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Topics on Patient Safety Culture in Hospitals

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TOPICS ON PATIENT SAFETY CULTURE IN HOSPITALS

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In

PUBLIC HEALTH

By

Jayson Jermaine Forbes

To: Dean Tomas Guilarte
Robert Stempel College of Public Health and Social Work

This dissertation written by Jayson Jermaine Forbes, and entitled Topics on Patient Safety Culture in Hospitals, having been approved in respect to style and intellectual content, is referred to you for judgement.

We have read this dissertation and recommend that it be approved.

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Date of Defense: November 3, 2022

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DEDICATION

I dedicate this dissertation to my friends and family. They helped kept me sane with all their support and love during this time. Without this support from them I would not have been able to pursue this degree and complete this paper.

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I am very lucky to have a dedicated and compassionate committee, who has sacrificed time to provide me with specialized and crucial feedback and support. First and foremost, Dr. Alejandro Arrieta who has taught, mentored, and helped me through the entire journey. During the struggles of losing my job in the beginning of the COVID-19 pandemic he did whatever he could to make sure I was able to continue my degree. Dr. Gilbert Ramirez came into our department during a tough time and helped ease all our stresses. Dr. Nan Hu passionately spent time with me to discuss various methods for my research and provided resources to help me comprehend everything. Dr. Nathan Hiller helped me understand the concept of culture and provided me with key researchers to familiarize. Special thanks to all the various faculty and staff who are not in my committee but were extremely important to my success. Dr. Jessica Adler started in our department and was an absolute amazing person with helping formulate and support my research ideas. Dr. Donna Davis has been extremely supportive and helped shape my understanding of health policy in context. Dr. Susan Biersteker and Dr. Elena Bastida have been very supportive of my writing and has been super caring, compassionate, and instrumental to my success in completing this dissertation. I also want to thank Marie Alvarez, program coordinator for the Health Policy and Disease Prevention department, because without her no one in the Health Policy and Management department would be so accomplished in all of their work. Finally, I want to thank all the friends and classmates I have made during this venture: Kai Carey, Abraham Enyeji, Noof Alabdullatif, Richard Munoz, Rochelle Parrino, Aamna Qamar, and Michelle Fields.

ABSTRACT OF THE DISSERTATION

TOPICS ON PATIENT SAFETY CULTURE IN HOSPITALS

by

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Florida International University, 2022

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Professor Alejandro Arrieta, Major Professor

Purpose: Patient safety culture is the beliefs, values, and actions a healthcare organization has towards patient safety. For this dissertation, I analyze influences and perceptions of patient safety culture composites. First, I explore any correlations between the Medicaid expansion from the Affordable Care Act and patient safety culture responses in hospitals. Subsequently, I investigate the difference in responses for Hospital Survey on Patient Safety Culture (HSOPS) items between leaders and frontline workers. Following, I evaluate how different topics in the open-ended questions of HSOPS correlates with different composites of patient safety culture.

Methods: This dissertation used data from the Agency for Healthcare Research and Quality's (AHRQ) HSOPS Version 1.0. When evaluating Medicaid expansion and patient safety culture, I used an unbalanced panel dataset of U. S. hospitals reporting to AHRQ from years 2008 - 2017. To analyze the data, I used a difference-in-difference approach based on linear regressions. When considering the differences between leadership and frontline workers, I used the same unbalanced panel dataset from years

2008 – 2017. For this analysis, I used a first difference estimation approach based on linear regressions. An F-test determined any differences between leadership and frontline workers. While determining if HSOPS composites captures topics based on the open-ended comments reported in the survey, I used cross-sectional data from Latin American hospitals for the years of 2018 – 2020. Topic modeling and sentiment analysis was performed to identify topics with positive and negative sentiments, and logistic regressions were used to assess correlations between topics and HSOPS components.

Findings: I found that Medicaid expansion affected hospitals based on their sizes. Additionally, I found that leaders reported more positive to all items in HSOPS compared to front-line staff. Finally, it was found that composites in HSOPS captures topics identified from the open-ended comments of the survey.

Conclusion: Policies, such as Medicaid expansion, could affect patient safety culture in hospitals. I also discovered that there is a gap in perspective between hospital leaders and frontline workers. Finally, topic modeling can be used to recognize gaps of perceptions in the quantitative components of patient safety culture surveys.

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ABBREVIATIONS AND ACRONYMS

ACA – The Patient Protection and Affordable Care Act/Affordable Care Act

AHRQ – Agency for Healthcare Research and Quality

SOPS – Survey on Patient Safety Culture

HSOPS – Hospital Survey on Patient Safety Culture

PSC – Patient safety culture

SAQ – Safety Attitudes Questionnaire

DiD – Difference-in-Differnce

FMAQ - Flight Management Attitudes Questionnaire

LDA – Latent Dirichlet Allocation

AT – Author-Topic model

Analyzing the influences and perceptions of patient safety culture in hospitals

Chapter 1: Introduction to Dissertation

Patient safety culture is a key factor to reduce errors and strengthen patient safety in the healthcare sector. The Agency for Healthcare Resource and Quality (AHRQ) defines patient safety culture as "the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of an organization's health and safety management." (Sorra et al., 2018). According to the monumental report "To Err is Human: Building a Safer Health System" by the Institute of Medicine, a health system needs to build a culture prioritizing patient safety (Kohn et al., 2000). Patient safety culture is composed of multiple dimensions, including leadership, teamwork, practices being evidence-based, communication, prioritizing learning, conducting work and consequences that are just, and having a patient-centered approach (Sammer et al., 2010). This dissertation discusses three topics on patient safety culture, from how it could be influenced by a healthcare policy, to how staff perceptions on safety culture differ by type of job position and are associated to the content of open-ended comments.

The first study (chapter 2) measures the impact of Medicaid expansion on patient safety culture. The Patient Protection and Affordable Care Act was passed on March 23rd, 2010. This bill aims at improving various aspects of health and healthcare, such as public health, healthcare workforce, quality of health, and access to healthcare. A major provision of this bill was the expansion of the Medicaid program ("The Patient Protection and Affordable Care Act," 2010). Medicaid expansion would increase the availability of

Medicaid to individuals who are now 133% within the poverty line, a change from 100% (Miller & Wherry, 2017). This proposed increase in access allows for an increase in the demand for healthcare services. It has been found that reform like that of the ACA has increased the utilization of healthcare services in hospitals. Shindul-Rothschild & Gregas evaluated how Medicaid expansion affected healthcare use based on the amount of full-time patient work hours nurses averaged. This study compared the states of Massachusetts, California, and New York. Massachusetts is often credited with healthcare reform that laid precedent for the ACA (Shindul-Rothschild & Gregas, 2013). It was found that Massachusetts nurses worked higher full-time patient work hours in comparison to California and New York nurses (Shindul-Rothschild & Gregas, 2013). This study has shown that there has been influence from the increase access to healthcare towards the demand of health services being used. In this first study I hypothesize that observations in hospitals within states that have implemented Medicaid expansion will show a change in patient safety culture, especially in dimensions of safety culture related to staffing. This study is the first to access any changes in patient safety culture due to any health policy.

The second study (chapter 3) compares the perceptions of patient safety culture between leaders and frontline workers. Previous studies have shown that leaders often responds more positively to surveys measuring the functioning of a health system. Provonost et al. found that leadership in hospitals respond more positively to questions regarding to patient safety climate (Pronovost, 2003). Agreeably, Parand et al. found that leaders have responded more positively to improvements from a patient safety enhancement initiative (Parand et al., 2011). Additionally, leaders often desire a more

positive image due to a phenomenon called the social desirability effect (Densten & Sarros, 2012). I believe that like previous studies and due to the social desirability effect, leadership in hospitals will respond more positively in patient safety culture items in comparison to all other occupations, and more specifically there will be a significant difference between leadership and frontline workers. This study would be critical in identifying any gaps in perceptions between hospital leaders and frontline workers. It is expected that leadership creates various initiatives, while frontline workers execute them. The third study (chapter 4) evaluates the content of respondents' open-ended comments and its association with the dimensions of patient safety culture. This study uses topic modeling and sentiment analysis to group comments into common themes and measure if comments are more negative or positive. In this study I aim at understanding if the HSOPS composites contain areas of concern based on comments. Being that the HSOPS has been validated and deemed reliable by various countries and that sentiment analysis has previously found to be an effective measure for predicating responses, I expect for HSOPS to capture some of the topics identified (Abu-El-Noor et al., 2019; Arnulf et al., 2014; Arrieta et al., 2018; Bodur & Filiz, 2010; Brborović et al., 2014; Hedsköld et al., 2013; Nie et al., 2013). This study has the potential to identify key areas of concerns for patient safety culture that HSOPS does capture, but more importantly, this study will start understanding the topics for concern that HSOPS is not addressing, opening possibilities for future research.

Overall, this dissertation is significant not only because it contributes to the literature on patient safety culture, but most importantly, because it addresses an important area that is known to improve quality and health outcomes. Patient safety

culture is proven to produce a positive effect on patient's family satisfaction, patient experience, mortality, medication errors, community-acquired pneumonia, urinary tract infection, and readmission (DiCuccio, 2015). In addition, it was found that patient safety culture programs can potentially increase perceptions of patient safety within a health system and reduce patient harm (Weaver et al., 2013). Equally as important, patient safety culture has the influence to affect patient outcomes indirectly. This is possible because patient safety culture may impact adherence to evidence-based practices by a healthcare provider, which will, in turn, affect patient outcomes (Groves, 2014).

The quantitative analysis used in the three studies, and discussed with more detail in each corresponding chapter, is based on a common instrument to measure patient safety culture. I used the first version of the AHRQ's Hospital Survey on Patient Safety Culture (HSOPS) (Sorra et al., 2018). The HSOPS measurement tool is comprised of 42 items grouped into 12 composites. These 12 composites include: Communication Openness, Feedback and Communication About Error, Frequency of Events Reported, Handoffs and Transitions, Management Support for Patient Safety, Nonpunitive Response to Error, Organizational Learning-Continuous Improvement, Overall Perceptions of Patient Safety, Staffing, Supervisor/Manager Expectations and Actions Promoting Patient Safety, Teamwork Across Units, and Teamwork Within Units. Item responses are reported on a Likert scale (Strongly Disagree – Strongly Agree). The first and second study used a longitudinal dataset of 1,810 U.S. hospitals that implemented HSOPS in multiple years from 2008 to 2017. The third study used a cross-sectional dataset of 2,866 observations throughout three Latin American based hospitals that

implemented the Spanish version of HSOPS between 2008 and 2010. This large and global dataset on patient safety culture provides a unique opportunity to identify generalizable lessons that can be used to inform future research and safety improvement strategies.

Chapter 2: Research Questions and Hypotheses

The three papers that combine to make this dissertation are based on the following research questions and hypotheses:

Study 1: <u>The effects of the patient protection and affordable care act on patient safety culture in U.S. Hospitals</u>

- **Research Question 1.1:** Did the Medicaid expansion provision from the Affordable Care Act impact patient safety culture in hospitals throughout the United States?
    - **Hypothesis:** Composites related to staffing for patient safety culture was most impacted from the Medicaid expansion of the ACA.
    - **Justification:** Individual states have recorded changes in healthcare utilization due to the ACA. Shindul-Rothschild & Gregas compared Massachusetts, California, and New York nurses' workload based on healthcare utilization. Massachusetts has been credited with developing healthcare reform that helped shape the ACA (Shindul-Rothschild & Gregas, 2013). This study showed that after the healthcare reform in Massachusetts, nurses had significantly greater full-time equivalent hours per patient day than those in California or New York, reflecting that the reform caused higher strain for these nurses (Shindul-Rothschild & Gregas, 2013). This increased strain on healthcare staff will lead to a change in patient safety culture responses.

- **Research Question 1.2:** Did the impact of Medicaid expansion on patient safety culture in hospitals vary based on hospital unit?
    - **Hypothesis:** Staff in the emergency departments responses were most affected by the implementation of the Medicaid expansion
    - **Justification:** Dresden et al. found that after the Medicaid expansion of the ACA, the state of Illinois also showed that the average monthly emergency department visits increased (Dresden et al., 2017). It is expected that due to this increase in health services demanded, there will be an increased burden placed on staff in emergency departments. The increased burden on emergency department staff will be associated with a change in patient safety culture responses for these individuals.

Study 2: <u>Hospital leadership and frontline workers' perceptions of patient safety culture</u>

- **Research Question 2.1:** Is there a difference between hospital leadership and frontline workers' perspectives on patient safety culture?
    - **Hypothesis:** Hospital leadership will respond more positively than frontline workers.
    - **Justification:** The social desirability effect is a phenomenon that refers to how leaders often want to look effective and successful to the public (Densten & Sarros, 2012). Leaders tend to be more optimistic

about quality improvements. Parand et al. found that after quality and patient safety improvement initiatives, leadership perceived a larger sense of improvement in the culture of an organization to be providing more safe, effective, and reliable care (Parand et al., 2011). In agreement, Provonost et al. found that management responds more positively when asked about patient safety climate than other staff (Pronovost, 2003). Accounting for the social desirability effect and previous research proclaiming leaders to perceive environments more positively, we hypothesize that leadership will respond more positively for patient safety culture items relating to management.

Study 3: <u>Identifying areas of strength and improvement in HSOPS using open comments</u>

- **Research Question 3:** Would the topic modeling of open comments capture the composites that are included in HSOPS?
    - **Hypothesis:** Topic modeling of open comments will capture the composites included in HSOPS.
    - **Justification:** HSOPS has been validated in various countries (Abu-El-Noor et al., 2019; Arrieta et al., 2018; Bodur & Filiz, 2010; Brborović et al., 2014; Hedsköld et al., 2013; Nie et al., 2013). Topic models are algorithms for discovering the main themes throughout documents (Blei & McAuliffe, 2007). Additionally, previous research has

found that sentiment analysis is a reliable method for predicting survey responses (Arnulf et al., 2014) Based on the validity of HSOPS and the effectiveness of using both topic modeling and sentimental analysis we hypothesize that HSOPS composites will capture topics based on the comment section of the survey.

Chapter 3: Paper 1 - The effects of the patient protection and affordable care act on patient safety culture in U.S. Hospitals

Introduction

Schein (1990) has defined organizational culture as "(a) a pattern of basic assumptions, (b) invented, discovered, or developed by a given group, (c) as it learns to cope with its problems of external adaptation and internal integration, (d) that has worked well enough to be considered valid and, therefore (e) is to be taught to new members as the (f) correct way to perceive, think, and feel in relation to those problems (Schein, 1990)". In healthcare, a universal norm is prioritizing patient safety. Healthcare systems are trending towards analyzing and understanding how to develop highly reliable organizations that aim towards zero-harm for its patients (Cochrane et al., 2017). These initiatives require comprehension of the culture for patient safety within health systems.

The monumental report "To Err is Human: Building a Safer Health System" by the Institute of Medicine declared that health systems must prioritize the culture of patient safety in order to deliver quality care in America (Kohn et al., 2000). Patient safety culture is "the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to an organization's health and safety management" (Sorra et al., 2018). Patient safety culture affects other aspects of healthcare that can be directly or indirectly linked to patient safety (Weaver et al., 2013). It is proven to produce a positive effect on patients' family satisfaction, patient experience, mortality, medication errors, community-acquired pneumonia, urinary tract infection, and readmission (DiCuccio, 2015). Equally as

important, patient safety culture has the influence to affect patient outcomes indirectly through adherence to evidence-based practices (Groves, 2014).

Many countries have tested and validated measurement instruments in efforts to understand and improve their patient safety culture (Arrieta et al., 2018; Bodur & Filiz, 2010; Brborović et al., 2014; Hedsköld et al., 2013; Moghri et al., 2012; Nie et al., 2013; Palmieri et al., 2020; Pfeiffer & Manser, 2010; Robida, 2013; Smits et al., 2008). Researchers have prioritized creating interventions aimed at improving patient safety culture. It was found that many interventions involve driving enhancements of teamwork (Bleakley et al., 2004; Fiscella et al., 2017; Rosen et al., 2018; Weaver et al., 2010; Weld et al., 2016). Initiatives prioritize analyzing patient safety culture based on units within health facilities. Projects such as the Comprehensive Unit-Based Program (CUSP) and the Triad for Optimal Patient Safety (TOPS) Project, aim to improve the unit-level for health systems (Blegen et al., 2010; Romig et al., 2010). Meanwhile, interdisciplinary walk-arounds and leadership walk-arounds focus on leadership strategies as a priority for improving patient safety culture (O'Leary et al., 2010; Thomas et al., 2005).

By understanding their patient safety culture, organizational leaders can take appropriate actions towards the improvement of care. Unfortunately, healthcare workers have to endure many obstacles such as heavy workloads, burnout, high turnover, and even long hours that negatively affect their work experiences (Chan et al., 2013). A shortage in the healthcare workforce can be attributed to many of these difficulties (Drennan & Ross, 2019). The current nursing shortage forces employees to take on larger workloads and longer work hours, which lead to higher rates of absenteeism and job

dissatisfaction (Rogers et al., 2004). Higher nurse-to-patient ratios due to fewer staff result in worse outcomes in patient mortality (Driscoll et al., 2018). Additionally, there's evidence showing relationships between nurse staffing and healthcare-associated infections (Patricia et al., 2008), and adverse events that correlate to a prolonged length of stay and increased medical costs (Cho et al., 2003).

In 2010, the United States passed the Patient Protection and Affordable Care Act (ACA). The ACA includes provisions that improve affordability of healthcare, quality and efficiency of healthcare, public health, the healthcare workforce, transparency in healthcare, and access to innovative medical therapies ("The Patient Protection and Affordable Care Act," 2010). All these priorities have potential implications on patient safety culture. A substantial provision within this law was an expansion on Medicaid eligibility to 138% below the poverty line ("The Patient Protection and Affordable Care Act," 2010). The ACA is a federal law; however, states were allowed to opt in to the additional coverage for Medicaid expansion (Sommers & Epstein, 2010). This created an increased demand for healthcare services, feasibly adding more burden on an already depleted workforce. This study focuses on the Medicaid expansion derived from the ACA. Previous studies have shown changes in the utilization of healthcare services after the implementation of the Medicaid expansion or similar reform. Based on a study conducted by Courtemanche et al., in states that implemented the Medicaid expansion of the ACA, insurance coverage increased at a higher rate than states which did not accept Medicaid expansion in both Medicaid and private insurance providers (Courtemanche et al., 2017). Agreeably, Miller and Wherry, found that uninsured rates decreased after the implementation of the ACA (Miller & Wherry, 2017). Individual states have recorded

changes in healthcare utilization due to the Medicaid expansion of the ACA. First, Shindul-Rothschild & Gregas, compared Massachusetts, California, and New York nurses' workload based on healthcare utilization. This is pivotal because the state of Massachusetts has been credited with developing healthcare reform that helped shape the ACA (Shindul-Rothschild & Gregas, 2013). This study showed that after the healthcare reform in Massachusetts, nurses had significantly greater full-time equivalent hours per patient day than those in California or New York, reflecting that the reform caused higher strain for these nurses (Shindul-Rothschild & Gregas, 2013). Likewise, Dresden et al. found that after the Medicaid expansion of the ACA, the state of Illinois also showed that the average monthly emergency department visits increased (Dresden et al., 2017). In 2015, it was projected that 40% of the workforce shortage would be in relation to the ACA (Frogner et al., 2015).

The various components of the ACA all have potential in affecting patient safety culture. However, in this study we are most interested in Medicaid expansion since it is the only optional provision of the ACA. A ruling by the United States' Supreme Court in July 2012 declared a federal requirement to provide an expansion of Medicaid unconstitutional (Rosenbaum & Westmoreland, 2012). This declaration made Medicaid expansion an optional buy-in on a state-level basis. We understand that the ACA could affect hospitals based on the possible improvements due to the other components, but we expect those changes due to the other components of the ACA to impact all hospitals throughout the United States. On the contrary, Medicaid expansion is an optional criterion, which allows us to compare patient safety culture ratings of hospitals within

states that have enacted Medicaid expansion versus hospitals that are in states that have not opted in.

This study will assess how Medicaid expansion affects patient safety culture in hospitals. Culture is a term that is hard to pinpoint to just one concept; it is often comprised of many interconnecting parts (Azzolini et al., 2018). Patient safety culture considers multiple composites, including staffing, teamwork, leadership, practicing being evidence-based, communication, prioritizing learning, consequences that are just and nonpunitive, and having a patient-centered approach (Sammer et al., 2010). Based on the work by Shindul-Rothschild & Gregas, it is expected that the staffing composite will be the most impacted by the adoption of Medicaid expansion. It shows an increase in workload for nurses in hospitals throughout Massachusetts based on a policy like the Medicaid expansion introduced in the ACA (Shindul-Rothschild & Gregas, 2013). This should reflect on a change in responses in staffing for patient safety culture. Based on Dresden et al., showing an increase in emergency room visits, it is expected that the staff located in the emergency departments responses' were most affected by the implementation of the Medicaid expansion from the ACA (Dresden et al., 2017).

This is the first study, to the authors' knowledge, to evaluate patient safety culture based on the implementation of a specific public policy.

Methods

The Hospital Survey on Patient Safety Culture (HSOPS) Version 1.0, an instrument developed by the Agency for Healthcare Research and Quality (AHRQ) in

2004 was used in this study. Version 1 of the HSOPS includes 42 items grouped into 12 composites. These composites include Communication Openness, Feedback and Communication About Error, Frequency of Events Reported, Handoffs and Transitions, Management Support for Patient Safety, Nonpunitive Response to Error, Organizational Learning-Continuous Improvement, Overall Perceptions of Patient Safety, Staffing, Supervisor/Manager Expectations and Actions Promoting Patient Safety, Teamwork Across Units, and Teamwork Within Units. Participating staff does not require direct contact with patients to participate. The survey can be administered via paper, web, or a mixed-mode, based on the hospitals' capabilities and needs. The participants answer survey questions structured in a Likert scale (Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5), with the addition of a single question asking the respondent to give his/her organization a letter grade between A and E. Respondents also filled in information describing their demographics in reference to the hospital, such as how long they have worked at the facility, and their working unit. (Sorra et al., 2018). This data is used to address the levels of patient safety culture within each hospital and can display areas of strengths and weaknesses.

We believe composites in relation to staffing will be the most impacted (*Teamwork within Units* and *Staffing*). Previous studies, such as the work from Shindul-Rothschild & Gregas indicate that provisions similar to those from the ACA's Medicaid expansion caused additional strain on nurses, so it is expected that similar trends will be followed in states that have accepted Medicaid expansion (Shindul-Rothschild & Gregas, 2013). The additional workload demanded will cause additional stress and burden for hospital staff ultimately leading to a more negative outlook for patient safety culture. The

composites of interest are *Teamwork within Units* and *Staffing*. The *Teamwork within Units* composite is comprised of the following items: *People support one another in this unit; When a lot of work needs to be done quickly, we work together as a team to get the work done; In this unit, people treat each other with respect.; When one area in this unit gets really busy, others help out (Sorra et al., 2018)*. The *Staffing* composite is comprised of the following items: *We have enough staff to handle the workload; Staff in this unit work longer hours than is best for patient care; We use more agency/temporary staff than is best for patient care; We work in "crisis mode" trying to do too much, too quickly* (Sorra et al., 2018). The effect of Medicaid expansion on these composites by hospital size, occupation, and hospital unit was explored. Hospitals were grouped into three classifications: small (less than 99 beds), medium (100 to 399 beds), and large (more than 400 beds). The effect that Medicaid expansion had on all other items to test if any effect was unique to composites in relation to staffing was also explored. Based on this study's hypothesis, it is believed that the composites related to staffing will be the most impacted items. If this is true, there should be little or no effect observed in other composites.

Study Design

This study used an unbalanced panel data of hospitals reporting to the HSOPS database from 2008 to 2017. A total of 1,810 hospitals reported surveys to AHRQ during that period. The analysis included all items and composites from the patient safety culture survey, the patient safety grade, primary work area/unit information, and background information. Additionally, available hospital characteristics (bed size group was the only

provided characteristic used in analysis) were used. All data was de-identified and provided by the AHRQ. The study received IRB exemption number IRB-22-0030.

The policy intervention variable was Medicaid expansion (M_{ht}), a binary variable indicating if the hospital (*h*) was in a state where Medicaid was expanded at the year (*t*) when the survey was implemented. For the analysis, a Difference-in-Difference (DiD) estimation, with the longitudinal unit for the Panel Data at the hospital level, was used. Wooldridge explains that to comprehend a quasi-experiment it is important to have at least four crucial time points throughout a time period, a control that has data before and after the policy change, and a treatment group that has data before and after the policy change (Wooldridge, 2005). The purpose of a Difference-in-Difference estimation is to find the average treatment effect. Wooldridge states that the average treatment effect "can be estimated in two ways: (1) Compute the differences in averages between the treatment and control groups in each time period, and then difference the results over time; (2) Compute the change in averages over time for each of the treatment and control groups, and then difference these changes (Wooldridge, 2005)." A key assumption of DiD is that both groups behaved similarly before the intervention/policy (followed a parallel trend) with respect to the policy outcome, but the treatment group's trend changes after the intervention/policy (Goodman-Bacon, 2021; Wooldridge, 2005). In this study, our control group are those observations in states that have not implemented the Medicaid expansion provision from the ACA. While our treatment group are those observations in states that have accepted the Medicaid expansion from the ACA. The nature of this study using panel data requires a variable that accounts for the effect of the Medicaid expansion. This is captured by M_{ht}, which indicates if hospital h received the

intervention or not. A hospital received the intervention ($M_{ht} = 1$) after the state where its located expanded Medicaid. Otherwise, $M_{ht} = 0$ before the expansion or when the hospital was in a state that did not expand Medicaid (control group). The following DiD model (equation 1) describes the specification including a hospital fixed effect (H_h) and a time trend (T_t).

$$Y_{iht} = \beta_0 + \gamma \cdot M_{ht} + \beta_1 X_{iht} + \beta_2 Z_{ht} + \beta_3 H_h + \beta_4 T_t + \varepsilon_{iht} \quad (1)$$

The goal is to estimate γ, which captures the effect of Medicaid expansion on a particular item response for patient safety culture (Y_{iht})as assessed by individual (i) from hospital (h) at year (t). Variables (X_{iht}) were included to control for individual characteristics (staff's occupation, tenure, and occupational tenure), and (Z_{ht}) to control for different hospital characteristics that may change over time (bed size, number of staff, services offered, etc.). Lastly, (ε_{iht}) refers to the error term for this equation. A first difference estimator was used to remove the hospital fixed effect (H_h) to control for observable and unobservable hospital characteristics (ownership type, academic status, leadership style, etc.). Since this study uses unbalanced panel data there are certain variables that need to be accounted for in any model. Our original model contains variables for hospitals and individuals. Hospitals are assumed to have both variables we can observe and variables that are unobservable. An observable variable can consist of hospital size, academic status, and ownership status, while an unobservable variable will consist of aspects that are not easily measured, such as leadership style and organizational culture. The first difference estimator will assume that these observed and unobserved variables will be fixed effects over time and remove them from the model since they

would already be considered (Wooldridge, 2005). Because the data includes individuals grouped at hospital level, it was averaged twice across individuals and time to account for hospitals as described in equation (2).

$$\bar{\bar{Y}}_h = \beta_0 + \gamma\bar{\bar{M}}_h + \beta_1\bar{\bar{X}}_h + \beta_2\bar{\bar{Z}}_h + \beta_3 H_h + \beta_4\bar{\bar{T}} + \bar{\bar{\varepsilon}}_h \quad (2)$$

The difference estimator demeans equation (1) using equation (2), resulting in linear panel data model (3) that is estimated clustered by hospitals using Stata IC version 16.1.

$$(Y_{iht} - \bar{\bar{Y}}_h) = (\gamma M_{ht} - \gamma\bar{\bar{M}}_h) + (\beta_1 X_{iht} - \beta_1\bar{\bar{X}}_h) + (\beta_2 Z_{ht} - \beta_2\bar{\bar{Z}}_h) + (\beta_4 T_t - \beta_4\bar{\bar{T}}) + (\varepsilon_{iht} - \bar{\bar{\varepsilon}}_h) \quad (3)$$

Results

The analysis included approximately 1,423,965 observations, corresponding to staff from 1,810 hospitals between years 2008 and 2017 (Based on exhibit 1, using item *A1: People support one another in this unit*). Out of those observations 599,789 (across 686 hospitals) were in states that accepted or in the process of accepting Medicaid expansion and each was categorized by hospital bed size. HSOPS defines bed sizes categories as follows: 6 – 24 beds = 1, 25 – 49 beds = 2, 50 – 99 beds = 3, 100 – 199 beds = 4, 200 – 299 beds = 5, 300 – 399 beds = 6, 400 – 499 beds = 7, 500 or more beds = 8 ("Site-Level Survey Data File Specifications AHRQ Hospital Survey on Patient Safety Culture,"). However, for this study bed size categories based on the AHA DataQuery

were interpreted and labeled as follows: Small Hospitals: Under 100 beds, Medium Hospitals: 100 – 399 beds, Large Hospitals: 400 or more beds (*AHA DataQuery*).

Exhibit 1: Difference-in-Difference Descriptive Statistics						
	Average Responses in States that Never Accepted Medicaid Expansion	**Average Responses in States that Accepted Medicaid Expansion (pre-acceptance)**	**Average Responses in States that Accepted Medicaid Expansion (post-acceptance)**	**Difference between Responses in States that Never Accepted Medicaid and those that have accepted Medicaid (pre-acceptance)**	**Difference between Responses in States that Never Accepted Medicaid expansion and those that have accepted Medicaid expansion (post-acceptance)**	**Difference between Responses in States that Accepted Medicaid expansion (pre-acceptance) and Responses in States that Accepted Medicaid expansion (post-acceptance)**
Hospitals	1124	246	440			
Respondent	824,176	260,337	339,452			
Bed Size Category[+]	4.849	5.134	5.027			
[+]**Bed Size Categories: 1 (6 - 24); 2 (25 – 49); 3 (50 – 99); 4 (100 – 199); 5 (200 – 299); 6 (300 – 399); 7 (400 - 499); 8 (500+)**						
Teamwork within Units						
People support one another in this unit.	4.146	4.053	4.116	-0.093***	-0.030***	0.064***
When a lot of work needs to be done quickly, we work	4.158	4.066	4.115	-0.092***	-0.043***	0.049***

together as a team to get the work done.						
In this unit, people treat each other with respect.	3.961	3.854	3.949	-0.107***	-0.012***	0.095***
When one area in this unit gets really busy, others help out.	3.742	3.638	3.709	-0.104***	-0.033***	0.071***
Staffing						
We have enough staff to handle the workload.	3.183	3.135	3.084	-0.047***	-0.099***	-0.051***
Staff in this unit work longer hours than is best for patient care. (negatively worded)	2.683	2.744	2.807	0.062***	0.124***	0.062***
We use more agency/tem	2.14	2.216	2.282	0.075***	0.141***	0.066***

porary staff than is best for patient care. (negatively worded)						
We work in "crisis mode" trying to do too much, too quickly. (negatively worded)	2.789	2.789	2.871	0.073***	0.081***	0.008***
Items Groups by Composite (Likert Scale 1-5; 1 = Strong Disagree, 5 = Strongly Agree) * p-value = 0.05; ** p-value = 0.01; *** p-value = 0.001						

Results by hospital size for the Staffing and Teamwork within Units composites are summarized in Exhibit 2. The appendix presents all estimation results. First, a summary for all composites in Appendix Exhibit 1A and second, the full estimation for each item in Appendix Exhibit 2A. The results show that Teamwork within Units was negatively affected in all hospitals, but it was statistically significant for 3 out of 4 items for small hospitals. The largest effects were for *People support one another in this unit* (-0.085, p-value < 0.01), *In this unit, people treat each other with respect* (-0.067, p-value < 0.05), and *When a lot of work needs to be done quickly, we work together as a team to get the work done* (-0.061, p-value < 0.05). These results indicate that staff feel a disconnect with their teams. A coefficient of -0.085 in *People support one another in this*

unit depicts that there has been a decline in the responses for this item on the scale of 1 to 5 by 0.085 after the implementation of Medicaid expansion. This is similar for items *In this unit, people treat each other with respect* and *When a lot of work needs to be done quickly, we work together as a team to get the work done*, which respectively showed a decline in responses by 0.067 and 0.061. Results for all items of the Staffing composite were not statistically significant.

Exhibit 2: Effect of Medicaid Expansion on Patient Safety Culture by Hospital Size (Composite Level)				
	Hospital Size Category			
Item	**Small**	**Medium**	**Large**	**Total**
Teamwork Within Units				
A1. People support one another in this unit.	-0.085**	-0.012	-0.038	-0.032*
A3. When a lot of work needs to be done quickly, we work together as a team to get the work done.	-0.061*	-0.003	-0.028	-0.017
A4. In this unit, people treat each other with respect.	-0.067*	0.002	-0.020	-0.013
A11. When one area in this unit gets really busy, others help out.	-0.037	-0.010	-0.024	-0.013
Staffing				
A2. We have enough staff to handle the workload.	-0.042	-0.009	0.007	0.001
A5. Staff in this unit work longer hours than is best for patient care. (negatively worded)	0.010	-0.001	-0.032	-0.015

A7. We use more agency/temporary staff than is best for patient care. (negatively worded)	0.042	-0.042	-0.031	-0.023
A14. We work in "crisis mode" trying to do too much, too quickly. (negatively worded)	0.018	0.000	0.004	-0.003
Nonpunitive Response to Error				
A8. Staff feel like their mistakes are held against them. (negatively worded)	0.019	0.005	0.047*	0.021
A12. When an event is reported, it feels like the person is being written up, not the problem. (negatively worded)	0.018	0.009	0.051**	0.024
A16. Staff worry that mistakes they make are kept in their personnel file. (negatively worded)	0.034	0.021	0.055**	0.037**
* p-value = 0.05; ** p-value = 0.01; *** p-value = 0.001				

Results by occupation for the Staffing, Teamwork within Units, and the Nonpunitive Response to Error composites are summarized in Exhibit 3. The appendix presents all estimation results, first, a summary for all composites in Appendix Exhibit 1A and second, the full estimation for each item in Appendix Exhibit 3A. The results show that nursing is the only occupation that yielded significant results. Nursing showed significance in The *Nonpunitive Response to Error* composite with items, *Staff feel like their mistakes are held against them* (0.033, p-value < 0.05), *When an event is reported, it feels like the person is being written up, not the problem* (0.042, p-value < 0.01), and *Staff worry that mistakes they make are kept in their personnel file* (0.046, p-value < 0.01).

Exhibit 3: Effect of Medicaid Expansion on Patient Safety Culture by Occupation (Composite Level)				
	Nursing Occupation Status			Total
Item	Nurses	Physicians	All Other Occupations	
Teamwork Within Units				
A1. People support one another in this unit.	-0.040**	0.006	-0.032*	-0.032*
A3. When a lot of work needs to be done quickly, we work together as a team to get the work done.	-0.023	0.008	-0.017	-0.017
A4. In this unit, people treat each other with respect.	-0.016	0.010	-0.013	-0.013
A11. When one area in this unit gets really busy, others help out.	-0.024	-0.014	-0.013	-0.013
Staffing				
A2. We have enough staff to handle the workload.	-0.014	0.067	0.001	0.001
A5. Staff in this unit work longer hours than is best for patient care. (negatively worded)	-0.011	-0.038	-0.015	-0.015
A7. We use more agency/temporary staff than is best for patient care. (negatively worded)	-0.026	-0.074*	-0.023	-0.023
A14. We work in "crisis mode" trying to do too much, too quickly. (negatively worded)	0.006	-0.045	-0.003	-0.003
Nonpunitive Response to Error				

A8. Staff feel like their mistakes are held against them. (negatively worded)	0.033*	-0.022	0.021	0.021
A12. When an event is reported, it feels like the person is being written up, not the problem. (negatively worded)	0.042**	-0.011	0.024	0.024
A16. Staff worry that mistakes they make are kept in their personnel file. (negatively worded)	0.046**	0.012	0.037**	0.037**
* p-value = 0.05; ** p-value = 0.01; *** p-value = 0.001				

No composite showed statistically significant results when analyzing the data based on working unit/department (Appendix Exhibit 4A).

Discussion

When analyzing the effect of Medicaid expansion on patient safety culture, it is essential to disseminate findings based on hospital size.

Hospitals in the small classification were more affected by items and/or composites in relation to teamwork. This could be due to having fewer staff members. The potential addition of more demand for healthcare services due to Medicaid expansion will further burden each nurse since the patient-to-nurse ratio will increase. Staff members will be more prone to mistakes and have a lesser ability to prioritize teamwork the more strained they are.

On the other hand, hospitals in the large group responded with more of an impact on items in the Nonpunitive Response to Error composite. It's possible that larger hospitals have the capacity to manage any potential increase of demand for healthcare services. A study by Songul Cinaroglu, found that smaller hospitals in Turkey reported a higher bed-occupancy rate (proportion of total beds to beds being used) compared to larger hospitals, depicting a higher comparative workload in smaller hospitals (Cinaroglu, 2021).

Staff in larger hospitals are more worried about the punitive measures used in addressing adverse events. Due to a less personal approach with communication amongst all staff members, it's possible that leaders/supervisors/managers find the most logical and efficient way of handling errors is to report it and reprimand the staff member responsible. Debriefing and addressing the adverse event with that staff member would take too much time since they have much more staff and/or patients.

Nurses were the only occupation to yield significant results, and this was in relation to Nonpunitive Response to Error. Nurses are frontline workers and sometimes distant to leadership. This disconnect with leadership leads them to believe that they will be punished for any mistake that they make. Juliet Battard found that a nonpunitive environment training intervention can improve this negative perception and patient safety culture (Battard, 2017).

The two main implications from this study are (1) that policies can affect culture within hospitals and (2) it is important to consider hospital size and capabilities when constructing policies that could possibly affect health services demand. Previous studies

have shown the correlation of hospital size and varying outcomes. Rodriguez-Homs et al. found that there was a positive correlation with nurse communication and hospital size based on patient satisfaction surveys (Rodriguez-Homs et al., 2020). This agrees with the study findings that smaller hospitals reported a more negative impact in teamwork. Naleef Fareed found that larger hospitals have lower odds of patient mortality compared to smaller hospitals (Fareed, 2012).

The findings from this study can help health experts conceptualize supplemental support for the various areas of patient safety culture impacted. Because patient safety culture has a correlation with aspects of patient care quality, it is crucial to address any deficiencies. Additional resources such as labor forces, equipment, and/or grants should be established for smaller hospitals during policy rollouts to alleviate any potential additional burden caused by more health services being demanded.

For any potential future surge of needed health care services and to address the current workforce shortage, it is critical to have trained and willing staff. Unfortunately, it seems as if an impactful obstacle for healthcare staff growth, such as nurses, isn't solely based on the interest in these careers from prospective students, but a shortage in faculty (Aiken et al., 2009; Berent & Anderko, 2011). Working conditions in hospitals, such as consistent burnout and heavy workloads make nursing a less attractive occupation (Spetz & Given, 2003). To improve the shortage of healthcare staff and patient safety culture, health policies should aim at increasing wages, incentivizing the role of being a healthcare faculty member, and improving working conditions for staff, such as reducing daily working hours.

Further research could expand this study to other health facilities, such as medical offices, pharmacies, and/or ambulatory surgical centers. It could be very informative to compare how significantly Medicaid expansion affected these other health facilities in comparison to hospitals. This study has provided vital information in understanding how the Patient Protection and Affordable Care Act can affect healthcare facilities and workers. Members of the healthcare workforce should be consulted during health policy making. Policies are created for the people it can affect via outcomes but should also understand implications towards those delivering care.

Chapter 4: Paper 2 - Hospital leadership and frontline workers' perceptions of patient safety culture

Introduction

Previous research has shown a disconnect between hospital leadership and frontline workers' perceptions in hospital operations and quality of care. Nyssen et al. found that frontline staff and leadership within hospitals tend to not agree on regular challenges faced by frontline workers, such as production pressure, working time, doctors–nurses collaboration, managing new staff, infrastructure, heat, and working positions (Nyssen et al., 2017). Furthermore, Gormley found that when analyzing work environment, managers respond more positively than frontline workers in the areas of opportunity for advancement, participative governance, unit decision-making, nursing manager, scheduling environment, job enjoyment, quality of care, and anticipated turnover (Gormley, 2011). In addition, it was found that there was a significant difference in results between frontline nurses and managers on all of these measurements (Gormley, 2011). Possible causes of these disconnects in work environment can stem from the psychometrics of the stressful environment faced by frontline workers. It has been found that both nurses and physicians commonly face burnout and job satisfaction (Huang et al., 2018; Rotenstein et al., 2018). More recently, it was found during the COVID-19 Pandemic, frontline workers exhibited more cases of depression and psychosocial stressors in comparison to leaders (Zahiriharsini et al., 2022). There is a possibility that the nature of being a frontline worker leads to certain providers responding more negatively than those in leadership positions, who may be more distant from the reality of

processes. Jararr et al. reported that shift lengths of nurses correlated with nurses' perceived healthcare quality and patient safety (Jarrar et al., 2019).

An important concept to acknowledge any differences between leadership and frontline workers is patient safety culture. The Agency for Healthcare Research and Quality (AHRQ) defines organizational culture as "the beliefs, values, and norms shared by staff throughout the organization that influence their actions and behaviors to promote patient safety (Famolaro et al., 2018)." Patient safety culture has been found to have associations with more positive patient outcomes so it is crucial to understand and interpret any differences between hospital leadership and frontline workers (DiCuccio, 2015). There has been no previous research comparing patient safety culture between leaders and frontline workers in the United States.

In this study, we are measuring the differences in perceptions between leaders and frontline workers for multiple dimensions of patient safety culture. We will be using the AHRQ's Hospital Survey on Patient Safety Culture (HSOPS). This survey breaks down various composites of patient safety culture including "Management support for Patient Safety," "Supervisor/Manager Expectations & Actions Promoting Patient Safety," "Staffing," "Teamwork Within Units," and "Overall Perceptions of Patient Safety" (Etchegaray & Thomas, 2012). We hypothesize that the leaders in hospitals will respond more positively to the dimensions of patient safety culture that relate to assessing management, this includes "Management Support or Patient Safety" and "Supervisor/Manager Expectations & Actions Promoting Patient Safety," in comparison to frontline workers. We propose this hypothesis due to a combination of the social

desirability effect and the disproportion of leaders-to-frontline workers with who proposes initiatives and who conducts the actions (Densten & Sarros, 2012; Parand et al., 2011). The social desirability effect is a phenomenon that refers to how leaders often want to look effective and successful to the public (Densten & Sarros, 2012). Moreover, leaders tend to be more optimistic about quality improvements. Parand et al. found that after quality and patient safety improvement initiatives, leadership perceived a larger sense of improvement in the culture of an organization to be providing more safe, effective, and reliable care (Parand et al., 2011). In agreement, Provonost et al. found that management responds more positively when asked about patient safety climate than other staff (Pronovost, 2003). It is believe in this study that leadership is distant to the every operations of patient care and proposes executive walk arounds to help close a gap of understanding (Pronovost, 2003). However, none of these studies analyzed and compared patient safety culture between leaders and frontline workers throughout hospitals in the United States. This is an important distinction because leaders often create patient safety initiatives, but frontline workers implement them. Additionally, it has been found that a more positive nurses' perception on patient safety culture is correlated to better patient outcomes (Han et al., 2020). A better connection between the individuals creating patient safety/patient safety culture initiatives and the individuals implementing them should improve patient safety in hospitals. Moreover, our study explore for differences by hospital size, we expect as hospitals get larger the effect of leadership and frontline status to be diminished, as it's been found that patient experience has a negative correlation with hospital size, and patient experience has been associated with patient safety culture (Abrahamson et al., 2016; Silvera, 2017). Our study will be the first of its kind to

compare the responses of frontline workers to those in leadership roles for patient safety culture.

Methods

This study uses the Hospital Survey on Patient Safety Culture (HSOPS) Version 1.0, an instrument developed by the Agency for Healthcare Research and Quality (AHRQ) in 2004. The instrument includes 42 items that are grouped into 12 composites that characterize different dimensions of patient safety culture, including Communication Openness, Feedback and Communication About Error, Handoffs and Transitions, Management Support for Patient Safety, Nonpunitive Response to Error, Organizational Learning-Continuous Improvement, Staffing, Supervisor/Manager Expectations and Actions Promoting Patient Safety, Teamwork Across Units, and Teamwork Within Units. Participating staff does not require direct contact with patients to participate. Respondents of the survey answer questions structured in a Likert scale (Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5), with the addition of a single question asking the respondent to give his/her organization a letter grade between A and E. The participants also filled in information describing their demographics in reference to the hospital, such as how long they have worked at the facility, their working unit, and their occupation. (Sorra et al., 2018).

For this study, we grouped hospitals into three classifications based on the American Hospital Association's DataQuery: small (less than 99 beds), medium (100 to 399 beds), and large (more than 400 beds)(*AHA DataQuery*). We believe that

respondents that are considered in a leadership role will respond more positively to items across HSOPS including reporting a more positive patient safety grade for their respective hospitals. To assess the effect of leadership on patient safety culture, we created binary variables to depict if an individual belonged to either a leadership, frontline, or other role. Leaders were considered anyone who responded as their occupation being "Administrative/Management," while frontline workers were considered as anyone who responded as a "Registered Nurse," "Physician Assistant/Nurse Practitioner," "LVN/LPN," "Patient Care Asst/Hospital Aide/Care Partner," "Attending/Staff Physician," or "Resident Physician/Physician in Training."

Study Design

This study used an unbalanced panel data of hospitals reporting to the HSOPS database from 2008 to 2017. A total of 1,810 hospitals reported surveys to AHRQ during that period. The analysis included all items and composites from the patient safety culture survey, the patient safety grade, primary work area/unit information, and background information. Additionally, available hospital characteristics (bed size group was the only provided characteristic used in analysis) were used. All data was de-identified and provided by the AHRQ. The study received IRB exemption number IRB-22-0030.

The Leadership (L_{ht}) and Frontline (F_{ht}) occupational exposure variables are binary variables indicating if a respondent represented someone who identifies their role as being a part of Leadership (L) or Frontline (F). For the analysis, a first difference estimator at the hospital level was used. Based on our study, we would have to use a

linear mixed-effects model. A fixed-effect can be considered observable and unobservable variables that are not expected to change over the time of the panel that we want to control (Borenstein et al., 2010). An observable variable is something that can be denoted and measured, such as bed size and ownership status of a hospital. While an unobservable variable is considered any variable that is not directly measurable such as organizational culture and leadership style (Borenstein et al., 2010). The first difference demeans the model in efforts to remove the fixed-effects (Wooldridge, 2005). Note that because the HSOPS is anonymized, individuals from the same hospital cannot be followed up across different survey years. The following model (equation 1) describes the specification including a hospital fixed effect (H_h) and a time trend (T_t).

$$Y_{iht} = \beta_0 + \gamma_L L_{iht} + \gamma_F F_{iht} + \beta_1 X_{iht} + \beta_2 Z_{ht} + \beta_3 H_h + \beta_4 T_t + \varepsilon_{iht} \quad (1)$$

The goal is to estimate γ_L and γ_F, which capture the response to a particular component of patient safety culture (Y_{iht}) of a leader and frontline individual (i), respectively, compared to other staff who worked in hospital (h) at time (t). Additionally, we want to test for differences between γ_L and γ_F. Variables (X_{iht}) were included to control for individual characteristics (staff's tenure, and occupational tenure), and (Z_{ht}) to control for different hospital characteristics that may change over time (bed size, number of staff, services offered, etc.). A hospital fixed effect (H_h) was included to control for observable and unobservable hospital characteristics (ownership type, academic status, leadership style, etc.), and time trend (T_t) to capture common variations over time. Lastly, (ε_{iht}) refers to the error term for this equation. A difference estimation was used to remove the hospital fixed effect (H_h). Because the data includes individuals grouped at

hospital level, it was averaged twice across individuals and time as described in equation (2).

$$\bar{\bar{Y}}_h = \beta_0 + \gamma\bar{\bar{L}}_h + \gamma\bar{\bar{F}}_h + \beta_1\bar{\bar{X}}_h + \beta_2\bar{\bar{Z}}_h + \beta_3 H_h + \beta_4\bar{\bar{T}} + \bar{\bar{\varepsilon}}_h \quad (2)$$

The difference estimator demeans equation (1) using equation (2), resulting in linear panel data model (3) that is estimated with robust standard errors clustered by hospitals using Stata IC version 16.1.

$$(Y_{iht} - \bar{\bar{Y}}_h) = \gamma(M_{ht} - \bar{\bar{M}}_h) + \beta_1(X_{iht} - \bar{\bar{X}}_h) + \beta_2(Z_{ht} - \bar{\bar{Z}}_h) + \beta_4(T_t - \bar{\bar{T}}) + (\varepsilon_{iht} - \bar{\bar{\varepsilon}}_h) \quad (3)$$

Results

The total number of observations in the study were 1,739,083 individuals, spread throughout 1,810 hospitals between the years of 2008 and 2017. Of these individuals, 115,228 (X1%) self-identified as leaders, and 772,505 (X2%) self-identified as frontline workers (*Table 1*).

Table 1: Descriptive Statistics of Leadership and Frontline Workers

	Occupational Role		
	Leadership	**Frontline**	**Others**
Hospital Size			
Small	23,547	142,095	161,260

Medium	69,864	472,968	439,313
Large	21,817	157,442	134,536
Hospital Tenure			
< 1 year	9,960	85,044	85,055
1 to 5 years	30,946	248,250	243,654
6 to 10 years	21,195	142,931	152,657
11 to 15 years	15,250	85,413	94,795
16 to 20 years	10,558	55,176	58,754
21+ years	22,299	99,047	106,093
Unit Tenure			
< 1 year	13,953	114,895	107,666
1 to 5 years	40,886	303,439	291,789
6 to 10 years	22,588	143,013	155,641
11 to 15 years	13,591	74,907	87,120
16 to 20 years	7,975	41,294	48,822
21+ years	11,982	50,016	67,764
Occupation Tenure			
< 1 year	4,400	49,880	51,932
1 to 5 years	17,645	204,234	194,288
6 to 10 years	15,640	132,446	144,338
11 to 15 years	14,741	91,869	105,698
16 to 20 years	14,905	76,082	82,876
21+ years	43,930	166,863	178,993
Work Hours per Week			

< 20 hours	1,753	35,257	39,591
20 to 39 hours	11,554	388,661	228,657
40 to 59 hours	83,780	228,948	425,246
60 to 79 hours	7,198	39,953	21,304
80 to 99 hours	3,432	11,053	21,014
100+ hours	225	1,297	1,260
Direct Patient Contact	44,640	714,693	500,238
No Direct Patient Contact	67,908	30,713	279,571
Year			
2008	1,789	10,477	10,657
2009	7,606	46,860	52,500
2010	11,879	83,744	86,699
2011	15,825	102,144	107,758
2012	12,859	83,236	97,722
2013	12,373	86,249	88,860
2014	13,990	92,053	101,353
2015	15,138	102,033	126,722
2016	10,368	71,796	79,730
2017	13,401	93,913	99,349

Overall effect of Leadership Status on Patient Safety Culture

When analyzing the overall impact of leadership status on patient safety culture responses we observed many items of significance. Leaders responded more positively

for items that are directly related to management composites. The first composite examining management is “Supervisor/Manager Expectations & Actions Promoting Patient Safety,” which is comprised of items “My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures” (0.33, p-value < 0.01), where 0.33 signifies that leaders had an average response more positive by 0.33 compared to all other occupations on a Likert scale of 1 through 5, “My supervisor/manager seriously considers staff suggestions for improving patient safety” (0.37, p-value < 0.01), “Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts” (0.29, p-value < 0.01), and “My supervisor/manager overlooks patient safety problems that happen over and over” (0.32, p-value < 0.01)(*Table 2*). The other composite assessing management is “Management Support for Patient Safety,” which is comprised of items “Hospital management provides a work climate that promotes patient safety” (0.26, p-value < 0.01), “The actions of hospital management show that patient safety is a top priority” (0.27, p-value < 0.01), and “Hospital management seems interested in patient safety only after an adverse event happens” (0.32, p-value < 0.01)(*Table 2*). In total, leaders responded more positively in 42 out of the 42 items in HSOPS. The items with the largest positive responses consist of “When an event is reported, it feels like the person is being written up, not the problem” (0.55, p-value < 0.01), “Staff feel free to question the decisions or actions of those with more authority” (0.52, p-value < 0.01), “Staff feel like their mistakes are held against them” (0.47, p-value < 0.01), “Staff worry that mistakes they make are kept in their personnel file” (0.38, p-value < 0.01), and “It is just by chance that more serious mistakes

don't happen around here" (0.36, p-value < 0.01). *Full estimation results can be viewed on Appendix Table 2A.*

In comparison, frontline workers reported more positively in 13 out of the 42 items and more negative in 29 out of the 42 items in HSOPS. The largest positive responses consist of items "People support one another in this unit" (0.09, p-value < 0.01), "In this unit, people treat each other with respect" (0.06, p-value < 0.01), "Staff feel free to question the decisions or actions of those with more authority" (0.06, p-value < 0.01), "When a lot of work needs to be done quickly, we work together as a team to get the work done" (0.05, p-value < 0.01), and "Mistakes have led to positive changes here" (0.03, p-value < 0.01)(*Table 2*). *Full estimation results can be viewed on Appendix Table 2A.*

Table 2: Summary of Leadership and Frontline Results

	Leadership	**Frontline**	**Difference**
Items			
Composite 1: Teamwork Within Units			
People support one another in this unit	0.356***	0.0913***	562.926***
When a lot of work needs to be done quickly, we work together as a team to get the work	0.328***	0.045***	605.892***

In this unit, people treat each other with respect	0.342***	0.057***	665.252***
When one area in this unit gets really busy, others help out	0.303***	0.013*	395.013***
Composite 2: Supervisor/Manager Expectations & Actions Promoting Patient Safety			
My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures	0.329***	-.030***	1489.478***
My supervisor/manager seriously considers staff suggestions for improving patient safety	0.370***	-0.011*	1118.328***
Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts	-0.291***	0.046***	805.757***
My supervisor/manager overlooks patient safety problems that happen over and over	-0.318***	0.067***	1282.596***
Composite 3: Organizational Learning-Continuous Improvement			
We are actively doing things to improve patient safety	0.261***	0.003	434.957***

Mistakes have led to positive changes here	0.348***	0.033***	445.219***
After we make changes to improve patient safety, we evaluate their effectiveness	0.249***	0.019***	372.664***
Composite 4: Management Support for Patient Safety			
Hospital management provides a work climate that promotes patient safety	0.261***	-0.213***	2283.764***
The actions of hospital management show that patient safety is a top priority	0.270***	-0.190***	1556.509***
Hospital management seems interested in patient safety only after an adverse event happens	-0.320***	0.146***	1524.974***
Composite 5: Overall Perceptions of Patient Safety			
Patient safety is never sacrificed to get more work done	0.161***	-0.331***	2715.267***
Our procedures and systems are good at preventing errors from happening	0.158***	-0.079***	425.699***
It is just by chance that more serious mistakes don't happen around here	-0.357***	0.078***	789.731***

We have patient safety problems in this unit	-0.213***	0.304***	2632.900***
Composite 6: Feedback & Communication About Error			
We are given feedback about changes put into place based on event reports	0.264***	-0.030***	591.089***
We are informed about errors that happen in this unit	0.217***	-0.142***	702.741***
In this unit, we discuss ways to prevent errors from happening again	0.285***	-0.050***	604.690***
Composite 7: Communication Openness			
Staff will freely speak up if they see something that may negatively affect patient care	0.221***	-0.067***	948.691***
Staff feel free to question the decisions or actions of those with more authority	0.520***	0.056***	594.716***
Staff are afraid to ask questions when something does not seem right	-0.262***	0.020***	634.980***
Composite 8: Frequency of Events Reported			
When a mistake is made, but is caught and corrected before	0.100***	-0.077***	668.950***

affecting the patient, how often is this reported?			
When a mistake is made, but has no potential to harm the patient, how often is this reported?	0.114***	0.0161**	165.592***
When a mistake is made that could harm the patient, but does not, how often is this reported?	0.120***	-0.016***	255.286***
Composite 9: Teamwork Across Units			
There is good cooperation among hospital units that need to work together	0.154***	-0.121***	891.026***
Hospital units work well together to provide the best care for patients	0.140***	-0.131***	1172.356***
Hospital units do not coordinate well with each other	-0.188***	0.105***	867.480***
It is often unpleasant to work with staff from other hospital units	-0.193***	0.027***	565.550***
Composite 10: Staffing			
We have enough staff to handle the workload	0.335***	-0.042***	388.860***
Staff in this unit work longer hours than is best for patient care	-0.204***	0.046***	412.845***
We use more agency/temporary staff than is best for patient care	-0.245***	-0.028***	232.980***

We work in crisis mode trying to do too much, too quickly	-0.188***	0.130***	367.488***
Composite 11: Handoffs & Transitions			
Things fall between the cracks when transferring patients from one unit to another	-0.090***	0.115***	709.613***
Important patient care information is often lost during shift changes	-0.116***	0.041***	421.333***
Problems often occur in the exchange of information across hospital units	-0.085***	0.083***	518.988***
Shift changes are problematic for patients in this hospital	-0.118***	0.046***	414.560**
Composite 12: Nonpunitive Response to Error			
Staff feel like their mistakes are held against them	-0.465***	-0.026***	702.841***
When an event is reported, it feels like the person is being written up, not the problem	-0.552***	-0.013*	904.009***
Staff worry that mistakes they make are kept in their personnel file	-0.382***	0.001	648.891***

We found that there was a statistical significance in the difference between leadership and frontline workers in 42 out of the 42 items in HSOPS. The largest

differences consist of items “Patient safety is never sacrificed to get more work done” (F-Statistic = 2715.267, p-value < 0.01), “We have patient safety problems in this unit” (F-Statistic = 2632.900, p-value < 0.01), “Hospital management provides a work climate that promotes patient safety” (F-Statistic = 2283.764, p-value < 0.01), “The actions of hospital management show that patient safety is a top priority” (F-Statistic = 1556.509, p-value < 0.01), and “My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures” (F-Statistic = 1489.478, p-value < 0.01)(*Table 3*).

Table 3: Largest Differences Between Leadership and Frontline Workers

	Patient safety is never sacrificed to get more work done	*We have patient safety problems in this unit*	*Hospital management provides a work climate that promotes patient safety*	*The actions of hospital management show that patient safety is a top priority*	*My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures*
F-Statistic	2715.267	2632.900	2283.764	1556.509	1489.478
p-value	0	0	0	1.4439E-237	2.4245E-230

Effect of Leadership Status on Patient Safety Culture Based on Hospital Size

When analyzing the overall impact of leadership status on patient safety culture responses based on hospital sizes there were many items of statistical significance. Each

category of hospital size (small, medium, large) follows similar result patterns as the overall analysis. Leadership responded more positively in 42 out of the 42 items in HSOPS for all hospital size categories. Frontline workers in each hospital bed size category commonly reported more negatively than other occupations with small hospitals having the most negative results; 37 out of 42 items associating frontline workers with more negative responses. Like the overall analysis, each hospital bed size category reported a statistically significant difference between leadership and frontline workers for all 42 items in HSOPS. *Full estimation results can be viewed on Appendix Tables 4-6.*

Discussion

The results of this study confirmed our hypothesis that leadership would respond more positively in areas that reflect on management. Additionally, it was found that leadership responded more positively to all composites of patient safety culture with a significant difference when compared to frontline workers. This study is important because it identifies necessary areas of improvement in patient safety culture. Often, leaders are creating and dictating how hospitals operate, but frontline staff are the ones executing the plan. Closing any form of disconnect between the two groups will improve quality in the healthcare provided for patients.

There are various potential causes for these results. As theorized, there is the possibility of the social desirability effect causing a bias in the reporting of participants considered leaders. Alternatively, these results could originate from the lack of awareness leadership may have on the day-to-day challenges that frontline workers possess in

hospitals. Frontline workers, such as nurses are often subject to staffing shortages, long hours, heavy workloads, and immense burnout (Al Ma'mari et al., 2020).

Furthermore, HSOPS has a limitation with requiring participants to only choose one selection for their occupation. This limitation forbids true understanding of leadership within hospitals because it does not recognize anyone in leadership that may be considered a frontline worker, such as doctors or nurses. Another limitation is the nature of patient safety culture and HSOPS requires as a self-reported survey. Self-reported surveys often have been questioned for their reliability and validity based on the idea of a self-report bias (Donaldson & Grant-Vallone, 2002).

The implication of this study insists that there is a disconnect between hospital leadership and frontline staff. This issue should be addressed by enhancing leadership engagement and involvement with the direct day-to-day operations hospitals. Leadership WalkRounds is a form of intervention being practiced in efforts to improve patient safety culture (Sexton et al., 2018). This includes leaders engaging with frontline operations by periodically observing and interacting more directly in the clinical setting (Sexton et al., 2018). Although evidence is mixed for the effectivity of Leadership WalkRounds, as a standalone intervention, with improving patient safety culture as whole, this will give leaders more of an understanding of frontline workers' perspectives and narrow the disconnect between the groups (Morello et al., 2013).

This study provides evidence displaying a difference in patient safety culture for hospital leadership and frontline workers. Research going forward should aim at further enhancing and fine-tuning these implications. To truly understand the effects of

leadership status on patient safety culture, a study should be done that allows respondents to select if they hold a role in leadership while considered a frontline worker based on occupation (for example: Chief Nursing officer, Chief Medical Officer, or nursing managers). It is common for doctors or nurses to hold some form of leadership role in hospitals. Likewise, it has been found that including doctors in hospital leadership has led to more positive outcomes (Clay-Williams et al., 2017). Additionally, there should be more specific research in patient safety culture to understand the difference between various occupational groups (for example: physicians vs nurses, staff with direct patient contact vs staff with no direct patient contact). Lastly, a follow-up to this study should involve analyzing the difference between leadership and frontline workers after a leadership engagement intervention to theorize if the gap between the two groups could be addressed.

Chapter 5: Paper 3 - Identifying areas of strength and improvement in HSOPS using open comments

Introduction

Patient safety culture is defined by the Agency for Healthcare Resource and Quality as "the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of an organization's health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and my confidence in the efficacy of preventive measures" (Sorra et al., 2018). This concept derives from a key report by the Institute of Medicine in 1999 called "To Err is Human," which stated the necessity for health systems to create a culture aimed at preventing patient harm (Kohn et al., 2000).

Research depicts that prioritizing a greater patient safety culture can lead to more positive health outcomes for patients and perceived work conditions for healthcare staff (DiCuccio, 2015; Sturm et al., 2019). DiCuccio has found that a higher patient safety culture is correlated with improvements in patient family satisfaction, patient experience, medication errors, readmission, community-acquired pneumonia, and mortality (DiCuccio, 2015). Sturm et al. found an association between patient safety culture and perceived work-psychosocial stress and strain, patient-related burnout and longer patient stays and readmissions (Sturm et al., 2019).

Measuring and quantifying patient safety culture has been essential for the past two decades. The two most popular instruments used to measure patient safety culture has been identified as the Safety Attitudes Questionnaire (SAQ) and the Hospital Survey on Patient Safety Culture (HSOPS)(Etchegaray & Thomas, 2012). The Safety Attitudes Questionnaire was developed by Bryan Sexton, Eric Thomas, and Bob Helmreich and is a refined version of the Intensive Care Unit Management Attitudes Questionnaire, which itself was derived from the Flight Management Attitudes Questionnaire (FMAQ). Many of the aspects in the FMAQ were transferable to the medical setting, so they were kept in the SAQ. New items were created by asking healthcare providers and experts. The SAQ has been made for use in intensive care units, operating rooms, general inpatient settings, and ambulatory clinics, with minor changes based on the clinical area. Participants for the SAQ included both full and part-time staff that worked in the unit for at least a month before administering the survey. It is suggested that the individuals participating are either influenced by or an influencer for the "working environment" (Sexton et al., 2006). The Hospital Survey on Patient Safety Culture was first developed by the Agency for Healthcare Research and Quality (AHRQ) in 2004 and with a second version released in 2019. In this survey, 42 items are grouped into 12 composites. These composites include Communication Openness, Feedback and Communication About Error, Frequency of Events Reported, Handoffs and Transitions, Management Support for Patient Safety, Nonpunitive Response to Error, Organizational Learning-Continuous Improvement, Overall Perceptions of Patient Safety, Staffing, Supervisor/Manager Expectations and Actions Promoting Patient Safety, Teamwork Across Units, and Teamwork Within Units. In terms of participants, they are required to know the day-to-day operations of the

hospital, and they should interact with staff in the hospital regularly. The staff does not require contact with patients to participate, for example, pathologists, or even a housekeeper may fill out the survey. The survey can be administered via a paper-based method, web, or a mixed-mode, based on the hospitals' capabilities, and needs. The participants answer survey questions that are answered in a Likert scale (Sorra et al., 2018). This study is interested on the use of the HSOPS measurement tool.

Various studies have analyzed the feasibility and usability of the HSOPS tool in multiple healthcare facilities and countries. AHRQ patient safety culture surveys have been used in nursing homes, primary care facilities, and hospitals (Blumenthal et al., 2018; Bonner et al., 2008; Famolaro et al., 2018). Based on the AHRQ brief on their Surveys on Patient Safety Culture (SOPS), there are five available surveys to assess patient safety culture in different settings. These settings include hospitals, nursing homes, medical offices, community pharmacies, and ambulatory surgical centers ("SOPS: Assessing Patient Safety Culture From a Provider and Staff Perspective," 2022). In addition, the HSOPS measurement tool has been validated for use in the Gaza Strip, Turkey, Croatia, Sweden, China, and Peru (Abu-El-Noor et al., 2019; Arrieta et al., 2018; Bodur & Filiz, 2010; Brborović et al., 2014; Hedsköld et al., 2013; Nie et al., 2013).

Included in the HSOPS is an open-comments section in which respondents are given the opportunity to input their feedback about the survey or additional information they would like to use to supplement their selections. Only one previous study in France by Boussat et al has been conducted to analyze the open-comment section of the HSOPS. Boussat et al.'s research in France on the open-comments was from approximately 5,000 respondents to understand a qualitative understanding of what areas were mentioned in

the comment section (Boussat et al., 2018). Using thematic analysis, they found common concerns in relation to staffing and hospital management (Boussat et al., 2018). Our study will use a combination of topic modeling and sentimental analysis to comprehend common themes and their connections to responses of HSOPS from Latin American hospitals.

Topic models are algorithms for discovering the main themes throughout documents (Blei & McAuliffe, 2007). Three popular methods of topic modelling are the Latent Dirichlet Allocation, Author-Topic model, and the Dynamic Topic models (Curiskis et al., 2020). Latent Dirichlet allocation (LDA) is a generative probabilistic model of a corpus, based on the ideology that documents are random mixtures of latent topics composed of various distributions of words (Blei et al., 2003). Similarly to LDA, an Author-Topic model (AT) generates topics based on a distribution of words throughout a document, however AT models create an additional association between the listed topics and potential authors (Rosen-Zvi et al., 2010). Dynamic Topic models accounts for a chronological topic evolution. This method of topic modeling assumes that topics within a document are built on time slices, where the current time slice t is an evolution of time slice $t-1$ (Alghamdi & Alfalqi, 2015). A sentiment analysis is used to label responses based on opinions into different categories, such as positive or negative (Madhoushi et al., 2015).

The use of topic modeling can evolve the understanding of patient safety culture by highlighting potential feelings not accounted for in surveys. Geert Hofstede proclaims that culture is a mental software that has been programmed by an individual's social

environment (Hofstede & Hofstede, 2005). Social environments are social, economic, and political relationships (Schulz et al., 2005). This implies that culture is difficult to define within the restriction of survey items alone. Using topic modeling on the open-comments section within HSOPS will identify areas of importance (*comments frequently mentioned that are addressed in survey*) and/or areas for improvement (*comments frequently mentioned that are not addressed in the survey*) in either the survey and/or hospital.

Previous research has found that sentimental analysis is a reliable methods for predicting survey responses (Arnulf et al., 2014). We hypothesize that the topics formed in the topic modeling, based on the open comment section of HSOPS, will capture HSOPS composites. This study will formulate areas of strength for HSOPS as well potential gaps in knowledge for further research and enhancement of the tool.

Methods

For this study, we used a 2-step approach to compile data. HSOPS responses were collected from three Latin American countries, Peru, Colombia, and Chile. We then used topic modeling and a sentiment analysis based on the open comments submitted by the participants to develop initial themes and understand whether that perspective was more positive or negative. To account for any bias the researchers may have with previously understanding patient safety culture and themes in measuring tools, we used unsupervised, fully computational and no human decision-making, to decide on topics found in the open comments. The program identified common words and weighted them

based on repetitiveness. Topics were decided based on the words with the highest weights. Although topics weren't named, the program identified the top words for each topic (*As shown in Tables 1A and 1B*). Based on the number of observations for each group, researchers concluded that 7 topics was appropriate for group A and 5 topics was appropriate for group C.

For the sentiment analysis, respondents were placed into three groups: Group A, which was individuals whose comments were more negative, Group B, which was individuals that were neutral, and Group C, which was individuals whose comments were more positive. Like the topic modeling program, the semantic analysis was fully computational and unsupervised. When determining the groups, there was a coherence score calculated that identified if a comment was more negative, neutral, or positive. Scores between 0 and 0.33 were identified as more negative, scores greater than 0.33 and less than 0.66 were identified as neutral, and scores higher than 0.66 were identified as more positive.

The topic modeling and semantic analysis data was merged with the HSOPS responses from the three Latin American countries using the comment responses for matching.

Study Design

This study used the combined 2018 – 2020 Latin America Hospitals HSOPS and topic modeling/sentimental dataset that has been created for this analysis. For our research, we are interested in understanding if the topics identified in the topic modeling are captured within the composites of HSOPS. A logistic regression was conducted using

the sentiment groups as conditional variables (analysis based on group) and comparing the topics to the responses' composite scores to gather the log odds of a topic and the various composites in HSOPS. This portion of the analysis is conducted on Stata 16. The log odds are then converted to probabilities using Microsoft Excel.

Results

We analyzed each group based on the topics created from the topic modeling, semantic analysis, and composite scores throughout HSOPS. We are interested in the individuals who either responded more negative or positive in their comments. Group A, respondents whose comments were more negative resulted in 2,552 observations (*Table 2A*). Group C, whose comments were more positive resulted in 140 observations (*Table 2B*). Each group had it's own specific topics based on the amount of observations and comments.

Table 1A: Topics and Top Words, Group A	
Topics	Key Words For Topic
A1	quali' 'institution' 'must'
A2	unit' do' 'personnel' 'service'
A3	lack' 'personnel' incident' 'do'
A4	be' 'unit' 'personnel' 'respect' 'medic' 'institution'
A5	error' 'personnel' 'incident' 'norm' 'do'
A6	times' 'lack' 'bad' 'much' ten' 'service'
A7	report' ' incident' 'personnel' 'event' 'institution'

Table 1B: Topics and Top Words, Group C	
Topics	Key Words For Topic
C1	personnel' 'capacit' realiz' 'report' 'institution'
C2	personnel' 'process' 'excellent' 'institution' 'give' any'
C3	continue' 'personnel' 'good' 'realiz' 'health'
C4	personnel' 'service' 'labor' 'excellent' 'urgent' 'good'
C5	personnel' 'quali' 'equip' 'comply' 'effort' 'always'

Table 2A: Topics by Observations, Group A (Negative)	
Topics	Observations
1	106
2	183
3	221
4	42
5	450
6	149
7	1,401
Total	2,552

Table 2B: Topics by Observations, Group C (Positive)	
Topics	Observations
1	21
2	20
3	16
4	39
5	44
Total	140

For group A, we found that Topic 1 had statistical significance for the Management Support for Patient Safety composite (OR = 0.536, p-value < 0.01) (*OR* = *odds ratio*). This interprets to the probability that the individuals whose comments were classified as Topic 1 have 0.464 lower odds for a positive response in the Management Support for Patient Safety composite in comparison to other individuals. Topic 2 had statistical significance for the Management Support for Patient Safety (OR = 0.525, p-value < 0.001) and Nonpunitive Response to Error (OR = 1.325, p-value < 0.05) composites. This would interpret as those comments who were classified as Topic 2 would have a 0.325 increase in odds for a positive response for the Nonpunitive Response to Error composite. Topic 3 had statistical significance for the Overall Perceptions of Patient Safety (OR = 0.690, p-value < 0.01) composite. Topic 5 had statistical significance for the Organizational Learning-Continuous Improvement (OR = 0.780, p-value < 0.01), Frequency of Events Reported (OR = 1.186, p-value < 0.01), and Handoffs & Transitions (OR = 1.187, p-value < 0.05) composites. Topic 6 had statistical significance for the Teamwork Within Units (OR = 0.647, p-value < 0.01), Overall Perceptions of Patient Safety (OR = 1.594, p-value < 0.01), and Nonpunitive Response to Error (OR = 1.325, p-value < 0.05) composites (*Table 2*). Topic 7 had statistical significance for the Management Support for Patient Safety (OR = 1.339, p-value < 0.01), Handoffs & Transitions (OR = 0.858, p-value < 0.01), and Nonpunitive Response to Error (OR = 0.796, p-value < 0.001) composites (*Table 3*).

Table 3: Logistic Regression of Topics and HSOPS Composites, Group A							
	Topic A1	Topic A2	Topic A3	Topic A4	Topic A5	Topic A6	Topic A7
Teamwork Within Units	0.816	1.058	1.011	0.856	1.045	0.647**	1.110
Supervisor/Manager Expectations & Actions Promoting Patient Safety	1.364	0.986	1.030	0.910	0.948	0.961	0.991
Organizational Learning—Continuous Improvement	1.093	0.960	1.126	0.897	0.780**	1.126	1.109
Management Support for Patient Safety	0.536**	0.525***	0.957	0.738	1.161	0.818	1.339**

Overall Perceptions of Patient Safety	0.918	0.950	0.690**	0.939	1.041	1.594**	1.030
Feedback & Communication About Error	0.849	1.189	1.116	1.154	0.863	1.250	0.971
Communication Openness	0.780	1.193	1.195	0.602	0.912	0.846	1.063
Frequency of Events Reported	1.078	0.948	0.930	0.827	1.186**	0.927	0.957
Teamwork Across Units	1.079	1.301	1.028	1.577	0.875	1.122	0.930
Staffing	1.214	1.068	0.825	1.162	0.857	0.945	1.114
Handoffs & Transitions	1.255	0.952	1.147	0.999	1.187*	0.937	0.858**
Nonpunitive Response to Error	1.308	1.325*	1.052	1.252	1.036	1.325*	0.796***

For group C, we found that Topic C1 had statistical significance for the Staffing (OR = 0.365, p-value < 0.05) composite. Topic C2 had statistical significance for the Overall Perceptions of Patient Safety (OR = 0.310, p-value < 0.05) composite. Topic C3 had statistical significance for the Management Support for Patient Safety (OR = 0.219,

p-value < 0.05) composite. Topic C4 had statistical significance for the Feedback & Communication About Error (OR = 0.516, p-value < 0.05) composite.

Table 3: Logistic Regression of Topics and HSOPS Composites, Group C					
	Topic C1	Topic C2	Topic C3	Topic C4	Topic C5
Teamwork Within Units	0.621	1.534	3.469	0.986	0.846
Supervisor/Manager Expectations & Actions Promoting Patient Safety	3.208	1.262	0.348	0.520	1.083
Organizational Learning—Continuous Improvement	1.008	1.776	0.292	1.167	1.205
Management Support for Patient Safety	1.354	0.921	0.219 *	2.577	0.618
Overall Perceptions of Patient Safety	2.207	0.310 *	1.103	1.321	0.874
Feedback & Communication About Error	1.035	1.145	2.494	0.516 *	1.354
Communication Openness	0.904	1.108	2.081	0.843	0.762
Frequency of Events Reported	0.959	0.708	0.626	1.619	0.841
Teamwork Across Units	0.925	1.156	5.757	0.802	0.577

Staffing	0.365 *	1.433	0.987	1.094	1.163
Handoffs & Transitions	1.364	1.198	1.505	1.003	0.664
Nonpunitive Response to Error	0.602	1.731	1.797	0.721	1.298

Discussion

This study provides researchers with insight about the potential areas of strengths and gaps of knowledge of the AHRQ Hospital Survey on Patient Safety Culture. Although the programs algorithm of classifying comments into topics was unsupervised, it can be used to guide further supervised studies. We identified various topics of interest based on the open comments provided by respondents in various Latin American countries. This research has identified key topics that are being captured by different composites within HSOPS (composites with statistical significance), such as with Topic C1 being related to the Staffing composite ($OR = 0.365$, p-value < 0.05). Based on Table 1B, we can assume Topic C1 relates to having the appropriate capacity of staff for the institution. It is reasonable for this topic to be captured within the Staffing composite since the staffing composite asks how much do respondents agree with this statement "We have enough staff to handle the workload." This statement would directly address the topic identified. Moreover, it is noteworthy to mention that if a topic was captured within a HSOPS composite this means that this respective composite holds significant weight for respondents. HSOPS does not ask for participants to prioritize the composites

in a list of importance. This study is now allowing for researchers to rate how valuable each composite is for participants.

Alternatively, this study identifies topics that are not captured by any composite within HSOPS. These areas that are not addressed by HSOPS could be concerns that directly affect patient safety culture, and ultimately patient safety. For example, Topic A4 is not captured in any HSOPS composite. Based on Table 1A, we can assume Topic A4 relates to medical staff being respected throughout the institution. Knowing that this topic belongs to Group A, it is also known that comments relating to this topic were more likely to be negative. This result portrays a need for understanding how staff members are respected throughout the entire institution, which is feasible since the survey only asks if staff is respected based on their unit.

Future research should dive deeper into both the topics that were captured and devoid within HSOPS composites. Understanding which composites are more important can assist health administrators and researchers with the creation of interventions to improve areas of patient safety culture. While the topics that are not captured by HSOPS composites can be used to create additional items for HSOPS, either encompassed into current composites or through the creation of new composites. This tool will be very helpful with identifying areas of improvement for hospitals going forward. This study should also be followed up using the HSOPS Version 2.0 that was created in 2019.

Chapter 6: Dissertation Discussion

This dissertation conducted research on patient safety culture in U.S. and Latin American hospitals. In chapter 3, I found that when evaluating hospitals based on size, patient safety culture in U.S. hospitals was affected by Medicaid expansion, an important health policy component of the ACA. Components of culture associated to staffing were reduced in hospitals located in states that expanded Medicaid as proposed in our hypothesis to research question 1.1. This result suggests that the insurance expansion increased staff shortages, affecting the staff perception of safe care. Small hospitals reported a change in patient safety culture composites that related to teamwork. In comparison, large hospital shown a change in the nonpunitive response to error composite. As for our hypothesis for research question 1.2, we were not able to suggest that the emergency department had significant changes in patient safety culture responses based on Medicaid expansion. These results show that resources, such as number of staff and hospital space, should be accounted for when rolling out new health policies to ease any additional burdens.

In chapter 4, I found that leadership and frontline workers in hospitals perceive patient safety culture significantly different, confirming our hypothesis to research question 2.1. In addition, all hospital sizes followed a similar trend to our overall analysis, meaning we do not have enough evidence to accept out hypothesis from research question 2.2. This study demonstrates that there is a disconnect between leadership and frontline workers perceived working environment. Further research should test interventions to narrow any disengagement between hospital leaders and frontline

workers. Supplementary research should include opportunities to make conclusions using data that allows leaders who are considered frontline workers to identify as both occupations. This will allow for an interaction to be considered in any analysis and has the potential to add another dimension to this research. These frontline leaders will be the key in communicating between hospital leadership (who aren't considered frontline workers) and the frontline workers (who aren't considered leaders), possibly bridging a gap in perspectives.

In chapter 5, I discovered that through topic modeling of the open comments of HSOPS, the composites of the survey have correlations with topics of concern, verifying the hypothesis for research question 3.1. By learning this, I have information on what is not being captured in HSOPS. These can be considered areas of improvement for the HSOPS or potentially another patient safety culture measurement tool. Further research should implement composites relating to the topics of concern, to test for validity and if more comments are now captured by the updated tool.

Overall, based on these three studies, it has been shown that there are various factors that can affect patient safety culture in hospitals. These studies have also demonstrated that there is still plenty to learn about patient safety culture. All three of these studies have the potential to influence further research and enhancing patient safety and patient safety culture.

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Appendices

Study 1: The effects of the patient protection and affordable care act on patient safety culture in U.S. Hospitals

"The SOPS® data used in this analysis was provided by the SOPS Database. The SOPS Database is funded by the U.S. Agency for Healthcare Research and Quality (AHRQ) and administered by Westat under Contract Number HHSP233201500026I / HHSP23337004T."

Exhibit 1: Difference-in-Difference Descriptive Statistics

Description: Below is the descriptive statistics for the analysis of this study based on the Difference-in-Difference model. The table is divided into sections depicting responses that are in hospitals within states that have not accepted Medicaid expansion at all, responses that are in hospitals in states that have accepted Medicaid expansion (but for a particular year it has not been adopted yet), and responses that are in hospitals in states that have already accepted and adopted Medicaid expansion.

Exhibit 1: Difference-in-Difference Descriptive Statistics						
	Average Responses in States that Never Accepted Medicaid Expansion	**Average Responses in States that Accepted Medicaid Expansion (pre-acceptance)**	**Average Responses in States that Accepted Medicaid Expansion (post-acceptance)**	**Difference between Responses in States that Never Accepted Medicaid and those that have accepted Medicaid (pre-acceptance)**	**Difference between Responses in States that Never Accepted Medicaid expansion and those that have accepted Medicaid expansion (post-acceptance)**	**Difference between Responses in States that Accepted Medicaid expansion (pre-acceptance) and Responses in States that Accepted Medicaid expansion (post-acceptance)**
Hospitals	1124	246	440			
Respondent	824,176	260,337	339,452			
Bed Size Category*	4.849	5.134	5.027			
Items Groups by Composite (Likert Scale 1-5; 1 = Strong Disagree, 5 = Strongly Agree)						
Teamwork within Units						
People support one another in this unit.	4.146	4.053	4.116	-0.093***	-0.030***	0.064***

When a lot of work needs to be done quickly, we work together as a team to get the work done.	4.158	4.066	4.115	-0.091***	-0.043***	0.049***
In this unit, people treat each other with respect.	3.961	3.854	3.949	-0.107***	-0.012***	0.095***
When one area in this unit gets really busy, others help out.	3.742	3.638	3.709	-0.104***	-0.033***	0.071***
Staffing						
We have enough staff to handle the workload.	3.183	3.135	3.084	-0.047***	-0.099***	-0.051***
Staff in this unit work longer hours than is best for patient care. (negatively worded)	2.683	2.744	2.807	0.062***	0.124***	0.062***
We use more agency/temporary staff than is best for patient care. (negatively worded)	2.14	2.216	2.282	0.075***	0.141***	0.066***
We work in "crisis mode" trying to do too much, too quickly. (negatively worded)	2.789	2.789	2.871	0.073***	0.081***	0.008***

*** = p-value < 0.001

Exhibit 1A: Regression Results and Characteristics

Description: Below are the full regressions for the individual items in the HSOPS. All items are placed into tables based on their composites. There is a total of 12 composites/tables.

Composite 1: Teamwork within Units				
	People support one another in this unit.	When a lot of work needs to be done quickly, we work together as a team to get the work done.	In this unit, people treat each other with respect.	When one area in this unit gets really busy, others help out.
Medicaid Expansion	-0.014*	-0.020	-0.017	-0.015
Bed Size Category 2	0.069***	0.057*	0.070**	0.056*
Bed Size Category 3	0.111***	0.080**	0.097**	0.096***
Bed Size Category 4	0.130***	0.091**	0.112***	0.109***
Bed Size Category 5	0.129***	0.084**	0.106**	0.107***
Bed Size Category 6	0.119***	0.080**	0.097**	0.103***
Bed Size Category 7	0.133***	0.088**	0.113***	0.112***
Bed Size Category 8	0.121***	0.082*	0.099**	0.121***
Hospital Tenure <1 year	-0.064***	-0.085***	-0.095***	-0.027***

Hospital Tenure 1 – 5 years	-0.097***	-0.098***	-0.134***	-0.054***
Hospital Tenure 6 – 10 years	-0.083***	-0.075***	-0.108***	-0.059***
Hospital Tenure 11 – 15 years	-0.062***	-0.50***	-0.081***	-0.043***
Hospital Tenure 16 – 20 years	-0.044***	-0.034***	-0.056***	-0.042***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.157***	0.132***	0.251***	0.187***
Unit Tenure 1 – 5 years	0.047***	0.038***	0.106***	0.042***
Unit Tenure 6 – 10 years	0.021***	0.019***	0.059***	0.020**
Unit Tenure 11 – 15 years	0.026***	0.022***	0.052***	0.025***
Unit Tenure 16 – 20 years	0.018***	0.019***	0.039***	0.023***
Unit Tenure >21 years	Omitted Due to Collinearity	Omitted Due to Collinearity	Omitted Due to Collinearity	Omitted Due to Collinearity
Hours Worked Per Week <20 hours	0.234***	0.171***	0.290***	0.192***
Hours Worked Per Week 20 – 39 hours	0.145***	0.110***	0.147***	0.122***
Hours Worked Per Week 40 – 59 hours	0.123***	0.105***	0.114***	0.100***
Hours Worked Per Week 60 – 79 hours	0.079**	0.058*	0.069*	0.070*
Hours Worked Per Week 80 – 99 hours	0.030	0.031	0.026	0.058*

Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	0.135***	0.089***	0.063***	0.023***
Occupation: Physician Assistant/Nurse Practitioner	0.144***	0.082***	0.155***	0.008
Occupation: LVN/LPN	0.006	-0.048***	-0.024*	-0.080***
Occupation: Patient Care Asst/Hospital Aide/Care Partner	-0.083***	-0.140***	-0.106***	-0.084***
Occupation: Attending/Staff Physician	0.296***	0.152***	0.382***	0.124***
Occupation: Resident Physician/Physician in Training	0.253***	0.133***	0.301***	0.058***
Occupation: Pharmacist	0.042**	-0.031**	0.012	-0.024
Occupation: Dietician	0.054***	0.023	0.076***	0.113***
Occupation: Unit Assistant/Clerk/Secretary	-0.000	0.007	-0.041***	0.016*
Occupation: Respiratory Therapist	0.011	-0.006	-0.041***	0.131***
Occupation: Physical, Occupational, or Speech Therapist	0.370***	0.194***	0.413***	0.213***
Occupation: Technician	-0.036***	-0.011	-0.076***	-0.112***
Occupation: Administration/Management	0.366***	0.332***	0.339***	0.290***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)

Direct Patient Contact: Yes	-0.001	-0.007	-0.028***	-0.010
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	0.023***	-0.012	-0.006	0.066***
Occupation Tenure 1 – 5 years	-0.031***	-0.041***	-0.041***	0.010*
Occupation Tenure 6 – 10 years	-0.072***	-0.062***	-0.073***	-0.048***
Occupation Tenure 11 – 15 years	-0.069***	-0.057***	-0.068***	-0.054***
Occupation Tenure 16 – 20 years	-0.056***	-0.046***	-0.058***	-0.046***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N*)	1,423,965	1,422,422	1,420,789	1,399,899
F-Test	F(37, 1586) = 252.27	F(37, 1586) = 211.40	F(37, 1586) = 271.59	F(37, 1586) = 204.75
R^2	0.054	0.043	0.056	0.036
Adjusted R^2	0.053	0.042	0.055	0.035
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse				

Composite 2: Supervisor/Manager Expectations & Actions Promoting Patient Safety				
	My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures	My supervisor/manager seriously considers staff suggestions for improving patient safety.	Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts. (negatively worded)	My supervisor/manager overlooks patient safety problems that happen over and over. (negatively worded)
Medicaid Expansion	-0.013	-0.006	-0.014	-0.011
Bed Size Category 2	0.070	0.105*	-0.032	-0.048
Bed Size Category 3	0.093	0.132*	-0.036	-0.068
Bed Size Category 4	0.105*	0.137*	-0.031	-0.069
Bed Size Category 5	0.110*	0.141*	-0.031	-0.069
Bed Size Category 6	0.113*	0.130*	-0.019	-0.057

Bed Size Category 7	0.118*	0.137*	-0.029	-0.067
Bed Size Category 8	0.107*	0.132*	-0.013	-0.052
Hospital Tenure <1 year	-0.0120***	-0.129***	0.052***	0.100***
Hospital Tenure 1 – 5 years	-0.153***	-0.157***	0.076***	0.117***
Hospital Tenure 6 – 10 years	-0.114***	-0.126***	0.070***	0.110***
Hospital Tenure 11 – 15 years	-0.081***	-0.090***	0.054***	0.085***
Hospital Tenure 16 – 20 years	-0.057***	-0.062***	0.041***	0.056***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.320***	0.291***	-0.211***	-0.204***
Unit Tenure 1 – 5 years	0.143***	0.125***	-0.085***	-0.106***
Unit Tenure 6 – 10 years	0.065***	0.058***	-0.031***	-0.063***

Unit Tenure 11 – 15 years	0.045***	0.041***	-0.0193***	-0.051***
Unit Tenure 16 – 20 years	0.028***	0.026***	-0.011	-0.020**
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.238***	0.219***	-0.170***	-0.188***
Hours Worked Per Week 20 – 39 hours	0.104**	0.103**	-0.100**	-0.121***
Hours Worked Per Week 40 – 59 hours	0.140***	0.130***	-0.115***	-0.148***
Hours Worked Per Week 60 – 79 hours	0.092**	0.080*	-0.057	-0.073*
Hours Worked Per Week 80 – 99 hours	0.101**	0.075*	-0.041	-0.064*
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	-0.076***	-0.028***	0.018**	0.056***
Occupation: Physician Assistant/Nurse Practitioner	-0.051**	0.060***	-0.022	-0.031*

Occupation: LVN/LPN	-0.042***	-0.028*	-0.050***	0.018
Occupation: Patient Care Asst/Hospital Aide/Care Partner	-0.030***	0.012	-0.049***	0.068***
Occupation: Attending/Staff Physician	-0.011	0.143***	-0.024*	-0.093***
Occupation: Resident Physician/Physician in Training	-0.024	0.146***	0.061***	-0.0129
Occupation: Pharmacist	-0.136***	0.010	-0.097***	-0.0127
Occupation: Dietician	0.021***	0.097***	0.018	-0.007
Occupation: Unit Assistant/Clerk/Secretary	0.022***	0.039	-0.104***	-0.055***
Occupation: Respiratory Therapist	-0.137***	-0.133***	0.123***	0.134***
Occupation: Physical, Occupational, or Speech Therapist	0.083***	0.247***	-0.183***	-0.244***
Occupation: Technician	-0.154***	-0.083***	-0.048***	0.009

Occupation: Administration/Management	0.281***	0.359***	-0.320***	-0.327***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	-0.049***	-0.032***	0.024***	0.002
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	-0.017**	-0.0131*	0.036***	0.099***
Occupation Tenure 1 – 5 years	-0.055***	-0.055***	0.045***	0.102***
Occupation Tenure 6 – 10 years	-0.066***	-0.075***	0.061***	0.103***
Occupation Tenure 11 – 15 years	-0.051***	-0.064***	0.047***	0.086***
Occupation Tenure 16 – 20 years	-0.032***	-0.050***	0.036***	0.063***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N)*	1,372,778	1,366,193	1,373,642	1,364,235

F-Test	F(37, 1586) = 261.70	F(37, 1579) = 238.84	F(37, 1586) = 131.03	F(37, 1586) = 195.34
R^2	0.049	0.049	0.043	0.035
Adjusted R^2	0.048	0.048	0.042	0.033
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse				

Composite 3: Organizational Learning-Continuous Improvement			
	We are actively doing things to improve patient safety.	Mistakes have led to positive changes here.	After we make changes to improve patient safety, we evaluate their effectiveness.
Medicaid Expansion	-0.017	0.000	-0.007
Bed Size Category 2	0.039	0.032	0.030
Bed Size Category 3	0.072*	0.047	0.047
Bed Size Category 4	0.084*	0.056	0.061
Bed Size Category 5	0.074	0.056	0.058
Bed Size Category 6	0.051	0.043	0.039
Bed Size Category 7	0.056	0.057	0.048
Bed Size Category 8	0.073	0.069	0.059
Hospital Tenure <1 year	-0.102***	-0.109***	-0.097***
Hospital Tenure 1 – 5 years	-0.118***	-0.114***	-0.117***
Hospital Tenure 6 – 10 years	-0.098***	-0.087***	-0.097***
Hospital Tenure 11 – 15 years	-0.072***	-0.060***	-0.067***

Hospital Tenure 16 – 20 years	-0.046***	-0.043***	-0.044***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.148***	0.043***	0.142***
Unit Tenure 1 – 5 years	0.074***	0.009	0.059***
Unit Tenure 6 – 10 years	0.048***	0.004	0.034***
Unit Tenure 11 – 15 years	0.038***	0.008	0.025***
Unit Tenure 16 – 20 years	0.021***	0.000	0.014*
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.099***	0.091***	0.114***
Hours Worked Per Week 20 – 39 hours	0.049	0.048*	0.049
Hours Worked Per Week 40 – 59 hours	0.073**	0.079***	0.056*
Hours Worked Per Week 60 – 79 hours	0.073**	0.075**	0.053*
Hours Worked Per Week 80 – 99 hours	0.057*	0.047	0.057*
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	0.006	0.037***	0.006***
Occupation: Physician Assistant/Nurse Practitioner	-0.001	0.056***	-0.065***

Occupation: LVN/LPN	0.044***	0.010	0.081***
Occupation: Patient Care Asst/Hospital Aide/Care Partner	0.073***	0.030***	0.113***
Occupation: Attending/Staff Physician	0.096***	0.178***	-0.099***
Occupation: Resident Physician/Physician in Training	0.000	0.198***	-0.068***
Occupation: Pharmacist	0.129***	0.259***	-0.137***
Occupation: Dietician	0.002	0.032**	0.027*
Occupation: Unit Assistant/Clerk/Secretary	0.040***	0.011	0.065***
Occupation: Respitory Therapist	-0.132***	-0.097***	-0.095***
Occupation: Physical, Occupational, or Speech Therapist	0.174***	0.074	0.057***
Occupation: Technician	0.000	0.010	-0.044***
Occupation: Administration/Management	0.273***	0.362***	0.233***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	0.020***	-0.039***	0.019***
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	0.034***	0.040***	0.031***
Occupation Tenure 1 – 5 years	-0.011***	-0.011**	-0.009**

Occupation Tenure 6 – 10 years	-0.044***	-0.050***	-0.046***
Occupation Tenure 11 – 15 years	-0.041***	-0.050***	-0.039***
Occupation Tenure 16 – 20 years	-0.035***	-0.043***	-0.032***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N)*	1,401,278	1,399,793	1,386,051
F-Test	F(37, 1587) = 148.28	F(37, 1587) = 161.01	F(37, 1587) = 132.30
R^2	0.036	0.038	0.040
Adjusted R^2	0.035	0.036	0.039
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse			

Composite 4: Management Support for Patient Safety			
	Hospital management provides a work climate that promotes patient safety.	The actions of hospital management show that patient safety is a top priority.	Hospital management seems interested in patient safety only after an adverse event happens. (negatively worded)
Medicaid Expansion	-0.005	0.010	-0.014
Bed Size Category 2	0.061	0.058*	-0.026

Bed Size Category 3	0.092*	0.089**	-0.064
Bed Size Category 4	0.095*	0.091**	-0.059
Bed Size Category 5	0.091*	0.087*	-0.046
Bed Size Category 6	0.058	0.044	-0.015
Bed Size Category 7	0.061	0.043	-0.027
Bed Size Category 8	0.092	0.086*	-0.052
Hospital Tenure <1 year	-0.004	-0.001	-0.008
Hospital Tenure 1 – 5 years	-0.107***	-0.112***	0.107***
Hospital Tenure 6 – 10 years	-0.117***	-0.125***	0.131***
Hospital Tenure 11 – 15 years	-0.090***	-0.101***	0.105***
Hospital Tenure 16 – 20 years	-0.063***	-0.068***	0.078***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.191***	0.145***	-0.157***
Unit Tenure 1 – 5 years	0.091***	0.062***	-0.075***
Unit Tenure 6 – 10 years	0.070***	0.056***	-0.068***
Unit Tenure 11 – 15 years	0.052***	0.043***	-0.051***
Unit Tenure 16 – 20 years	0.031*	0.024***	-0.036***

Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.262***	0.228***	-0.273***
Hours Worked Per Week 20 – 39 hours	0.136***	0.114***	-0.168***
Hours Worked Per Week 40 – 59 hours	0.169***	0.151***	-0.182***
Hours Worked Per Week 60 – 79 hours	0.111***	0.109***	-0.097**
Hours Worked Per Week 80 – 99 hours	0.135***	0.141***	-0.081*
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	-0.301***	-0.282***	0.202***
Occupation: Physician Assistant/Nurse Practitioner	-0.168***	-0.187***	0.113***
Occupation: LVN/LPN	0.148***	-0.120***	0.079***
Occupation: Patient Care Asst/Hospital Aide/Care Partner	-0.053***	0.009	0.050***
Occupation: Attending/Staff Physician	-0.157***	-0.171***	0.057***
Occupation: Resident Physician/Physician in Training	-0.075***	-0.151***	0.078***
Occupation: Pharmacist	-0.257***	-0.208***	0.176***
Occupation: Dietician	0.005	0.011	-0.013
Occupation: Unit Assistant/Clerk/Secretary	-0.009	0.005	-0.038***

Occupation: Respitory Therapist	-0.227***	-0.261***	0.214***
Occupation: Physical, Occupational, or Speech Therapist	0.032**	-0.011	-0.078***
Occupation: Technician	-0.083***	-0.084***	0.070***
Occupation: Administration/Management	0.215***	0.224***	-0.288***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	-0.054	-0.068***	0.084***
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	0.002	-0.004	0.129***
Occupation Tenure 1 – 5 years	-0.050***	-0.072***	0.181***
Occupation Tenure 6 – 10 years	-0.079***	-0.102***	0.189***
Occupation Tenure 11 – 15 years	-0.059***	-0.078***	0.138***
Occupation Tenure 16 – 20 years	-0.044***	-0.060***	0.102***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N)*	1,389,211	1,371,807	1,363,449
F-Test	F(37, 1587) = 193.26	F(37, 1581) = 179.45	F(37, 1581) = 247.40
R^2	0.087	0.079	0.059

Adjusted R^2	0.086	0.078	0.057
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse			

Composite 5: Overall Perceptions of Patient Safety				
	My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures	My supervisor/manager seriously considers staff suggestions for improving patient safety.	Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts. (negatively worded)	My supervisor/manager overlooks patient safety problems that happen over and over. (negatively worded)
Medicaid Expansion	-0.007	-0.001	-0.007	-0.004
Bed Size Category 2	0.063	0.011	-0.039	-0.061
Bed Size Category 3	0.095	0.026	-0.063	-0.096
Bed Size Category 4	0.098	0.034	-0.066	-0.108
Bed Size Category 5	0.094	0.28	-0.064	-0.105
Bed Size Category 6	0.063	0.011	-0.041	-0.087

Bed Size Category 7	0.087	0.027	-0.058	-0.108
Bed Size Category 8	0.105	0.046	-0.074	-0.132
Hospital Tenure <1 year	-0.050***	-0.089***	0.089***	0.124***
Hospital Tenure 1 – 5 years	-0.122***	-0.110***	0.103***	0.151***
Hospital Tenure 6 – 10 years	-0.134***	-0.093***	0.107***	0.139***
Hospital Tenure 11 – 15 years	0.107***	-0.072***	0.085***	0.103***
Hospital Tenure 16 – 20 years	-0.073***	-0.048***	0.060***	0.067***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.281***	0.089***	-0.261***	-0.305***
Unit Tenure 1 – 5 years	0.144***	0.016**	-0.136***	-0.166***
Unit Tenure 6 – 10 years	0.111***	0.016**	-0.093***	-0.121***

Unit Tenure 11 – 15 years	0.084***	0.025***	-0.075***	-0.092***
Unit Tenure 16 – 20 years	0.048***	0.013*	-0.047***	-0.058***
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.155***	0.174***	-0.258***	-0.242***
Hours Worked Per Week 20 – 39 hours	0.020	0.091**	-0.140***	-0.103***
Hours Worked Per Week 40 – 59 hours	0.087**	0.082**	-0.153***	-0.141***
Hours Worked Per Week 60 – 79 hours	0.011	0.041	-0.046	-0.025
Hours Worked Per Week 80 – 99 hours	0.058	0.037	-0.007	-0.040
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	-0.411***	-0.078***	0.010	0.326***
Occupation: Physician Assistant/Nurse Practitioner	-0.224***	-0.058***	-0.129***	0.144***

Occupation: LVN/LPN	-0.123***	0.011	-0.036**	0.154***
Occupation: Patient Care Asst/Hospital Aide/Care Partner	-0.141***	0.018*	0.156***	0.185***
Occupation: Attending/Staff Physician	-0.195***	-0.020*	-0.180***	0.139***
Occupation: Resident Physician/Physician in Training	-0.300***	0.038**	-0.197***	0.079***
Occupation: Pharmacist	-0.316***	-0.056***	-0.026	0.231***
Occupation: Dietician	-0.055***	-0.009	-0.100***	0.009
Occupation: Unit Assistant/Clerk/Secretary	0.017**	0.027***	-0.035***	-0.006
Occupation: Respitory Therapist	-0.382***	-0.092***	0.063***	0.172***
Occupation: Physical, Occupational, or Speech Therapist	0.171***	0.118***	-0.468***	-0.216***
Occupation: Technician	-0.038***	0.056***	-0.082***	-0.040***

Occupation: Administration/Management	0.125***	0.171***	-0.400***	-0.211***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	-0.015**	0.016***	-0.019***	0.044***
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	-0.059***	0.051***	0.051***	0.047***
Occupation Tenure 1 – 5 years	-0.108***	-0.002	0.062***	0.074***
Occupation Tenure 6 – 10 years	-0.126***	-0.046***	0.099***	0.086***
Occupation Tenure 11 – 15 years	-0.093***	-0.048***	0.093***	0.064***
Occupation Tenure 16 – 20 years	-0.062***	0.048***	0.074***	0.047***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N)*	1,387,404	1,405,105	1,397,588	1,380,334

F-Test	F(37, 1587) = 247.31	F(37, 1587) = 144.55	F(37, 1586) = 203.71	F(37, 1586) = 257.66
R^2	0.067	0.035	0.047	0.068
Adjusted R^2	0.066	0.034	0.046	0.067
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse				

Composite 6: Feedback & Communication About Error			
	We are given feedback about changes put into place based on event reports.	We are informed about errors that happen in this unit.	In this unit, we discuss ways to prevent errors from happening again.
Medicaid Expansion	-0.022	-0.000	-0.003
Bed Size Category 2	0.067*	0.058*	0.066
Bed Size Category 3	0.097*	0.092**	0.086*
Bed Size Category 4	0.110**	0.113***	0.099*

Bed Size Category 5	0.110*	0.109***	0.097*
Bed Size Category 6	0.081	0.086**	0.075
Bed Size Category 7	0.097*	0.103**	0.092*
Bed Size Category 8	0.119**	0.115***	0.098*
Hospital Tenure <1 year	-0.090***	-0.083***	-0.136***
Hospital Tenure 1 – 5 years	-0.134***	-0.110***	-0.159***
Hospital Tenure 6 – 10 years	-0.117***	-0.101***	-0.129***
Hospital Tenure 11 – 15 years	-0.080***	-0.070***	-0.096***
Hospital Tenure 16 – 20 years	-0.055***	-0.053***	-0.065***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.237***	0.213***	0.217***

Unit Tenure 1 – 5 years	0.077***	0.098***	0.093***
Unit Tenure 6 – 10 years	0.034***	0.060***	0.051***
Unit Tenure 11 – 15 years	0.022***	0.041***	0.042***
Unit Tenure 16 – 20 years	0.012	0.029***	0.027***
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.203***	0.043	0.161***
Hours Worked Per Week 20 – 39 hours	0.060*	-0.011	0.085**
Hours Worked Per Week 40 – 59 hours	0.064*	0.034	0.112***
Hours Worked Per Week 60 – 79 hours	0.048	0.017	0.086**
Hours Worked Per Week 80 – 99 hours	0.063*	0.046	0.096***
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)

Occupation: Registered Nurse	-0.054***	-0.169***	-0.068***
Occupation: Physician Assistant/Nurse Practitioner	-0.137***	-0.263***	-0.085***
Occupation: LVN/LPN	0.028*	-0.067***	0.020
Occupation: Patient Care Asst/Hospital Aide/Care Partner	0.121***	0.102	0.096***
Occupation: Attending/Staff Physician	-0.105***	-0.195***	-0.020
Occupation: Resident Physician/Physician in Training	-0.125***	-0.299***	-0.111***
Occupation: Pharmacist	-0.076	-0.030	-0.020
Occupation: Dietician	0.015	-0.051**	0.032*
Occupation: Unit Assistant/Clerk/Secretary	0.097***	0.102***	0.085***
Occupation: Respitory Therapist	-0.110***	-0.081***	-0.160***
Occupation: Physical, Occupational, or Speech Therapist	0.093***	-0.064***	0.122***

Occupation: Technician	-0.082***	-0.011	-0.034***
Occupation: Administration/Management	0.250***	0.211***	0.282***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	-0.006	0.001	-0.015**
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	0.017**	0.080***	0.049***
Occupation Tenure 1 – 5 years	-0.032***	0.028***	-0.001
Occupation Tenure 6 – 10 years	-0.065***	-0.011**	-0.038***
Occupation Tenure 11 – 15 years	-0.050***	-0.014***	-0.035***
Occupation Tenure 16 – 20 years	-0.040***	-0.009*	-0.028***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)

Sample Size (*N)*	1,367,231	1,367,768	1,375,920
F-Test	F(37, 1586) = 208.96	F(37, 1586) = 171.48	F(37, 1586) = 181.76
R^2	0.052	0.051	0.044
Adjusted R^2	0.051	0.050	0.043
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse			

Composite 7: Communication Openness			
	Staff will freely speak up if they see something that may negatively affect patient care.	Staff feel free to question the decisions or actions of those with more authority.	Staff are afraid to ask questions when something does not seem right. (negatively worded)
Medicaid Expansion	-0.013	-0.016	0.002
Bed Size Category 2	0.017	0.053	-0.027
Bed Size Category 3	0.012	0.046	0.004

Bed Size Category 4	0.023	0.049	0.006
Bed Size Category 5	0.019	0.051	0.018
Bed Size Category 6	0.008	0.031	0.033
Bed Size Category 7	0.006	0.035	0.026
Bed Size Category 8	0.014	0.049	0.051
Hospital Tenure <1 year	-0.138***	-0.167***	0.076***
Hospital Tenure 1 – 5 years	-0.166***	-0.186***	0.117***
Hospital Tenure 6 – 10 years	-0.139**	-0.148***	0.113***
Hospital Tenure 11 – 15 years	-0.101***	-0.104***	0.088***
Hospital Tenure 16 – 20 years	-0.074***	-0.072***	0.069***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)

Unit Tenure <1 year	0.223***	0.262***	-0.234***
Unit Tenure 1 – 5 years	0.112***	0.092***	-0.111***
Unit Tenure 6 – 10 years	0.074***	0.040***	-0.062***
Unit Tenure 11 – 15 years	0.058***	0.034***	-0.047***
Unit Tenure 16 – 20 years	0.041***	0.017*	-0.035***
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.156***	0.228***	-0.220***
Hours Worked Per Week 20 – 39 hours	0.086**	0.062*	-0.119***
Hours Worked Per Week 40 – 59 hours	0.120***	0.107***	-0.112***
Hours Worked Per Week 60 – 79 hours	0.068*	0.079**	-0.046
Hours Worked Per Week 80 – 99 hours	0.082**	0.092***	-0.026

Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	-0.053***	0.054***	-0.013*
Occupation: Physician Assistant/Nurse Practitioner	-0.031**	0.214***	-0.073***
Occupation: LVN/LPN	-0.000	-0.054	-0.022*
Occupation: Patient Care Asst/Hospital Aide/Care Partner	0.004	-0.042***	0.013
Occupation: Attending/Staff Physician	-0.046***	0.365***	-0.148***
Occupation: Resident Physician/Physician in Training	-0.016	0.357***	-0.135***
Occupation: Pharmacist	-0.051***	0.137***	-0.137***
Occupation: Dietician	0.031*	0.170***	-0.081***
Occupation: Unit Assistant/Clerk/Secretary	0.074***	-0.004	-0.066***
Occupation: Respitory Therapist	-0.072***	-0.009	0.054***

Occupation: Physical, Occupational, or Speech Therapist	0.192***	0.251***	-0.268***
Occupation: Technician	-0.009	-0.086***	-0.025***
Occupation: Administration/Management	0.227***	0519***	-0.292***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	0.031***	-0.055***	0.023***
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	-0.036***	-0.038***	0.000
Occupation Tenure 1 – 5 years	-0.058***	-0.069***	0.031***
Occupation Tenure 6 – 10 years	-0.069***	-0.092***	0.061***
Occupation Tenure 11 – 15 years	-0.056***	-0.074***	0.053***
Occupation Tenure 16 – 20 years	-0.045***	-0.059***	0.046***

Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N*)	1,373,356	1,375,177	1,380,042
F-Test	F(37, 1586) = 194.96	F(37, 1585) = 302.18	F(37, 1585) = 175.80
R^2	0.035	0.045	0.031
Adjusted R^2	0.034	0.044	0.030
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse			

Composite 8: Frequency of Events Reported			
	When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?	When a mistake is made, but has no potential to harm the patient, how often is this reported?	When a mistake is made that could harm the patient, but does not, how often is this reported?
Medicaid Expansion	-0.005	-0.017	-0.006
Bed Size Category 2	0.041*	0.043*	0.029

Bed Size Category 3	0.039	0.053*	0.031
Bed Size Category 4	0.051*	0.071**	0.042*
Bed Size Category 5	0.043	0.067**	0.032
Bed Size Category 6	0.025	0.048	0.019
Bed Size Category 7	0.043	0.068*	0.026
Bed Size Category 8	0.070**	0.079	0.033
Hospital Tenure <1 year	-0.044***	-0.065***	-0.063***
Hospital Tenure 1 – 5 years	-0.085***	-0.099***	-0.090***
Hospital Tenure 6 – 10 years	-0.066***	-0.074***	-0.081***
Hospital Tenure 11 – 15 years	-0.053***	-0.053***	-0.064***
Hospital Tenure 16 – 20 years	-0.032***	-0.040***	-0.049***

Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.160***	0.154***	0.133***
Unit Tenure 1 – 5 years	0.081***	0.082***	0.072***
Unit Tenure 6 – 10 years	0.050***	0.053***	0.049***
Unit Tenure 11 – 15 years	0.038***	0.039***	0.045***
Unit Tenure 16 – 20 years	0.014*	0.020**	0.028***
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.012	0.019	0.069*
Hours Worked Per Week 20 – 39 hours	-0.019	0.006	0.065*
Hours Worked Per Week 40 – 59 hours	0.023	0.034	0.084**
Hours Worked Per Week 60 – 79 hours	0.032	0.033	0.062*

Hours Worked Per Week 80 – 99 hours	0.083**	0.085**	0.078**
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	-0.151***	0.001	0.017*
Occupation: Physician Assistant/Nurse Practitioner	-0.259***	-0.175***	-0.105***
Occupation: LVN/LPN	0.091***	0.222***	0.174***
Occupation: Patient Care Asst/Hospital Aide/Care Partner	0.154***	0.155***	0.099***
Occupation: Attending/Staff Physician	-0.293***	-0.287***	-0.126***
Occupation: Resident Physician/Physician in Training	-0.387***	-0.362***	-0.215***
Occupation: Pharmacist	-0.493***	-0.258***	-0.053***
Occupation: Dietician	-0.162***	-0.191***	-0.089***
Occupation: Unit Assistant/Clerk/Secretary	0.113***	0.131***	0.137***

Occupation: Respitory Therapist	-0.243***	-0.215***	-0.147***
Occupation: Physical, Occupational, or Speech Therapist	-0.127***	-0.144***	-0.019***
Occupation: Technician	-0.071***	-0.008	-0.097***
Occupation: Administration/Management	0.046***	0.090***	0.145***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	-0.046***	-0.022***	0.005
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	-0.043***	-0.061***	-0.055***
Occupation Tenure 1 – 5 years	-0.054***	-0.057***	-0.059***
Occupation Tenure 6 – 10 years	-0.050***	-0.046***	-0.064***
Occupation Tenure 11 – 15 years	-0.022***	-0.018***	-0.050***

Occupation Tenure 16 – 20 years	-0.008	-0.006	-0.031***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N*)	1,325,063	1,320,993	1,317,590
F-Test	F(37, 1585) = 153.17	F(37, 1585) = 106.69	F(37, 1585) = 91.22
R^2	0.046	0.036	0.027
Adjusted R^2	0.045	0.035	0.026

*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05;
LPN = Licensed Practical Nurse
LVN = Licensed Vocational Nurse

Composite 9: Teamwork Across Units				
	There is good cooperation among hospital units that need to work together.	Hospital units work well together to provide the best care for patients.	Hospital units do not coordinate well with each other. (negatively worded)	It is often unpleasant to work with staff from other hospital units. (negatively worded)
Medicaid Expansion	-0.003	0.001	-0.005	-0.004

Bed Size Category 2	0.032	0.057*	-0.040	-0.018
Bed Size Category 3	0.051*	0.072*	-0.060	-0.026
Bed Size Category 4	0.071**	0.090**	-0.069	-0.046
Bed Size Category 5	0.059*	0.077*	-0.054	-0.041
Bed Size Category 6	0.039	0.055	-0.036	-0.029
Bed Size Category 7	0.051	0.057	-0.056	-0.041
Bed Size Category 8	0.064*	0.083*	-0.072	-0.041
Hospital Tenure <1 year	-0.009	0.002***	-0.016	0.006
Hospital Tenure 1 – 5 years	-0.116***	-0.105***	0.123***	0.098***
Hospital Tenure 6 – 10 years	-0.108***	-0.100***	0.119***	0.099***
Hospital Tenure 11 – 15 years	-0.081***	-0.073***	0.088***	0.079***

Hospital Tenure 16 – 20 years	-0.055***	-0.053***	0.066***	0.055***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.112***	0.093***	-0.118***	-0.152***
Unit Tenure 1 – 5 years	0.036***	0.023***	-0.034***	-0.076***
Unit Tenure 6 – 10 years	0.024***	0.018***	-0.024***	-0.046***
Unit Tenure 11 – 15 years	0.025***	0.017**	-0.028***	-0.040***
Unit Tenure 16 – 20 years	0.016**	0.014*	-0.026***	-0.030***
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.206***	0.172***	-0.260***	-0.227***
Hours Worked Per Week 20 – 39 hours	0.076**	0.069**	-0.094***	-0.146***
Hours Worked Per Week 40 – 59 hours	0.075*	0.071**	-0.073*	-0.124***

Hours Worked Per Week 60 – 79 hours	0.056	0.062*	-0.024	-0.097**
Hours Worked Per Week 80 – 99 hours	0.067*	0.078**	-0.019	-0.065*
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	-0.184***	-0.203***	0.147***	0.032***
Occupation: Physician Assistant/Nurse Practitioner	-0.074***	-0.148***	0.060***	-0.027*
Occupation: LVN/LPN	-0.123***	-0.099***	0.083***	0.030**
Occupation: Patient Care Asst/Hospital Aide/Care Partner	-0.033***	0.002	0.024**	0.045***
Occupation: Attending/Staff Physician	-0.037***	-0.137***	0.074***	-0.108***
Occupation: Resident Physician/Physician in Training	0.095***	-0.050**	-0.109***	-0.109***
Occupation: Pharmacist	-0.153***	-0.193***	0.130***	-0.027*
Occupation: Dietician	0.051***	-0.005	-0.098***	-0.110***

Occupation: Unit Assistant/Clerk/Secretary	-0.023***	-0.009	-0.026***	-0.022***
Occupation: Respitory Therapist	0.013	-0.045***	-0.022	-0.076***
Occupation: Physical, Occupational, or Speech Therapist	0.0156	-0.045***	-0.043***	-0.169***
Occupation: Technician	-0.086***	-0.088***	0.087***	0.073***
Occupation: Administration/Management	0.122***	0.100	-0.166***	-0.191***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	-0.024***	-0.014***	0.040***	-0.017***
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	0.002	0.031***	0.009	0.056***
Occupation Tenure 1 – 5 years	-0.054***	-0.027***	0.066***	0.081***
Occupation Tenure 6 – 10 years	-0.075***	-0.055***	0.079***	0.094***

Occupation Tenure 11 – 15 years	-0.059***	-0.038***	0.056***	0.071***
Occupation Tenure 16 – 20 years	-0.047***	-0.032***	0.046***	0.056***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N)*	1,356,682	1,350,553	1,365,131	1,348,425
F-Test	F(37, 1585) = 216.84	F(37, 1585) = 198.68	F(37, 1581) = 196.44	F(37, 1581) = 162.79
R^2	0.049	0.056	0.051	0.036
Adjusted R^2	0.048	0.055	0.050	0.035

*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05;
LPN = Licensed Practical Nurse
LVN = Licensed Vocational Nurse

Composite 10: Staffing				
	We have enough staff to handle the workload.	Staff in this unit work longer hours than is best for patient care. (negatively worded	We use more agency/temporary staff than is best for patient care. (negatively worded)	We work in "crisis mode" trying to do too much, too

				quickly. (negatively worded)
Medicaid Expansion	0.003	-0.013	-0.020	-0.002
Bed Size Category 2	0.068	-0.007	-0.018	-0.032
Bed Size Category 3	0.068	-0.018	-0.011	-0.050
Bed Size Category 4	0.036	0.001	-0.011	-0.035
Bed Size Category 5	0.004	-0.006	-0.017	-0.022
Bed Size Category 6	-0.035	0.003	0.019	-0.004
Bed Size Category 7	-0.015	-0.009	-0.014	-0.009
Bed Size Category 8	0.022	-0.010	-0.022	-0.022
Hospital Tenure <1 year	-0.222***	0.083***	0.164***	0.054***
Hospital Tenure 1 – 5 years	-0.257***	0.069***	0.123***	0.092***

Hospital Tenure 6 – 10 years	-0.191***	0.056***	0.074***	0.095***
Hospital Tenure 11 – 15 years	-0.120***	0.041***	0.043***	0.070***
Hospital Tenure 16 – 20 years	-0.077***	0.029***	0.025***	0.049***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	0.450***	-0.138***	-0.143***	-0.319***
Unit Tenure 1 – 5 years	0.216***	-0.082***	-0.155***	-0.143***
Unit Tenure 6 – 10 years	0.148***	-0.062***	-0.081***	-0.085***
Unit Tenure 11 – 15 years	0.107***	-0.050***	-0.055***	-0.066***
Unit Tenure 16 – 20 years	0.064***	-0.029***	-0.038***	-0.029***
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	0.466***	-0.249***	-0.092**	-0.339***

Hours Worked Per Week 20 – 39 hours	0.231***	-0.280***	-0.133***	-0.188***
Hours Worked Per Week 40 – 59 hours	0.185***	-0.200***	-0.150***	-0.159***
Hours Worked Per Week 60 – 79 hours	0.088*	-0.044	-0.062	-0.031
Hours Worked Per Week 80 – 99 hours	0.110**	-0.016	-0.020	-0.053
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	-0.025*	-0.064***	-0.218***	0.134***
Occupation: Physician Assistant/Nurse Practitioner	0.095***	-0.038**	-0.160***	-0.048***
Occupation: LVN/LPN	-0.079***	-0.045**	-0.142***	0.046***
Occupation: Patient Care Asst/Hospital Aide/Care Partner	-0.180***	0.121***	0.017*	0.086***
Occupation: Attending/Staff Physician	0.145***	-0.069***	0.087***	-0.118***
Occupation: Resident Physician/Physician in Training	0.515***	-0.128***	0.008	-0.195***

Occupation: Pharmacist	-0.032	-0.258***	-0.375***	0.062***
Occupation: Dietician	0.126***	-0.090***	-0.096***	-0.111***
Occupation: Unit Assistant/Clerk/Secretary	0.001	-0.037***	-0.102***	-0.114***
Occupation: Respitory Therapist	-0.069**	-0.144***	-0.223***	0.142***
Occupation: Physical, Occupational, or Speech Therapist	0.217***	-0.229***	-0.243***	-0.345***
Occupation: Technician	0.005	-0.169***	-0.244***	0.026**
Occupation: Administration/Management	0.347***	-0.282***	-0.352***	-0.206
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	-0.048***	-0.000	-0.108***	-0.043***
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	-0.113***	0.128***	0.249***	0.055***

Occupation Tenure 1 – 5 years	-0.135***	0.082***	0.168***	0.065***
Occupation Tenure 6 – 10 years	-0.113***	0.058***	0.104***	0.077***
Occupation Tenure 11 – 15 years	-0.067***	0.049***	0.064***	0.060***
Occupation Tenure 16 – 20 years	-0.043***	0.037***	0.042***	0.046***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N)*	1,420,600	1,384,050	1,354,093	1,399,075
F-Test	F(37, 1581) = 202.92	F(37, 1581) = 123.74	F(37, 1581) = 197.70	F(37, 1586) = 176.39
R^2	0.063	0.037	0.073	0.049
Adjusted R^2	0.061	0.036	0.072	0.048
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse				

Composite 11: Handoffs & Transitions				
	Things "fall between the cracks" when transferring patients from one unit to another. (negatively worded)	Important patient care information is often lost during shift changes. (negatively worded)	Problems often occur in the exchange of information across hospital units. (negatively worded)	Shift changes are problematic for patients in this hospital. (negatively worded)
Medicaid Expansion	-0.008	-0.005	-0.001	0.003
Bed Size Category 2	-0.041	-0.040	-0.025	-0.013
Bed Size Category 3	-0.061	-0.063	-0.045	-0.048
Bed Size Category 4	-0.075*	-0.075*	-0.065	-0.060
Bed Size Category 5	-0.060	-0.072*	-0.052	-0.048
Bed Size Category 6	-0.052	-0.057	-0.035	-0.026
Bed Size Category 7	-0.079	-0.073*	-0.066	0.036
Bed Size Category 8	-0.088*	-0.066	-0.068	0.053

Hospital Tenure <1 year	-0.067***	-0.111***	-0.068***	-0.165***
Hospital Tenure 1 – 5 years	0.069***	-0.008	0.038***	-0.026***
Hospital Tenure 6 – 10 years	0.079***	0.026***	0.054***	0.013*
Hospital Tenure 11 – 15 years	0.064***	0.028***	0.045***	0.015**
Hospital Tenure 16 – 20 years	0.047***	0.030***	0.044***	0.022***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	-0.097***	-0.041***	-0.077***	0.012
Unit Tenure 1 – 5 years	-0.028***	0.026***	-0.017**	0.060***
Unit Tenure 6 – 10 years	-0.029***	0.022***	-0.015*	0.042***
Unit Tenure 11 – 15 years	-0.033***	0.013*	-0.021***	0.026***
Unit Tenure 16 – 20 years	-0.027***	-0.003	-0.022***	0.011

Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	-0.257***	-0.263***	-0.235***	-0.265***
Hours Worked Per Week 20 – 39 hours	-0.119***	-0.181***	-0.133***	-0.176***
Hours Worked Per Week 40 – 59 hours	-0.085**	-0.109**	-0.087*	-0.109**
Hours Worked Per Week 60 – 79 hours	-0.036	-0.069*	-0.035	-0.061
Hours Worked Per Week 80 – 99 hours	-0.042	-0.059	-0.033	-0.041
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	0.226***	0.076***	0.117***	0.059***
Occupation: Physician Assistant/Nurse Practitioner	0.189***	0.224***	0.141***	0.122***
Occupation: LVN/LPN	0.117***	0.064***	0.059***	0.024*
Occupation: Patient Care Asst/Hospital Aide/Care Partner	0.016	-0.029***	0.000	0.042***

Occupation: Attending/Staff Physician	0.183***	0.199***	0.120***	0.169***
Occupation: Resident Physician/Physician in Training	0.181***	0.229***	0.101***	0.135***
Occupation: Pharmacist	0.609***	0.294***	0.266***	0.196***
Occupation: Dietician	0.106***	0.157***	0.042**	0.054***
Occupation: Unit Assistant/Clerk/Secretary	-0.030***	-0.089***	-0.075***	-0.008
Occupation: Respitory Therapist	0.237***	0.106***	0.025*	-0.036***
Occupation: Physical, Occupational, or Speech Therapist	0.192***	0.210***	0.048***	0.129***
Occupation: Technician	0.112***	0.029***	0.049***	0.017**
Occupation: Administration/Management	-0.011	-0.085***	-0.063***	-0.096***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Direct Patient Contact: Yes	-0.060***	-0.068***	-0.057***	-0.013***

Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	0.037***	-0.030***	0.014*	-0.041***
Occupation Tenure 1 – 5 years	0.086***	0.018***	0.047***	0.003
Occupation Tenure 6 – 10 years	0.081***	0.044***	0.054***	0.029***
Occupation Tenure 11 – 15 years	0.052***	0.035***	0.038***	0.018***
Occupation Tenure 16 – 20 years	0.034***	0.027***	0.029***	0.012**
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N)*	1,321,910	1,315,833	1,326,580	1,311,595
F-Test	F(37, 1586) = 186.36	F(37, 1586) = 171.68	F(37, 1586) = 158.45	F(37, 1586) = 156.31
R^2	0.057	0.038	0.041	0.042
Adjusted R^2	0.056	0.037	0.040	0.041

*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05;
LPN = Licensed Practical Nurse
LVN = Licensed Vocational Nurse

Composite 12: Nonpunitive Response to Errors			
	Staff feel like their mistakes are held against them	When an event is reported, it feels like the person is being written up, not the problem. (negatively worded)	Staff worry that mistakes they make are kept in their personnel file. (negatively worded)
Medicaid Expansion	0.017	0.022	0.036**
Bed Size Category 2	-0.021	-0.024	-0.021
Bed Size Category 3	0.015	-0.013	0.003
Bed Size Category 4	0.023	-0.017	0.023
Bed Size Category 5	0.034	-0.015	0.030
Bed Size Category 6	0.040	-0.008	0.040
Bed Size Category 7	0.058	-0.002	0.051

Bed Size Category 8	0.037	-0.017	0.056
Hospital Tenure <1 year	0.091***	0.123***	0.007
Hospital Tenure 1 – 5 years	0.123***	0.134***	0.043***
Hospital Tenure 6 – 10 years	0.105***	0.107***	0.063***
Hospital Tenure 11 – 15 years	0.082***	0.084***	0.053***
Hospital Tenure 16 – 20 years	0.062***	0.063***	0.045***
Hospital Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Unit Tenure <1 year	-0.252***	-0.219***	-0.208***
Unit Tenure 1 – 5 years	-0.128***	-0.120***	-0.110***
Unit Tenure 6 – 10 years	-0.078***	-0.076***	-0.074***
Unit Tenure 11 – 15 years	-0.065***	-0.062***	-0.061***

Unit Tenure 16 – 20 years	-0.043***	-0.040***	-0.042***
Unit Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Hours Worked Per Week <20 hours	-0.280***	-0.223***	-0.255***
Hours Worked Per Week 20 – 39 hours	-0.141***	-0.122***	-0.111***
Hours Worked Per Week 40 – 59 hours	-0.164***	-0.175***	-0.138***
Hours Worked Per Week 60 – 79 hours	-0.085*	-0.086*	-0.059
Hours Worked Per Week 80 – 99 hours	-0.038	-0.044	-0.030
Hours Worked Per Week >100 hours	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation: Registered Nurse	-0.065***	-0.059***	-0.026***
Occupation: Physician Assistant/Nurse Practitioner	-0.148***	-0.088***	-0.140***
Occupation: LVN/LPN	-0.043***	-0.007	0.026*

Occupation: Patient Care Asst/Hospital Aide/Care Partner	0.077***	0.097***	0.086***
Occupation: Attending/Staff Physician	-0.189***	-0.135***	-0.160***
Occupation: Resident Physician/Physician in Training	-0.252***	-0.139***	-0.293***
Occupation: Pharmacist	-0.216***	-0.239***	-0.200***
Occupation: Dietician	-0.214***	-0.155***	-0.215***
Occupation: Unit Assistant/Clerk/Secretary	0.007	0.016*	0.028***
Occupation: Respitory Therapist	0.095***	0.163***	0.117***
Occupation: Physical, Occupational, or Speech Therapist	-0.482***	-0.510***	-0.545***
Occupation: Technician	0.072***	0.077***	0.095***
Occupation: Administration/Management	-0.476***	-0.558***	-0.386***
Occupation: Other	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)

Direct Patient Contact: Yes	0.051***	0.042***	0.040***
Direct Patient Contact: No	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Occupation Tenure <1 year	0.079***	0.096***	0.004
Occupation Tenure 1 – 5 years	0.082***	0.100***	0.004
Occupation Tenure 6 – 10 years	0.090***	0.100***	0.037***
Occupation Tenure 11 – 15 years	0.067***	0.081***	0.036***
Occupation Tenure 16 – 20 years	0.052***	0.065***	0.033***
Occupation Tenure >21 years	Omitted (reference group)	Omitted (reference group)	Omitted (reference group)
Sample Size (*N)*	1,404,688	1,388,779	1,390,821
F-Test	F(37, 1586) = 236.43	F(37, 1587) = 254.81	F(37, 1583) = 210.11
R^2	0.053	0.058	0.053

Adjusted R^2	0.052	0.057	0.051
*** p-value < 0.001; ** p-value < 0.01, * p-value < 0.05; LPN = Licensed Practical Nurse LVN = Licensed Vocational Nurse			

Exhibit 2A: Effect of Medicaid Expansion on Patient Safety Culture by Hospital Size (Composite Level)

Description: This table is the longer version of Exhibit 2 in the manuscript. It displays the results for all items' regressions based on Medicaid expansion and hospital size.

Exhibit 2A: Effect of Medicaid Expansion on Patient Safety Culture by Hospital Size (Composite Level)				
	Hospital Size Category			
(**Composite**) Item	**Small**	**Medium**	**Large**	**Total**
****E1. Please give your work area/unit in this hospital an overall grade on patient safety.	0.026	-0.033	-0.054	-0.043
*****G1. In the past 12 months, how many event reports have you filled out and submitted?	0.003	0.000	0.021	0.011
Teamwork Within Units				
A1. People support one another in this unit.	-0.085**	-0.012	-0.038	-0.032*
A3. When a lot of work needs to be done quickly, we work together as a team to get the work done.	-0.061*	-0.003	-0.028	-0.017
A4. In this unit, people treat each other with respect.	-0.067*	0.002	-0.020	-0.013
A11. When one area in this unit gets really busy, others help out.	-0.037	-0.010	-0.024	-0.013
Supervisor/Manager Expectations & Actions Promoting Patient Safety				
B1. My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures.	-0.028	0.010	-0.029	-0.010

B2. My supervisor/manager seriously considers staff suggestions for improving patient safety.	-0.023	0.018	-0.022	-0.003
B3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts. (negatively worded)	0.052	-0.041*	0.000	-0.017
B4. My supervisor/manager overlooks patient safety problems that happen over and over. (negatively worded)	0.046	-0.039*	0.008	-0.015
Organizational Learning – Continuous Learning				
A6. We are actively doing things to improve patient safety.	-0.043	0.002	-0.021	-0.016
A9. Mistakes have led to positive changes here.	-0.006	0.011	-0.008	0.001
A13. After we make changes to improve patient safety, we evaluate their effectiveness.	-0.012	0.000	-0.011	-0.006
Management Support for Patient Safety				
F1. Hospital management provides a work climate that promotes patient safety.	-0.082**	0.014	-0.008	-0.008
F8. The actions of hospital management show that patient safety is a top priority.	-0.049	0.031	0.006	0.008
F9. Hospital management seems interested in patient safety only after an adverse event happens. (negatively worded)	0.037	-0.028	-0.006	-0.014
Overall Perceptions of Patient Safety				
A15. Patient safety is never sacrificed to get more work done.	-0.040	0.000	-0.007	-0.005

A18. Our procedures and systems are good at preventing errors from happening.	-0.019	0.008	-0.001	-0.001
A10. It is just by chance that more serious mistakes don't happen around here. (negatively worded)	0.057*	-0.023	-0.013	-0.009
A17. We have patient safety problems in this unit. (negatively worded)	0.047	-0.022	0.013	-0.005
Feedback & Communication About Error				
C1. We are given feedback about changes put into place based on event reports.	-0.031	-0.012	-0.013	-0.020
C3. We are informed about errors that happen in this unit.	-0.024	0.006	0.001	0.002
C5. In this unit, we discuss ways to prevent errors from happening again.	-0.031	0.010	-0.007	-0.001
Communication Openness				
C2. Staff will freely speak up if they see something that may negatively affect patient care.	-0.047	-0.003	-0.015	-0.014
C4. Staff feel free to question the decisions or actions of those with more authority.	-0.017	-0.016	-0.022	-0.016
C6. Staff are afraid to ask questions when something does not seem right. (negatively worded)	0.042	-0.021	0.017	0.000
Frequency of Events Reported				
D1. When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?	-0.020	-0.001	-0.017	-0.006
D2. When a mistake is made, but has no potential to harm the patient, how often is this reported?	-0.045	-0.008	-0.025	-0.016

D3. When a mistake is made that could harm the patient, but does not, how often is this reported?	-0.035	-0.002	-0.017	-0.006
Teamwork Across Units				
F4. There is good cooperation among hospital units that need to work together.	-0.028	0.000	-0.010	-0.002
F10. Hospital units work well together to provide the best care for patients.	-0.037	0.012	-0.012	0.000
F2. Hospital units do not coordinate well with each other. (negatively worded)	0.018	-0.003	0.001	-0.006
F6. It is often unpleasant to work with staff from other hospital units. (negatively worded)	0.028	-0.023	0.007	-0.005
Staffing				
A2. We have enough staff to handle the workload.	-0.042	-0.009	0.007	0.001
A5. Staff in this unit work longer hours than is best for patient care. (negatively worded)	0.010	-0.001	-0.032	-0.015
A7. We use more agency/temporary staff than is best for patient care. (negatively worded)	0.042	-0.042	-0.031	-0.023
A14. We work in "crisis mode" trying to do too much, too quickly. (negatively worded)	0.018	0.000	0.004	-0.003
Handoffs & Transitions				
F3. Things "fall between the cracks" when transferring patients from one unit to another. (negatively worded)	-0.013	-0.005	0.006	-0.009
F5. Important patient care information is often lost during shift changes. (negatively worded)	0.011	-0.016	0.009	-0.007

F7. Problems often occur in the exchange of information across hospital units. (negatively worded)	0.013	-0.006	0.002	-0.004
F11. Shift changes are problematic for patients in this hospital. (negatively worded)	0.015	-0.002	0.023	0.003
Nonpunitive Response to Error				
A8. Staff feel like their mistakes are held against them. (negatively worded)	0.019	0.005	0.047*	0.021
A12. When an event is reported, it feels like the person is being written up, not the problem. (negatively worded)	0.018	0.009	0.051**	0.024
A16. Staff worry that mistakes they make are kept in their personnel file. (negatively worded)	0.034	0.021	0.055**	0.037**

** p-value = 0.05; ** p-value = 0.01; *** p-value = 0.001*

***** Patient Safety Grade (Not Considered a Composite)*

****** Reported Adverse Events (Not Considered a Composite)*

Exhibit 3A: Effect of Medicaid Expansion on Patient Safety Culture by Occupation

Description: This table is the longer version of Exhibit 3 in the manuscript. It displays the results for all items' regressions based on Medicaid expansion and Occupation.

Exhibit 3A: Effect of Medicaid Expansion on Patient Safety Culture by Occupation				
	Nursing Occupation Status			**Total**
(**Composite**) Item	**Nurses**	**Physicians**	**All Other Occupations**	
****E1. Please give your work area/unit in this hospital an overall grade on patient safety.	-0.019	-0.156	-0.043	-0.043
*****G1. In the past 12 months, how many event reports have you filled out and submitted?	0.026	0.058	0.011	0.011
Teamwork Within Units				
A1. People support one another in this unit.	-0.040**	0.006	-0.032*	-0.032*
A3. When a lot of work needs to be done quickly, we work together as a team to get the work done.	-0.023	0.008	-0.017	-0.017
A4. In this unit, people treat each other with respect.	-0.016	0.010	-0.013	-0.013
A11. When one area in this unit gets really busy, others help out.	-0.024	-0.014	-0.013	-0.013
Supervisor/Manager Expectations & Actions Promoting Patient Safety				

B1. My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures.	-0.029	0.014	-0.010	-0.010
B2. My supervisor/manager seriously considers staff suggestions for improving patient safety.	-0.016	0.020	-0.003	-0.003
B3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts. (negatively worded)	-0.005	-0.050	-0.017	-0.017
B4. My supervisor/manager overlooks patient safety problems that happen over and over. (negatively worded)	0.003	-0.057*	-0.015	-0.015
Organizational Learning – Continuous Learning				
A6. We are actively doing things to improve patient safety.	-0.022	0.022	-0.016	-0.016
A9. Mistakes have led to positive changes here.	-0.003	0.011	0.001	0.001
A13. After we make changes to improve patient safety, we evaluate their effectiveness.	-0.006	-0.001	-0.006	-0.006
Management Support for Patient Safety				
F1. Hospital management provides a work climate that promotes patient safety.	-0.024	0.048	-0.008	-0.008
F8. The actions of hospital management show that patient safety is a top priority.	-0.010	0.030	0.008	0.008
F9. Hospital management seems interested in patient safety only after an adverse event happens. (negatively worded)	-0.005	-0.058	-0.014	-0.014

Overall Perceptions of Patient Safety				
A15. Patient safety is never sacrificed to get more work done.	-0.017	-0.005	-0.005	-0.005
A18. Our procedures and systems are good at preventing errors from happening.	-0.008	-0.020	-0.001	-0.001
A10. It is just by chance that more serious mistakes don't happen around here. (negatively worded)	0.001	-0.063*	-0.009	-0.009
A17. We have patient safety problems in this unit. (negatively worded)	0.010	-0.019	-0.005	-0.005
Feedback & Communication About Error				
C1. We are given feedback about changes put into place based on event reports.	-0.031	0.024	-0.020	-0.020
C3. We are informed about errors that happen in this unit.	-0.003	0.014	0.002	0.002
C5. In this unit, we discuss ways to prevent errors from happening again.	-0.011	0.020	-0.001	-0.001
Communication Openness				
C2. Staff will freely speak up if they see something that may negatively affect patient care.	-0.026	-0.009	-0.014	-0.014
C4. Staff feel free to question the decisions or actions of those with more authority.	-0.028	0.004	-0.016	-0.016
C6. Staff are afraid to ask questions when something does not seem right. (negatively worded)	0.004	-0.007	0.000	0.000
Frequency of Events Reported				
D1. When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?	-0.010	0.001	-0.006	-0.006

D2. When a mistake is made, but has no potential to harm the patient, how often is this reported?	-0.025	0.002	-0.016	-0.016
D3. When a mistake is made that could harm the patient, but does not, how often is this reported?	-0.014	0.007	-0.006	-0.006
Teamwork Across Units				
F4. There is good cooperation among hospital units that need to work together.	-0.011	0.038	-0.002	-0.002
F10. Hospital units work well together to provide the best care for patients.	-0.013	0.026	0.000	0.000
F2. Hospital units do not coordinate well with each other. (negatively worded)	0.006	-0.063	-0.006	-0.006
F6. It is often unpleasant to work with staff from other hospital units. (negatively worded)	0.005	-0.056*	-0.005	-0.005
Staffing				
A2. We have enough staff to handle the workload.	-0.014	0.067	0.001	0.001
A5. Staff in this unit work longer hours than is best for patient care. (negatively worded)	-0.011	-0.038	-0.015	-0.015
A7. We use more agency/temporary staff than is best for patient care. (negatively worded)	-0.026	-0.074*	-0.023	-0.023
A14. We work in "crisis mode" trying to do too much, too quickly. (negatively worded)	0.006	-0.045	-0.003	-0.003
Handoffs & Transitions				
F3. Things "fall between the cracks" when transferring patients from one unit to another. (negatively worded)	-0.007	-0.053	-0.009	-0.009

F5. Important patient care information is often lost during shift changes. (negatively worded)	-0.002	-0.080*	-0.007	-0.007
F7. Problems often occur in the exchange of information across hospital units. (negatively worded)	-0.008	-0.049	-0.004	-0.004
F11. Shift changes are problematic for patients in this hospital. (negatively worded)	0.011	-0.048	0.003	0.003
Nonpunitive Response to Error				
A8. Staff feel like their mistakes are held against them. (negatively worded)	0.033*	-0.022	0.021	0.021
A12. When an event is reported, it feels like the person is being written up, not the problem. (negatively worded)	0.042**	-0.011	0.024	0.024
A16. Staff worry that mistakes they make are kept in their personnel file. (negatively worded)	0.046**	0.012	0.037**	0.037**

** p-value = 0.05; ** p-value = 0.01; *** p-value = 0.001*

***** Patient Safety Grade (Not Considered a Composite)*

****** Reported Adverse Events (Not Considered a Composite)*

Exhibit 4A: Effect of Medicaid Expansion on Patient Safety Culture by Unit/Department

Description: This table displays the regressions of each item for the

Exhibit 4A: Effect of Medicaid Expansion on Patient Safety Culture by Unit/Department			
	Unit/Department		**Total**
(**Composite**) Item	**Emergency or Intensive Care Units**	**All Other Units**	
****E1. Please give your work area/unit in this hospital an overall grade on patient safety.	-0.026	-0.057	-0.043
*****G1. In the past 12 months, how many event reports have you filled out and submitted?	0.036	0.011	0.011
Teamwork Within Units			
A1. People support one another in this unit.	-0.022	-0.032*	-0.032*
A3. When a lot of work needs to be done quickly, we work together as a team to get the work done.	-0.026	-0.018	-0.017
A4. In this unit, people treat each other with respect.	-0.010	-0.014	-0.013
A11. When one area in this unit gets really busy, others help out.	-0.031	-0.015	-0.013
Supervisor/Manager Expectations & Actions Promoting Patient Safety			

B1. My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures.	-0.018	-0.009	-0.010
B2. My supervisor/manager seriously considers staff suggestions for improving patient safety.	-0.014	-0.004	-0.003
B3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts. (negatively worded)	0.005	-0.023	-0.017
B4. My supervisor/manager overlooks patient safety problems that happen over and over. (negatively worded)	0.004	-0.020	-0.015
Organizational Learning – Continuous Learning			
A6. We are actively doing things to improve patient safety.	-0.041	-0.016	-0.016
A9. Mistakes have led to positive changes here.	-0.008	0.000	0.001
A13. After we make changes to improve patient safety, we evaluate their effectiveness.	-0.019	-0.007	-0.006
Management Support for Patient Safety			
F1. Hospital management provides a work climate that promotes patient safety.	-0.020	-0.002	-0.008
F8. The actions of hospital management show that patient safety is a top priority.	-0.018	0.013	0.008
F9. Hospital management seems interested in patient safety only after an adverse event happens. (negatively worded)	0.019	-0.024	-0.014

Overall Perceptions of Patient Safety			
A15. Patient safety is never sacrificed to get more work done.	-0.030	-0.003	-0.005
A18. Our procedures and systems are good at preventing errors from happening.	-0.006	-0.002	-0.001
A10. It is just by chance that more serious mistakes don't happen around here. (negatively worded)	0.022	-0.015	-0.009
A17. We have patient safety problems in this unit. (negatively worded)	0.009	-0.008	-0.005
Feedback & Communication About Error			
C1. We are given feedback about changes put into place based on event reports.	-0.030	-0.027	-0.020
C3. We are informed about errors that happen in this unit.	-0.017	-0.001	0.002
C5. In this unit, we discuss ways to prevent errors from happening again.	-0.008	-0.004	-0.001
Communication Openness			
C2. Staff will freely speak up if they see something that may negatively affect patient care.	-0.021	-0.016	-0.014
C4. Staff feel free to question the decisions or actions of those with more authority.	-0.019	-0.020	-0.016
C6. Staff are afraid to ask questions when something does not seem right. (negatively worded)	-0.008	-0.005	0.000
Frequency of Events Reported			

D1. When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?	-0.015	-0.008	-0.006
D2. When a mistake is made, but has no potential to harm the patient, how often is this reported?	-0.022	-0.020	-0.016
D3. When a mistake is made that could harm the patient, but does not, how often is this reported?	-0.015	-0.012	-0.006
Teamwork Across Units			
F4. There is good cooperation among hospital units that need to work together.	-0.012	-0.001	-0.002
F10. Hospital units work well together to provide the best care for patients.	-0.018	0.002	0.000
F2. Hospital units do not coordinate well with each other. (negatively worded)	0.010	-0.015	-0.006
F6. It is often unpleasant to work with staff from other hospital units. (negatively worded)	0.025	-0.012	-0.005
Staffing			
A2. We have enough staff to handle the workload.	-0.036	0.003	0.001
A5. Staff in this unit work longer hours than is best for patient care. (negatively worded)	0.008	-0.017	-0.015
A7. We use more agency/temporary staff than is best for patient care. (negatively worded)	-0.014	-0.033	-0.023

A14. We work in "crisis mode" trying to do too much, too quickly. (negatively worded)	0.030	-0.010	-0.003
Handoffs & Transitions			
F3. Things "fall between the cracks" when transferring patients from one unit to another. (negatively worded)	-0.003	-0.016	-0.009
F5. Important patient care information is often lost during shift changes. (negatively worded)	0.001	-0.013	-0.007
F7. Problems often occur in the exchange of information across hospital units. (negatively worded)	-0.003	-0.010	-0.004
F11. Shift changes are problematic for patients in this hospital. (negatively worded)	0.022	-0.006	0.003
Nonpunitive Response to Error			
A8. Staff feel like their mistakes are held against them. (negatively worded)	0.016	0.021	0.021
A12. When an event is reported, it feels like the person is being written up, not the problem. (negatively worded)	0.030	0.022	0.024
A16. Staff worry that mistakes they make are kept in their personnel file. (negatively worded)	0.024	0.036**	0.037**

** p-value = 0.05; ** p-value = 0.01; *** p-value = 0.001*

***** Patient Safety Grade (Not Considered a Composite)*

****** Reported Adverse Events (Not Considered a Composite)*

Exhibit 5A: Hospital leadership and frontline workers associations with patient safety culture

Association of Leadership and Frontline Status on Patient Safety Culture - Overall Analysis				
Composite 1: Teamwork within Units				
Variable	*People support one another in this unit*	*When a lot of work needs to be done quickly, we work together as a team to get the work*	*In this unit, people treat each other with respect*	*When one area in this unit gets really busy, others help out*
leadership	0.356***	0.328***	0.342***	0.303***
frontline	0.091***	0.045***	0.057***	0.013*
Hospital Tenure	0.015***	0.021***	0.020***	0.007***
Unit Tenure	-0.024***	-0.021***	-0.039***	-0.029***
Work Hours per Week	-0.037***	-0.025***	-0.043***	-0.031***
Occupation Tenure	0.007***	0.009***	0.010***	-0.005***
Direct Patient Contact	0.017***	0.001	-0.009*	0.005

No Direct Patient Contact	(omitted)	(omitted)	(omitted)	(omitted)
Bed Size Category	0.003	0.002	0.002	0.005
Year Data Collection Ended	0.011***	0.008***	0.018***	0.015***
_cons	-18.785***	-12.474***	-32.521***	-26.3199***
N	1423965	1422422	1420789	1399899
r2_a	0.039	0.034	0.037	0.026
F-Statistic (Leadership Vs Frontline)	562.93	605.89	665.25	395.01
p-value (F-Test)	9.564E-107	1.416E-113	8.5878E-123	1.14693E-78
Composite 2: Supervisor/Manager Expectations & Actions Promoting Patient Safety				
Variable	*My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures*	*My supervisor/manager seriously considers staff suggestions for improving patient safety*	*Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts*	*My supervisor/manager overlooks patient safety problems that happen over and over*
leadership	0.329***	0.370***	-0.291***	-0.318***
frontline	-0.030***	-0.011*	0.046***	0.067***
Hospital Tenure	0.029***	0.027***	-0.011***	-0.021***

Unit Tenure	-0.061***	-0.053***	0.039***	0.038***
Work Hours per Week	-0.008***	-0.008***	0.018***	0.009***
Occupation Tenure	0.010***	0.010***	-0.011***	-0.024***
Direct Patient Contact	-0.059***	-0.034***	0.030***	0.002
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	(omitted)
Bed Size Category	0.004	0.001	0.004	0.003
Year Data Collection Ended	0.027***	0.019***	-0.020***	-0.014***
_cons	-49.987***	-34.681***	41.592***	29.187***
N	1372778	1366193	1373642	1364235
r2_a	0.039	0.037	0.036	0.028
F-Statistic (Leadership Vs Frontline)	1489.48	1118.33	805.76	1282.60
p-value (F-Test)	2.4245E-230	7.8328E-186	1.1784E-143	2.4252E-206
Composite 3: Organizational Learning-Continuous Improvement				

Variable	*We are actively doing things to improve patient safety*	*Mistakes have led to positive changes here*	*After we make changes to improve patient safety, we evaluate their effectiveness*	
leadership	0.261***	0.348***	0.249***	
frontline	0.003	0.033***	0.019***	
Hospital Tenure	0.022***	0.021***	0.025***	
Unit Tenure	-0.027***	-0.006***	-0.030***	
Work Hours per Week	0.005**	0.013***	-0.011***	
Occupation Tenure	0.001	0.000	-0.001	
Direct Patient Contact	0.014**	-0.052***	0.016***	
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	
Bed Size Category	-0.001	0.004	0.000	
Year Data Collection Ended	0.003	0.005**	0.006***	
_cons	-1.395	-5.614	-8.529**	
N	1401278	1399793	1386051	
r2_a	0.029	0.031	0.033	

F-Statistic (Leadership Vs Frontline)	434.96	445.22	372.66	
p-value (F-Test)	1.4523E-85	2.59107E-87	9.38735E-75	
Composite 4: Management Support for Patient Safety				
Variable	*Hospital management provides a work climate that promotes patient safety*	*The actions of hospital management show that patient safety is a top priority*	*Hospital management seems interested in patient safety only after an adverse event happens*	
Leadership	0.261***	0.271***	-0.320***	
frontline	-0.213***	-0.190***	0.146***	
Hospital Tenure	0.010***	0.011***	-0.010***	
Unit Tenure	-0.038***	-0.031***	0.033***	
Work Hours per Week	-0.002	0.003	0.022***	
Occupation Tenure	0.007***	0.010***	-0.038***	
Direct Patient Contact	-.06569331***	-0.086***	0.097***	
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	

Bed Size Category	-0.002	-0.006	0.003	
Year Data Collection Ended	0.003	0.002	0.004	
_cons	-1.357	-0.917	-5.150	
N	1389211	1371807	1363449	
r2_a	0.071	0.063	0.0480	
F-Statistic (Leadership Vs Frontline)	2283.76	1556.51	1524.97	
p-value (F-Test)	0	1.4439E-237	3.8888E-234	
Composite 5: Overall Perceptions of Patient Safety				
Variable	*Patient safety is never sacrificed to get more work done*	*Our procedures and systems are good at preventing errors from happening*	*It is just by chance that more serious mistakes don't happen around here*	*We have patient safety problems in this unit*
leadership	0.161***	0.158***	-0.357***	-0.213***
frontline	-0.331***	-0.079***	0.078***	0.304***
Hospital Tenure	0.015***	0.019***	-0.015***	-0.025***
Unit Tenure	-0.054***	-0.013***	0.044***	0.054***
Work Hours per Week	0.013***	-0.023***	0.032***	0.014***

Occupation Tenure	0.022***	-0.003***	-0.016***	-0.016***
Direct Patient Contact	-0.025***	0.017***	-0.039***	0.039***
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	(omitted)
Bed Size Category	0.002	0.003	-0.001	-0.006
Year Data Collection Ended	0.002	0.007***	-0.001	-0.002
_cons	0.322	-10.988**	3.723	6.679
N	1387404	1405105	1397588	1380334
r2_a	0.051	0.028	0.036	0.058
F-Statistic (Leadership Vs Frontline)	2715.27	425.70	789.73	2632.90
p-value (F-Test)	0	5.58808E-84	2.3633E-141	0
Composite 6: Feedback & Communication About Error				
Variable	*We are given feedback about changes put into place based on event reports*	*We are informed about errors that happen in this unit*	*In this unit, we discuss ways to prevent errors from happening again*	
leadership	0.267***	0.217***	0.285***	

frontline	-0.030***	-0.142***	-0.050***	
Hospital Tenure	0.024***	0.020***	0.0305***	
Unit Tenure	-0.045***	-0.041***	-0.041***	
Work Hours per Week	-0.024***	0.011***	-0.003	
Occupation Tenure	0.004***	-0.011***	-0.003**	
Direct Patient Contact	-0.014**	-0.017***	-0.024***	
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	
Bed Size Category	0.002	0.003	0.001	
Year Data Collection Ended	0.016***	0.019***	0.019***	
_cons	-28.670***	-33.732***	-33.353***	
N	1367231	1367768	1375920	
r2_a	0.040	0.041	0.035	
F-Statistic (Leadership Vs Frontline)	591.09	702.74	604.69	

p-value (F-Test)	3.2248E-111	1.7818E-128	2.2418E-113	
Composite 7: Communication Openness				
Variable	*Staff will freely speak up if they see something that may negatively affect patient care*	*Staff feel free to question the decisions or actions of those with more authority*	*Staff are afraid to ask questions when something does not seem right*	
leadership	0.221***	0.520***	-0.262***	
frontline	-0.067***	0.056***	0.020***	
Hospital Tenure	0.032***	0.032***	-0.016***	
Unit Tenure	-0.042***	-0.042***	0.041***	
Work Hours per Week	-0.004*	0.006**	0.031***	
Occupation Tenure	0.012***	0.016***	-0.007***	
Direct Patient Contact	0.033***	-0.053***	0.020***	
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	
Bed Size Category	-0.002	-0.001	0.009**	
Year Data Collection Ended	0.012***	0.016***	-0.019***	

_cons	-21.061***	-29.268***	40.856***	
N	1373356	1375177	1380042	
r2_a	0.028	0.032	0.023	
F-Statistic (Leadership Vs Frontline)	948.69	594.72	634.98	
p-value (F-Test)	1.1564E-163	8.4038E-112	4.1161E-118	
Composite 8: Frequency of Events Reported				
Variable	*When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?*	*When a mistake is made, but has no potential to harm the patient, how often is this reported?*	*When a mistake is made that could harm the patient, but does not, how often is this reported?*	
leadership	0.100***	0.114***	0.120***	
frontline	-0.077***	0.016**	-0.016***	
Hospital Tenure	0.020***	0.026***	0.019***	
Unit Tenure	-0.038***	-0.036***	-0.027***	
Work Hours per Week	0.017***	0.003	-0.004*	
Occupation Tenure	0.009***	0.012***	0.013***	
Direct Patient Contact	-0.058***	-0.041***	-0.009	

No Direct Patient Contact	(omitted)	(omitted)	(omitted)	
Bed Size Category	0.005	0.004	-0.001	
Year Data Collection Ended	0.020***	0.013***	0.007***	
_cons	-37.368***	-22.241***	-11.024***	
N	1325063	1320993	1317590	
r2_a	0.032	0.025	0.021	
F-Statistic (Leadership Vs Frontline)	668.95	165.59	255.29	
p-value (F-Test)	2.3979E-123	4.0781E-36	2.14162E-53	
Composite 9: Teamwork Across Units				
Variable	*There is good cooperation among hospital units that need to work together*	*Hospital units work well together to provide the best care for patients*	*Hospital units do not coordinate well with each other*	*It is often unpleasant to work with staff from other hospital units*
leadership	0.154***	0.140***	-0.188***	-0.193***
frontline	-0.121***	-0.132***	0.105***	0.027***
Hospital Tenure	0.011***	0.011***	-0.011***	-0.009***
Unit Tenure	-0.021***	-0.019***	0.023***	0.028***

Work Hours per Week	-0.013***	-0.009***	0.040***	0.029***
Occupation Tenure	0.008***	0.001	-0.011***	-0.018***
Direct Patient Contact	-0.023***	-0.019***	0.039***	-0.025***
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	(omitted)
Bed Size Category	0.001	-0.001	-0.002	-0.001
Year Data Collection Ended	0.012***	0.013***	-0.013***	-0.014***
_cons	-20.475***	-23.187***	29.361***	30.364***
N	1356682	1350553	1365131	1348425
r2_a	0.037	0.043	0.041	0.028
F-Statistic (Leadership Vs Frontline)	891.03	1172.36	867.48	565.55
p-value (F-Test)	1.1767E-155	1.3941E-192	2.2918E-152	4.0336E-107
Composite 10: Staffing				

Variable	*We have enough staff to handle the workload*	*Staff in this unit work longer hours than is best for patient care*	*We use more agency/temporary staff than is best for patient care*	*We work in crisis mode trying to do too much, too quickly*
leadership	0.335***	-0.204***	-0.245***	-0.188***
frontline	-0.042***	0.046***	-0.028***	0.130***
Hospital Tenure	0.049***	-0.015***	-0.035***	-0.010***
Unit Tenure	-0.075***	0.020***	0.027***	0.055***
Work Hours per Week	-0.063***	0.077***	0.026***	0.051***
Occupation Tenure	0.031***	-0.024***	-0.048***	-0.014***
Direct Patient Contact	-0.041***	-0.017***	-0.123***	-0.052***
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	(omitted)
Bed Size Category	-0.006	-0.000	-0.001	0.005
Year Data Collection Ended	-0.017***	0.015***	0.027***	-0.002
_cons	37.752***	-27.723***	-51.683***	7.533
N	1420600	1384050	1354093	1399075
r2_a	0.051	0.031	0.061	0.038

F-Statistic (Leadership Vs Frontline)	388.86	412.84	232.98	367.49
p-value (F-Test)	1.35999E-77	9.24314E-82	3.50674E-49	7.77841E-74
Composite 11: Handoffs & Transitions				
Variable	*Things fall between the cracks when transferring patients from one unit to another*	*Important patient care information is often lost during shift changes*	*Problems often occur in the exchange of information across hospital units*	*Shift changes are problematic for patients in this hospital*
leadership	-0.090***	-0.116***	-0.085***	-0.118***
frontline	0.115***	0.041***	0.083***	0.046***
Hospital Tenure	-0.005**	0.009***	0.001	0.018***
Unit Tenure	0.023***	0.010***	0.016***	-0.001
Work Hours per Week	0.044***	0.066***	0.051***	0.066***
Occupation Tenure	-0.013***	0.002*	-0.007***	0.003**
Direct Patient Contact	-0.050***	-0.053***	-0.056***	-0.011**
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	(omitted)

Bed Size Category	-0.007	-0.000	-0.005	0.001
Year Data Collection Ended	-0.008***	-0.010***	-0.012***	-0.013***
_cons	19.754***	21.630***	27.804***	28.261***
N	1321910	1315833	1326580	1311595
r2_a	0.040	0.028	0.033	0.035
F-Statistic (Leadership Vs Frontline)	709.61	421.33	518.99	414.56
p-value (F-Test)	1.8063E-129	3.35234E-83	1.3817E-99	4.91578E-82
Composite 12: Nonpunitive Response to Error				
Variable	*Staff feel like their mistakes are held against them*	*When an event is reported, it feels like the person is being written up, not the problem*	*Staff worry that mistakes they make are kept in their personnel file*	
leadership	-0.465***	-0.552***	-0.382***	
frontline	-0.026***	-0.013*	0.001	
Hospital Tenure	-0.019***	-0.025***	0.000	
Unit Tenure	0.045***	0.041***	0.037***	
Work Hours per Week	0.026***	0.009***	0.019***	

Occupation Tenure	-0.022***	-0.026***	-0.003**	
Direct Patient Contact	0.040***	0.036***	0.025***	
No Direct Patient Contact	(omitted)	(omitted)	(omitted)	
Bed Size Category	0.007	0.001	0.010**	
Year Data Collection Ended	-0.019***	-0.022***	-0.031***	
_cons	41.788***	46.923***	66.095***	
N	1404688	1388779	1390821	
r2_a	0.040	0.045	0.038	
F-Statistic (Leadership Vs Frontline)	702.84	904.01	648.89	
p-value (F-Test)	1.6209E-128	1.4295E-157	3.0491E-120	

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Publications and Presentations

Conference: American Public Health Association 2021 Annual Meeting and Expo – Creating the Healthiest Nation: Strengthening Social Connectedness Title: The effect of the patient protection and affordable care act on patient safety culture. Virtual. 2021