to the measurement tool in the area of validity and reliability as demonstrated by the OAT from Centers from Medicare and Medicaid Services (Econometrica, Inc., 2013). Content validity was seen as the largest of validity limitation because the participants could have a different set of leadership behaviors that they feel or have used in their organization (Frankfort-Nachmias and Nachmias, 2008) and the reporting tool may not have indicated these interventions due to the tool not

addressing other interventions. It would be nearly impossible to determine if those leadership actions were being considered when answering the questions to the survey.

The influence of other experiences or knowledge is certainly a concern for this research (M. Nugent, personal conversation, January 4, 2016). The organizations for the Partnership for Patients program signed a contract in the being of the program in 2010 and agreed to submit the clinical quality of care data, implement best practices, and completed the organizational assessment surveys (M. Nugent, personal conversation, January 4, 2016). Because of this relationship, the organizations may have been influenced by the perceived value of the program to implement changes. In addition, a concern is the reliability of the testing instrument (M. Sheppard, personal conversation, February 19, 2016) because of the limited release of information for test development it was unclear how the OAT was tested prior to use, other than a 13 organization pilot test (Econometrica, 2013). The instrument was a survey based on an ordinal ranking scale and would allow the participants to self-select and determine the level of behavioral influences. A test-retest method would have strengthened the reliability of the testing instrument and determined that the participant's results are truly the intended results (Frankfort-Nachmias and Nachmias, 2008). In addition, this may be minimized by having a standard operating definition for the survey ranking (Frankfort-Nachmias and Nachmias, 2008). Overall, the fact that the instrument for this study may have been previously tested for validity and reliability may prove to be strength for the study (Econometrica, 2013). Other limitations could include the rate of survey return and participation for the study. These could be challenges due to the technology of the survey

or the determined value in the participation. However, the purpose of the study was to begin to link the leadership actions to clinical results and it may prove to be a more exploratory study.

Since the study was conducted with secondary data, there is limited direct bias of the researcher. However, the data source that collected the leadership behaviors, conducted the OAT, for the data set may have had some influence with the organizations who reported. The Iowa Healthcare Collaborative collected the leadership survey data and reviewed the action plans throughout the Partnership for Patients program. This review by the data source may have some organizations to improperly report the leadership actions taken in their organization. This bias was addressed in the limitations of the study. According to the Iowa Healthcare Collaboration Vice President of Operations, Meg Nugent, the organization has not published the results from the OAT survey (M. Nugent, personal conversation, January 4, 2016). They have considered the OAT data complements the clinical quality outcome data and no independent testing was completed for validity and reliability.

Ethical Procedures

Agreements for data access and study analysis were completed prior to the actual access of the data. All ethical procedures were addressed through the study, also having an external review by the Institutional Review Board (IRB; Walden University, 2015). IRB ensured that the study does not reflect any validity or ethical concerns with the study's methods or procedures. Documents from IRB review are included in Appendix D including the agreements to gain access to data and the use of human participates.

Criterion-referenced tests are intended to measure how well a person has learned a concept (Frankfort -Nachmias and Nachmias, 2008). This study did not investigating the knowledge level of the leaders, yet the attitude toward the behaviors and the comparisons among the leadership. Therefore, the design of the test does not increase the ethical concerns for the study. One of the other concerns was the informed consent of the participants. This was controlled by the data source organization gaining a preprogram Charter or agreement with the reporting hospitals and the ability for the participants to remove themselves from the study during the survey. Other ethical implications were neutralized by disclosing any process defects or errors, maintaining professional codes of research (example no deception or invasion of privacy) through full discloser of process. This research included a process to de-identify all organizations in the data and reduce any bias for results from particular organizations or leadership. De-identification was completed by the data source prior to sending the secured file. The confidentiality of all results was maintained by blinding the identifier for the participants, only results were available.

Other ethical concerns include the use of human subjects and the security of the data. No human subjects were used in this study. This study proceeded through the Institutional Review Board (IRB) process at Walden University (2015) in May 2016. The IRB process reviewed the data collection method for primary research, sensitive topics such as legal or illegal proceedings, and vulnerable populations. This study does not contain any of the immediate high-risk areas; however, IRB still reviewed the plan for the study prior to data exchange from the data source. Only the determinations of post

treatment outcome were studied and the study was initiated after the clinical intervention was completed in the hospital organizations. It is determined that there was statistical analysis with software such as SPSS, which allowed for the participants' information to be entered and stored with confidentiality and identification only by a case number. The exchange of data was done through an encrypted; secure (password protected) email method with storage encrypted. The information was then be securely encrypted and backed up with the platform of the software download. The information and details of the survey results will also be destroyed following the (statistical analysis) and final approval for the doctoral degree.

Summary

The quantitative cross-sectional study addressed the relationship between the independent variable of leadership actions, federal funding designation, and the clinical care outcomes for hospitals across the state of Iowa. The statistical analyses attempted to determine if there was a relationship between the different independent variables and the clinical outcomes (dependent variables). Results of research, such as those related to clinical outcomes, could have an effect on the competencies and behavioral dimension of leadership performance. However, researchers need to continue to link the importance or value of each leadership competency by explaining the impact to organizational results. It is supported that the concepts of leadership performance in the application of innovation, strategic planning, creating and realization of vision, growth and management, and project/change management (Planima and Skarzauskiene, 2010). However, this study created the continual discovery for the support between leadership performance and

clinical quality outcomes (results) by demonstrating how the quantitative cross-sectional methods demonstrate statistically such as relationship. This study attempted to determine such an impact of leadership actions related to the quality of the organization. Related to leadership's use of systems thinking theory was from Haines (1998) "one of the ways to improve the quality of results of an activity is to enhance the quality of thinking: how you think, is how you act, is how you are". In addition, leaders begin to use consistently the theory of their actions in their management; the organizational performance may have significant improvement in the outcome or results.

Chapter 4: Results

Introduction

The purpose of this study was to investigate the relationship between leadership actions, U.S. federal funding sources and/or payment types, and the clinical quality outcomes as defined by the Centers for Medicare and Medicaid Services (CMS) Partnership for Patients/Hospital Engagement Network. The study determined how healthcare leadership actions contributed to driving the performance of the organization's result for better quality outcomes. Healthcare organizations across the U.S. have worked to improve their quality outcomes provided to the patients following several publicized statements from government agencies (e.g., Agency for Healthcare Research and Quality, 2015). The results of this study are intended to guide leadership within healthcare organizations to continue to provide value-added services.

Research Question

Research Question: What is the predictive relationship between hospital funding source, the occurrence of hospital leadership activities (safety checklist, creating a dashboard, board involved in decision making, root cause analysis), and clinical quality outcomes (fall rates, venous thromboembolism, catheter-associated urinary tract infections, and central line associated bloodstream infections), as measured by the associated Partnership for Patients (Centers for Medicare and Medicaid Services) criteria?

- **Null Hypothesis (H_0):** There is no statistically significant predictive relationship between hospital funding source, the occurrence of hospital leadership activities

(safety checklist, creating a dashboard, board involved in decision making, root cause analysis), and clinical quality outcomes (fall rates, venous thromboembolism, catheter-associated urinary tract infections, and central line associated bloodstream infections), as measured by the associated Partnership for Patients (Centers for Medicare and Medicaid Services) criteria.

- **Alternative Hypothesis (H_A):** There is a statistically significant predictive relationship between hospital funding source, the occurrence of hospital leadership activities (safety checklist, creating a dashboard, board involved in decision making, root cause analysis), and clinical quality outcomes (fall rates, venous thromboembolism, catheter-associated urinary tract infections, and central line associated bloodstream infections), as measured by the associated Partnership for Patients (Centers for Medicare and Medicaid Services) criteria.

This chapter describes the data collection, study analysis techniques, and variables for the analyses, as well as the descriptive statistics, assumptions, statistical analysis, and post-hoc analysis and additional statistics completing during the study.

Data Collection

The Hospital Engagement Network program Partnership for Patients began in 2012 with hospital quality outcome data collected by the Iowa Healthcare Collaborative, quarterly from 2012 until 2014 (Iowa Healthcare Collaborative, 2015). Recruitment for the *Partnership for Patient* program was completed by the Iowa Healthcare Collaborative and followed the same timeframe as the data collection. The Iowa Healthcare Collaborative was also the data source for all secondary data in this study. The data used

in this study including the leadership actions (independent variables) and clinical quality outcomes were collected in the final quarter of 2014 using the Organizational Assessment Tool (OAT).

Discrepancies in Data Collection Plan

There was a discrepancy in the final sample size for the population in the study. I initially that there would be data from 118 hospitals included in the provided secondary data. However, some organizations discontinued data reporting during the program, so the final number of participating hospitals reporting leadership actions was 105. In addition, some hospitals did not submit all data for the dependent variables and missing data points have been classified as missing data from the study. Final response rates for variables were 105 organizations reporting the predictor variables and within the data set the response size were: catheter-associated urinary tract infections (CAUTI) measures, n = 67; central line associated bloodstream infections (CLABSI), n = 50; falls with injury measures, n = 98; and venous thromboembolism (VTE) measures n = 96.

Sample Demographics Compared to Population

The sampling method used for the study was a convenience sampling of a secondary data source tracking participating hospitals across state of Iowa. The sample is representative of the hospitals in Iowa, with a mix of urban and rural facilities. According to the United Health Foundation (2016), Iowa can be generalized for the type of healthcare organizations and is very similar to other states across the country with a mix of (urban) prospective payment system hospitals and rural cost based funding (or Critical Access Hospital). The Iowa Hospital Association (2016) placed the population of Iowa at

a rank of 30th in size and demographic of rural hospitals versus urban hospitals for size and location. There are approximately 1,332 (23%) Critical Access Hospitals across the U.S., out of 5,627 total hospitals, with only five states not participating in the federal hospital status (Rural Health Information Hub, 2016). These states that do not have designated Critical Access Hospitals still have facilities that are under the bed size of 25 (federal qualifications) and are similar in payment funding, with similar quality outcome regulations (Rural Health Information Hub, 2016).

Sample characteristics and relationship to the population are seen in the demographics of organization size, payment model, and criteria of clinical quality outcomes. Demographic representation of the sample include 26 prospective payment system hospitals including large, urban centers, Rural, and Rural Referral systems who are all paid through the prospective payment or PPS system. There are also the remaining (n = 79) Critical Access Hospitals are paid on a cost-plus basis however Federal Regulations require them to be small in nature and payment is based on a cost-plus nature. All organizations in the study previously met the same clinical procedural or protocol criteria for each of the quality outcomes (dependent variables), as established by CMS (2012). These clinical procedures or outcome measures do not vary based on size or location of the organization. Since some of the organizations did not report the clinical quality outcomes for each of the dependent variables of the CAUTI and CLABSI, measures did fall below the preferred sample size. These results indicated that the power (or probability of error) only meet expectations for falls with injuries and VTE with a

power of .99 for each dependent variable. In Table 4 lists other power calculations, effect size and *R* Squares for each of the dependent variables.

Table 4

Power Calculations for Each Clinical Quality Outcome (Dependent Variable) Using Five Predictor Variables, Effect Size Calculated With R^2*, and Alpha of .05*

Dependent Variables	*N*	R^2	Effect size	Power (error probability
Catheter-Associated Urinary Tract Infection (CAUTI)	67	.056	.06	.27
Central Line-Associated Blood Stream Infections (CLABSI)	50	.108	.12	.39
Falls with injuries from immobility	98	.244	.32	.99
Venous Thromboembolism (VTE)	96	.293	.41	.99

Results

This study was designed to investigate the relationship between leadership actions, federal funding systems, and clinical quality outcomes across Iowa hospitals. The purpose is to summarize key findings and to include a solid framework for the recommendations, generalizability, and influence of social change. Social change implies that there was a result of the study that would be a recommendation for leaders for behaviors modification that could influence the larger society toward the good. The focus of the social change section related the results of the study to the possible implications for leaders and how to improve the outcomes of a healthcare organization.

Descriptive Statistics and Variables

An analysis was conducted to compare the relationship of hospital funding type (payment) and leadership actions to the clinical quality outcomes of CAUTI, CLABSI, rates for Falls with Injury, and VTE. The following is a list of the variables in the study.

Each dependent variable was studied for relationship to the group of predictor (independent) variables. As stated prior final response rates for variables were 105 Iowa hospital organizations reporting the predictor variables for a frequency of 89% of hospitals reporting the OAT assessment. Within the data set, the response size for the criterion (dependent variable) outcomes were CLABSI with the lowest response rate (*n* = 50, frequency 47%), followed by CAUTI measures (*n* = 67, frequency 63%), then two variables met a power calculation above the desired 80%, were VTE measures (*n* = 96, frequency 91%) and the highest response variable of falls with injury measures (*n* = 98, frequency of 93%). The range of the dependent variable is from n = 50 to n = 98 and a mean of the n = 78. Table 5 and Table 6 contain the descriptive statistics for each of the reporting and non-reporting organizations from the OAT (five predictor/independent variables) and the clinical quality outcomes (criterion/dependent variables).

Table 5

Descriptive Statistics for Independent Variable with Reporting and Frequency

Independent Variables*	*n*	Frequency %
Funding Payment – Reporting Organizations	105	89%
Funding Payment – Non-reporting	13	11%
Total Organizations	118	
Leadership Checklist –Reporting Organizations	105	89%
Leadership Checklist – Non-reporting Organizations	13	11%
Total Organizations	118	
Dashboard for Communication–Reporting Organizations	105	89%
Dashboard for Communication – Non-reporting Organizations	13	11%
Total Organizations	118	
Board in Decision Making –Reporting Organizations	105	89%
Board in Decision Making – Non-reporting Organizations	13	11%
Total Organizations	118	

Root Cause for Events – Reporting Organizations	105	89%
Root Cause for Events – Non-reporting Organizations	13	11%
Total Organizations	118	

* Population for data set was 127 with 118 organization reporting

Table 6

Descriptive Statistics for Dependent Variables (N = 105)

Dependent Variables**	*M*	*SD*	*n*
CAUTI rates	.13	.489	67
CLABSI rates	.04	.283	50
Falls with Injury	.52	1.203	98
VTE rates	.38	1.275	96

Statistical Analyses

Several statistical analyses were conducted to determine the relationship between leadership actions, funding type, and clinical quality outcomes. The analyses for this study included tests for assumptions, *t* test, multiple linear regression, and additional multiple logistic regression. Each of the tests used applicable information for the predictor and criterion variables which were all from secondary data collected on the population of Iowa hospitals. Significant results are presented in the following sections and complete results can be found in the respective appendixes.

Assumptions. The analyses for this investigation included correlation analyses, *t*-tests for variable means, and multiple linear regression tests for the clinical outcomes of CAUTI, CLABSI, VTE, and falls with injuries. Summary information for the correlation analyses, *t*-tests and linear regression results are presented here with detailed information located in Appendix E, F, and G respectively. There are four assumptions with these analyses (correlation analyses, *t*-tests and multiple linear regression) including normality

or normal distribution outliers, homoscedasticity, diminished sample size, multicollinearity, and independent errors (Field, 2013). The first two assumptions are for outliers and homoscedasticity in both the independent and dependent variables and, if needed, can be data cleaned prior to completing the analyses (Field, 2013; Marrow, n.d.). Data cleaning was completed and absent (non-reported) values coded in the database as "missing" ("999") prior to the analysis. The homoscedasticity is when the variables have the same level of variance and this can be overcome by using the weighted squares regression results as needed and can be detected by reviewing the scatter plots (Field, 2013). Both outliers and homoscedasticity were validated through regression (scatter) plots of all four dependent variables; the histograms and normal p-p plot of regression indicated normally distributed residuals or normal distribution of the bell curve for analyses including *t*-test analysis. Since the values were indicated to be normally distributed no further adjustments in the data are indicated (Field, 2013).

The third assumption was for cases when the sample sizes of the populations are too small (Field, 2013). The appropriate number of cases in the sample (N) should be the number of dependent variables (regression coefficients) to demonstrate a power of alpha greater than .80 (Buchner, Faul, and Erdfelder, n.d.). This was not the case for CAUTI and CLABSI G-Power calculations effect size of .27 and .39, respectively; however it was the case for falls with injury and VTE (effect size of .99 for both). This indicates that the results for all the regression analyses come with some concern for the results to determine if the null hypothesis should be rejected or retained with confidence (Field, 2013).

The fourth assumption was for multicollinearity, when at least two independent variables are highly correlated to each other (Field, 2013). This resulted in larger standard errors for the equation, and data cleaning was performed prior to testing as needed (Field, 2013). The results of correlation testing, through the Pearson's Correlation Coefficients can indicate where there is a very strong relationship ($r < .8$) between two variables and one or more variables may be removed from the analyses to not confound the results (Field, 2013). According to Field (2013), high Pearson's Correlation Coefficient are indicated when $r > = .9$. In this study, none of the variables had a high Pearson's Correlation Coefficient with the range of the values for all comparisons from $-.406 < r > .532$, showing that there were no high correlations between variables in the data set. Therefore, all of the variables can be used in the linear modeling, as recommended by Field (2013). Further discussion of the variable correlation results can be found later in the chapter.

The variance inflation factor (VIF) can also be reviewed for multicollinearity. According to Bowerman and O'Connell (1990, in Field 2013), the average of the VIF of considerably greater than one can indicate a biased of multicollinearity. The final assumption is for independent errors, which is when two observations are truly uncorrelated, and can be tested through the Durbin-Watson test (results from 0-4 with a 2 score are unrelated; Field, 2013). Appendix F includes the results of the Durbin-Watson test for independent errors for the analyses. Each of the dependent variables had an average VIF value near 1.0 so there was no concern about the relationship between

independent variables. The results of the Durbin-Watson test indicate results near 2.0 so there was no concern for independent errors in the dependent variables.

Correlations. The correlations between variables were examined by using the Pearson's Correlation Coefficient Tests in SPSS. This was completed to determine if any of the variables (predictor or criterion) were highly correlated. According to Field (2013), if any of the variables that have a high Pearson's Correlation Coefficient (r < +/-) of .8 or higher, one of the variables should be removed from the regression testing in order to not confound the results. During this testing all of the variables for each of the criterion variables with the predictor variables were compared. Results indicate that none of the variables had a high correlation coefficient. The range for all variables was -.406 < r > .523. Table 7 summarizes the results of the correlation testing for all variables and the results of the complete correlation testing can be found in detail in Appendix E.

Table 7

Statistically Significant Results for the Pearson's Correlation Testing Between Variables

Variables	Pearson's' Correlation	Sig p value (2-tailed)
CAUTI - Funding to Root Cause	-.406	.001**
CLABSI – Funding type to Root Cause	-.354	.012*
CLABSI – Dashboard to Root Cause	-.309	.029*
Falls – Payment to Root Cause	-.377	.000**
Falls with Injury - Funding	.481	.000**
Falls – Decision making to checklists	.215	.034*
VTE – Funding to Root Cause	-.381	.000**
VTE rates - Funding	.523	.000**

** Correlation is statistically significant to the p < .01 level (2-tailed)
* Correlation is statistically significant to the p < .05 level (2-tailed)

Statistical *t*-Tests. Statistical *t*-tests were completed on the predictor criterion variables that presented statistical significance in the linear regression testing. Statistical

t-tests were completed to determine the differences in the means and to compute the standard error for variability between sample means (Field, 2013). The evaluation of each of the dependent variables was calculated with a determination of effects by the each of the independent variables. Statistical *t*-tests were completed for each of the dependent variable with statistically significance demonstrated on three of the five independent variables. Table 8 demonstrates the results for each independent and dependent variables with statistical significance.

Table 8

Results for Each Variable and Statistically Significant Outcome

Independent Variables	Dependent Variable*	Sig. *p* value
Hospital Funding / Payment	CAUTI*	.044*
Hospital Funding / Payment	Falls**	.000**
Hospital Funding / Payment	VTE**	.000**
Leadership uses safety Checklist at meetings	CLABSI*,	.037*
Leadership creates a safety Dashboard for goals	none	-
Leadership involves the Board in safety Decision Making	none	-
Leadership determines Root Cause was communication	Falls*	.040*
Leadership determines Root Cause was communication	VTE**	.008**

* Correlation is statistically significant to the $p < .05$ level
**Correlation is statistically significant to the $p < .01$ level

Testing for the relationship between the predictor variables Federal Funding – Payment type based on Region (Funding-Payment) and Root Cause for Events with both the criterion (dependent) variables of falls with injuries and VTE. Statistical tests for means, including the independent *t* test, were completed because the outcomes of the correlation analysis to determine the differences between means. Table 9 represents the statistically significant results for the *t* test when comparing the means and the results of the entire *t* test analysis can be found in Appendix G.

Table 9

Statistically Significant Results for the t Test Comparisons of Means

Independent Variables	Dependent Variable	Difference in Means	Sig *p* value
Funding between Critical Access and PPS hospitals to	Falls	-1.35	.000**
Root Cause completed and not completed	Falls	.396	.017**
Funding between Critical Access and PPS hospitals to	VTE	-1.230	.000**
Root Cause completed and not completed	VTE	.613	.000**

** Correlation is statistically significant to the $p < .01$ level (2-tailed)

Completion of t-test for funding type. The results for funding type in relationship to the criterion variable of falls with injuries demonstrated organizations with funding types of Critical Access Hospitals (CAH; $M = .26$, $SE = .069$), compared to those organization with funding type of Prospective Payment (PPS; $M = 1.61$, $SE = .361$) with a difference of means, -1.35, was statistically significant $t(116) = -5.391$, $p = .000$, and represented a medium-sized effect, $d = .66$. The results for funding type to the criterion variables of VTE rates demonstrated organizations with federal funding type of Critical Access Hospitals (CAH; $M = .01$, $SE = .012$), compared to those organization with funding type of Prospective Payment (PPS; $M = 1.24$, $SE = .348$) with a difference of means, -1.230, was statistically significant $t(113) = -5.584$, $p = .000$, and represented a medium-sized effect, $d = .77$.

These results indicated that for funding type there is a statistically significant difference in the means between the funding types and falls with injury and VTE rates and the results were not due to chance. For the results of the funding type to falls with injury indicate that there is a statistically significant difference between the population

from the Critical Access Hospital organizations and the Prospective Payment (PPS) organizations. Indicating that the result could be contributed by the payment or funding type with the larger mean contributed to the PPS hospitals. Results from the VTE rates and funding type were also statistically significant between Critical Access Hospitals and the PPS organizations, with Critical Access organization performing better than PPS. This also indicates that the difference in means could be contributed to the manipulation in the predictor variable. Organizational leadership often does not have a choice in payment systems; however, that payment should not be the only predictor of quality performance.

Completion of t-tests for Root Cause. The *t*-tests for the predictor variable of root cause completed and the criterion variable of falls, organizations with completed root cause analysis for events (M = .71, SE = .195), compare to those organizations who did not complete a root cause with events (M = .32, SE = .107), with a difference of means, .396, was statistically significant $t(98) = 1.651$, p = .017, and an effect size, d = .67. The *t*-tests for predictor variable of root cause and VTE rates, organizations with completed root cause analysis for events (M = .64, SE = .221), compare to those organizations who did not complete a root cause with events (M = .02, SE = .023), with a difference of means, .613, was statistically significant $t(96) = 2.445$, p = .000, and an effect size, d = .77.

In this predictor variable, root cause, the leadership of the organizations stated that they performed a root cause analysis and found that the reason the error occurred was because of communication. For both falls with injury and VTE the results indicated that

there was a statistically significant difference in the means between organizations that did not perform a root cause analysis to those that did perform a root cause analysis, and these results were not due to chance. This indicates that organizations who did complete the actions and discovery within a root cause analysis could contribute some of the improvement in outcomes to the activities to the root cause analysis. This supports the actions of leaders creating a culture for improvement in communication and use of the root cause analysis tool there should be a continual shift to better organizational performance.

Multiple Linear Regression. The multiple linear regression analyses for each of the dependent variables were run using a forced entry ("Enter") model. The forced entry model was chosen because there was low /no multicollinearity (all variables were kept in model) and each of the predictor variables were of equal influence on the dependent variable(s) (Field, 2013). Each multiple linear regression was conducted to evaluate how well leadership actions and payment type predicted the criterion (clinical quality outcomes – dependent variables). Table 10 demonstrates the variables used in the linear regression analysis for models one through four. Each model was evaluated for the R^2 value for best fit.

Table 10

Models for Linear Regression Variables

Models	Independent Variables Included
1, 2, 3, 4	Hospital Payment
1, 2, 3, 4	Leadership uses safety Checklist at meetings
2, 3, 4	Leadership creates a safety Dashboard for goals
3, 4	Leadership involves the Board in safety Decision Making
4	Leadership determines Root Cause was due to communication

Model 4 was determined to be the best fit for all of the criterion variables because of the percent of variance (R squared). The percent of variance (r^2), presented in Table 4, were Catheter-Associated Urinary Tract Infection (CAUTI) r^2 = .056, Central Line-Associated Blood Stream Infections (CLABSI) r^2= .108, falls with injuries r^2= .244, Venous Thromboembolism (VTE) r^2= .293.

Summary of statistically significant factors. Statistically significant factors for the Model 4 multiple linear regression analyses include the following:

- The linear combination of the predictors demonstrated a predictive relationship to the outcome of falls with injuries occurrences at statistically significant levels, $F(5, 92) = 5.939$, $p = .000$.
- The individual predictors to the outcome of "Falls with Injury", the results indicate that there was a statistically significant predictive relationship by predictors for 1-tailed significance with Funding Payment ($p = .000$) and Root Cause for Events ($p = .040$).
- The linear combination of the predictors there was a statistically significant predictive relationship to the clinical quality outcome of VTE rates, $F(5, 90) = 7.465$, $p = .000$.
- The individual predictors to the outcome of "VTE", the results indicate that there was a statistically significant predictive relationship by predictors for 1-tailed significance with Funding Payment ($p = .000$) and Root Cause for Events ($p = .008$).

- The results indicate there was not a statistically significant predictive relationship to the co-variable predictors to the clinical quality outcomes of CAUTI (p = .609) and CLABSI (p = .394).
- There were individual detail significance in the clinical quality outcomes of CAUTI with the predictor of Funding / Payment type (p = .044) and CLABSI with the predictor of Leadership Checklists (p = .037), both meeting the $p <$ .05 level. However, the overall analyses for these criterions were not statistically significant.

The multiple regression models were completed for each of the models to determine the best fit for each of the criterion variables. In each situation the best fit was model 4 and information throughout was represented in this model. Table 11 represents the results for the multiple linear regression analyses for all criterions (dependent variables). The information presented was discussed in further detail for each specific criterion variable. It is presented in the chapter with complete results in Appendix H.

Table 11

Model 4 Multiple Linear Regression Analyses for the Criterion Variables

Dependent Variables	*R*	R^2* (% contributed)	*df*	*F*	Sig (*p value)*
CAUTI	.24	.056 (5.6%)	5, 61	.723	.609
CLABSI	.33	.108 (10.8%)	5,44	1.062	.394
Falls with Injury	.494	.244 (24.4%)	5, 92	5.939	.000**
VTE	.541	.293 (29.3%)	5,90	7.465	.000**

*R^2 indicated the use of Model 4 for all criterion variables
** Correlation is statistically significant to the $p < .01$ level (2-tailed)

The statistically significant results are indicated for falls with injury and VTE. Results overall are not statistically significant for CAUTI and CLABSI outcomes for the models

overall. These outcomes are statistically significant to the $p < .01$ level ($p = .000$). The information presented is discussed in further detail for each specific criterion variables. It is presented in the chapter with complete results in Appendix H.

Cather-Associated Urinary Tract Infection (dependent variable). The results indicate after data cleaning that there was an N = 67 for Catheter-Associated Urinary Tract Infection (CAUTI) outcomes, falling below the sample size indicators in the population. It was noted that there was a small sample size ($n = 67$) that could impact the effect size; however, the results are still presented in Table 12 with complete details in the Appendix H for only the amount of sample size collected. It was not possible to return to the organizations and collect further details after the reporting period of 2014. The predictors were the four leadership actions and the federal payment type (Model 4), while the criterion (dependent variable) was CAUTI. Model 4 was determined to be the most appropriate model based on the largest of the R^2 value ($R^2 = .056$) and the strongest of the correlations. The sample multiple correlation coefficient was .24, indicating that only approximately 5.6% of the variable of outcome occurrences in the sample can be accounted for by the linear combination of the predictors. The linear combination of the predictors where not related to the outcome of CAUTI occurrences at a statistically significant level, $F(5, 61) = .723$, $p = .609$. The ANOVA for the model demonstrate that the overall data demonstrates that there is not a statistically significant relationship for the five independent variables on the outcome of CAUTI when combined ($p = .609$). Table 12 also includes the details of the coefficients analysis for CAUTI using the results in Model 4

Table 12

Model 4 Multiple Linear Regression Coefficient Analyses for CAUTI

Coefficients	*B*	*SE*	Beta
Constant*	-.185	.249	-
Funding/ Payment by Region	.260	.144	.248
Leadership Checklist for Meetings	-.041	.141	-.037
Dashboard for Communication	.039	.128	.040
Board involved in Decision Making	-.085	.142	-.076
Root Cause for Event	.070	.138	.071

*Model 4 with $R^2 = .056$ with $p = .609$

A statistically significant result for the single independent variable of funding/ payment type *(p*= .044) was indicated for outcome of CAUTI. However, the overall criterion statistical significance was not met ($p = .609$), the entire set of predictor variables compared to the criterion dependent variable.

Central Line-Associated Blood Stream Infections (dependent variable). The results indicate after data cleaning that there was an N = 50 for Central Line-Associated Blood Stream Infections (CLABSI), falling below the sample size indicators in the population. It was noted that there was a small sample size (n = 50) that could affect the effect size; however, the results are still presented with complete details in the Appendix H for only the amount of sample size collected. It was not possible to return to the organizations and collect further details after the reporting period of 2014. The predictors were the four leadership actions and the federal payment type (Model 4), while the criterion (dependent variable) was CLABSI outcomes. This was determined because of the largest R^2 ($R^2 = .108$) for the linear regression's fourth model of additional regression variables. The sample multiple correlation coefficient (R) was .33, indicating that only approximately 10.8% of the variable of outcome occurrences in the sample can be

accounted for by the linear combination of the predictors. The linear combination of the predictors where not statistically significant related to the outcome of CLABSI occurrences, $F(5, 44) = 1.062$, $p = .394$. The ANOVA for the model indicated that the overall data demonstrated that there was not a statistically significant relationship for the five independent variables on the outcome of CLABSI when combined ($p = .394$). Table 13 also included the details of the coefficients analysis for CLABSI using the results in Model 4.

Table 13

Model 4 Multiple Linear Regression Coefficient Analyses for CLABSI

Coefficients	*B*	*SE*	Beta
Constant*	.131	.154	-
Funding/ Payment by Region	-.114	.092	-.194
Leadership Checklist for Meetings	.168	.095	.256
Dashboard for Communication	.009	.091	.016
Board involved in Decision Making	.057	.092	.095
Root Cause for Event	-.081	.100	-.129

*Model 4 with $R^2 = .108$ with $p = .394$

When investigating the individual 1-tailed correlations for statistical significance there is a statistically significance relationship between CLABSI outcomes and a single predictor of Leadership Checklist for Meetings ($p = .037$). However, the overall statistical significance was not met for the dependent variable when entering all of the predictors.

Falls with Injury (dependent variable). The results indicate that after data cleaning there was an incidence of $n = 98$ for falls with injuries, reaching the sample size indicators in the population (power of .99). The predictors were the four leadership actions and the federal payment type (Model 4), while the criterion (dependent variable)

was injuries and falls from immobility (falls with injury) outcomes. This was determined because of the largest R^2 (R^2 = .244) for the linear regression's fourth model of additional regression variables. The sample multiple correlation coefficient (R) was .494, indicating that only approximately 24.4% of the variable of outcome occurrences in the sample can be accounted for by the linear combination of the predictors. The linear combination of the predictors were statistically significant related to the outcome of falls with injuries occurrences, $F(5, 92) = 5.939$, $p = .000$. The ANOVA for the model demonstrate that the overall data demonstrates that there is a statistically significant relationship for the five independent variables on the outcome of "Falls with Injury" when combined ($p = .000$). Table 14 also includes the details of the coefficients analysis for falls with injury using the results in Model 4

Table 14

Model 4 Multiple Linear Regression Coefficient Analyses for Falls With Injury

Coefficients	*B*	*SE*	Beta
Constant*	-1.303	.451	-
Funding/ Payment by Region	1.358	.283	.473
Leadership Checklist for Meetings	-.005	.259	-.002
Dashboard for Communication	-.105	.227	-.043
Board involved in Decision Making	.300	.251	.113
Root Cause for Event	.021	.238	.009

*Model 4 with R^2 = .244 with $p = .000$

When reviewing the individual predictors to the outcome of "Falls with Injury", the results indicate that there was a statistically significant relationship by predictors for 1-tailed significance with Funding Payment ($p = .000$) and Root Cause for Events ($p = .040$). Further tests were conducted to further study the relationship of the predictors to the dependent variable and were discussed in the *t*-test section.

Venous Thromboembolism (dependent variable). The results indicate after data cleaning that there was $n = 96$ for Venous Thromboembolism (VTE), reaching the sample size indicators in the population (power of .99). The predictors were the four leadership actions and the federal payment type (Model 4), while the criterion (dependent variable) was VTE outcomes. This was determined because of the largest R^2 ($R^2 = .293$) for the linear regression's fourth model of additional regression variables. The sample multiple correlation coefficient (R) was .541, indicating that only approximately 29.3% of the variable of outcome occurrences in the sample can be accounted for by the linear combination of the predictors. The linear combination of the predictors were statistically significant related to the outcome of VTE rates, $F(5, 90) = 7.465$, $p = .000$. The ANOVA for the model indicates that the overall data demonstrated that there was a statistically significant relationship for the five independent variables, Model 4, on the outcome of "VTE" when combined ($p = .000$). Table 15 also included the details of the coefficients analysis for VTE rates using the results in Model 4

Table 15

Model 4 Multiple Linear Regression Coefficient Analyses for VTE

Coefficients	*B*	*SE*	Beta
Constant*	-1.506	.465	-
Funding/ Payment by Region	1.530	.292	.507
Leadership Checklist for Meetings	-.014	.273	-.005
Dashboard for Communication	.328	.234	.128
Board involved in Decision Making	-.190	.258	-.068
Root Cause for Event	-.112	.247	-.044

*Model 4 with $R^2 = .293$ with $p = .000$

When reviewing the individual predictors to the outcome of "VTE", the results indicate that there was a statistically significant relationship by predictors for 1-tailed

significance with Funding Payment (p = .000) and Root Cause for Events (p = .008). Further tests were conducted to further study the relationship of the predictors to the dependent variable and were discussed in the *t*-test section.

Post-hoc Analysis and Additional Statistics

Multiple binary logistic regression analyses were completed for the predictive and criterion variables for additional statistical tests. Logistical regression tests determined the prediction between categorical variables and within the analyses of the odd ratio determined how much each independent variable predicts the dependent variable (Field, 2013). In this study, the dependent variable was not classified as categorical, so in order to run the logistic regression analyses the dependent variables were classified as 0 = "none" and 1 = "occurrences". Healthcare organizations that reported any dependent variable (clinical quality outcomes) as 1, 2, 3 … were coded as having "occurrences". Therefore, dependent variables included were 0 = no occurrences of outcome and 1 = occurrences of clinical quality outcome. Independent variables included in the logistic regression were funding type, checklists, dashboard, decision making, and root cause analysis.

The results of the analyses included the best Block or model fit (-2 log likelihood), test for model coefficients Chi-square and significance (Omnibus test significance / non-significance since prior model), the assessment of how well the model fits the data (significance/non-significance in the Hosmer-Lemeshow goodness-of-fit statistic) and the odds ratio for the appropriately fit Block. The blocks were chosen for fit because the differences in the blocks -2Log Likelihood, the statistically significant

Omnibus test, and Hosmer-Lemeshow test were not statistically significant. Table 16 demonstrates each of the dependent variable's model and results for independent variables that were statistically significant for best fit model.

Table 16

Multiple Logistic Regression Analyses for Each of the Criterion Variables

Dependent Variables	*Block**	*-2 Log Likelihood*	*Omnibus Model Chi-square*	*Chi-square Sig (p)*	*Hosmer – Lemeshow Sig (p)*	*Exp. (B) – (odds ratio)*
CAUTI	2	39.894	52.987	.017	.154	Payment = .108 Checklist = .270
CLABSI	2	12.673	56.642	.000	.082	Payment = .167 Checklist = .000
Falls with Injury	1	96.795	39.062	.000	-	Payment = .188
VTE	1	41.093	91.991	.000	-	Payment = .014

*Best fit blocks results presented

For all of the dependent variables when the odds ratio is less than one it means as the odds (or probability) of the independent variable increased the odds of the dependent variable decreased. The statistically significant results for the Logistic Regression indicate that the odds ratio of less than 1, the predictor increases the odd of the criterion decreases (Field, 2013). Results of the logistic regression indicate

- Organizations with PPS payment are .108 times more likely to have occurrences of CAUTI and .167 times more likely to have occurrences of CLABSI than Critical Access Hospitals.

- Organizations that demonstrate leadership checklists are .270 times more likely to have occurrences of CAUTI and not effect for CLABSI than organizations that do not.
- Organizations with PPS payment have .188 times and .014 times more likely to have occurrences of falls with injury and VTE than Critical Access Hospitals.

Because all odds ratios are less than 1 indicating that as the number of predictors increase, the odds of the clinical quality outcome decrease.

Summary

These results details were investigated, scrutinized, and possible future recommendations are explored in Chapter 5. In this conclusion chapter, results were explored in the area of interpretation of the findings in relationship to the theoretical framework and scope of the findings. Also presented in the chapter was to explore the limitations of the study and ability to generalize from the analyses. Finally, the final chapter explores recommendations for future research with strengths and limitation of the study, with implications of this study for the social change for healthcare organizations struggling with performing at the highest level or standards.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to determine the relationship between leadership actions, federal funding type, and the clinical quality outcomes in hospitals across the State of Iowa. The leadership actions and other variables that were investigated were implementing leadership checklist, safety results in a dashboard, discussion with the board regarding quality outcomes, root cause analysis with events, and the federal funding type for hospital payments. Statistical test of multiple linear regression tests were completed to compare these predictor variables to the clinical quality outcomes of CLABSI, CABSI, Falls with Injury occurrences, and VTE rates. Healthcare organizations have been working to improve the quality of care for years with some program implementation support at the policy level (CMS, 2013). Analyses were completed to investigate the relationship between the variables to determine if there were potential benefits of the national effort to improve quality of healthcare such as the Partnership for Patients (CMS, 2011).

The null hypotheses were accepted for the overall relationship between the predictors and the outcome variables. Key results indicated that overall for the investigation into the relationship between the leadership actions, funding type, and clinical quality outcomes, there are mixed and overall results were not statistically significant in any of the analyses (*t* test, multiple linear or logistical regression tests). However, with further investigation, and split of the data into the multiple regression testing, it appears that there was statistically significant relationship for two of the four

criterion variables of funding-payment type and the clinical quality outcomes of falls with injuries (p = .000) and VTE outcomes (p = .000). More specifically, Funding/Payment type and Root Cause for Events had the common occurrences of statistically significant results for falls with injuries and VTE outcomes when using *t*-tests between the different groups of Funding/Payment and Root Cause for events designations.

Interpretation of the Findings

The findings for my study illustrate the relationship between leadership actions, funding or payment type and clinical quality outcomes. In this chapter, the results are discussed in regards to the analyses and findings, limitations of the study, recommendations for future studies, and implications for organizations. A summary of findings with the acceptance or rejection of hypotheses for the research question is provided in Table 17.

Table 17

Summary of Findings for the Overall Hypotheses and Individual Variables

Hypotheses	Accept Null (Reject Alternative)	Accept Alternative (Reject Null)	Criterion Significance (*p*)*
Overall	X		-
CAUTI	X		.609
CLABSI	X		.394
Falls with Injury		X	.000**
VTE		X	.000**

*Model 4 used for all criterion

**Statistically Significant with $p < .01$

Further discussions of these findings are described in the upcoming sections including the next step for future research.

Comparison of the Results With Prior Literature

Pronovost and Jha (2014) questioned the effectiveness of the Partnerships for Patients program, critiquing it for poor program design, weak validity of clinical outcome measurements, and a lack of peer-reviewed results submitted for program evaluation. My study did not investigate these factors as Pronovost and Jha (2014) did; however, my study's findings did continue to support or confirm the validity of questions related to the measurements of the clinical quality outcomes. The support for my study's null hypotheses is in alignment with Pronovost and Jha (2014) statements that the methods within the Partnership for Patients program did have some questionable methods of implementing sustainable or impressionable processes to assist with increasing the benefits of patient care. I specifically found support for some concern with the results of the Partnership for Patients program related to the validity and reliability of the leadership actions that were reported.

In contrast, my study's results supported the work by DuPree (2016) and the Joint Commission. DuPree (2016) stated that high reliable organizations are less likely to have errors (i.e., increased rates of harmful outcomes) within the medical care. DuPree (2016) found that high reliable organizations have characteristics of leadership representing a preoccupation with failure, ability to notice differences in process, sensitivity of changes within operations, commitment to resilience, and engaging experts within the organization. The actions that DuPree (2016) reported as common to highly reliable leadership were not defined as leadership behaviors in my study. The highly reliable leadership actions were also not representing in the leadership characteristics that were

studied in organizations by the OAT survey as promoted and used as a leadership guide by CMS.

DuPree (2016) stressed the importance of having experts who do the work and are involved "at the front line" being involved in changes for better patient care. The Partnership for Patients program focused increasingly on the development and communication of leadership to the Board of Directors, however, not stressing that those that do the work are involved with the changes to the work (Partnership for Patients, 2011). This could be an indicator of why falls with injury and VTE both had statistically significant relationship to root cause analysis in my study. Generally root cause analyses are done with the individuals at the employee level and thus may have a large impact on changes to future processes and preventing future errors. Some of the other independent variables, dashboard, checklist, and board involvement in decision making may be beneficial for the Board of Directors support of the goals (transactional leadership).

One common characteristic between my study and the leadership characteristics stated by DuPree (2016) was the focus on the transparency to the board in addition to the managers, patients and staff, sharing through a dashboard. DuPree (2016) stated that leadership and Board should focus on improving the quality of care, with the process changes to achieve this improvement of care, at the healthcare worker level. Actions that involve the Board of Directors rarely reach the general employee level, so if the efforts do not reach the patient, it may not be effective in preventing harm. This difference in vision and goals within leadership behaviors could indicate why the organizations focus did not impact the clinical quality outcomes leading to improved patient care as

significantly in my study. Also, in highly reliable organizations, alignment of leadership comes with trust and communication of the patient safety culture from leadership and supported at the Board of Directors to all levels of the organization (DuPree, 2016). This information about highly reliable organizations was missing within my study. My study did not discuss or investigate the communication of leadership to the employee level, only at the Board of Directors level through Board engagement activities.

Findings Related to Theoretical Framework

Previous researchers have supported the findings that transactional leadership is focused on setting goals for the organization, as in the Partnership for Patients program, and on aligning work for improvement (Lowe, Kroeck, & Sivasubramaniam, 1996). However, this study indicated some of the effects of transactional leadership may be limited for sustaining results. Lowe, Kroeck, and Sivasubramaniam (1996) studied leadership effectives and the relationship between transformational and transactional scales. They discovered that transactional leadership was effective; however transformational leadership was found to have statistically significant results for effectiveness. They found that transactional scales for management had low correlations with effectiveness and some negative relationships to be statistically significant.

Judge and Piccolo (2004) also stated that support was significant for effectiveness of results with transformational leadership, behaviors support reward for work, and improved with rigor of work. However, Judge and Piccolo (2004) supported the use of transformational leadership over transactional or laizzez-faire leadership. It is additional identified that Bass (1985) when formulating the theory of leadership; he did not

differentiate the difference between transformational and transactional. So this may indicate that leadership relationship to outcomes, as investigated in this study, were not as easy to control for, measure the relationship in organizational work, and determining leadership actions as hoped in the Partnership for Patients program.

My findings supported that the Partnership for Patients program, which requested organizations to implement transactional leadership characteristics, did not have a strong a predictive relationship to the clinical quality outcomes and harm reduction. The concern for my study would be if leadership style was not the main focus and the implementation of the program based on just one style of leadership would be almost impossible to determine from my study. More detailed review and study of leadership style to isolate the difference between transactional and transformational programming in the healthcare organizations is certainly called for. The Partnership for Patients program did create an effort to focus on transparency, open communication, patient centered medical care (Iowa Healthcare Collaborative, 2015). The results have been impressive for the state of Iowa and one consideration is the low number of occurrences for any of the dependent variables. The possibility for the outcomes to be biased by one or two occurrences may also call for more pre-/post- or longitudinal study of the leadership behaviors, as did Judge and Piccolo (2004).

Limitations of the Study

Limitations for my study include the sample size for each of the dependent variables. Reporting organizations were smaller in size than originally desired for both CAUTI (n = 67) and CLABSI (n = 50) dependent variables. These small sample sizes did

reduce the power calculations and validity of the outcomes for these two criterion results. An implication for future practice indicates that the program administrators could consider a practice to return to non-reporting organizations and gain outcome measures. Also this limitation does reduce the ability for confidence if results would be generalized to other regions or type of organizations across the United States.

Earlier limitations of this study were described as the OAT reliability, validity, and the possibility of survey bias from the individual completing the OAT assessment survey. Following the statistical analysis of the study these limitations still exist including the concern of reliability and validity of the Organizational Assessment Tool (OAT) to accurately reflect the leadership actions within the organization.

Other limitations of my study included the ability to see a clear relationship between the actions of leadership and the clinical quality outcomes with a bias toward the perception of correct answers. The other possible limitation was the leader's bias of the results for the OAT survey. Leaders could have answered the questions on the assessment tool as they perceived as correct, creating a bias and inaccurate results for the assessments. One of the higher reliability outcomes indicated that Federal Funding or Payment system methodologies do have a productive relationship on the clinical quality outcomes. This could indicate that when organizations are paid for or rewarded for their outcomes it is seen as a priority and opportunities to continually improve in these clinical areas. This is in support of the mixed results for the relationship between payment and clinical quality outcomes as presented by Lee et al. (2012). Lee et al. (2012) stated that they found a minimal relationship for improvement as I did in the CAUTI and CLABSI

results. I did find a statistically significant predictive relationship between the funding type and fall and VTE rates. A recommendation would be to investigate the reliability and validity of the OAT questions, provide changes to the questions as needed, and use the revised questionnaire for further assessment of the healthcare organizations. Also, it is recommended that specific analyses be completed in the areas of funding type and the relationship to improvement of outcomes.

Recommendation

Further research is needed in the areas of leadership methodologies in theoretical framework, differences in the clinical outcomes of an organization, and influence of specific leadership actions within an organization. In my study only 89% of leaders deployed checklist, decision-making to the board, root cause analysis, and communication. Further studies are needed in the area of why certain leaders chose to see the value in implementing these measures within their organization. As agencies in decision making such as CMS (2012) and AHRQ (2015) put forth packages two leaders that have validity and reliability to change and predict outcomes within the organization, leaders need to be fully engaged and brought into these measures. Without proper or complete implementation organizations may run the risk of not seeing the success of these measures. Their studies are needed to investigate the differences in these change packages and the potential predictability of best success.

Regarding the leadership methodologies my study, this could imply that the transactional leadership was goal attainment and was only slightly correlated to the clinical quality outcomes. Further studies are needed in which the influence of

transactional leadership is as effective as other methodologies within an organization. Lowe, Kroeck, and Sivasubramaniam (1996) and Judge and Piccolo (2004) described transformational leadership as a higher association between effectiveness scales than transactional leadership for organizational success in outcomes. These researchers have shown that transformational leadership is more effective for outcomes within an organization (Lowe, Kroeck, & Sivasubramaniam, 1996). Judge and Piccolo (2004) did discuss that for some practical applications, the difference between transactional and transformational leadership styles can become difficult to separate. It is recommended that further research is needed for the practical application of change packages within an organization that an agency such as CMS has asked organizations to deploy within their organization. Further research could address leadership styles of programs such as the Partnership for Patients, where leadership protocols could benefit from implementation of styles that reflect transformative leadership versus transactional leadership styles.

Because there was a difference in the clinical quality outcomes of indicators within my study, further research is needed on why there are differences between positive outcomes such as health hospital acquired infection areas and outcomes such as falls with injury and VTE rates. Other researchers could investigate why some clinical measure actions are more successful in improving patient care than others.

Implications

As healthcare strives to improve the level of care that is provided to each and every patient, research should support the improvement through understanding what adds value and actions that may not be as beneficial to the goals of the organization. The

implications for this research can be related to the positive social change as benefits of healthcare organizations and the care that is received. The positive implication of this study can be for leadership to understand which actions can lead to improvement of organizational outcomes. The impact to positive social change and implications are further reflected in the recommendations for future practice and study for the health organizations and policy advocates.

Positive Social Change

Social change is described as the ability for research and other actions to change the behaviors or perceptions of a group of individuals (citation). I was looking for the impact of leadership behaviors and actions on patient safety and clinical quality outcomes and these findings will certainly have a positive potential for social change. The areas of potential social change are in two main categories: continuing to increase and provide patient safety measures or better care in our Healthcare systems and the impact of leadership's understanding of how their behaviors and actions can influence or predict the sustainability and overall performance of their organization. Healthcare organizations continually strive to provide better quality of care and services to the patients. The goal of healthcare organizations is to have zero defects or potential harmful events within an organization (DuPree, 2016). Healthcare organizations have been working to provide better or safer care to patients for several years and looking at measures such as the *Hospital Engagement Network*, which focuses on providing better care, as just one initiative (Centers for Medicare and Medicaid Services, 2012). As we continue to strive and provide better care organizations, need to understand what the environmental and

systems impacts are and what could have a relationship to these outcomes. Recent support from DuPree (2016) described part of healthcare organizations continuing to reach the goal of zero defects or adverse outcomes is reached by leadership commitment, a culture of safety and process for improvement.

Implications of this Study

Further study is needed on the differences in the leadership behaviors related to the differences found between the clinical quality outcomes. I implied in this analyses that future studies may need to look at the difference between departments and relatability of the indicators or even the parts of the organizations that are perceived as unit specific owners of the indicators. There were differences in clinical outcomes such as CAUTI and CLABSI, versus a clinical outcome that may be seen as more organizational improvement area overall, such as falls, where everyone in the organization seems to relate to the improvement. Leaders also need to further investigate their dedication and commitment to positive change within their organization and the determination of impact for better outcomes. The differences in more hands on indicators such as the positive impact of completing a Root Cause Analysis activity was seen as a trend between those indicators that were just passively tracked and reported to outside agencies. Overall the results indicate that Iowa organizations are performing quite well in all of the areas. This implies that there could be differences in what is happening in Iowa versus other states. Implications for the study to be conducted in other states or areas of the United States in order to see the relationship and outcome in such areas would be warranted.

Recommendations for Practice

This study explored those potential environmental factors and could influence the leadership decision within their organization. Leaders could learn from this study and determine how and what they are doing to impact their outcomes of their organization. From a policy level CMS has ask and initiated several high-level initiatives to continue to influence the quality of care that is driven across the United States (Center for Medicare and Medicaid Services, 2014). My findings could begin to influence the programmatic initiatives that are prescribed by an agency such as CMS. Finding a strong relationship between certain leadership behaviors and clinical quality outcomes is potentially an educational and policy-driven decision for certain behaviors over others. If we can continue to predict which behaviors would have a positive influence on increasing the safety of U.S. healthcare institutions, both individual organizational decision-makers and high-level policymakers, could potentially request these behaviors are institutionalized within their organization. For example, both falls with injury and VTE had a strong statistically significant level for the funding type related to the clinical quality outcome. One could begin to determine why the impact of the funding or reimbursement for outcomes has the most statistical significance.

Several authors have implemented the idea of transactional leadership versus transformational leadership with some results indicating that Transformative Leadership leads to improved organizational outcomes (Lowe, Kroeck, & Sivasubramaniam, 1996, Judge & Piccolo, 2004). I found in my findings that testing results that indicated transformational leadership may indeed support better outcomes within an organization.

To further clarify CMS's intentions of both transactional and transformational leadership within the organization, I recommend continuing to study theoretical or methodology leadership and leadership's actions within the organization to discover more relationships between actions and outcomes. My study is just beginning of the conversation of these leadership behaviors within the organizations related to the leadership methodologies.

Conclusion

Over the last two decades healthcare organizations have continually attempted to drive out errors within medical care and improve the quality of services that are provided to the patients. My study examined the relationship of leadership actions, organizational funding (payment) type and these clinical quality outcomes that hospitals attempt to improve for patients. My study was one small step to determine if programs, such as the CMS lead Partnership for Patients, had a positive effect in the areas of leadership actions and clinical quality outcomes.

One of the major trends in healthcare programming is the push for value based payment models which include the improvement of clinical quality outcomes for the patients. The leaders that continually link the relationship between value for the patient and the financial performance of the organization may run the risk of creating a dual paradigm that some healthcare leaders cannot manage. While healthcare organization generally implemented the transactional leadership, and actions within their organizations, my study had mixed results when implementing transactional leadership behaviors and the influential relationship to the outcomes of clinical care. The predictor variables of federal payment or funding type, which is a risk and reward system for

improvement in clinical outcomes, and conducting root cause analysis for events were statistically significant for two clinical measures of falls and VTE. Leadership actions the influences on two outcomes (CAUTI and CLABSI) do need further research studies because of lack of statistically significant results. These results begin to highlight the difficulty with improving healthcare and the programing efforts of agencies such as Centers for Medicare and Medicaid services which are beginning to focus on the value of healthcare services (Centers for Medicare and Medicaid Services, 2016). Programs where the perceived value is for the patient, that focus on improving clinical quality outcomes, and effect payment for such services; and continue to drive the need for more studies to investigative what drives organizational success.

In this study, I highlighted three major themes for the relationship of leadership actions and clinical quality outcomes. First, organizations need to continually strive for outcome improvement including data submission that allows for analysis of such data. Without this submission, it is difficult for organizations to determine success. Second, although leadership has influence of process through actions, it appears that risk and reward such as payment models may have the largest influence for positive outcomes. Finally, more investigation is needed into the complex and compelling nature of healthcare to determine those predictor variables that create a stronger relationship to the safety and value within the system. More research is needed on what statistically significant factors that can drive value and patient safety.

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Appendix A: Organizational Assessment Tool (OAT)

Double click the first page of the document to open the entire OAT survey and view the entire document in Adobe Acrobat Reader.

OAT.pdf

ORGANIZATIONAL ASSESSMENT TOOL (OAT)

This evidenced-based tool is being developed by the National Content Developer (NCD) as a resource for the Hospital Engagement Networks (HENs) and their partner hospitals to achieve the goals of the Partnership for Patients and support efforts to expand the use of models shown to improve care. The first section includes questions to gather data on hospital location and other hospital-level characteristics. Subsequent section are organized by ten areas of focus - safety culture, leadership, measurement, medication, purchasing practice, procedural, risk management, nursing practice, communication, and infection control. Completion of OAT should be led by the hospital's patient safety officer, quality improvement director, or equivalent. It is expected that this individual will contact appropriate staff to complete the OAT. Only a single OAT should be completed for a hospital.

1. DEMOGRAPHICS

1. Hospital name

   _____

2. State

   _____

3. Zip code

   _____

4. Region

   ❑ Rural ❑ Urban

5. Hospital type (Check all that apply)

   ❑ General ❑ For-profit
   ❑ Specialized ❑ Safety net
   ❑ Teaching ❑ Critical access
   ❑ Academic ❑ Community
   ❑ Non teaching ❑ Not-for-profit
   ❑ Other

   Please specify

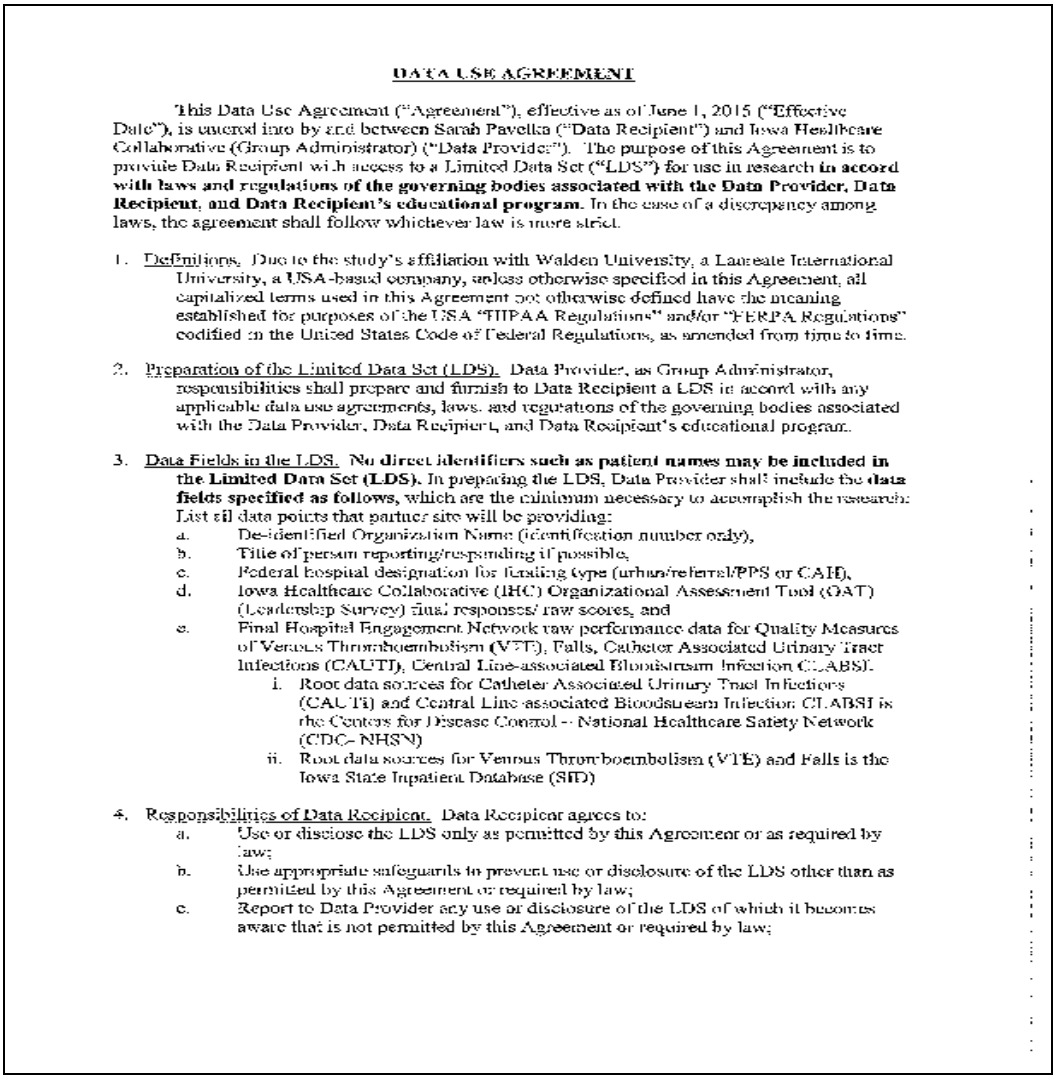
   _____

1 National Content Developer - January 18, 2012

Appendix B: Data Use – Letter of Agreement

Double click the image of the Data Use Agreement (page 1) to open the Adobe Acrobat reader file and view the remaining pages.

DUA_Pavelka.pdf



DATA USE AGREEMENT

This Data Use Agreement ("Agreement"), effective as of June 1, 2015 ("Effective Date"), is entered into by and between Sarah Pavelka ("Data Recipient") and Iowa Healthcare Collaborative (Group Administrator) ("Data Provider"). The purpose of this Agreement is to provide Data Recipient with access to a Limited Data Set ("LDS") for use in research **in accord with laws and regulations of the governing bodies associated with the Data Provider, Data Recipient, and Data Recipient's educational program.** In the case of a discrepancy among laws, the agreement shall follow whichever law is more strict.

1. Definitions. Due to the study's affiliation with Walden University, a Laureate International University, a USA-based company, unless otherwise specified in this Agreement, all capitalized terms used in this Agreement not otherwise defined have the meaning established for purposes of the USA "HIPAA Regulations" and/or "FERPA Regulations" codified in the United States Code of Federal Regulations, as amended from time to time.

2. Preparation of the Limited Data Set (LDS). Data Provider, as Group Administrator, responsibilities shall prepare and furnish to Data Recipient a LDS in accord with any applicable data use agreements, laws, and regulations of the governing bodies associated with the Data Provider, Data Recipient, and Data Recipient's educational program.

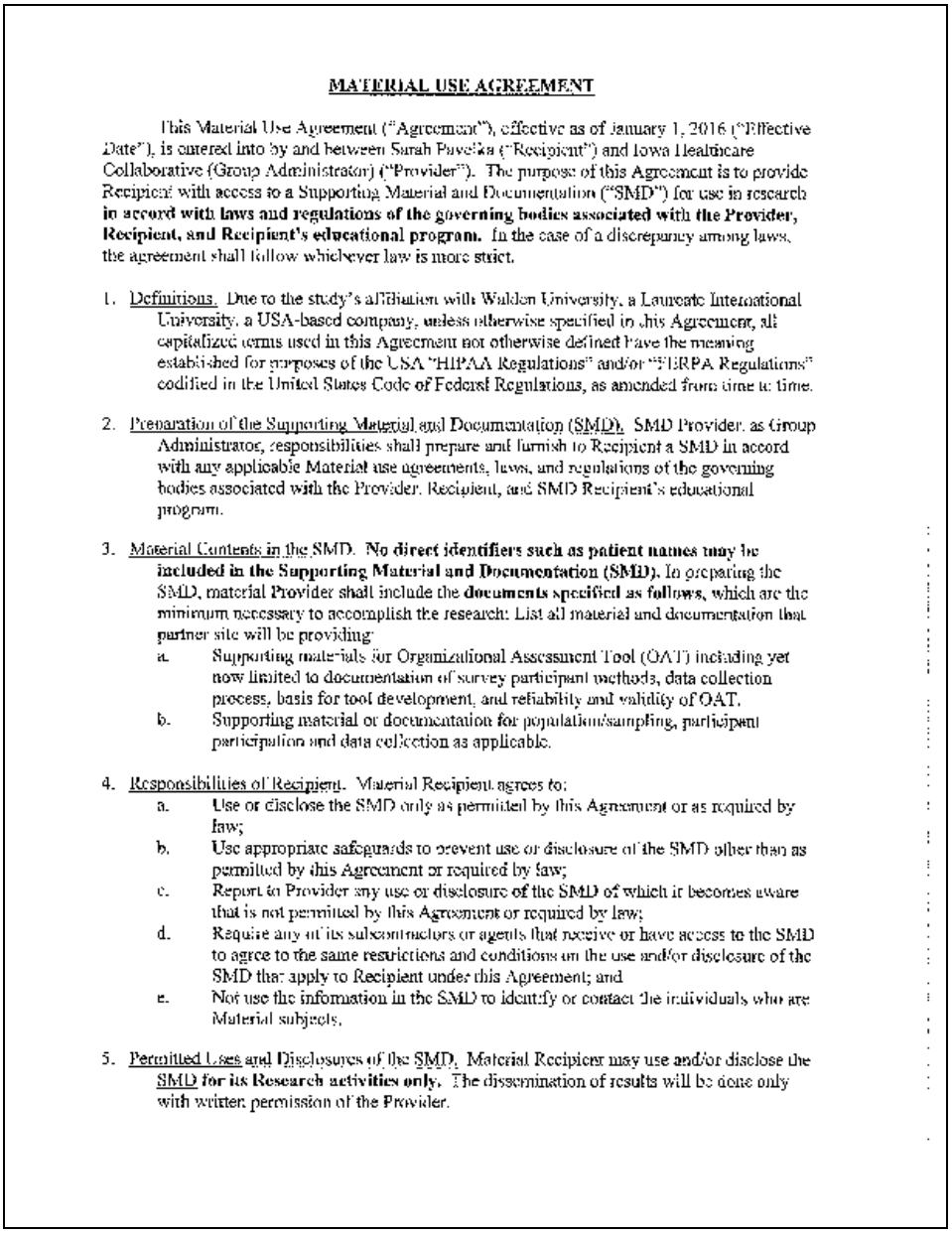
3. Data Fields in the LDS. **No direct identifiers such as patient names may be included in the Limited Data Set (LDS).** In preparing the LDS, Data Provider shall include the **data fields specified as follows,** which are the minimum necessary to accomplish the research: List all data points that partner site will be providing:
   a. De-identified Organization Name (identification number only),
   b. Title of person reporting/responding if possible,
   c. Federal hospital designation for Rating (yes (urban/referral/PPS or CAH),
   d. Iowa Healthcare Collaborative (IHC) Organizational Assessment Tool (OAT) (Leadership Survey) final responses/ raw scores, and
   e. Final Hospital Engagement Network raw performance data for Quality Measures of Venous Thromboembolism (VTE), Falls, Catheter Associated Urinary Tract Infections (CAUTI), Central Line-associated Bloodstream Infection (CLABSI).
      i. Root data sources for Catheter Associated Urinary Tract Infections (CAUTI) and Central Line-associated Bloodstream Infection CLABSI is the Centers for Disease Control – National Healthcare Safety Network (CDC- NHSN)
      ii. Root data sources for Venous Thromboembolism (VTE) and Falls is the Iowa State Inpatient Database (SID)

4. Responsibilities of Data Recipient. Data Recipient agrees to:
   a. Use or disclose the LDS only as permitted by this Agreement or as required by law;
   b. Use appropriate safeguards to prevent use or disclosure of the LDS other than as permitted by this Agreement or required by law;
   c. Report to Data Provider any use or disclosure of the LDS of which it becomes aware that is not permitted by this Agreement or required by law;

Appendix C: Material Use – Letter of Agreement

Double click the image of the Material Use Agreement to view the entire document in Adobe Acrobat reader.

MUA_Pavelka.pdf



MATERIAL USE AGREEMENT

This Material Use Agreement ("Agreement"), effective as of January 1, 2016 ("Effective Date"), is entered into by and between Sarah Pavelka ("Recipient") and Iowa Healthcare Collaborative (Group Administrator) ("Provider"). The purpose of this Agreement is to provide Recipient with access to a Supporting Material and Documentation ("SMD") for use in research **in accord with laws and regulations of the governing bodies associated with the Provider, Recipient, and Recipient's educational program.** In the case of a discrepancy among laws, the agreement shall follow whichever law is more strict.

1. Definitions. Due to the study's affiliation with Walden University, a Laureate International University, a USA-based company, unless otherwise specified in this Agreement, all capitalized terms used in this Agreement not otherwise defined have the meaning established for purposes of the USA "HIPAA Regulations" and/or "FERPA Regulations" codified in the United States Code of Federal Regulations, as amended from time to time.

2. Preparation of the Supporting Material and Documentation (SMD). SMD Provider, as Group Administrator, responsibilities shall prepare and furnish to Recipient a SMD in accord with any applicable Material use agreements, laws, and regulations of the governing bodies associated with the Provider, Recipient, and SMD Recipient's educational program.

3. Material Contents in the SMD. **No direct identifiers such as patient names may be included in the Supporting Material and Documentation (SMD).** In preparing the SMD, material Provider shall include the **documents specified as follows**, which are the minimum necessary to accomplish the research: List all material and documentation that partner site will be providing:
   a. Supporting materials for Organizational Assessment Tool (OAT) including yet now limited to documentation of survey participant methods, data collection process, basis for tool development, and reliability and validity of OAT.
   b. Supporting material or documentation for population/sampling, participant participation and data collection as applicable.

4. Responsibilities of Recipient. Material Recipient agrees to:
   a. Use or disclose the SMD only as permitted by this Agreement or as required by law;
   b. Use appropriate safeguards to prevent use or disclosure of the SMD other than as permitted by this Agreement or required by law;
   c. Report to Provider any use or disclosure of the SMD of which it becomes aware that is not permitted by this Agreement or required by law;
   d. Require any of its subcontractors or agents that receive or have access to the SMD to agree to the same restrictions and conditions on the use and/or disclosure of the SMD that apply to Recipient under this Agreement; and
   e. Not use the information in the SMD to identify or contact the individuals who are Material subjects.

5. Permitted Uses and Disclosures of the SMD. Material Recipient may use and/or disclose the SMD **for its Research activities only.** The dissemination of results will be done only with written permission of the Provider.

Appendix D: Approval From Walden University's Institutional Review Board (IRB)

The following is an email confirmation from the IRB committee from Walden University dated May 17, 2016. Data was collected from the data source following the confirmation of the approval. The confirmation email with approval number is 05-17-16-0445038, is attached and can be viewed below. Double click on image to open document.

Walden University
Mail - IRB Materials A|

[illegible] Walden University Mail - IRB Materials Approved - Sarah Pavelka

Sarah Pavelka <sarah.pavelka@waldenu.edu>

IRB Materials Approved - Sarah Pavelka
1 message

IRB <irb@waldenu.edu> Tue, May 17, 2016 at 6:16 PM
To: "Sarah Pavelka (sarah.pavelka@waldenu.edu)" <sarah.pavelka@waldenu.edu>
Cc: "Shari L. Jorissen" <shari.jorissen@waldenu.edu>

Dear Ms. Pavelka,

This email is to notify you that the Institutional Review Board (IRB) confirms that your study entitled, "The Relationship between Hospital Leadership Activities and Clinical Quality Outcomes in Iowa," meets Walden University's ethical standards. Our records indicate that you will be analyzing data provided to you by the Iowa Healthcare Collaborative as collected under its oversight. Since this study will serve as a Walden doctoral capstone, the Walden IRB will oversee your capstone data analysis and results reporting. The IRB approval number for this study is 05-17-16-0445038.

This confirmation is contingent upon your adherence to the exact procedures described in the final version of the documents that have been submitted to IRB@waldenu.edu as of this date. This includes maintaining your current status with the university and the oversight relationship is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, this is suspended.

If you need to make any changes to your research staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 1 week of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB materials, you made a commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained at the IRB section of the Walden website: http://academicguides.waldenu.edu/researchcenter/orec

Researchers are expected to keep detailed records of their research activities (i.e., participant log sheets, completed consent forms, etc.) for the same period of time they retain the original data. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Institutional Review Board.

Both students and faculty are invited to provide feedback on this IRB experience at the link below:

https://www.surveymonkey.com/s.aspx?sm=qHBJzkJMUz43pZagIGmeBQ_3d_3d

[illegible] 1/2

Appendix E: Results for Pearson's Correlation Coefficient Test

The following Tables 18 to 21 demonstrate the multiple results from the test for Correlation for CAUTI, CLABSI, fall rates, and VTE occurrences. Each table has the SPSS output for the respective criterion variable in the entirety. For summary information see the section in the results where information is summarized after analysis.

Table 18

Correlations for CAUTI

Correlations				Funding Payment (CAH or PPS)	Checklist	Dashboard	Decision Making	Root Cause for events	CAUTI
	Pearson Correlation			1	.124	.076	.098	-.406**	.211
	Sig. (2-tailed)				.319	.542	.429	.001	.087
	Sum of Squares and Cross-products			14.418	1.672	1.149	1.328	-6.149	3.179
Funding Payment - (CAH or PPS)	Covariance			.218	.025	.017	.020	-.093	.048
	N			67	67	67	67	67	67
	Bootstrap[d]	Bias		0	-.003	.000	.006	.000	.001[e]
		SE		0	.128	.122	.114	.092	.129[e]
		95% Conf. Interval	Lower	1	-.143	-.180	-.140	-.572	-.072[e]
			Upper	1	.369	.301	.307	-.224	.447[e]
	Pearson Correlation			.124	1	.042	.104	-.112	-.020
	Sig. (2-tailed)			.319		.736	.404	.365	.872
	Sum of Squares and Cross-products			1.672	12.687	.597	1.313	-1.597	-.284
	Covariance			.025	.192	.009	.020	-.024	-.004
Checklist	*N*			67	67	67	67	67	67
	Bootstrap[d]	Bias		-.003	0	-.001	.004	.000	.019[e]
		SE		.128	0	.123	.113	.116	.112[e]
		95% Confidence Interval	Lower	-.143	1	-.210	-.123	-.334	-.162[e]
			Upper	.369	1	.279	.307	.118	.300[e]
Dashboar	Pearson Correlation			.076	.042	1	.169	-.183	.031

d	Sig. (2-tailed)			.542	.736		.171	.138	.803
	Sum of Squares and Cross-products			1.149	.597	15.910	2.403	-2.910	.493
	Covariance			.017	.009	.241	.036	-.044	.007
	N			67	67	67	67	67	67
	Bootstrap[d]	Bias		.000	-.001	0	-.004	.000	-.023[e]
		SE		.122	.123	0	.124	.124	.119[e]
		95% Confidence Interval	Lower	-.180	-.210	1	-.091	-.415	-.288[e]
			Upper	.301	.279	1	.403	.058	.198[e]
	Pearson Correlation			.098	.104	.169	1	-.028	-.051
	Sig. (2-tailed)			.429	.404	.171		.820	.684
	Sum of Squares and Cross-products			1.328	1.313	2.403	12.687	-.403	-.716
Decision making	Covariance			.020	.020	.036	.192	-.006	-.011
	N			67	67	67	67	67	67
	Bootstrap[d]	Bias		.006	.004	-.004	0	-.006	.032[e]
		SE		.114	.113	.124	0	.122	.151[e]
		95% Conf. Interval	Lower	-.140	-.123	-.091	1	-.273	-.306[e]
			Upper	.307	.307	.403	1	.199	.212[e]
	Pearson Correlation			-.406[**]	-.112	-.183	-.028	1	-.031
	Sig. (2-tailed)			.001	.365	.138	.820		.803
	Sum of Squares and Cross-products			-6.149	-1.597	-2.910	-.403	15.910	-.493
Root Cause for events	Covariance			-.093	-.024	-.044	-.006	.241	-.007
	N			67	67	67	67	67	67
	Bootstrap[d]	Bias		.000	.000	.000	-.006	0	.003[e]
		SE		.092	.116	.124	.122	0	.117[e]
		95% Conf.Interval	Lower	-.572	-.334	-.415	-.273	1	-.220[e]
			Upper	-.224	.118	.058	.199	1	.236[e]
	Pearson Correlation			.211	-.020	.031	-.051	-.031	1
	Sig. (2-tailed)			.087	.872	.803	.684	.803	
	Sum of Squares and Cross-products			3.179	-.284	.493	-.716	-.493	15.791
CAUTI	Covariance			.048	-.004	.007	-.011	-.007	.239
	N			67	67	67	67	67	67
	Bootstrap[d]	Bias		.001[e]	.019[e]	-.023[e]	.032[e]	.003[e]	0[e]

	SE		.129[e]	.112[e]	.119[e]	.151[e]	.117[e]	0[e]
	95% Conf.Interval	Lower	-.072[e]	-.162[e]	-.288[e]	-.306[e]	-.220[e]	1[e]
		Upper	.447[e]	.300[e]	.198[e]	.212[e]	.236[e]	1[e]

**. Correlation is significant at the $p < 0.01$ level (2-tailed).

d. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

e. Based on 998 samples

The following, Table 19, is the output from SPSS for the dependent (criterion variable) of CLABSI. The information included the details analysis and summary information can be found in the results section of the chapter.

Table 19

Correlations results for CLABSI

Correlations				Funding Payment (CAH or PPS)	Checklist	Dashboard	Decision Making	Root Cause for events	CLABSI
Funding Payment - (CAH or PPS)	Pearson Correlation			1	.091	.069	.221	-.354[*]	-.103
	Sig. (2-tailed)				.530	.634	.123	.012	.479
	Sum of Squares and Cross-products			11.220	.920	.800	2.440	-3.760	-.680
	Covariance			.229	.019	.016	.050	-.077	-.014
	n			50	50	50	50	50	50
	Bootstrap[d]	Bias		0	.008	.002	-.003	.000	-.025[e]
		SE		0	.148	.142	.127	.101	.036[e]
		95% Conf. Interval	Lower	1	-.187	-.218	-.051	-.535	-.207[e]
			Upper	1	.393	.343	.440	-.137	-.080[e]
Checklist	Pearson Correlation			.091	1	.172	.084	-.038	.254
	Sig. (2-tailed)			.530		.232	.560	.796	.075
	Sum of Squares and Cross-products			.920	9.120	1.800	.840	-.360	1.520
	Covariance			.019	.186	.037	.017	-.007	.031

	n			50	50	50	50	50	50
	Bootstrap[d]	Bias		.008	0	-.002	-.007	.002	.061[e]
		SE		.148	0	.131	.141	.143	.083[e]
		95% Conf. Interval	Lower	-.187	1	-.089	-.235	-.296	.199[e]
			Upper	.393	1	.421	.333	.263	.505[e]
	Pearson Correlation			.069	.172	1	.315[*]	-.309[*]	.117
	Sig. (2-tailed)			.634	.232		.026	.029	.420
	Sum of Squares and Cross-products			.800	1.800	12.000	3.600	-3.400	.800
Dashboard	Covariance			.016	.037	.245	.073	-.069	.016
	n			50	50	50	50	50	50
	Bootstrap[d]	Bias		.002	-.002	0	-.008	.004	.028[e]
		SE		.142	.131	0	.140	.142	.039[e]
		95% Conf. Interval	Lower	-.218	-.089	1	.015	-.566	.089[e]
			Upper	.343	.421	1	.566	-.011	.243[e]
	Pearson Correlation			.221	.084	.315[*]	1	-.145	.098
	Sig. (2-tailed)			.123	.560	.026		.315	.498
	Sum of Squares and Cross-products			2.440	.840	3.600	10.880	-1.520	.640
Decision	Covariance			.050	.017	.073	.222	-.031	.013
making	*n*			50	50	50	50	50	50
	Bootstrap[d]	Bias		-.003	-.007	-.008	0	-.001	.024[e]
		SE		.127	.141	.140	0	.147	.034[e]
		95% Conf. Interval	Lower	-.051	-.235	.015	1	-.435	.071[e]
			Upper	.440	.333	.566	1	.138	.206[e]
	Pearson Correlation			-.354[*]	-.038	-.309[*]	-.145	1	-.089
	Sig. (2-tailed)			.012	.796	.029	.315		.538
	Sum of Squares and Cross-products			-3.760	-.360	-3.400	-1.520	10.080	-.560
Root Cause	Covariance			-.077	-.007	-.069	-.031	.206	-.011
for events	*n*			50	50	50	50	50	50
	Bootstrap[d]	Bias		.000	.002	.004	-.001	0	-.021[e]
		SE		.101	.143	.142	.147	0	.031[e]
		95% Conf. Interval	Lower	-.535	-.296	-.566	-.435	1	-.189[e]
			Upper	-.137	.263	-.011	.138	1	-.067[e]
CLABSI	Pearson Correlation			-.103	.254	.117	.098	-.089	1
	Sig. (2-tailed)			.479	.075	.420	.498	.538	

	Sum of Squares and Cross-products			-.680	1.520	.800	.640	-.560	3.920
	Covariance			-.014	.031	.016	.013	-.011	.080
	n			50	50	50	50	50	50
	Bootstrap[d]	Bias		-.025[e]	.061[e]	.028[e]	.024[e]	-.021[e]	0[e]
		SE		.036[e]	.083[e]	.039[e]	.034[e]	.031[e]	0[e]
		95% Conf. Interval	Lower	-.207[e]	.199[e]	.089[e]	.071[e]	-.189[e]	1[e]
			Upper	-.080[e]	.505[e]	.243[e]	.206[e]	-.067[e]	1[e]

*. Correlation is significant at the $p < 0.05$ level (2-tailed).

d. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

e. Based on 636 samples

The following, Table 20, is the output from SPSS for the dependent (criterion variable) of falls with injury. The information included the details analysis and summary information can be found in the results section of the chapter.

Table 20

Correlation results for Falls with Injury

Correlations				Funding Payment (CAH or PPS)	Checklist	Dashboard	Decision Making	Root Cause for events	Falls with Injury
Funding Payment - (CAH or PPS)	Pearson Correlation			1	.134	.060	.124	-.377**	.481**
	Sig. (2-tailed)				.188	.559	.225	.000	.000
	Sum of Squares and Cross-products			17.061	2.388	1.204	2.286	-7.653	23.551
	Covariance			.176	.025	.012	.024	-.079	.243
	n			98	98	98	98	98	98
	Bootstrap[c]	Bias		0	.003	.002	-.003	.001	.004
		SE		0	.111	.101	.093	.075	.080
		95% Conf. Interval	Lower	1	-.077	-.152	-.072	-.517	.310
			Upper	1	.361	.255	.297	-.221	.625
Checklist	Pearson Correlation			.134	1	.164	.215*	-.093	.078
	Sig. (2-tailed)			.188		.106	.034	.363	.445

	Sum of Squares and Cross-products			2.388	18.622	3.459	4.143	-1.969	3.990
	Covariance			.025	.192	.036	.043	-.020	.041
	n			98	98	98	98	98	98
		Bias		.003	0	.001	-.003	.000	-.004
		SE		.111	0	.097	.084	.099	.112
	Bootstrap[c]	95% Conf. Interval	Lower	-.077	1	-.030	.032	-.287	
			Upper	.361	1	.356	.364	.105	.297
	Pearson Correlation			.060	.164	1	.196	-.125	.006
	Sig. (2-tailed)			.559	.106		.053	.218	.955
	Sum of Squares and Cross-products			1.204	3.459	23.847	4.286	-3.010	.337
	Covariance			.012	.036	.246	.044	-.031	.003
Dashboard	*n*			98	98	98	98	98	98
		Bias		.002	.001	0	-.002	.001	-.002
		SE		.101	.097	0	.100	.102	.098
	Bootstrap[c]	95% Conf. Interval	Lower	-.152	-.030	1	.003	-.328	-.186
			Upper	.255	.356	1	.386	.069	.186
	Pearson Correlation			.124	.215*	.196	1	-.124	.162
	Sig. (2-tailed)			.225	.034	.053		.226	.112
	Sum of Squares and Cross-products			2.286	4.143	4.286	20.000	-2.714	8.571
	Covariance			.024	.043	.044	.206	-.028	.088
Decision making	*n*			98	98	98	98	98	98
		Bias		-.003	-.003	-.002	0	.002	-.002
		SE		.093	.084	.100	0	.103	.055
	Bootstrap[c]	95% Conf. Interval	Lower	-.072	.032	.003	1	-.313	.036
			Upper	.297	.364	.386	1	.081	.258
	Pearson Correlation			-.377**	-.093	-.125	-.124	1	-.178
	Sig. (2-tailed)			.000	.363	.218	.226		.079
	Sum of Squares and Cross-products			-7.653	-1.969	-3.010	-2.714	24.133	-10.378
Root Cause for events	Covariance			-.079	-.020	-.031	-.028	.249	-.107
	n			98	98	98	98	98	98
	Bootstrap[c]	Bias		.001	.000	.001	.002	0	.001

		SE		.075	.099	.102	.103	0	.074
		95% Conf. Interval	Lower	-.517	-.287	-.328	-.313	1	-.306
			Upper	-.221	.105	.069	.081	1	-.005
	Pearson Correlation			.481**	.078	.006	.162	-.178	1
	Sig. (2-tailed)			.000	.445	.955	.112	.079	
	Sum of Squares and Cross-products			23.551	3.990	.337	8.571	-10.378	140.459
Falls with injury during hospital stay	Covariance			.243	.041	.003	.088	-.107	1.448
	n			98	98	98	98	98	98
	Bootstrap[c]	Bias		.004	-.004	-.002	-.002	.001	0
		SE		.080	.112	.098	.055	.074	0
		95% Conf. Interval	Lower	.310	-.146	-.186	.036	-.306	1
			Upper	.625	.297	.186	.258	-.005	1

**. Correlation is significant at the $p < 0.01$ level (2-tailed).

*. Correlation is significant at the $p < 0.05$ level (2-tailed).

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

The following, Table 21, is the output from SPSS for the dependent (criterion variable) of VTE. The information included the details analysis and summary information can be found in the results section of the chapter.

Table 21

Correlation results for VTE

Correlations		Funding Payment (CAH or PPS)	Checklist	Dashboard	Decision Making	Root Cause for events	VTE rates
Funding Payment - (CAH or PPS)	Pearson Correlation	1	.158	.070	.132	-.381**	.523**
	Sig. (2-tailed)		.123	.498	.201	.000	.000
	Sum of Squares and Cross-products	16.958	2.729	1.396	2.417	-7.625	26.750
	Covariance	.179	.029	.015	.025	-.080	.282
	n	96	96	96	96	96	96

		Bias		0	-.004	.001	-.002	-.003	.018
		SE		0	.113	.100	.093	.073	.079
	Bootstrap[c]	95% Conf. Interval	Lower	1	-.065	-.133	-.063	-.520	.381
			Upper	1	.375	.266	.298	-.237	.693
	Pearson Correlation			.158	1	.139	.199	-.101	.084
	Sig. (2-tailed)			.123		.176	.052	.325	.415
	Sum of Squares and Cross-products			2.729	17.490	2.823	3.708	-2.063	4.375
	Covariance			.029	.184	.030	.039	-.022	.046
	n			96	96	96	96	96	96
Checklist		Bias		-.004	0	-.003	.001	-.002	.017
		SE		.113	0	.099	.078	.098	.115
	Bootstrap[c]	95% Confidence Interval	Lower	-.065	1	-.057	.039	-.291	-.081
			Upper	.375	1	.333	.349	.091	.364
	Pearson Correlation			.070	.139	1	.187	-.130	.156
	Sig. (2-tailed)			.498	.176		.068	.207	.130
	Sum of Squares and Cross-products			1.396	2.823	23.490	4.042	-3.063	9.375
	Covariance			.015	.030	.247	.043	-.032	.099
Dashboard	*n*			96	96	96	96	96	96
		Bias		.001	-.003	0	.002	.002	-.001
		SE		.100	.099	0	.102	.097	.076
	Bootstrap[c]	95% Conf. Interval	Lower	-.133	-.057	1	-.005	-.317	-.011
			Upper	.266	.333	1	.382	.059	.283
	Pearson Correlation			.132	.199	.187	1	-.127	.027
	Sig. (2-tailed)			.201	.052	.068		.217	.793
	Sum of Squares and Cross-products			2.417	3.708	4.042	19.833	-2.750	1.500
Decision making	Covariance			.025	.039	.043	.209	-.029	.016
	n			96	96	96	96	96	96
		Bias		-.002	.001	.002	0	.001	.026
	Bootstrap[c]	*SE*		.093	.078	.102	0	.105	.130
		95%	Lower	-.063	.039	-.005	1	-.327	-.185

		Conf. Interval	Upper	.298	.349	.382	1	.091	.250
	Pearson Correlation			-.381**	-.101	-.130	-.127	1	-.244*
	Sig. (2-tailed)			.000	.325	.207	.217		.017
	Sum of Squares and Cross-products			-7.625	-2.063	-3.063	-2.750	23.625	-14.750
	Covariance			-.080	-.022	-.032	-.029	.249	-.155
Root Cause for events	*n*			96	96	96	96	96	96
		Bias		-.003	-.002	.002	.001	0	-.007
		SE		.073	.098	.097	.105	0	.047
	Bootstrap[c]	95%	Lower	-.520	-.291	-.317	-.327	1	-.346
		Conf. Interval	Upper	-.237	.091	.059	.091	1	-.160
	Pearson Correlation			.523**	.084	.156	.027	-.244*	1
	Sig. (2-tailed)			.000	.415	.130	.793	.017	
	Sum of Squares and Cross-products			26.750	4.375	9.375	1.500	-14.750	154.500
	Covariance			.282	.046	.099	.016	-.155	1.626
VTE rates	*n*			96	96	96	96	96	96
		Bias		.018	.017	-.001	.026	-.007	0
		SE		.079	.115	.076	.130	.047	0
	Bootstrap[c]	95%	Lower	.381	-.081	-.011	-.185	-.346	1
		Conf Interval	Upper	.693	.364	.283	.250	-.160	1

**. Correlation is significant at the $p < 0.01$ level (2-tailed).

*. Correlation is significant at the $p < 0.05$ level (2-tailed).

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Appendix F: Results of the Variance Inflection Factor – Test for Multicollinearity

The final assumption is for independent errors, which is when two observations are truly uncorrelated, or indicating no concerns for multicollinearity. The variance inflation factor (VIF) can be reviewed for multicollinearity, Table 22 below. The variance inflation factor (VIF) can be reviewed for significance with an average score at or near 1, and can be tested through the Durbin-Watson test (results from 0-4 with a 2 score are unrelated; Field, 2013). When the "average VIF is substantially greater than 1 than the regression may be biased" (Bowerman & O'Connell, 1990, as quoted in Field, 2013).

Table 22

VIF Values (Multicollinearity) and Durbin-Watson (Independent Errors) Results

Dependent Variables	Average VIF	Durbin-Watson
Catheter-Associated Urinary Tract Infection	1.12	2.030
Central Line-Associated Blood Stream Infections	1.18	2.071
Injuries and falls from immobility	1.12	2.361
Venous Thromboembolism	1.12	2.121

Appendix G: Results for Entire *t* test for Falls (Funding and Root Cause) and VTE

The following eight tables represent the entire SPSS output for the *t* test for Falls and VTE to Funding type and Root Cause Analysis. These tests represent only the statistically significant results for the *t* test. Tables 23 to 30 are provided below with Tables 23 to 26 referring to Falls with Injury and Tables 27 to 30 for VTE results.

Table 23

Group Statistics – Falls to Funding/ Payment Type

	Funding Payment System - Region (CAH or PPS)	*n*	*M*	*SD*	*SEM*
Falls with injury during hospital stay	Critical Access Hospital	85	.26	.639	.069
	PPS Rural Referral or Urban	33	1.61	2.076	.361

Table 24

Independent Samples Test – Falls with Injury to Funding / Payment Type

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
		F	*Sig.*	*t*	*df*	Sig. (2-tailed)	Mean Diff	Std. Error Diff	95% Confidence Interval of the Difference	
									Lower	Upper
Falls with injury during hospital stay	Equal variances assumed	49.843	.000*	-5.391	116	.000	-1.347	.250	-1.842	-.852
	Equal variances not assumed			-3.662	34.381	.001	-1.347	.368	-2.095	-.600

*Statistically Significant to the $p < .01$ level

Table 25

Group Statistics – Falls with Injury to Root Cause

	Root Cause for events	*n*	*M*	*SD*	*SEM*
Falls with injury during hospital stay	Yes events	56	.71	1.461	.195
	No events	44	.32	.708	.107

Table 26

Independent Samples Test – Falls with Injury to Root Cause

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Diff	Std. Error Diff	95% Confidence Interval of the Difference Lower	Upper
Falls with injury during hospital stay	Equal variances assumed	5.945	.017*	1.651	98	.102	.396	.240	-.080	.872
	Equal variances not assumed			1.780	83.261	.079	.396	.223	-.046	.839

*Statistically Significant to the $p < .05$ level

Table 27

Group Statistics – VTE to Funding

	Funding Payment System - Region (CAH or PPS)	*n*	*M*	*SD*	*SEM*

Venous Thromboembolism rates	Critical Access Hospital	82	.01	.110	.012
	PPS Rural Referral or Urban	33	1.24	2.000	.348

Table 28

Independent Samples Test – VTE to Funding Payment Type

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Diff	Std. Error Diff	95% Confidence Interval of the Difference Lower	Upper
VTE rates	Equal variances assumed	113.022	.000*	-5.584	113	.000	-1.230	.220	-1.667	-.794
	Equal variances not assumed			-3.531	32.079	.001	-1.230	.348	-1.940	-.521

*Statistically Significant to the $p < .01$ level

Table 29

Group Statistics – VTE to Root Cause

	Root Cause for events	*n*	*M*	*SD*	*SEM*
Venous Thromboembolism rates	Yes events	55	.64	1.637	.221
	No events	43	.02	.152	.023

Table 30

Independent Samples Test – VTE to Root Cause

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Diff	Std. Error Diff	95% Confidence Interval of the Difference	
									Lower	Upper
VTE rates	Equal variances assumed	26.725	.000*	2.445	96	.016	.613	.251	.115	1.111
	Equal variances not assumed			2.762	55.197	.008	.613	.222	.168	1.058

*Statistically Significant to the $p < .01$ level

Appendix H: Linear Regression Testing Results for Dependent Variables

The following results in Tables 31 to 32 are from the complete linear regression analysis for CAUTI, providing the remaining model for the coefficients for the clinical quality outcomes when analyzing all the predictors as co-variables and the bivariate correlations between the predictors and criterion.

Table 31

*Model 4 Coefficients for predictors of clinical quality outcomes of CAUTI**

	b	*SE (B)*	*B*	*t*	*Coefficients p*
Funding Payment	.260 (-027, .547)	.144	.248	1.811	p = .075
Leadership Checklist	-.039 (-.322, .241)	.141	-.037	-.290	p = .773
Incident Dashboard	.014 (-.216, .295)	.128	.040	.308	p= .759
Board Decision Making	-.114 (-.369, .199)	.142	-.076	-.596	p= .553
Root Cause for Events	.118 (-.205, .346)	.138	.071	.511	p= .611

Note: R^2 = .056 for model 4

* *With 95% bias corrected and accelerate confidence intervals reported*

Table 32

The Bivariate and Partial Correlations of the Predictors with CAUTI

Predictor Variables	Correlation between each predictor and the criterion (zero-order)	Correlation between each and criterion for all predictors (partial)
Funding Payment	.211	.226
Leadership Checklist	-.020*	-.037*
Incident Dashboard	.031*	.039*
Board Decision Making	-.051	-.076
Root Cause for Events	-.031*	.065

* Statistically Significant to $p < .05$

The following results in Tables 33 and 34 are from the complete linear regression analysis for CLABSI, providing the remaining model for the coefficients for the clinical quality outcomes when analyzing all the predictors as co-variables and the bivariate correlations between the predictors and criterion.

Table 33

*Model 4 Coefficients for predictors of clinical quality outcomes of CLABSI**

	b	*Standard Error (B)*	*B*	*t*	*Coefficients p*
Funding Payment	-.114 (-.301, .072)	.092	-.194	-1.239	p = .222
Leadership Checklist	.168 (-.024, .360)	.095	.256	1.764	p = .085
Incident Dashboard	.009 (-.174, .193)	.091	.016	.100	p= .921
Board Decision Making	.057 (-.128, .243)	.092	.095	.621	p= .538
Root Cause for Events	-.081 (-.282, .121)	.100	-.129	-.807	p= .424

Note: R^2 = .108 for model 4

* *With 95% bias corrected and accelerate confidence intervals reported*

Table 34

The Bivariate and Partial Correlations of the Predictors with CLABSI

Predictor Variables	Correlation between each predictor and the criterion (zero-order)	Correlation between each and criterion for all predictors (partial)
Funding Payment	-.103	-.184
Leadership Checklist	.254	.257
Incident Dashboard	.117	.015*
Board Decision Making	.098	.093
Root Cause for Events	-.089	-.121

* Statistically Significant to $p < .05$

The following results in Tables 35 and 36 are from the complete linear regression analysis for falls with injuries, providing the remaining model for the coefficients for the

clinical quality outcomes when analyzing all the predictors as co-variables and the bivariate correlations between the predictors and criterion.

Table 35

*Model Coefficients for predictors of clinical quality outcomes of Falls with Injury**

	b	*Standard Error (B)*	*B*	*t*	*Coefficients p*
Funding Payment	1.358 (.795, 1.920)	.283	.473	4.796	$p = .000$
Leadership Checklist	-.005 (-.518, .509)	.259	-.002	-.019	$p = .985$
Incident Dashboard	-.105 (-.556, .346)	.227	-.043	-.462	$p = .645$
Board Decision Making	.300 (-.199, .798)	.251	.113	1.194	$p = .236$
Root Cause for Events	.021 (-.452, .494)	.238	.009	.087	$p = .931$

Note: $R^2 = .244$ for model 4

** With 95% bias corrected and accelerate confidence intervals reported*

Table 36

The Bivariate and Partial Correlations of the Predictors with Falls with Injuries

Predictor Variables	Correlation between each predictor and the criterion (zero-order)	Correlation between each and criterion for all predictors (partial)
Funding Payment	.481	.447
Leadership Checklist	.078	-.002*
Incident Dashboard	.006*	-.048*
Board Decision Making	.162	.124
Root Cause for Events	-.178	.009*

* Statistically Significant to $p < .05$

The following results in Tables 37 and 38 are from the complete linear regression analysis for VTE rates, providing the remaining model for the coefficients for the clinical quality outcomes when analyzing all the predictors as co-variables and the bivariate correlations between the predictors and criterion.

Table 37

*Model Coefficients for predictors of clinical quality outcomes of VTE**

	b	*Standard Error (B)*	*B*	*t*	*Coefficients p*
Funding Payment	-1.506 (.949, 2.111)	.292	.507	5.230	$p = .000$
Leadership Checklist	-.014 (-.556, .528)	.273	-.005	-.052	$p = .958$
Incident Dashboard	.328 (-.137, .793)	.234	.128	1.403	$p = .164$
Board Decision Making	-.190 (-.702, .321)	.258	-.068	-.739	$p = .462$
Root Cause for Events	-.112 (-.603, .380)	.247	-.044	-.451	$p = .653$

Note: $R^2 = .293$ for model 4

** With 95% bias corrected and accelerate confidence intervals reported*

Table 38

The Bivariate and Partial Correlations of the Predictors with VTE

Predictor Variables	Correlation between each predictor and the criterion (zero-order)	Correlation between each and criterion for all predictors (partial)
Funding Payment	.532	.483
Leadership Checklist	.084	-.006*
Incident Dashboard	.156	.146
Board Decision Making	.027*	-.078
Root Cause for Events	-.244	-.047*

*Statistically Significant to $p < .05$