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Chronic Obstructive Pulmonary Disease 30-Day Readmission Rates in California, Illinois, and New York

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This is to certify that the doctoral study by

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Walden University
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Abstract

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Theresa Teverbaugh

MS, North Park University, 2004

BSN, University of Illinois at Chicago, 1993

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration

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Abstract

The Centers for Medicare and Medicaid Services (CMS) have implemented financial penalties to reduce hospital readmissions for various conditions, including chronic obstructive pulmonary disease (COPD). As a result, hospital administrators explore ways to prevent financial penalties for excessive COPD 30-day hospital readmissions. The purpose of this quantitative study was to determine if there was a correlation between hospital Medicare reimbursement, quality-of-care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients in California, Illinois, and New York. The quality-of-care measures included communication with nurses, communication with doctors, the hospital staff's responsiveness, and medicine communication. The secondary data were obtained from CMS and were open sourced. Rogers's diffusion of innovation framework was used as the theoretical foundation, as this theory supported the purpose by promoting organizational improvement to decrease COPD 30-day readmissions. This study suggests relationships between hospitals' Medicare reimbursement and 30-day readmission rates differences for COPD in California, Illinois, and New York; as well as quality-of-care measures related to patient satisfaction in communication with hospital staff, and 30-day readmission rates differences for COPD in California, Illinois, and New York. This correlational research used a linear regression analysis model. This study has implications for potential positive social change, in that it provides information for healthcare administrators that may encourage innovative actions and policies to promote organizational improvements for COPD patients. In conclusion, it is recommended that researchers continue to study how hospitals can reduce readmissions for COPD patients.

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Dedication

To my family, gratitude—my loves, for your fondness, unselfish understanding, and encouragement over several years while completing this component for my doctoral degree in healthcare administration. This milestone completion honors our teaching, in which we thank the Lord Jesus, who is the head of our lives, and who gives us the strength to believe in our capabilities. Family, your love was a power source for me to dream and execute a plan to complete this project.

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Section 1: Foundation of the Study and Literature Review

Introduction

Chronic obstructive pulmonary disease (COPD) is an incapacitating lung disorder that affects one in eight Americans (Centers for Disease Control and Prevention [CDC], 2019). It is the fourth leading cause of death (CDC, 2019). Many Americans have gone undiagnosed with COPD; however, more than 16 million Americans aged 45 and older have been diagnosed (CDC, 2019). Women make up 56% of diagnosed cases of COPD (CDC, 2019). In the United States, direct medical costs of COPD are close to $50 billion, and hospital admissions are a third of healthcare expenditures in the United States in which Medicaid and Medicare cover most healthcare spending (CDC, 2018; Mirza et al., 2018; Regenstein & Andres, 2014). With 800,000 COPD patients hospitalized annually and one in five patients readmitted for acute exacerbation of COPD (AECOPD), COPD costs are roughly $13.2 billion of the direct medical cost annually (Shah et al., 2016).

In response to the economic burden of hospital readmissions, in 2010 policymakers adopted the Centers for Medicare and Medicaid Services (CMS) Hospital Readmissions Reduction Program (HRRP) as part of the Patient Protection and Affordable Care Act (CMS, 2014). HRRP provides guidelines for hospital administrators to encourage efforts to reduce preventable readmissions (Boccuti & Casillas, 2017). CMS was authorized to levy financial penalties on hospitals with higher than expected readmissions for the same health illness (CMS, 2014; Desai et al., 2016). After 2010, CMS expanded the relevant health illnesses to include COPD (CMS, 2016).

Hospital administrators are focused on adhering to the guidelines concerning readmissions established by CMS and are exploring ways to prevent financial penalties for COPD excessive 30-day readmissions. This study may provide additional information toward this aim (Boulding et al., 2011; CMS, 2014, 2016; Consumers Advancing Patient Safety [CAPS], 2014). Through this study, healthcare administrators may find information to aid in evaluating their hospitals and develop innovative actions and policies that promote organizational improvement to decrease COPD 30-day readmissions. Leppin et al. (2014) discussed how they assessed the cumulative complexity model (CuCoM), a validity framework to reduce 30-day readmissions. Leppin et al.'s result suggested that most interventions are efficient; however, advanced discharge interventions are needed for to decrease 30-day readmissions. The researchers also suggested that further work is required for the CuCoM framework to improve healthcare quality (Leppin et al., 2014). Krishnan et al. (2015) addressed the National COPD Readmissions Summit recommendations to enhance healthcare quality and decrease 30-day readmissions. Recommendations include, but are not limited to, offering patient education, conducting patient satisfaction review such as the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), evaluating current standards, and developing strategies to improve the quality of care and decrease readmissions. Lau et al. (2017) offered a model that promotes an accurate assessment of COPD individuals at risk for 30-day readmissions using demographic and clinical data.

This section details the study's potential contribution to positive social change. The section contains a description of the purpose of the research. Section 1 also details the research problem, the theoretical foundation of the study, and a literature review.

Problem

Hospital Medicare reimbursement, quality performance measures related to patient satisfaction, and 30-day hospital readmissions for patients with COPD are concerns for hospital administrators (CAPS, 2014). Shah et al. (2016) reported that the process and inefficient professional quality of care provided to many COPD patients was linked to preventable readmissions. This concern is apparent on a national level because readmissions have negatively impacted hospital reimbursement, reputations, and quality of life for patients (CMS, 2014, 2016). The consequences of readmissions for COPD patients result in financial hardships for organizations (CMS, 2016). The Patient Protection and Affordable Care Act created HRRP, giving authority to CMS to reduce reimbursement for COPD patients' excessive readmissions within 30 days to hospitals (CMS, 2016; Feemster & Au, 2014).

According to Boulding et al. (2011), quality of care influences patient satisfaction. Therefore, a lack of quality of care related to COPD readmissions could create an organizational hardship due to decreased government reimbursement, decreased patient satisfaction, and decreased reported quality performance measures (Boulding et al., 2011; CMS, 2014, 2016; CAPS, 2014). Research has shown that COPD readmissions adversely affect patients and hospitals. Still, there is a gap in the literature examining whether there is a correlation between patient satisfaction quality measures, hospitals' Medicare

reimbursement, and COPD 30-day readmissions. This study addressed this gap through quantitative research that focused on patient satisfaction, hospital Medicare reimbursement for COPD, and COPD 30-day readmissions.

Purpose of the Study

The purpose of this quantitative study was to determine if there is a correlation between hospital Medicare reimbursement, quality-of-care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients in California, Illinois, and New York. The quality-of-care measures included communication with nurses, communication with doctors, the hospital staff's responsiveness, and medicine communication. The three states chosen for this study, California, Illinois, and New York, provide a view of COPD readmissions in various parts of the country. The association of 30-day COPD readmissions to health care outcomes demonstrates a failure in hospital quality of care and a lack of education (Feemster & Au, 2014; Krishnan et al., 2015). This study provided information about COPD patients' readmissions for patients' health care outcomes. The study provided information about the need to reduce readmissions, strengthen financial measures, and improve quality assurance (QA) measures related to patient satisfaction (Folland et al., 2013; Lau et al., 2017). The dependent variable was 30-day readmission rates for COPD patients in California, Illinois, and New York. The independent variables were (a) hospital Medicare reimbursement in California, Illinois, and New York and (b) quality-of-care measures related to patient satisfaction (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines).

Significance of the Study

This research could be significant because it may address healthcare administrators' concerns related to quality and performance improvement for COPD patients (CMS, 2014, 2016; CAPS, 2014). The study may show a relationship to 30-day readmissions and communication for decision making to advance possible benefits. This study could offer social change plans that reflect a recognition of the importance of investing in quality healthcare and education to prevent or reduce readmissions. According to Krishnan et al. (2015), innovative solutions are needed in healthcare organizations to reduce the risk of 30-day readmissions to receive total payment incentives from CMS. Therefore, the results of this study may also provide effective use of QA measures related to patient satisfaction to decrease 30-day readmissions, which may improve Medicare reimbursement (CMS, 2014).

Research Questions and Hypotheses

Research Question 1: Is there a significant correlation between hospital Medicare reimbursement and 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York?

Null hypothesis (Ho): There is no difference in hospital Medicare reimbursement and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Alternative hypothesis (H1): There is a difference in hospital Medicare reimbursement and the 30-day readmission rates for chronic

obstructive pulmonary disease patients in California, Illinois, and New York.

Research Question 2: Is there a significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York?

Null hypothesis (Ho2): There is no significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Alternative hypothesis (Ha2): There is a significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Theoretical Foundation for the Study

The theoretical framework for this study was Rogers's diffusion of innovation (DOI). Rogers's theoretical framework demonstrates how communication, time, the

social culture of the organization, and new ideas (innovations) can produce positive change (Rogers, 2003). The rationale for choosing the DOI framework was that DOI has been used to guide administrators and structure innovative action plans that promote organizational improvements (Centola, 2011). The DOI theory related to this study by clarifying how healthcare administrators can successfully implement innovations proposed by lawmakers to decrease 30-day readmissions for COPD patients.

Rogers (2003) defined five steps that encourage the adoption of successful outcomes: collecting knowledge about a current trend, voicing opinion or persuasion, making the decision, implementing it, and finally seeking confirmation that leaders made the right choice. Mitchell (2015) publicized that the Institute for Healthcare Improvement (IHI) provides technical support to a group using Rogers's DOI to implement interventions to treat mental health in underprivileged areas. Multiple studies and scholarly articles have described the positive ways that the theory of DOI can help organizations improve programs and implement new ways to approach past problems (Centola, 2011; McCullen et al., 2013; Radford & Bloch, 2011).

Nature of the Study

The nature of this study focused on quantitative research that recognized how investing in quality and performance improvement, communication, and education may increase hospital Medicare reimbursement, improve quality-of-care measures related to patient satisfaction, and prevent or reduce 30-day readmissions for COPD patients. This study was consistent with Rogers's DOI framework while focusing on efficient and effective ways to reduce 30-day readmission of COPD patients, showing evidence of

improvements in the hospital's Medicare reimbursement and quality-of-care measures related to patient satisfaction. The results of this quantitative analysis study may add to the body of literature and encourage healthcare administrators to improve and promote healthcare outcomes for COPD patients by promoting innovative actions and policies.

Introduction—Literature Review

Through the literature review, I aim to provide information about studies that have been conducted on the 30-day readmission of COPD patients. Preventable hospital readmissions have contributed significantly to financial costs in the U.S. healthcare system (Zhang et al., 2016). HRRP penalizes hospitals with high occurrences of 30-day readmissions in patients suffering from COPD through diminishing reimbursements (CMS, 2016; Feemster & Au, 2014).

Search Strategy

The literature search was conducted using the academic databases of the Agency for Healthcare Research and Quality (AHRQ), Cochrane Library database, EBSCO host, Google Scholar, Medline, OVID Technologies, PubMed, ProQuest, and Sage. The key search terms included *chronic obstructive pulmonary disease (COPD)*, *COPD readmission*, *hospital reimbursement*, *COPD patient satisfaction*, *COPD quality of care measures*, *COPD quality care metric*, *hospital readmission*, and *Medicare hospitalizations reduction programs.* The three Boolean operators were used in the literature search: AND, OR, and NOT. The Boolean operators approach allowed for an additional focused method for finding literature. In combining keywords, I found over

2,000 articles related to strategies and factors contributing to reducing COPD 30-day readmissions or 30-day readmissions rates between 2010 and 2019.

According to Holmes (2013), when one is conducting a quantitative research study and using secondary data, research questions around current studies will be evident (Laureate Education, 2013). Therefore, research studies in this literature review included information about the quality of care related to patient satisfaction, hospital Medicare reimbursement, and 30-day readmissions for COPD patients. Relevant studies were also found within the reference lists of journal articles.

Chronic Obstructive Pulmonary Disease 30-Day Readmissions

Ranking as the third most frequent cause of hospital readmissions in the United States, COPD has become a significant public health challenge (Murray, 2018; Regenstein & Andres, 2014). Boccuti and Casillas (2017) reported a discrepancy in the quality of care for inpatients with COPD; the researchers suggested that inconsistency exists in the recommended guidelines for care. CMS has been very transparent in comparing hospitals' 30-day readmission rates. COPD affects a vast number of patients and individuals, many of whom are undiagnosed (Lau et al., 2017). Research has shown that COPD readmissions adversely affect patients and hospitals (Boccuti & Casillas, 2016; Desi et al., 2016).

Hospital's Medicare Reimbursement

The consequences of readmissions for COPD patients result in financial hardships for organizations (CMS, 2016; Press et al., 2018). In 2011, the AHRQ did an assessment revealing that there were 3.3 million readmissions in the United States. The payers

consisted of all of the following groups: Medicare (65+ years old), Medicaid (18 to 64 years old), privately insured (18 to 64 years old), and uninsured (18 to 64 years old). AHRQ (2014) made it known that all inpatient readmission costs are a hardship to the nation, with a cost of $41.3 billion. According to the AHRQ 2011 study, Medicare patients tiered the highest for total readmissions at 55.9% and related costs for readmissions at 58.2%. Medicaid patients ranked second in the number of readmissions, totaling 20.6%, with fewer associated healthcare costs, at 18.4% (AHRQ, 2014).

In 2013, the Patient Protection and Affordable Care Act created the HRRP, giving authority to CMS to reduce hospital reimbursement for excessive readmissions of patients within 30 days up to 3% (CMS, 2014; CMS, 2016; Feemster & Au, 2014). The purpose of the CMS program was to target health care issues with the most significant number of readmissions associated with high cost. HRRP first started monitoring pneumonia in 2013 along with acute myocardial infarction and heart failure (CMS, 2016). In 2014, HRRP began to follow other health conditions such as COPD (the focus of this study), total hip arthroplasty, and total knee arthroplasty (CMS, 2016). In 2015, HRRP added new diagnoses to the list including coronary artery bypass grafting, and finally, in 2016, both aspiration pneumonia and nonsevere sepsis with pneumonia were granted monitoring (Boccuti & Casillas, 2017; CMS, 2016; Desi et al., 2016). Even though more diagnoses are being monitored, COPD continues to be a primary focus (Boccuti & Casillas, 2017).

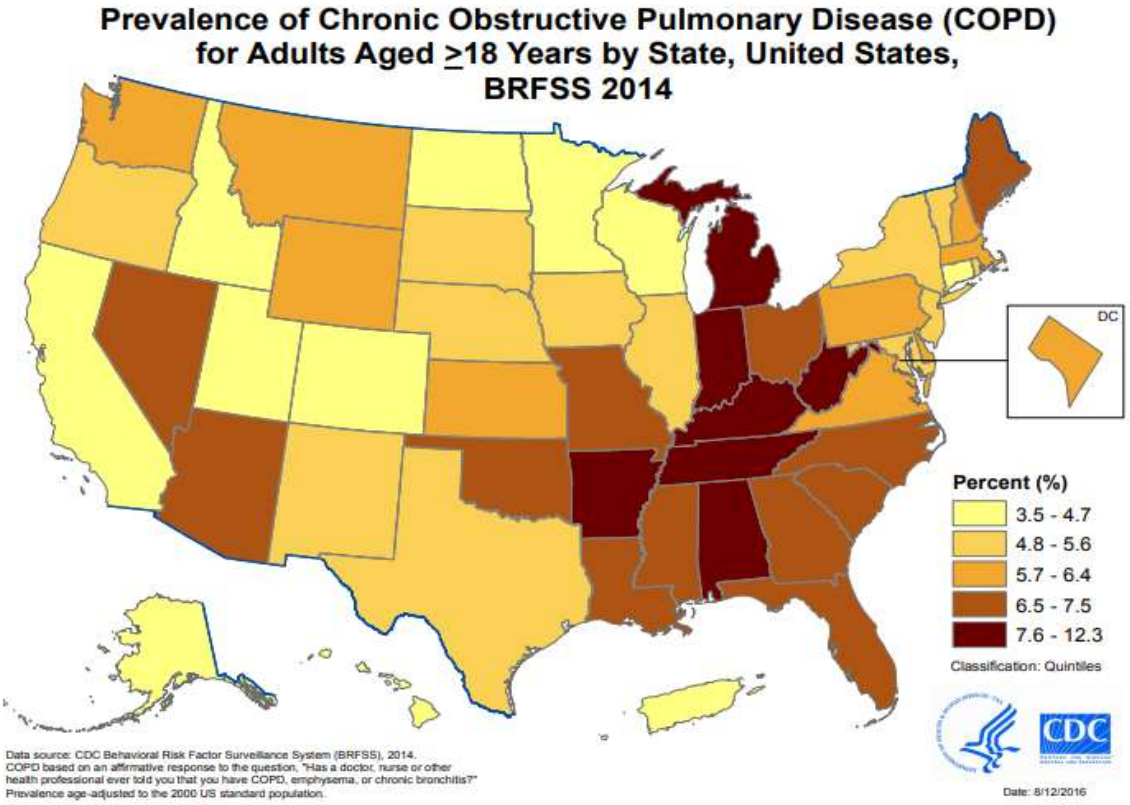
National-Level Concerns

Reducing inpatient COPD 30-day readmissions is a national healthcare concern (Krishnan et al., 2015; Papanicolas et al., 2018). COPD is a severe but manageable health issue (Gold, 2017). In the United States, COPD was classified as the third leading cause of death in 2014 and the fourth leading cause of death in 2016 and 2020 (CDC, 2019; Heron, 2017; Kochanek et al., 2017). COPD affects the lungs and can cause many hospital admissions and readmissions if patients are not adequately treated and medical regimens followed. In 2015, evidence showed that 15.5 million adults had documented COPD (CDC, 2016). Several researchers have argued that many more people have COPD but have not been diagnosed by their primary care physician (CDC, 2016; Croft et al., 2018). Figure 1 presents data on the prevalence of COPD in the United States from the 2014 CDC Behavioral Risk Factor Surveillance System (BRFSS) Study (CDC, 2016). The map is color coded according to the percentage of adults diagnosed with COPD in each state. The information supports the prevalence of COPD patients in the United States (CDC, 2016; Croft et al., 2018).

In 2017, COPD was listed as the third leading cause of death among women in the United States (National Center for Health Statistics, 2016). Researchers have claimed that women outlive men with COPD; however, the age-adjusted death rates for men have dropped (CDC, 2019). COPD is part of the HRRP, which penalizes hospitals for excess 30-day readmissions. The effort to educate has become a nationwide influence (CDC, 2019; CMS, 2016; Tang et al., 2014).

Figure 1

Chronic Obstructive Pulmonary Disease Prevalence by State



Note. From *Prevalence of Chronic Obstructive Pulmonary Disease (COPD) for Adults Aged ≥ 18 Years by State, United States, BFRSS 2014*, by Centers for Disease Control and Prevention, 2016 (https://www.cdc.gov/copd/pdfs/COPD_Prevalence_st2014_3.pdf). In the public domain.

It was nationally reported that in 2010, COPD healthcare costs were $32.1 billion, and these costs were expected to upsurge to $49.0 billion annually by the end of 2020; there is no prediction published for 2030 (CDC, 2014, 2016; Ford et al., 2013; Krishnan et al., 2015). HRRP experts have stated that it is necessary to improve accountability in

rendering patients quality care and reducing healthcare costs. Several researchers have claimed that there is minimal evidence to guide hospitals on reducing readmissions after an acute episode of the chronic disease COPD (Press et al., 2019).

There have been attempts to determine the risks of 30-day readmission for COPD patients. According to Lau et al. (2017), 13 million Americans suffer from COPD, and this condition is responsible for about 500,000 hospitalizations annually. Excessive readmissions are the reason that the Patient Protection and Affordable Care Act established the HRRP. Lau and colleagues aimed to develop a meaningful scale that can help to reasonably identify patients at risk of readmission. To carry out this research, the researchers analyzed clinical and demographic data of 339,389 patients from the states of California and New York as well as 258,113 patients from the states of Florida and Washington (Lau et al., 2017), using the State Inpatient Database that was used by Goto et al. (2017). With access to enough data to work with, Lau et al. developed the Readmission After COPD Exacerbation (RACE) scale to be capable of predicting the risks of 30-day readmission for COPD patients.

Patients from California and New York were classified as the "derivation cohort." In contrast, patients from Florida and Washington were classified as the "validation cohort." The rate of 30-day readmission after COPD for the derivation cohort was 7.54%. In comparison, that of the validation cohort was 6.70% (Lau et al., 2017). Elderly patients who were male, patients who were African American, and patients suffering from anemia, drug abuse, depression, or congestive heart failure were found to be at even

higher risk. Identification of these classes of patients can help with readmission-reduction strategies that will improve patient care.

States With the Highest Level of Chronic Obstructive Pulmonary Disease 30-Day Readmissions

In conjunction with COPD being the third leading cause of hospital readmissions in the United States, many state leaders and researchers have taken a closer look at the circumstance to increased COPD readmissions (Shah et al., 2016). Leaders have taken a stand and joined CMS in the effort to decrease 30-day readmission rates (Shah et al., 2016). The quality of care delivered to patients with COPD lacks critical interventions and contributes to readmissions (Ferdinand et al., 2019). Hospital administrators and lawmakers from state to state seek ways to decrease 30-day readmissions; however, many are concerned that penalties would widen health disparities (Jacobs et al., 2018). Leaders also seek answers regarding the policy related to why proprietary hospitals have such a different readmission ratio than their counterparts (Jacobs et al., 2018). Leaders of some individually owned health care organizations (HCOs) have feared not having the resources to meet the demand to recruit qualified staff or funds to invest in competitive technology to render high-quality value-based care that would prevent readmission (Shah et al., 2016; U.S. Department of Health and Human Services, 2016).

Researchers have agreed that there is not enough knowledge on trends in 30-day readmission rates after COPD hospitalization. According to Goto et al., (2017), it has been recognized that a reduction in the 30-day readmission rate in cases of COPD is a necessity and should be a national medical objective. The quick move for attention means

that it was vaguely understood how frequently 30-day readmission occurred, but no precise measurement was available. Information about its frequency was even more lacking in highly prioritized population groups such as the elderly, minority ethnic groups, low-income populations in rural environments, and people suffering from the most chronic illnesses, as defined by AHRQ (Goto et al., 2017).

Goto et al. (2017) conducted a study using available data from the state inpatient database of eight U.S. states that were geographically dispersed enough to be representative. They were Florida, New York, Utah, Arkansas, Nebraska, California, Iowa, and Washington, between 2006 and 2012. They noted hospitalization cases connected to COPD, being conscious of individuals over the age of 40 or precisely 40 years old. Goto et al. found that between 2006 and 2012, there were 845,465 hospitalizations at risk of 30-day readmission, which decreased from a rate of 20% in 2006 to 19% in 2012, showing a decreased rate of 0.8%. Following demographic and comorbidity adjustments for the analyzed patients, the decline became even more statistically significant. Nevertheless, it remains true that the readmission rate among the population groups defined by the AHRQ remained high over the 7 years. The importance of this study by Goto and associates is that it provides an important reference point for future investigations and a context for policymakers.

Quality of Care Measures and Chronic Obstructive Pulmonary Disease

According to researchers, many states are looking at health literacy as a quality measure that may be neglected, which may cause 30-day readmissions (Alper et al., 2017; Bailey et al., 2015). Patients who misconstrue their diagnosis and treatment plans

show poor compliance (AHRQ, 2018). Adults with low literacy skills find it difficult to comprehend essential health material such as discharge instructions, consent forms, preventive instructions, and drug labels (Alper et al., 2017). Healthcare providers who educate and speak in more straightforward language, repeat their instructions, and emphasize critical points while staying away from too much information in one appointment can expand their clients' health awareness and understanding (Collinsworth et al., 2018; Heinrich, 2012). Skillful healthcare workers serving COPD patients with low literacy skills should offer patient education resources that are brief and straightforward, are in large print, are written at a fourth-grade level, contain culturally sensitive graphics, and inspire desired behavior (Collinsworth et al., 2018; Heinrich, 2012; Miller et al., 2016).

The importance of an education-based program can also not be ignored, and it is therefore equally worth exploring. The evolution of this was the exact objective of the quality improvement (QI) project. The aim of the QI project was to assess the effects of an education-based program for COPD and its impact on 30-day readmission rates in a particular hospital located in a rural community in the U.S. state of Missouri (Hand-Eoloff, 2019). Four hundred and ninety-three patients who had been diagnosed with COPD from 2018 to 2019 were subjected to a retrospective chart review using a two-sample *t*-test analysis and a cohort study design. There was also an effort made to determine a heightened risk of readmission by analyzing additional variables. After the researchers carried out the two-sample *t*-test, the findings revealed that the difference in readmission rates between patients who did participate in the COPD education program

and patients who did not participate in the program was not substantial enough to be statistically significant (Hand-Eoloff, 2019).

Despite this lack of statistical significance in the differences between those who participated in the COPD education program and those who did not participate in it after this evaluation by the QI project, it was found that other essential variables contributed significantly to the result of the analysis. These variables include smoking habits, the patient's socioeconomic status, the motivation of the patient for participating, and the timing of collecting the data (Hand-Eoloff, 2019). These variables are likely to have influenced the participants and impacted how they used the educational information that they received due to being active participants in the program.

In 2011, Priest et al. conducted a cross-sectional, retrospective study to utilize claims data to establish a quality-of-care benchmark for several illnesses. The research study analyzed a Medicaid population of more than 2.8 million that were represented in nine states. The result revealed a significant gap in the documented claims data representing the national guidelines for quality of care and the chronic care services received. For this paper, I will only emphasize on the researcher's COPD findings. The study points out a possible quest for quality of care for COPD individual primary care providers. By providing more short-acting beta-agonist (SABAs) prescriptions, providers could prevent frequent COPD readmissions. The researchers also revealed that 12% of Level II readmissions (COPD-related cause) and Level III readmissions (respiratory distress readmitted COPD patients) had only four prescription order refills for SABAs. Priest et al.'s work suggested that some COPD patients were also to blame for

readmission even though they filled their prescriptions. The study revealed that COPD patients in the Medicaid population were commonly noncompliant with their medication regimens. The researchers strongly suggested that race also was a factor in noncompliance; African Americans had a lower medication compliance rate than Caucasians.

Priest et al. (2011) discussed the disparities in quality of care between Medicaid recipients and patients with other types of health care insurance underline the need for research to identify determinants of the differences in quality of care by health insurance status. The researcher's findings established a benchmark for lawmakers to design proven inventions for chronic diseases such as COPD to prevent hospital readmissions (Priest et al., 2011).

Healthcare Administrator Concern With Quality of Care

The quality of care and financial hardship is now a national concern. The impact of readmission seeks a broader system that examines failure in hospital quality of care and the lack of outpatient transitional care (Folland et al., 2013). It is predicted that COPD will be amongst the highest morbidity and preventable mortality rates globally by 2030 (Donze et al., 2016). Hospital readmissions are a universal concern and negatively impact the hospital finances, reputation, and the quality of life of their community of patients served (CMS, 2014). According to Boulding et al. (2011), quality of care influences patient satisfaction. CMS has also been very transparent with publishing hospitals' 30-day readmissions rates in the Hospital Readmissions Reduction Program - Hospital Compare website (Data.Medicare.gov., n.d.-b). Therefore, a lack of quality of

care related to COPD readmissions could create an organizational hardship due to decreased government reimbursement, decreased patient satisfaction, and decreased reported quality performance measures (Boulding et al., 2011; CAPS, 2014; CMS, 2014, 2016).

The lack of quality of care in the inpatient and outpatient setting will, in turn, create an organizational hardship due to the lack of government funding. As discussed, hospitals seek ways to avoid COPD 30-day readmissions penalties and improve patient outcomes (Guarascio et al., 2013). Lagoe et al. (2015) provided information on the advancement of quantitative tools for managing hospital readmissions by focusing on high-quality health care cost containment and preventing penalties for excessive readmissions. Donze et al. (2016) presented information on the hospital score, which included the following: patient's hemoglobin and sodium level, whether they were discharged from an oncology service, what procedure was done during the index admission, the index type of admission (urgent or non-urgent), the number of admissions within last 12 months, and their length of stay. The hospital score is presented as an identifier (prediction model) for patients at high risks for 30-day possible avoidable readmissions when applied to a large cohort of medical patients (Donze et al., 2016). The score is dynamic because it has a high potential to identify patients who will need more transitional care intervention to prevent 30-day readmissions.

In their research, Shah et al. (2016) pointed out one of the most significant obstacles and difficulties facing the tracking, documentation, and subsequent prevention of COPD readmissions. According to their findings, the definitions of COPD in medical

literature and clinical environment differ widely and make it challenging for healthcare systems to create effective evidence-based interventions. In clinical practice, COPD is often defined as a change in the quality of sputum, breathing, or cough (Shah et al., 2016). However, COPD has consistently been defined in a conflicting way by the International Classification of Diseases, Ninth Revision, Clinical Modification (Shah et al., 2016). They argue that it is critical to determine whether COPD has been defined by the provider method or the biller method before comparing data from diverse sources. Different studies tend to define it differently using either of the two, resulting in conflicting results and inconsistencies. Their findings can, therefore, not be considered side-by-side. The researchers predict an increase in the rate at which researchers use newer and different codes of classification in their definition of COPD (Shah et al., 2016). They pointed out that the codes of classification will result in more heterogeneity in the classifications and definitions of COPD in clinical practice, administrative identification, and the broader medical literature, creating more confusion and obfuscation, and making it even more challenging to compare studies meaningfully.

Codes of classifications affect not only the definition of COPD itself but also the definition of COPD readmission. One major obstacle is that readmission can be defined as rehospitalization not due to COPD alone, as it may result from other causes (Shah et al., 2016). There is also the problem of time intervals. While some studies are based on earlier readmissions, others include readmissions over two years. Therefore, careful attention must be paid to the definition of COPD and COPD readmissions.

Chronic Obstructive Pulmonary Disease Readmission Reduction Services

In reducing COPD readmission rates, Portillo et al. (2018) suggested care services that can help COPD patients transition to home in good health after discharge with reduced readmission risks. One of these services is intervention, which involves participants visiting a pharmacist and a nurse after discharge for follow-up health visits. Care services usually take place 30-days after the patients have been discharged (Portillo et al., 2018). Care services improve patients' access to proper health care while also preventing 30-day readmission (Portillo et al., 2018). The program's focus is to manage COPD patients, develop patient-specific plans for this management, and teach and review inhaler techniques to the patients (Portillo et al., 2018).

The analysis included the study sample size was nineteen older Caucasian male patients. Fifty-three percent of the patients received a referral to COPD Care service, 32 percent received a pulmonary rehabilitation referral, and 21 percent accepted a referral to the tobacco treatment clinic. Another care service is COPD monitoring (Portillo et al., 2018), involving disease management done very extensively based on recommended guidelines. COPD Care service also prescribed medication to the patient based on the results of a COPD assessment test and a review of the patient's COPD exacerbation history. Pharmacists modified hospital discharge medication 56 percent of the time (Portillo et al., 2018). Lifestyle medications are equally considered, and the pharmacist has corrected 52.6 percent of the patient's inhaler technique (Portillo et al., 2018).

With all attempts to decrease 30-day readmissions, the researchers Portillo et al. (2018) added COPD plans to the COPD Care services. Each COPD plan was specifically

designed for each patient, which they were to adhere to improve health outcomes (Portillo et al., 2018). The plan includes how the patient can self-manage COPD and directs the pharmacist on which model to use and whom to consult when prescribing the antibiotic and steroid therapy. Portillo et al. (2018) research pointed out that COPD plans decreased emergency department and hospital readmission for COPD exacerbation within 30-days of discharge with a zero percent readmission rate and a 63.2 percent decrease in primary care provider visits following discharge among the nineteen patients.

Improvement of 30-Day Readmissions

It has been shown that nearly all patients with COPD who reported to the emergency department within 30 days underwent readmission for several medical issues. Patients must be monitored and followed up intensively after discharge to prevent the representation of those patients to the emergency department (ED). Rezaee et al. (2017) particularly went in-depth into how COPD 30-day readmission could be prevented. While recognizing how prevalent and expensive COPD is, they contend that it can be prevented. Rezaee and associates also emphasized that the emergency departments (ED) may be the most suitable for readmission reduction strategies and efforts to carry out this prevention. The study was conducted from 2009 to 2015. However, unlike Goto et al. (2016), Rezaee and research partners brought the age factor down to 18 years of age. They also acquired electronic health record data from available information in the ED. They then examined the connection between likely risk factors and 30-day readmission using logistic regression.

The number of patients involved in this study was 1,574, who presented to the emergency department (ED) within 30-days of an index admission for COPD (Rezaee et al., 2017). Rezaee et al. (2017) reported that 82.5% of the patients were readmitted to the hospital through the ED. In their research, Rezaee et al. (2017) pointed out a significant relationship between 30-day readmission and several patients' characteristics. During various kinds of testing in the ED, the study revealed the following contributed to 30-day readmissions: Charlson score, inhaled steroids, arterial blood gas, fluticasone, tiotropium, a complaint of breathing difficulty, outpatient utilization of albuterol, and B-type natriuretic peptide (Rezaee et al., 2017). The patients readmitted to the hospital had a length of stay greater than 48 hours (Rezaee et al., 2017).

Research Gap—Strengths and Weaknesses

There is a gap in the literature that concerns the relationship between hospital Medicare reimbursement, quality of care measures related to patient satisfaction, and 30-day readmission rates. While studies considered some significant information on trends to reduce COPD 30-day readmissions, none addressed in detail a real correlation between COPD readmission rates and the HCAHPS patient's satisfaction quality measure reports.

Definitions of Frequently Used Terms

Chronic obstructive pulmonary disease (COPD): COPD is characterized by a poorly revisable decrease in the lungs, causing the airways to become inflamed and thicken. The tissue exchanged of oxygen becomes damaged, making it hard to rid carbon dioxide, resulting in other problems such as chronic bronchitis, emphysema, and bronchiolitis (GOLD, 2017).

30-day readmissions rate (*study dependent variable)*: The 30-day readmissions rate are unplanned readmissions for any reason to an acute care hospital 30 days after discharge from the initial hospital (Medicare.gov, n.d.). The study focus is COPD.

Excessive readmissions: The excessive readmissions are measured by a ratio calculated by dividing a hospital's number of "predicted" 30-day readmissions by the number that would be "expected" (CMS, 2014; Medicare.gov, n.d.).

Excess readmissions ratio: The excess readmissions ratio (ERR) measures a hospital's relative performance (CMS, 2020a). The ERR for COPD is the quantity of a hospital's readmission performance compared to the national average of patients with the pertinent health condition. If a hospital has an inferior to an average number of readmissions, the ratio will be larger than 1.0000, and this result decreases the qualification for full reimbursement from CMS (CMS, 2016; Medicare.gov, n.d.).

Global Initiative for Chronic Obstructive Lung Disease: The Global Initiative for Chronic Obstructive Lung Disease (GOLD) offers procedures aimed at the diagnosing, staging, and treatment of COPD (GOLD, 2017).

Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey: HCAHPS Survey, a standardized survey tool to measure patient's quality-of-care experience with hospital care. HCAHPS results are publicly reported on Hospital Compare as "top-box," "bottom-box" and "middle-box" scores (HCAHPS, 2016).

Hospital's Medicare reimbursement (*one of the study's independent variables)*: Hospital's Medicare reimbursement - CMS uses the Inpatient Prospective Payment System to reimburse hospitals for Medicare patients based on a fixed rate (CMS, 2020b).

Hospital's Medicare reimbursement is based on the diagnostic Related Grouping (DRGs) and procedures assigned and performed during the patient's hospital stay. Hospital Medicare reimbursement is also based on the value-based purchasing program that encourages hospitals to improve communication and coordination of care to engage patients and caregivers in discharge plans to reduce avoidable readmissions. The program is called Hospital Readmissions Reduction Program (HRRP). The study focus is COPD.

Preventable readmissions: A preventable readmission concept refers to unplanned re-hospitalization within 30 days of a prior acute care admission discharge (CMS, 2016).

Quality-of-care measures related to patient satisfaction (*one of the study's independent variables)*: Quality of care measures related to patient satisfaction measure standards and promote high-quality healthcare treatment, process, outcomes, patient perceptions, and organizational systems (CMS, 2020b). The quality-of-care measures included communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines.

- *Communication with nurses*: Question structure topics - nurse respect, nurse listening, and explanations from the nurses (HCAHPS, 2016).
- *Communication with doctors*: Question structure topics - doctor respect, doctor listening, and explanations from the doctors (HCAHPS, 2016).
- *Responsiveness of hospital staff*: Question structure topics - call button response and bathroom assistance (HCAHPS, 2016).
- *Communication about medicines:* Question structure topics - new medicines purpose, and new medications side effects (HCAHPS, 2016).

Assumptions

An assumption concerned the data and that the data collected for the variables are independent of each other. The variables are hospital Medicare reimbursement for COPD, quality of care measures related to patient satisfaction, and 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in California, Illinois, and New York. It is assumed that the secondary data used in this study is generated from the government CMS websites, Data.Medicare.gov Hospital Compare, is unbiased and accurate. It is also assumed that the acute care hospitals that reported COPD data to the CMS platforms reported current data for the timeframe. It is assumed that linear regression must validate the assumption. These assumptions are essential in the content of the study for statistical analysis.

Limitations

The study's generalizability is limited to acute care hospitals listed in the CMS Datasets for California, Illinois, and New York. I obtained the factors associated with the data from the publicly available Medicare.gov database. The analysis included organizations that met all analysis requirements. The study was limited to findings concerning the variables hospital Medicare reimbursement for COPD, quality of care measures related to patient satisfaction (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines), and 30-day readmissions rates for COPD patients.

Scope and Delimitations

I limited the scope of this study to the use of government-sponsored CMS websites. All secondary data will be extracted from Data.Medicare.gov Hospital Compare, as shown from the national organization, without manipulation or interpretation. The data represented COPD readmissions of California, Illinois, and New York patients who returned to a hospital within 30-days of discharge regardless of whether the patients returned to the same hospital or a different hospital (CMS, 2016).

The Potential for Positive Social Change

This study offered social change ideas by providing data that healthcare administrators may use to assess their organization and structure innovative actions and policies that promote organizational improvement. Leaders may recognize how investing in quality healthcare, and education may prevent or reduce readmissions by using the data. The information provided would assist healthcare administrators in developing ideas for discharge planning, a quality-of-care measure. This study provides information on patient satisfaction scores and the information may provide ideas that may decrease the burden of further illness and the cost of readmission within 30-days of discharge.

Summary and Conclusion

Chronic obstructive pulmonary disease (COPD) is the third leading cause of hospital readmissions in the United States. COPD has become a significant public health challenge (Murray, 2018; Regenstein & Andres, 2014). Shah et al. (2016) reported that the progression of COPD 30-day readmissions and the quality of care rendered to many patients was linked to preventable readmissions. This concern is apparent on a national

level where readmissions have negatively impacted hospitals' Medicare reimbursement, reputation, and the quality of life for patients (CMS, 2014). The research was designed to discover a correlation or difference between hospital Medicare reimbursement for COPD, quality of care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients in California, Illinois, and New York.

Section 2: Research Design and Data Collection

Introduction

The purpose of this quantitative study was to determine whether there was a correlation between hospital Medicare reimbursement, quality-of-care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients in California, Illinois, and New York. The quality-of-care measures included communication with nurses, communication with doctors, the hospital staff's responsiveness, and medicine communication. Section 1 provided information about the validity for defining if a relationship is apparent between the dependent variables hospital Medicare reimbursement for COPD and quality-of-care measures related to patient satisfaction and the independent variable of 30-day readmissions rates for COPD patients in California, Illinois, and New York. In Section 2, I describe the research design's specifics, study population and inclusions, and analytical tools to address the literature gap.

Research Design and Rationale

The research design was a correlation study; the design predicts the dependent variable's value from the independent variable's information. Although correlation is a measure of an observed relationship, it cannot by itself prove causation. This approach was appropriate for determining a relationship between hospital Medicare reimbursement for COPD, quality-of-care measures related to patient satisfaction, and 30-day readmissions rates for COPD, and the data were obtained from the publicly available Medicare.gov database.

The study's design option was consistent with other studies examining factors that could contribute to decreasing 30-day readmissions for COPD. Goto et al. (2017) explored trends in 30-day readmission rates after COPD hospitalization for 6 years, from 2006–2012, using state and published data utilizing logistical regression. Rezaee et al. (2014) also analyzed state-published data using logistic regression analysis to examine the relationship between potential risk factors and 30-day readmissions. Boulding et al. (2011) also analyzed state-published data, including hospital care quality information from a consumer perspective (HCAHPS data), using multivariable logistic regression in studying the association between patient satisfaction scores regarding inpatient care and hospital readmission within 30 days.

Research Design

The study was a correlation research design. The study was a quantitative methodology with a nonexperimental comparative design. The correlation design predicted the dependent variable's value (30-day readmissions rates for COPD patients in California, Illinois, and New York) from the independent variable's information (hospital Medicare reimbursement for COPD and quality-of-care measures related to patient satisfaction—communication with nurses and doctors, the responsiveness of hospital staff, and communication about medicines).

Variables

The metric-level dependent variable that showed an interval-ratio level of measurement for this study was the 30-day readmissions rate for COPD in California, Illinois, and New York. The metric-level independent variables were hospital Medicare

reimbursement for COPD and quality-of-care measures related to patient satisfaction. However, one independent variable, quality-of-care measures related to patient satisfaction, had categorical variables (communication with the nurses, communication with doctors, hospital staff responsiveness, and communication about medicines).

Methodology

Population

The population of interest for this study was patients diagnosed with COPD who had been admitted and discharged from one of the acute care hospitals in California, Illinois, or New York. The data further identified the population as patients readmitted within 30 days after discharge from July 1, 2015 through June 30, 2018. Each hospital met the minimum data elements required: It was listed as a hospital participating in the hospital value-based program (VBP), had January 1, 2016 through December 31, 2018 scores for the HCAHPS dimensions, and had public data listed in the CMS dataset and HRRP, both of which are found at Data.Medicare.gov (see Table 1).

Table 1

Required Data Conditions for Study Capture

State	7/1/2015–6/30/2018 HRRP COPD 30-day readmissions rate and hospital's Medicaid readmission	1/1/2016–12/31/2018 HCAHPS Patients' satisfaction scores	Hospital sample meeting patient data requirement
California	Yes	Yes	209
Illinois	Yes	Yes	111
New York	Yes	Yes	123
Total			443

Sampling and Sampling Procedures

The study consisted of data elements on COPD patients' readmission rates, hospital Medicare reimbursement for COPD, and quality-of-care measures related to patient satisfaction from acute care hospitals from California, Illinois, and New York (see Table 1). To be included, the participating hospitals need to have patient data from July 1, 2015–June 30, 2018 listed in the HRRP on the dependent variable 30-day readmissions rates and the independent variable hospital Medicare reimbursement for COPD information. Hospitals also needed to have information on the HCAHPS sites from January 1, 2016–December 31, 2018 on the independent variable patient satisfaction scores (HCAHPS). HCAHPS dates are on the same timeframe as HRRP because HCAHPS reports quarterly. The total number of acute care hospitals listed in the CMS datasets for California, Illinois, and New York was 567 hospitals listed on the HRRP site. There were 519 hospitals listed on the HCAHPS site. The study sample was reduced to the 443 hospitals that met the participation data requirement. Table 1 outlines the necessary data components for study inclusion and the total hospital sample meeting the inclusion requirements.

Power Analysis and Sample Size Estimation

Statistical power was calculated with G*Power version 3.1.9.7. The effected size of the odds ratios was computed using *f* tests linear multiple regression: fixed model, R^2 deviation from zero. A priori power analysis was performed to determine if the acute care hospital sample size included in the study would be appropriate to get a significant difference at a small effect size ($f^2 = 0.10$ with an alpha of 0.05 and power of 0.80), as

detailed in Table 2. The small effect size was selected because there was expected to be a small difference in COPD 30-day readmissions rates and patient satisfaction scores among the acute care hospitals. The projected sample size needed (*N*) was *N* = 100, with a power of 0.80, as outlined in Figure 2. The proposed sample size of 443 acute care hospitals was adequate and exceeded the a priori minimum power to detect differences.

Table 2

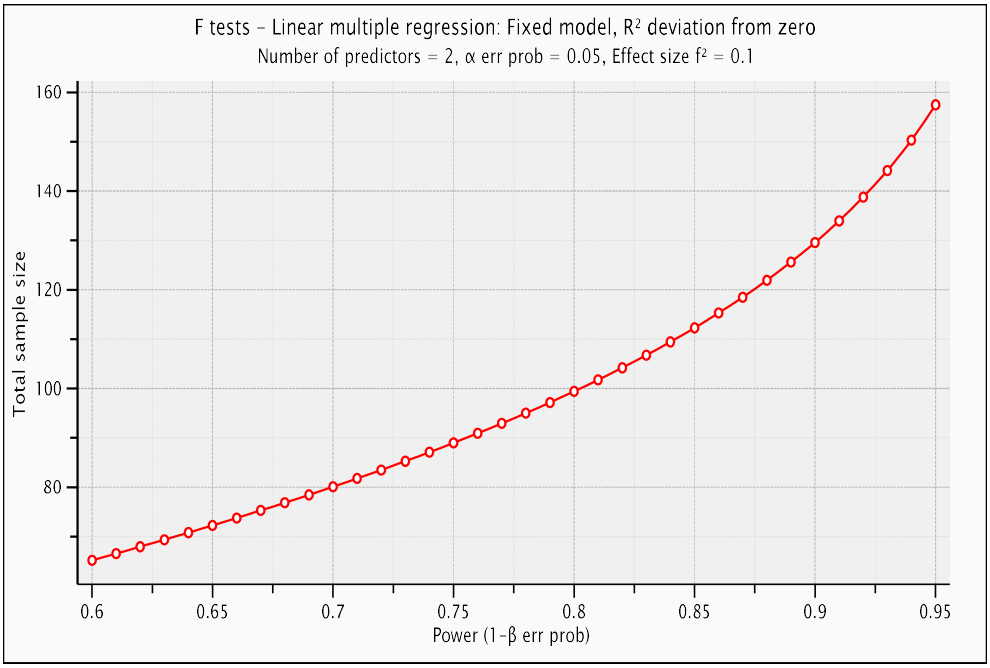
Analysis: A Priori Computed Required Sample Size

Input:	Effect size f^2	0.10
	α err prob	0.05
	Power (1-β err prob)	0.80
	Number of predictors	2
Output:	Total sample size	100
	Actual power	0.8025847

Note. *F* tests—Linear multiple regression: Fixed model, R^2 deviation from zero.

Figure 2

Power Analysis and Sample Size Estimation



Operationalization of Variables

In this study, I analyzed the dependent variable and two independent variables, one of which had categorical variables. The dependent variable was the 30-day readmissions rates for COPD patients in California, Illinois, and New York. The independent variables were hospital Medicare reimbursement for COPD and quality-of-care measures related to patient satisfaction. The dependent variable 30-day readmissions rate measured patients with COPD who were discharged from California, Illinois, and New York hospitals and readmitted within 30 days after discharge. The independent variable hospitals' Medicare reimbursement represented California, Illinois, and New York hospitals' excess readmission ratio for hospital Medicare reimbursement for COPD. The independent variable quality of care measures related to patient satisfaction had four categorical variables. The independent variable measured California, Illinois, and New York hospitals' patient satisfaction rates on communication with nurses and doctors, hospital staff responsiveness, and communication about medicines.

Secondary Data Analysis Methodology

All data were taken from annual files on government sites owned by CMS, which were downloaded from the Medicare.gov Hospital Compare websites as outlined in Table 3. Table 3 provides details about which elements were derived from the secondary data CMS—Medicare.gov Hospital Compare websites.

Table 3

Secondary Data, Centers for Medicare and Medicaid Services—Medicare.gov Hospital Compare Websites

Variables	HRRP	HCAHPS
Dependent variable		
30-day readmissions rates difference for COPD in California, Illinois, and New York	Yes	No
Independent variables		
Hospital Medicare reimbursement for COPD in California, Illinois, or New York	Yes	No
Quality-of-care measures related to patient satisfaction	No	Yes
Communication with nurses		
Communication with doctors		
Responsiveness of hospital staff		
Communication about medicines		

Data Analysis Plan

In this correlational research, linear regression analysis models were used. The data gathered were analyzed to determine a relationship between California, Illinois, and New York variables. The independent variables were hospital Medicare reimbursement for COPD and quality-of-care measures related to patient satisfaction. The independent variable was the 30-day readmissions rates for COPD patients. The data were from the periods July 1, 2015 through June 30, 2018 (HRRP) and January 1, 2016 through December 31, 2018 (HCAHPS). HCAHPS dates are on the same timeframe as HRRP because HCAHPS reports quarterly. CMS annual files were downloaded from the Medicare.gov Hospital Compare website and safely stored on a personal computer. The data were analyzed using Statistical Package for the Social Sciences (SPSS) Version 27, using the regression tool, and populating data tables were imported from Microsoft Excel.

Research Questions and Hypotheses

Research Question 1: Is there a significant correlation between hospital Medicare reimbursement and 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York?

Null hypothesis (Ho): There is no significant correlation in hospital Medicare reimbursement and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Alternative hypothesis (H1): There is a significant correlation in hospital Medicare reimbursement and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Research Question 2: Is there a significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York?

Null hypothesis (Ho): There is no significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission

rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Alternative hypothesis (H1): There is a significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Regression Analysis

I conducted one linear regression analysis for Research Question 1. The assumptions for linear regression are linearity, homoscedasticity, independence of error, and normal distribution of error (normality). Regression diagnostics were used to evaluate the model assumptions and study whether there were observations with an enormous, undue influence on the analysis. I also conducted one one-way analysis of variance (ANOVA) for Research Question 2. For both studies, I used a priori $p < .05$ to determine if the model presented statistical significance. The unstandardized β was studied to establish the effect size of each included independent variable. The adjusted $R2$ was utilized to assess the strength of the model. A variance inflation factor score of > 5 was used for determining collinearity among the independent variables. No data element demonstrated multicollinearity, using variance inflation factor; therefore, no data were eliminated from the final regression.

Threats to Validity

The data for this study were examined by using the information supplied to CMS by the participating hospitals. Each hospital's representatives validated data provided to CMS. CMS does not recheck the participating organization data to ensure validity; however, HRRP ensures that data are based on an average hospital with similar patients with excessive readmissions. CMS ensured that the data were calculated by a ratio computed by dividing the selected hospital's total of anticipated 30-day readmissions by the number that would be likely (CMS, 2016; Medicare.gov, n.d.).

Ethical Procedure

Only officially released information from Data.Medicare.gov, a CMS program website, was used in this study. All datasets are harmless to any person's confidential information; all information is deidentified to preserve privacy. I contacted no acute care hospital. All datasets were collected and analyzed without bias, judgmental thoughts, or verbiage. The Walden University Institutional Review Board (IRB) complies with U.S. federal regulations; I ensured that the IRB's code of ethics for research data collection and data access bylaws was followed.

Summary

In this study, I examined the data by using information supplied to CMS by the participating hospitals. In review, Section 1 provided the correlation study design, data collection methods, and study analytic strategies used to determine a relationship between hospital reimbursement, quality-of-care measures related to patient satisfaction, and 30-day readmission rates. Section 2 contained a description of how the web links

data.medicare.gov secondary datasets were used to conduct quantitative analysis. This section also addressed possible data threats and ethical concerns. In Section 3, I present the statistical results vital to the research questions and associated hypotheses.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative study was to determine if there was a correlation between hospital Medicare reimbursement, quality-of-care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients in California, Illinois, and New York. The quality-of-care measures included communication with nurses, communication with doctors, the hospital staff's responsiveness, and medicine communication. Decreasing inpatient COPD 30-day readmissions is a nationwide healthcare concern. Many healthcare administrators fear losing hospital Medicare reimbursement related to quality and performance improvement for COPD patients (Krishnan et al., 2015; Papanicolas et al., 2018). This study was similar to other studies examining factors that could contribute to decreasing 30-day readmissions for COPD (Boulding et al., 2011; Goto et al., 2017; Rezaee et al., 2014). The dependent variable for this study, which had an interval-ratio level of measurement, was 30-day readmissions rates for COPD patients in California, Illinois, and New York. The metric independent variables were hospital Medicare reimbursement for COPD and quality-of-care measures related to patient satisfaction. The quality-of-care measures related to patient satisfaction had categorical variables (communication with the nurses, communication with doctors, hospital staff responsiveness, and communication about medicines). The research questions (RQs) for this study were as follows.

Research Questions and Hypotheses

Research Question 1: Is there a significant correlation between hospital Medicare reimbursement and 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York?

Null hypothesis (Ho): There is no significant correlation in hospital Medicare reimbursement and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Alternative hypothesis (H1): There is a significant correlation in hospital Medicare reimbursement and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Research Question 2: Is there a significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York?

Null hypothesis (Ho): There is no significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission

rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Alternative hypothesis (H1): There is a significant correlation between patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York.

Secondary Data Set Collection

This section presents the secondary data collection process, data selection criteria (exclusions and inclusions), data analysis methodologies, and a summary of the statistical results.

Data Collection Process

After obtaining IRB approval number 12-24-20-0654105 from Walden University, I obtained secondary data sets for the periods July 1, 2015 through June 30, 2018 for HRRP and January 1, 2016 through December 31, 2018 for HCAHPS. I downloaded CMS annual files from the Medicare.gov Hospital Compare website. The total number of hospitals listed on the HRRP site for California, Illinois, and New York was 567. There were 519 hospitals listed on the HCAHPS site. However, in comparing the data requirements of both sites, I found that only 443 hospitals' patient data met the minimum data elements required for this study. The distribution of patients' data among the states used in this study was as follows: California, 42%; Illinois, 25%; and New

York, 28% (Table 5). For the patient data from each hospital included in the study, an Excel list was populated using a search by states approach from the CMS database. The data were analyzed using SPSS Version 27 with the regression tool and imported populating data tables from Microsoft Excel.

Data Selection Criteria—Exclusions and Inclusions

The focus population for this study consisted of data elements for patients diagnosed with COPD. Hospitals were matched by state, facility name, and facility identification number. The patients must have been admitted and discharged from one of the hospitals in California, Illinois, or New York within the 3-year timeframe of 2015 through 2018, which provided a view of COPD readmission in various regions. The patients must also have been readmitted within 30 days after discharge from July 1, 2015 through June 30, 2018. Each hospital had to have met the minimum data elements required: (a) being listed as a hospital participating in the Hospital VBP, along with January 1, 2016 through December 31, 2018 scores for the HCAHPS dimensions published; and (b) having public data listed in the CMS dataset, HRRP. Both datasets were imported from Data.Medicare.gov (see Table 1).

30-Day Readmission Rates for COPD Patients in California, Illinois, and New York

The 30-day readmission rate for COPD was defined by dividing the number of readmissions by the number of discharges (Data.Medicare.gov., n.d.-a). The HRRP 30-day readmission rate for COPD data for the period July 1, 2015 through June 30, 2018 for California, Illinois, and New York was recovered from the CMS.gov website. After downloading the dataset as a Microsoft Excel file, allowing for deleting states not in the

study, the data were sorted and matched by states, hospitals, and identification numbers. I manually entered 30-day readmission rates for COPD patients for each of the 443 hospitals in California, Illinois, and New York into SPSS.

Quality-of-Care Measures Related to Patient Satisfaction

The quality-of-care measures related to patient satisfaction were four HCAHPS performance scores for communication with nurses, communication with doctors, hospital staff responsiveness, and communication about medication. The performance score was the actual percentage of the patient's top box responses of *always* for communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medication. Performance scores were recovered from the CMS.gov website from HCAHPS data for California, Illinois, and New York for the period January 1, 2016 through December 31, 2018. The data were sorted and matched by states, hospitals, and identification numbers. The data element for patient satisfaction quality-of-care measures on the performance scores from the 443 hospitals for communication with nurses, doctors, hospital staff responsiveness, and communication about medications was manually entered into SPSS and analyzed.

Hospital's Medicare Reimbursement for COPD

The HRRP links payment to the quality of hospital care (CDC, 2019; CMS 2020a). Relating compensation to quality of care is an effort by HRRP to encourage professional communication and care coordination that engages patients and caregivers in discharge plans and, in turn, reduces avoidable readmissions (CDC, 2019; CMS 2020b). CMS calculates each hospital's payment reduction and component results based on its

performance during a rolling performance period (CDC, 2019; CMS 2020a). The payment adjustment factor is the form of the payment reduction that CMS uses to reduce hospital payments. Currently, the payment reduction is capped at 3%, which equals a payment adjustment factor of 0.97 (CDC, 2019; CMS 2020a).

The HRRP, July 1, 2015, through June 30, 2018, payment adjustment factor for COPD data for California, Illinois, and New York was recovered from the CMS.gov website. The dataset was downloaded as a Microsoft Excel file to allow deletion of states not in the study. The data was sorted and matched by state, hospital, and identification number to prevent discrepancies. I manually entered each of the COPD excess readmission ratio results for each hospital's Medicare reimbursement results into SPSS.

Descriptive Characteristics of Sample and Population

The study involved patient data from acute care hospitals located in California (CA; $n = 209$), Illinois (IL; $n = 111$), and New York (NY; $n = 123$). In Table 4, descriptive statistics are related to the COPD admissions and discharges percentage of the state's population by age group, sex, and race/ethnicity for this study. Most of the population for each state's average age group was 65–84, and each state had a mixture of both females and males. The study's largest race/ethnicity group was White for all the states.

Table 4

Chronic Obstructive Pulmonary Disease Admissions and Discharges Percentage of State Population by Age Group, Sex, and Race/Ethnicity

		CA	IL	NY
Age group				
	< 1	0.05	0.02	0.02
	1–17	0.34	0.13	0.16
	18–44	3.60	2.57	2.21
	45–64	28.44	29.39	28.40
	65–84	50.60	52.83	52.43
	85+	16.97	15.06	16.78
Gender				
	Male	51.36	48.81	49.41
	Female	48.64	51.19	50.59
Race/ethnicity				
	White	64.89	74.37	73.18
	Black	10.87	16.03	12.86
	Hispanic	14.19	4.68	6.09
	Asian/Pacific	6.46	0.96	1.40
	Native American	0.28	0.08	0.24
	Other	2.75	3.83	6.23
	Missing data	0.56	0.05	0

Table 5 shows the hospital COPD frequencies statistics by state, along with the listing ownership, teaching status, location, and bed size for the reported patient's data to CMS. CA has the highest hospital frequency of readmissions at 47.2%; followed by NY with 27.8% and finally IL, with a hospital readmission frequency of 25.1%. NY has the highest number of patient data from private, not-for-profit hospital ownership, and CA has the highest patient data from private, for-profit, and government hospital ownership. The hospital patient data in CA are mainly from nonteaching institutions, and IL and NY patient data are primarily from teaching institutions. When glancing at the highest

number for all states, one can see that the patient data used in this study are from urban locations with large numbers of hospital beds.

Table 5

Hospital Information by State, Frequencies Statistics—Listing Ownership, Teaching Status, Location, and Bed Size Percentage

CA	Number of hospitals	209	47.2%
	Ownership	Government	11.4%
		Private, not for profit	67.0%
		Private, for profit	21.6%
	Teaching status	Nonteaching	52.7%
		Teaching	47.3%
	Location	Rural	2.6%
		Urban	97.4%
	Bed size	Small	14.33%
		Medium	26.73%
		Large	58.94%
IL	Number of hospitals	111	25.1%
	Ownership	Government	4.62%
		Private, not for profit	88.67%
		Private, for profit	6.71%
	Teaching status	Nonteaching	46.29%
		Teaching	53.71%
	Location	Rural	12.48%
		Urban	87.52%
	Bed size	Small	17.43%
		Medium	25.69%
		Large	56.88%
NY	Number of hospitals	123	27.8%
	Ownership	Government	9.95%
		Private, not for profit	90.05%
		Private, for profit	0
	Teaching status	Nonteaching	29.34%
		Teaching	70.66%
	Location	Rural	8.58%
		Urban	91.42%
	Bed size	Small	11.71%
		Medium	29.18%
		Large	59.11%
	Total hospitals with patient data	443	100.0%

Descriptive Statistics

Dependent Variable

The descriptive statistics for the dependent variable, the 30-day readmission rate for COPD patients in CA, IL, and NY, are listed in Table 6.

Table 6

Descriptive Statistics for Dependent and Independent Variables

		N	Mean	*SD*
Dependent variable				
30-day readmission for COPD				
CA	COPD readmission	209	.2023	.04966
IL	COPD readmission	111	.1967	.04041
NY	COPD readmission	123	.2154	.03678
Independent variable				
QOC related to patient satisfaction				
CA	Communication—Nurses	209	75.4764	4.27303
	Communication—Doctors	209	76.2636	4.37330
	Responsiveness of staff	209	61.9276	4.86933
	Communication—Meds	209	61.6970	4.37841
IL	Communication—Nurses	111	78.9725	3.99591
	Communication—Doctors	111	79.0452	3.42941
	Responsiveness of staff	111	64.9278	6.58854
	Communication—Meds	111	62.8459	4.58311
NY	Communication—Nurses	123	76.2897	5.29563
	Communication—Doctors	123	76.7626	3.38896
	Responsiveness of staff	123	60.6314	7.32427
	Communication—Meds	123	59.2327	4.86334
Hospital Medicare reimbursement for COPD				
CA	Hospital Medicare reimbursement	209	.9995	.08512
IL	Hospital Medicare reimbursement	111	.9999	.06868
NY	Hospital Medicare reimbursement	123	1.0289	.10455

Figures 3–5 demonstrate that the dependent variable 30-day readmission rates difference for COPD in CA, IL, and NY is normally distributed around the mean.

Figure 3

30-Day Readmission Rates for Chronic Obstructive Pulmonary Disorder Patients in the State of California Distribution

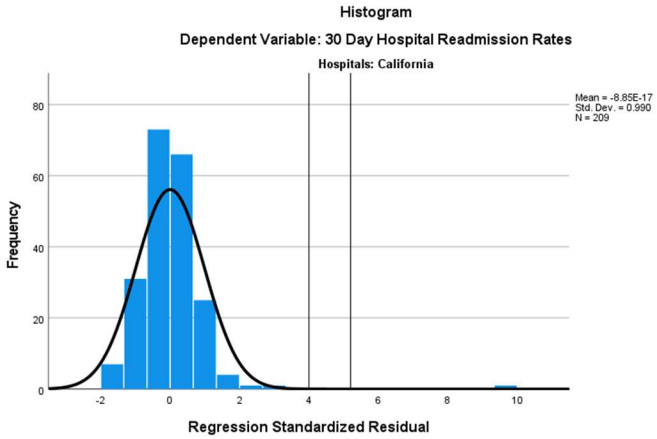


Figure 4

30-Day Readmission Rates for Chronic Obstructive Pulmonary Disorder Patients in the State of Illinois Distribution

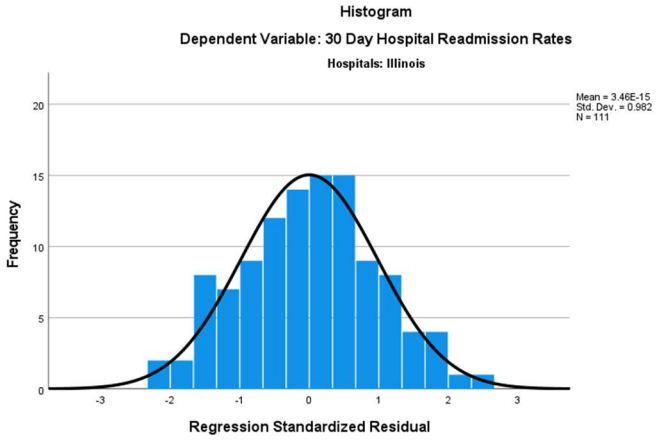
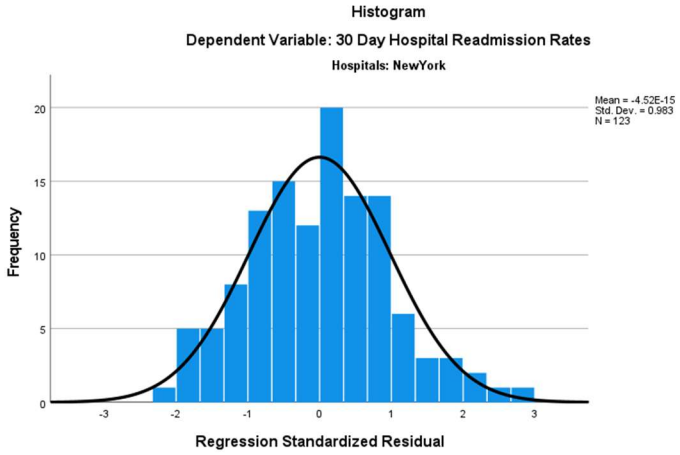


Figure 5

30-Day Readmission Rates for Chronic Obstructive Pulmonary Disorder Patients in the State of New York Distribution



Independent Variables

The statistics for the independent variables are as follow – Hospital Medicare reimbursement for COPD (Table 6) were available for all the studies hospitals in each state: CA 47% (n = 209), mean = .9995, SD =0.08512; IL 25% (n = 111), mean = .9999, SD = 0.06868; and NY 28% (n = 123), mean = 1.0289, SD = 0.10455. Quality of care (QOC) measures related to patient satisfaction rates were also available for all the hospitals' HCAHPS performance areas in each state. I will be checking normality or errors after modeling. Notably, errors are assumed a normal distribution in linear regression with a mean of zero.

Study Results for Research Question 1

RQ1: Is there a significant correlation between hospital Medicare reimbursement and 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in California, Illinois, and New York?

Correlation Coefficient Measure

The Pearson Bivariate correlation coefficient measures linear association between two interval- or ratio-level variables (Frankfort-Nachmias & Leon-Guerrero, 2015). Here, the test of significance is the one-tailed test used to prevent an assumption whether there is a positive or negative correlation between the two variables, hospital Medicare reimbursement for COPD and the 30-day readmission rates for Chronic Obstructive Pulmonary Disease Patients in CA, IL, and NY. The linear regression findings below attempt to model the relationship between two variables by fitting a linear equation to observed data. The hospital's Medicare reimbursement is considered an explanatory variable, and 30-day readmission is the dependent variable.

Linear Regression Findings

Finding 1

The variables' correlation coefficient is $p < 0.05$. Table 7 outlines the correlation of hospital Medicare reimbursement for COPD in California, Illinois, and New York with 30-day readmission rates difference for Chronic Obstructive Pulmonary Disease patients. Table 7 reports a correlation coefficient of .651 in CA, .896 in Illinois, and .456 in New York. Correlation coefficients range from -1.0 to +1.0. A positive correlation occurred, meaning that the hospitals performance differences for Medicare reimbursement suggests

a relationship between 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in CA, IL, and NY.

Table 7

Correlation—Chronic Obstructive Pulmonary Disease Hospital Medicare Reimbursement and 30-Day Readmission Rate for Chronic Obstructive Pulmonary Disease Patients

Hospital patient data state—Differences			30-day readmission rate for COPD	COPD hospital's Medicare reimbursement
CA	Pearson correlation	30-day readmission rate for COPD patients	1.000	.651
		COPD hospital's Medicare reimbursement	.651	1.000
	Sig. (1-tailed)	30-day readmission rate for COPD patients	.	.000
		COPD hospital's Medicare reimbursement	.000	
IL	Pearson correlation	30-day readmission rate for COPD patients	1.000	.896
		COPD hospital's Medicare reimbursement	.896	1.000
	Sig. (1-tailed)	30-day readmission rate for COPD patients	.	.000
		COPD hospital's Medicare reimbursement	.000	
NY	Pearson correlation	30-day readmission rate for COPD patients	1.000	.456
		COPD hospital's Medicare reimbursement	.456	1.000
	Sig. (1-tailed)	30-day readmission rate for COPD patients	.	.000
		COPD hospital's Medicare reimbursement	.000	

Finding 2

However, variation in hospitals' Medicare reimbursement differences, is not totally explained by the hospitals performance variation in 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in CA, IL, and NY. In this case, the p-value is the same for the three states (CA, IL, and NY) .000, which means the odds of finding a relationship between these two variables is less than .001, or less than 1 in a

thousand. This significant relationship indicates that we can reject the null hypothesis and accept the alternative hypothesis suggesting a relationship between hospital Medicare reimbursement for COPD and 30-day readmission rates for Chronic Obstructive Pulmonary Disease among CA, IL, and NY patients.

Finding 3

Linear regression displays the effect the independent variable (hospital Medicare reimbursement for COPD) has on the dependent variable (30-day readmissions rates for COPD patients in CA, IL, and NY. Table 8 shows the actual regression coefficients for the regression equation and the statistical significance. Here, the B value for hospital's Medicare reimbursement for CA is .380; IL is .527; the B value for NY is .161. The constant value (y-intercept or the point at which the regression line crosses the y-axis) for CA is -.177; IL is -.331; NY is .050. Both CA and IL value levels of significance are less than the alpha of .05, therefore rejecting the null hypothesis and concluding that at least one of the means is significantly different. However, the p-value clues the odds of finding this relationship between hospital's Medicare reimbursement and 30-day readmission rates for COPD patients', in CA and IL by chance is less than 1 in 1,000. NY, value levels of significance equal the alpha of 0.05 which is different than CA and IL.

Table 8

Coefficients—Chronic Obstructive Pulmonary Disease Hospital Medicare Reimbursement and 30-Day Readmission Rate for Chronic Obstructive Pulmonary Disease Patients

		Coefficients [a]								
		Unstandardized coefficients		Standardized coefficients			95.0% Confidence interval for B		Collinearity statistics	
	Hospital's Medicare reimbursement	B	Std. error	Beta	*t*	Sig.	Lower bound	Upper bound	Tolerance	VIF
CA	(Constant)	-.177	.031		-5.745	.000	-.238	-.116		
	Hospital Medicare reimbursement	.380	.031	.651	12.344	.000	.319	.441	1.000	1.000
IL	(Constant)	-.331	.018		-18.756	.000	-.365	-.296		
	Hospital Medicare reimbursement	.527	.018	.896	29.980	.000	.493	.562	1.000	1.000
NY	(Constant)	.050	.017		2.970	.003	.017	.083		
	Hospital Medicare reimbursement	.161	.016	.456	9.824	.000	.128	.193	1.000	1.000

[a] Dependent variable: 30-day readmission rates for COPD patients in the states of CA, IL, and NY.

Finding 4

In examining Table 9, in the Model summary, $R^2 = .424$, and adjusted $R^2 = .421$ shows that 42.4% of the variation of hospital Medicare reimbursement performance difference in CA is explained by the 30-day readmission rates for COPD patients. $R^2 = .803$ and the adjusted $R^2 = .802$ show that 80.3% of the variation of hospital Medicare reimbursement performance difference in IL is explained by the 30-day readmission rates

for COPD patients. R^2 = .208, and the adjusted R^2 =.202 shows that 20.8% of the variation of hospital Medicare reimbursement performance difference in NY is explained by the 30-day readmission rates for COPD patients.

Table 9

Model Summary—Chronic Obstructive Pulmonary Disease Hospital Medicare Reimbursement and 30-Day Readmission Rate for Chronic Obstructive Pulmonary Disease Patients

Model summary [a c]											
					Std. error of the	Change statistics					
Hospitals	Model	*R*	*R* square	Adjusted *R* square	estimate	*R* square change	*F* change	df1	df2	Sig. *F* Change	Durbin-Watson
CA	1	.651[b]	.424	.421	.03778	.424	152.374	1	207	.000	1.593
IL	1	.896[b]	.803	.802	.01800	.803	445.316	1	109	.000	1.916
NY	1	.456[b]	.208	.202	.03286	.208	31.817	1	121	.000	2.129

[a] Hospitals = CA, IL, and NY. [b] Predictors: (Constant), hospital Medicare reimbursement. [c] Dependent variable: 30-day readmission rates for COPD patients in the states of CA, IL, and NY.

Finding 5

The F displayed in the model summary (ANOVA), Table 9, CA- West Region F = 152.374 with a significance of .000; IL- Midwest Region F = 445.316 with a significance of .000; and NY-Northeast Region F=31.817 with a significance .000. The level of significance is less than the alpha of .05 for CA, IL, and NY, therefore rejecting the null hypothesis and concluding that at least one of the means is significantly different. This means 30-day readmission rates difference for patients in CA, IL, and NY significantly impacts hospital Medicare reimbursement for COPD.

Regression Analysis

The diagnostics were run on the regression model to investigate if it meets the assumptions of linearity, normal distribution errors, independence of error, multicollinearity, undue influence, and homoscedasticity.

Assumptions of Linearity. In evaluating for linearity, the Durbin-Watson score for CA =1.239; IL=1.675; NY=1.024 indicating a positive autocorrelation (Table 7), reflecting that there is likely a correlation between the residuals. The model was statistically significant ($p < .05$), demonstrating a correlation between hospital Medicare reimbursement for COPD and 30-day readmission rates for COPD patients in CA, IL, and NY. In review, in model summary (ANOVA), Table 9, the F obtained for CA, IL, and NY and significance of .000. The level of significance is less than the alpha of .05, meaning the variability of 30-day readmission rates for COPD patients in the states of CA, IL, and NY impacts the hospitals' Medicare reimbursement differences, although the relationship is weak and does not violate the assumption.

Normal Distribution Errors. Figures 3-5 demonstrate that the dependent variable 30-day readmission rates difference for COPD in CA, IL, and NY. The figures show each state is normally distributed around the mean and does not violate the assumption.

Independence of Error. In the independence of error evaluation, $p <.000$ is below the alpha of .05; therefore, it does not violate the assumption.

Multicollinearity. To evaluate the data for multicollinearity, I analyzed the variance inflation factor (VIF) of each state (Table 8). CA, IL, and NY all equal 1.000,

which is well below the level of 10, and tolerance values equal 1.000; therefore, it does not violate the assumption of demonstrating multicollinearity.

Undue Influence. The Residual Statistics table (Table 10) evaluates for undue influence; here, the CA Cook's Distance values range from .000 - .456, with a mean of .006; the IL Cook's Distance values range from .000 - .079, with a mean of .010; and the NY Cook's Distance values range from .000 - .128, with a mean of .009. The Cook's Distance for all the states are more than three times the mean indicating outlier (classification of atypical patients' data and cannot be classified), confirming that the observation is influential. The Cook's Distance shows the undue influence on the regression line, reflecting a violation of this assumption.

Table 10

Residuals Statistics

	Residuals statistics [a]				
.	Minimum	Maximum	Mean	Std. deviation	*N*
CA Cook's distance	.000	.456	.006	.033	209
IL Cook's distance	.000	.079	.010	.017	111
NY Cook's distance	.000	.128	.009	.017	123

[a] Dependent variable: 30-day hospital readmission rates.

Homoscedasticity. The scatter plot (Figure 6-8) was to evaluate homoscedasticity. The findings show that there are groupings of plots. There is no funnel or U shape. Therefore, there is no violation of this assumption.

Figure 6

Scatterplot, Research Question 1—30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in California

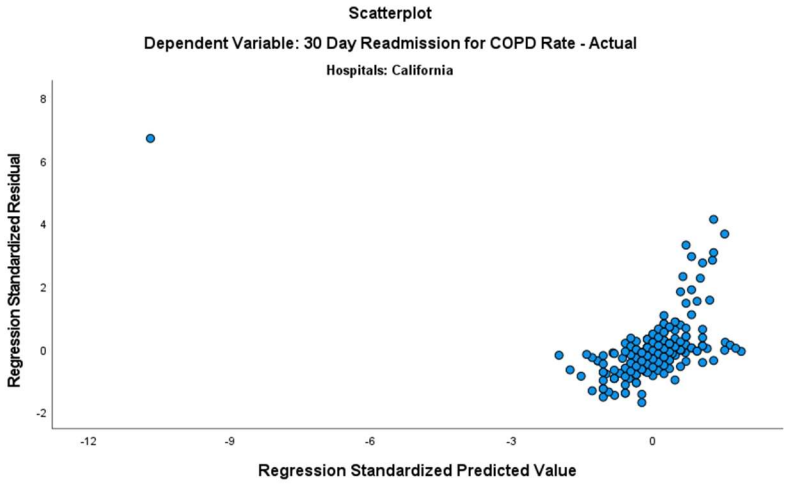


Figure 7

Scatterplot, Research Question 1—30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in Illinois

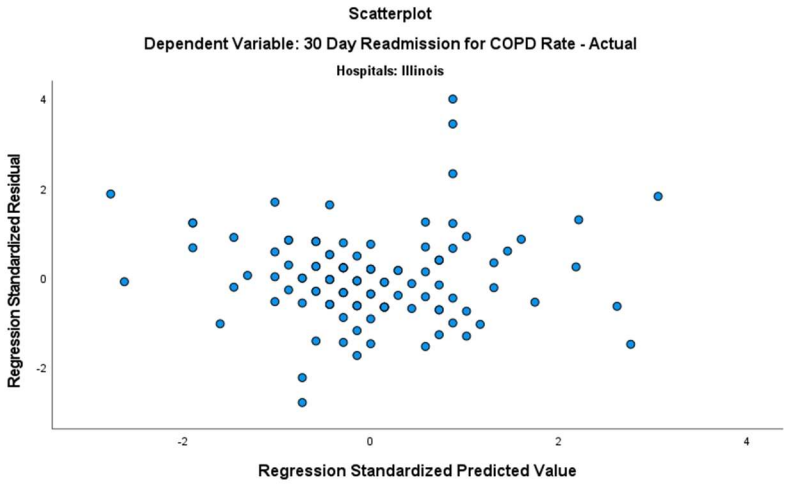
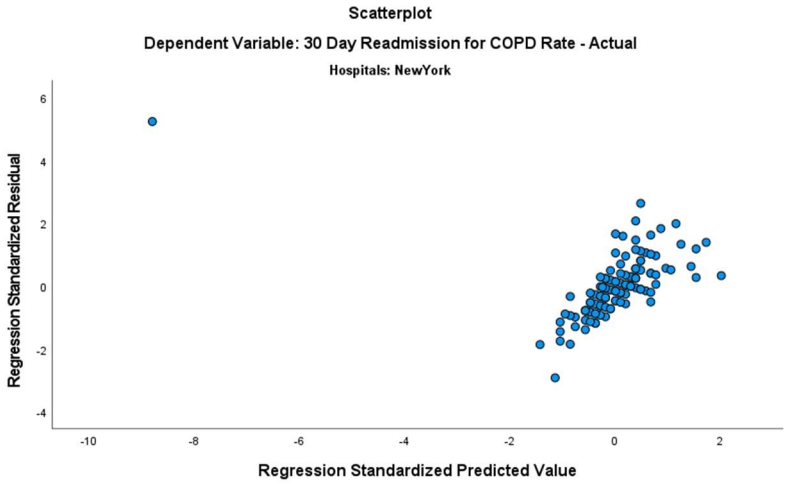


Figure 8

Scatterplot, Research Question 1—30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in New York



Summary for Research Question 1

In review of the research question, "Is there a significant correlation between hospital Medicare reimbursement and 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in California, Illinois, and New York," the conclusion was to reject the null hypothesis which states that there is no relationship between the two variables. Therefore, accept the alternative hypothesis that there is a significant relationship between hospital Medicare reimbursement and 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in California, Illinois, and New York. A positive correlation occurred, meaning that the hospitals' performance differences for Medicare reimbursement suggest a relationship between 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in CA, IL, and NY. The test of Significance was .000, which was below the standard p-value of 0.05. Illinois appears to

be the highest, followed by California, then New York. Justified by Pearson Correlation Bivariate Coefficients testing shows the correlation coefficient for CA as .651, IL .896, and NY as .456 -between 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in California, Illinois, and New York and hospital Medicare reimbursement.

Study Results for Research Question 2

RQ2: Is there a significant correlation between patient satisfaction quality of care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in CA, IL, and NY?

Correlation Coefficient Measure

The Pearson Bivariate correlation coefficient measures linear association between two interval- or ratio-level variables (Frankfort-Nachmias & Leon-Guerrero, 2015). Pearson's correlation coefficient is a measure of strength of a linear relationship between the variable. The linear regression findings below attempt to model the relationship between two variables by fitting a linear equation to observed data. Regression tests constant variables, producing statistical data on patient satisfaction quality of care measures related to communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medication; and 30-day readmissions rates difference for COPD patients in CA, IL, and NY. The metric level-dependent, showing an interval-ratio level of measurement for this study is 30-day

readmissions rates for COPD patients in CA, IL, and NY. The categorical nominal level of measurement for the independent variable is patient satisfaction quality of care measures; the one independent variable has categorical variables: communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medication.

Linear Regression Findings

Finding 1

The variables' correlation coefficient is $p < 0.05$. Table 11 outlines the correlation of between patient satisfaction quality of care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in CA, IL, and NY. Table 11 describes a correlation coefficient of each hospital by state and patient satisfaction quality care measure categorical group. The correlation coefficients range from -1.0 to +1.0. A positive correlation occurred, meaning that patient satisfaction quality of care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) differences suggest a relationship between 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in CA, IL, and NY.

Table 11

Correlation—Patient Satisfaction Quality-of-Care Measures and 30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in CA, IL, and NY

			30-day readmission for COPD rate	Communication with nurses	Communication with doctors	Responsiveness of hospital staff	Communication about medication
CA	Pearson correlation	30-day readmission for COPD rate	1.000	-.158	-.181	-.220	-.154
		Communication with nurses	-.158	1.000	.822	.670	.695
		Communication with doctors	-.181	.822	1.000	.470	.524
		Responsiveness of hospital staff	-.220	.670	.470	1.000	.672
		Communication about medication	-.154	.695	.524	.672	1.000
	Sig. (1-tailed)	30-day readmission for COPD rate	.	.011	.004	.001	.013
		Communication with nurses	.011	.	.000	.000	.000
		Communication with doctors	.004	.000	.	.000	.000
		Responsiveness of hospital staff	.001	.000	.000	.	.000
		Communication about medication	.013	.000	.000	.000	.
		Communication about medication	209	209	209	209	209
IL	Pearson correlation	30-day readmission for COPD rate	1.000	-.340	-.247	-.196	-.203
		Communication with nurses	-.340	1.000	.762	.797	.765
		Communication with doctors	-.247	.762	1.000	.613	.635
		Responsiveness of hospital staff	-.196	.797	.613	1.000	.782
		Communication about medication	-.203	.765	.635	.782	1.000
	Sig. (1-tailed)	30-day readmission for COPD rate	.	.000	.004	.019	.016
		Communication with nurses	.000	.	.000	.000	.000
		Communication with doctors	.004	.000	.	.000	.000
		Responsiveness of hospital staff	.019	.000	.000	.	.000
		Communication about medication	.016	.000	.000	.000	.

			30-day readmission for COPD rate	Communication with nurses	Communication with doctors	Responsiveness of hospital staff	Communication about medication
NY	Pearson correlation	30-day readmission for COPD rate	1.000	-.136	.031	-.140	-.111
		Communication with nurses	-.136	1.000	.697	.860	.830
		Communication with doctors	.031	.697	1.000	.632	.715
		Responsiveness of hospital staff	-.140	.860	.632	1.000	.802
		Communication about medication	-.111	.830	.715	.802	1.000
	Sig. (1-tailed)	30-day readmission for COPD rate	.	.067	.365	.062	.111
		Communication with nurses	.067	.	.000	.000	.000
		Communication with doctors	.365	.000	.	.000	.000
		Responsiveness of hospital staff	.062	.000	.000	.	.000
		Communication about medication	.111	.000	.000	.000	.

Note. Quality-of-care measures: Communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines.

Finding 2

The Model Summary in Table 12 shows the R^2 and the adjusted R^2 for CA, IL, and NY. CA adjusted R^2 0.45 and an R^2 score of .063, which shows that 6.3% of the variation of patient satisfaction quality of care measures: communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines is explained by the 30-day readmission rates for COPD patients in CA. IL adjusted R^2.100 and an R^2 score of .133, which shows that 13.3% of the variation of patient satisfaction quality of care measures: communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines may relate to 30-day readmission rates for COPD patients in IL. NY adjusted R^2 .023 and an R^2 score of .055, which shows that 5.5% of the variation of patient satisfaction quality of care measures: communication with nurses, communication with doctors, the

responsiveness of hospital staff, and communication about medicines may relate to 30-day readmission rates for COPD patients in NY.

Table 12

Model Summary—Patient Satisfaction Quality-of-Care Measures and 30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in CA, IL, and NY

Model summary [b]											
					Std. error of the estimate	Change statistics					
Data		*R*	*R* square	Adjusted *R* square		*R* square change	*F* change	df1	df2	Sig. *F* change	Durbin-Watson
CA	1	.251[a]	.063	.045	.04854	.063	3.433	4	204	.010	2.034
IL	1	.364[a]	.133	.100	.03834	.133	4.057	4	106	.004	1.897
NY	1	.235[a]	.055	.023	.03636	.055	1.719	4	118	.150	2.135

Note. Quality-of-care measures: Communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines.

[a] Predictors: (Constant), patient satisfaction quality measure communication about medication, patient satisfaction quality measure communication with doctors, patient satisfaction quality measure responsiveness of hospital staff, patient satisfaction quality measure communication with nurses.

[b] Dependent variable: 30-day readmission rate for COPD Patients in CA, IL, and NY.

Finding 3

In using Table 12, data on the AVONA was obtained; the F and significance for each state are as follows: CA, F is displayed as 3.433 with a significance of .010; IL, F is shown as 4.057 with a significance of .004; and NY, F is displayed as 1.719 with a significance .150. The significance level for the states of CA and IL, which is less than

the alpha of 0.5. therefore, concluding that the variability of the 30 – day hospital readmission rate significantly impacts patient satisfaction quality measure.

One-Way Analysis of Variance

The One-way analysis of variance (ANOVA) is used to test if the means of the groups have statistical significance difference (Frankfort-Nachmias & Leon-Guerrero, 2015). The diagnostics were run on the regression model to investigate if it meets one-way AVONA homogeneity of variances, assumptions of homoscedasticity, and normal distribution errors.

Means Significance Difference

Here, the one-way AVONA will test whether the means for the groups differ on the continuous dependent variable. The number of cases, means, standard deviations, and variances are noted in Table 13. The four categorical nominals level variables (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medication) mean for patient satisfaction quality measures in CA, IL, and NY are different. I used Table 13 to discuss the mean lowest to highest patient satisfaction quality measures among categories (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medication) in CA, IL, and NY. Communication with nurses' lowest mean was CA at 75.47; the mean for NY was 76.28, and the highest mean was IL at 78.97. Communication with doctors' lowest mean was CA at 76.26; the mean for NY was 76.76, and the highest mean was IL at 79.04. The responsiveness of hospital staff's lowest mean was NY at 60.63; the mean for CA was 61.92, and the highest mean was IL

at 64.93. Communication about medication's lowest mean was NY at 59.23; the mean for CA was 61.69, and the highest mean was IL at 62.85.

Table 13

Statistics for Patient Satisfaction Quality Measures in CA, IL, and NY

Descriptive statistics

Hospitals	Patient satisfaction quality measure	*N*	Mean	Std. deviation	Std. error	95% confidence interval for mean		Minimum	Maximum
						Lower bound	Upper bound		
California	Communication with nurses	209	75.47	4.27303	.29557	74.8937	76.0591	56.43	84.57
	Communication with doctors	209	76.26	4.37330	.30251	75.6673	76.8600	56.22	85.70
	Responsiveness of hospital staff	209	61.92	4.86933	.33682	61.2636	62.5916	44.24	73.98
	Communication about medication	209	61.69	4.37841	.30286	61.0999	62.2941	45.55	72.35
Illinois	Communication with nurses	111	78.97	3.99591	.37927	78.2209	79.7242	67.15	87.86
	Communication with doctors	111	79.04	3.42941	.32551	78.4002	79.6903	71.49	87.56
	Responsiveness of hospital staff	111	64.93	6.58854	.62536	63.6885	66.1671	49.61	87.22
	Communication about medication	111	62.85	4.58311	.43501	61.9839	63.7080	48.85	75.20
New York	Communication with nurses	123	76.28	5.29563	.47749	75.3444	77.2349	62.98	88.35
	Communication with doctors	123	76.76	3.38896	.30557	76.1577	77.3675	69.13	84.20
	Responsiveness of hospital staff	123	60.63	7.32427	.66041	59.3240	61.9387	43.97	80.30
	Communication about medication	123	59.23	4.86334	.43851	58.3646	60.1008	49.97	71.46

Note. Patient satisfaction quality measures = Communication with nurses, communication with doctors, responsiveness of hospital staff, and communication about medication.

Assumption of Homogeneity

Levene's F test for equality of variances also tests the assumption of homogeneity of variances. In Table 14, if the Significance value is greater than 0.05, Levene's Test is non-significant and equal variances are assumed. The significance value for CA (communication about medication), IL (communication with doctors), and NY (responsiveness of hospital staff) was less than the alpha of 0.05, stating that not all

comparison groups have the same variance. The assumption of homogeneity of variance was not met.

Table 14

Test of Homogeneity of Variances

Tests of homogeneity of variances

Hospitals	Patient satisfaction quality measure		Levene's statistic	df1	df2	Sig.
California	Communication with nurses	Met	.979	19	182	.487
	Communication with doctors	Met	.881	19	182	.607
	Responsiveness of hospital staff	Met	1.081	19	182	.373
	Communication about medication	Not met	1.820	19	182	.023
Illinois	Communication with nurses	Met	1.251	16	90	.247
	Communication with doctors	Not met	1.860	16	90	.035
	Responsiveness of hospital staff	Met	.971	16	90	.495
	Communication about medication	Met	1.062	16	90	.402
New York	Communication with nurses	Met	.942	14	103	.517
	Communication with doctors	Met	.626	14	103	.838
	Responsiveness of hospital staff	Not met	2.008	14	103	.024
	Communication about medication	Met	.758	14	103	.711

The One-way ANOVA, Table 15, outlines the linear term weighted between groups. The significance level for the states of CA and IL, which is less than the alpha of 0.5. therefore, rejecting the null hypothesis and concluding that the variability of the 30 – day hospital readmission rate significantly impacts patient satisfaction quality measure rather it's in communication with nurses, Communication with doctors, responsiveness of hospital staff, and communication about medications. However, the significance level for the states of NY, is greater than the alpha of 0.5. Therefore, accepting the null hypothesis.

Table 15

One-Way Analysis of Variance—Patient Satisfaction Quality-of-Care Measures and 30-Day Readmission Rate for Chronic Obstructive Pulmonary Disease Patients

Hospitals	Patient satisfaction quality measure				Sum of squares	*df*	Mean square	*F*	Sig.
California	Communication with nurses	Between groups	(Combined)		509.551	26	19.598	1.085	.363
			Linear Term	Weighted Deviation	94.397	1	94.397	5.225	.023
					415.154	25	16.606	.919	.579
	Communication with doctors	Between groups	(Combined)		681.804	26	26.223	1.448	.084
			Linear Term	Weighted Deviation	129.767	1	129.767	7.165	.008
					552.037	25	22.081	1.219	.227
	Responsiveness of hospital staff	Between groups	(Combined)		799.345	26	30.744	1.354	.129
			Linear Term	Weighted Deviation	237.679	1	237.679	10.468	.001
					561.667	25	22.467	.989	.483
	Communication about medication	Between groups	(Combined)		516.462	26	19.864	1.042	.416
			Linear Term	Weighted Deviation	94.546	1	94.546	4.957	.027
					421.916	25	16.877	.885	.626
Illinois	Communication with nurses	Between groups	(Combined)		358.628	20	17.931	1.155	.312
			Linear Term	Weighted Deviation	203.534	1	203.534	13.105	.000
					155.095	19	8.163	.526	.944
	Communication with doctors	Between groups	(Combined)		225.643	20	11.282	.951	.527
			Linear Term	Weighted Deviation	79.068	1	79.068	6.663	.011
					146.575	19	7.714	.650	.857
	Responsiveness of hospital staff	Between groups	(Combined)		728.549	20	36.427	.810	.695
			Linear Term	Weighted Deviation	184.329	1	184.329	4.100	.046
					544.220	19	28.643	.637	.868
	Communication about medication	Between groups	(Combined)		387.504	20	19.375	.907	.580
			Linear Term	Weighted Deviation	95.222	1	95.222	4.456	.038
					292.282	19	15.383	.720	.789
New York	Communication with nurses	Between groups	(Combined)		801.796	19	42.200	1.659	.056
			Linear Term	Weighted Deviation	63.183	1	63.183	2.484	.118
					738.613	18	41.034	1.613	.070
	Communication with doctors	Between groups	(Combined)		247.842	19	13.044	1.165	.302
			Linear Term	Weighted Deviation	1.382	1	1.382	.123	.726
					246.460	18	13.692	1.223	.257
	Responsiveness of hospital staff	Between groups	(Combined)		1659.179	19	87.325	1.841	.027
			Linear Term	Weighted Deviation	127.557	1	127.557	2.689	.104
					1531.621	18	85.090	1.794	.036
	Communication about medication	Between groups	(Combined)		609.610	19	32.085	1.452	.120
			Linear Term	Weighted Deviation	35.448	1	35.448	1.604	.208
					574.163	18	31.898	1.444	.127

Note. Patient satisfaction quality-of-care measures = communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines.

Concluding that NY has no significant correlation between patient satisfaction quality of care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day

readmission rates for Chronic Obstructive Pulmonary Disease patients in California, Illinois, and New York.

Homoscedasticity

The scatter plot (Figure 9-11) was to evaluate homoscedasticity. The findings show that there are groupings of plots. There is no funnel or U shape. Therefore, there is no violation of this assumption.

Figure 9

Scatterplot Research Question 2—30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in California

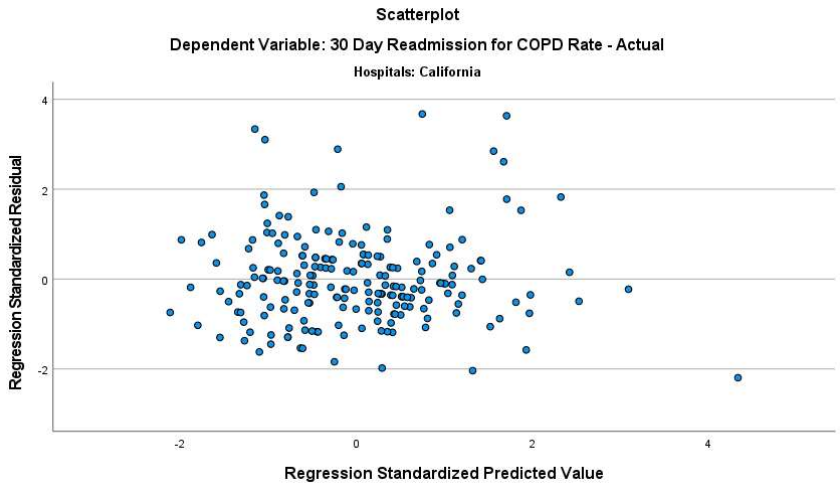


Figure 10

Scatterplot Research Question 2—30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in Illinois

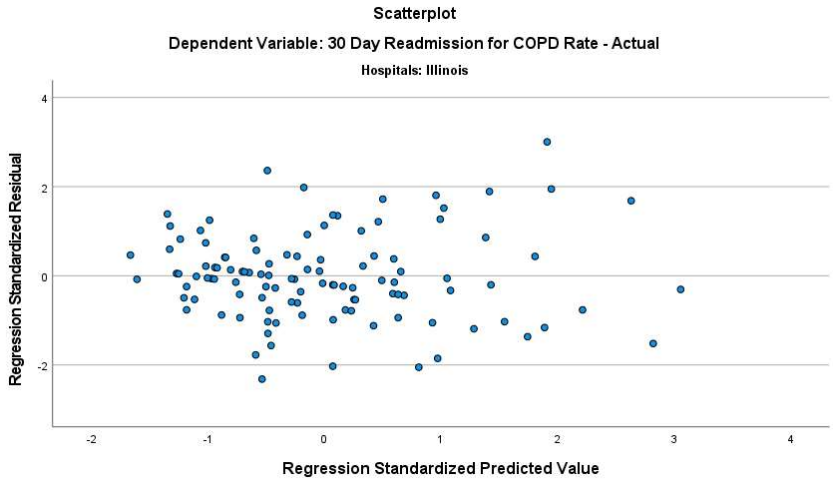
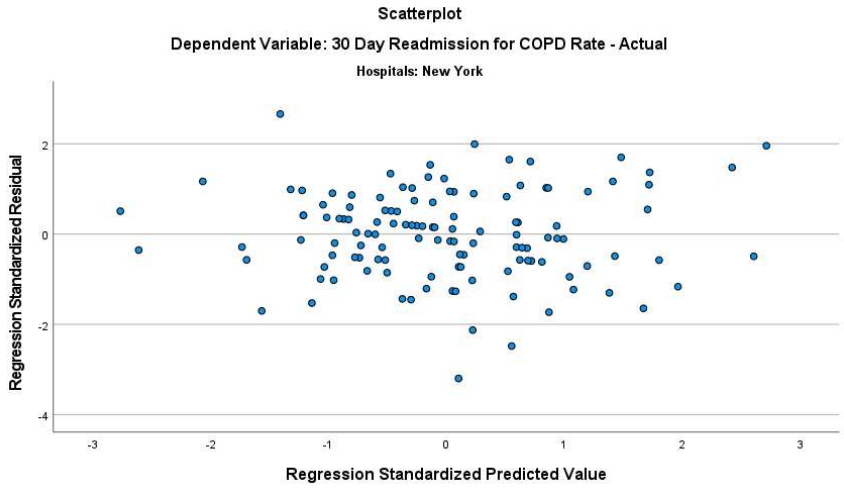


Figure 11

Scatterplot Research Question 2—30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in New York



Normal Distribution Errors

Figures 12-14 demonstrate that the dependent variable 30-day readmission rates difference for COPD in CA, IL, and NY. The figures show each state is normally distributed around the mean and does not violate the assumption.

Figure 12

30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in California Distribution

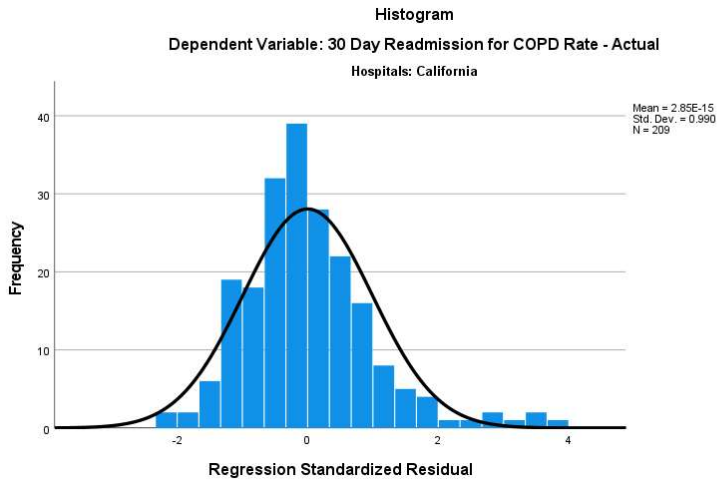


Figure 13

30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in Illinois Distribution

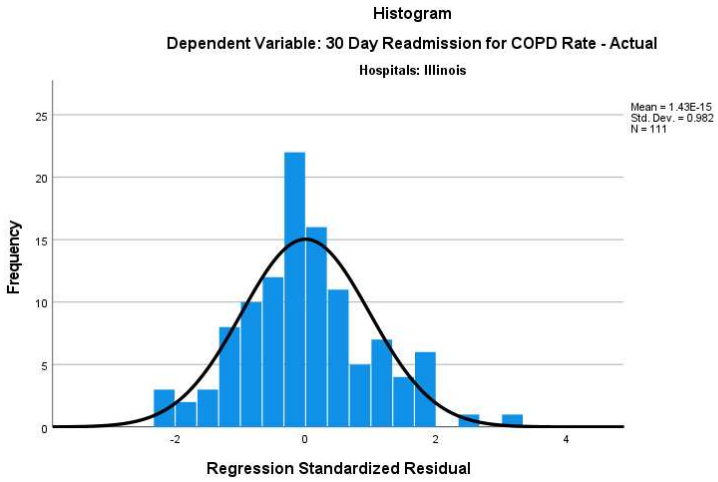
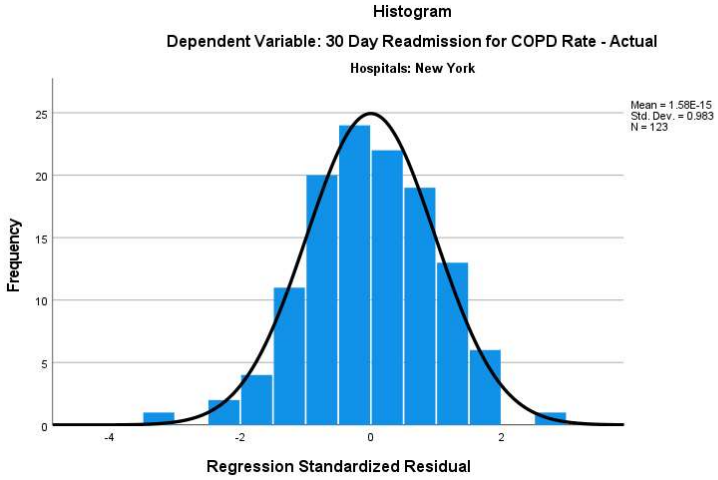


Figure 14

30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease Patients in New York Distribution



Summary for Research Question 2

In review of the research question, "Is there a significant correlation between patient satisfaction quality of care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and the 30-day readmission rates for Chronic Obstructive Pulmonary Disease patients in CA, IL, and NY," the conclusion is as follows: the assumption of homogeneity of variances - the significance value for CA (communication about medication), IL (communication with doctors), and NY (responsiveness of hospital staff) was less than the alpha of 0.05, therefore rejecting the null hypothesis for the assumption of homogeneity of variance. The assumption of homogeneity of variance was not met. Conclude that there is a significant difference between hospital patient quality measures CA (communication with nurses, communication with doctors, and the responsiveness of hospital staff), IL (communication with nurses, the responsiveness of hospital staff, and communication about medication), and NY (communication with nurses, communication with doctors, and communication about medication) and 30-day readmission for COPD patients. The ANOVA outlined the linear term weighted between groups. The significance level for CA and IL states is less than the alpha of 0.5. Therefore, rejecting the null hypothesis and concluding that the variability of the 30 – day hospital readmission rate suggests a correlation between communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medications. However, the significance level for the states of NY is greater than the alpha of 0.5.; therefore, accepting the null hypothesis.

Conclusion

Section 3 presented the statistical results concerning the research questions and associated hypotheses. The results included the data collection representation; results of the descriptive, Pearson's Correlation, linear regression, and one-way AVONA regression analyses of the hypotheses and research questions; and the key findings. The study examined if there is a correlation between hospital Medicare reimbursement, quality of care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients in California, Illinois, and New York. The quality-of-care measures include communication with nurses, communication with doctors, the hospital staff's responsiveness, and medicine communication. The data is from July 1, 2015, through June 30, 2018 (HRRP) and January 1, 2016, through December 31, 2018 (HCAHPS). HCAHPS dates are on the same timeframe as HRRP because HCAHPS reports quarterly. Section 4 provides a detailed analysis and interpretation of the results and findings of the study. This section includes the analysis, and interpretation of the outcomes in the context of Rogers's conceptual framework, limitations, recommendations, and conclusions relevant to the study.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

CMS has implemented financial penalties to reduce hospital readmissions for COPD. In response to the economic burden of hospital readmissions, in 2010 policymakers adopted the CMS HRRP as part of the Patient Protection and Affordable Care Act (CMS, 2014, 2020a). The secondary data were obtained through CMS HRRP and HCAHPS. HRRP provides guidelines for hospital administrators to encourage efforts to reduce preventable readmissions with efficient patient care goals (Boccuti & Casillas, 2017; CMS, 2020b). HCAHPS is a standardized survey tool to measure patients' quality-of-care experience with hospital care (HCAHPS, 2016). Medicare requires that hospitals collect and report patients' experiences with their care as a condition of payment. As a result, hospital administrators explore ways to prevent financial penalties for excessive COPD 30-day hospital readmissions.

The purpose of this quantitative study was to determine whether there is a correlation between hospital Medicare reimbursement, quality-of-care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients in California, Illinois, and New York. The quality-of-care measures include communication with nurses, communication with doctors, the hospital staff's responsiveness, and medicine communication. The results included the data collection representation, results of the descriptive statistics, Pearson’s correlation, linear regression, one-way AVONA regression analyses of the hypotheses and research questions, and the key findings from both research questions. Section 4 includes an interpretation of the findings, limitations of

the study, recommendations for further research, and implications for professional practice and social change.

Interpretation of the Findings

Research Question 1 Analysis

In the analysis for Research Question 1 (Is there a significant correlation between hospital Medicare reimbursement and 30-day readmission rates for chronic obstructive pulmonary disease patients in California, Illinois, and New York?), the null hypothesis was rejected, and the alternative hypothesis was accepted. There is a significant correlation between hospital Medicare reimbursement and 30-day readmission rates for COPD patients in California, Illinois, and New York. Specifically, the variable correlation coefficient is $p < 0.05$. A positive correlation occurred, meaning that the hospitals' performance differences for Medicare reimbursement suggest a relationship between 30-day readmission rates for COPD patients in CA, IL, and NY. In this case, the *p*-value is the same for CA, IL, and NY, .000, which means that the odds of finding a relationship between hospital Medicare reimbursement for COPD and 30-day readmission rates for COPD among CA, IL, and NY patients are less than .001, or less than 1 in 1,000. The coefficient of determination shows that 80.3% of the variation of hospital Medicare reimbursement performance difference in IL is explained by the 30-day readmission rates for COPD patients, followed by CA at 42.4% and NY at 20.8%. The CA coefficient of determination shows that 30-day readmission rates explained 42% of the variation of hospital Medicare reimbursement performance difference for COPD patients and NY coefficient of determination shows that 30-day readmission rates

explained 29% of the variation of hospital Medicare reimbursement performance difference for COPD patients. Data for both states strongly suggest that other factors were involved. Each state was normally distributed around the mean and did not violate the assumption. The study consisted of patient data from acute care hospitals located in CA (n = 209), IL (n = 111), and NY (n = 123). Most of the population for each state's average age group was 65–84 years of age, and each state had a mixture of females and males. The study's largest racial/ethnicity group was White for all the states. The hospital COPD frequencies statistics by state and the listing ownership, teaching status, location, and bed size for the reported patient data to CMS showed that CA had the highest hospital frequency of readmissions, at 47.2%, followed by NY, with 27.8%, and finally IL, with a hospital readmission frequency of 25.1%. NY had the highest amount of patient data from private, not-for-profit hospital ownership, and CA had the highest amount of patient data from private, for-profit, and government hospital ownership. The hospital patient data in CA was mainly from nonteaching institutions, and IL and NY patient data were primarily from teaching institutions. When glancing at the highest numbers for all states, it becomes apparent that the patient data used in this study were from urban locations and large hospital beds. Pearson's correlation and linear regression analysis was the most robust analysis to display the effect that the independent variable (hospital Medicare reimbursement for COPD) has on the dependent variable (30-day readmissions rates for COPD patients in CA, IL, and NY).

Many healthcare administrators fear losing hospital Medicare reimbursement related to quality and performance improvement for COPD patients (Krishnan et al.,

2015; Papanicolas et al., 2018). Pearson's correlation and linear regression analysis approach were the strongest to determine the correlation or similarity of hospital Medicare reimbursement performance differences in three states and 30-day readmission rates for COPD patients. The findings showed that there is a correlation between the variables. Currently, HRRP has a common goal, and it is executed without complex interventions to encourage hospitals to improve communication and care coordination to engage patients and caregivers in discharge planning.

Research Question 2 Analysis

The analysis for Research Question 2 (Is there a significant correlation between patient satisfaction quality-of-care measures [communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines] and the 30-day readmission rates for chronic obstructive pulmonary disease patients in CA, IL, and NY?) is described in parts. The correlation coefficients range from -1.0 to +1.0. A positive correlation occurred, meaning that patient satisfaction quality-of-care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) differences suggest a relationship between 30-day readmission rates for COPD patients in CA, IL, and NY.

The alpha level of .05 was used for all analyses. The one-way ANOVA revealed if there was or was not a statistically significant difference in 30-day readmission for COPD in CA, IL, and NY between communication with nurses and doctors, hospital staff responsiveness, and communication about medicines. The one-way ANOVA of standardized test score revealed a statistically significant main effect indicating that not

all four groups of the quality of care related to patient satisfaction resulted in the same standardized test score. The assumption of homogeneity of variances—the significance value for CA (communication about medication), IL (communication with doctors), and NY (responsiveness of hospital staff)—was less than the alpha of 0.05, therefore rejecting the null hypothesis for the assumption of homogeneity of variance. The assumption of homogeneity of variance was not met. One may conclude that there is a significant difference between hospital patient quality measures in CA (communication with nurses, communication with doctors, and the responsiveness of hospital staff), IL (communication with nurses, the responsiveness of hospital staff, and communication about medication), and NY (communication with nurses, communication with doctors, and communication about medication) and 30-day readmission for COPD patients. Therefore, I rejected the null hypothesis and concluded that the variability of the 30-day hospital readmission rate suggests a correlation between communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medications. However, the significance level for the state of NY was greater than the alpha of 0.5.; therefore, I accepted the null hypothesis.

The factorial ANOVA assumes homoscedasticity of error variances, which means that the error variances of all data points of the dependent variable are equal or homogenous throughout the sample, and the study did not violate the assumption. Each state was normally distributed around the mean and did not violate the assumption.

The Pearson's correlation (measuring linear interdependence) and the one-way ANOVA were used to test statistical differences among patient satisfaction quality-of-

care measures (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines) and 30-day readmission rates for COPD patients in CA, IL, and NY. This study contributes to the body of knowledge, allowing healthcare administrators to compare trends of interventions that others are doing in patient satisfaction and decreasing 30-day readmissions for COPD in CA, IL, and NY. Future studies that include more states could further investigate and strengthen the assumption of homogeneity of variances where the significance value for CA (communication about medication), IL (communication with doctors), and NY (responsiveness of hospital staff) was less than the alpha of 0.05. In ANOVA, when homogeneity of variance is violated, there is a greater probability of falsely rejecting the null hypothesis.

Findings to Theory

Rogers's theoretical framework demonstrates how communication, time, the social culture of the organization, and new ideas (innovations) can produce positive change (Rogers, 2003). The DOI framework has guided administrators and structured innovative action plans that promote organizational improvements (Centola, 2011). Rogers's DOI theory is most appropriate for studying an area in public health to reduce the uncertainty in a cause–effect relationship involved in achieving a desired outcome. Rogers defined five steps that encourage the adoption of successful outcomes: collecting knowledge about a current trend, voicing opinion or persuasion, making the decision, implementing it, and finally seeking confirmation that leaders made the right choice (Rogers, 2003). The DOI theory clarifies steps whereby healthcare administrators could

successfully implement innovations proposed by lawmakers to decrease 30-day readmissions for COPD patients, showing evidence of improvements in the hospital's Medicare reimbursement by executing organizational patient satisfaction policies.

DOI theory is most appropriate for studying the correlation, if any, between (patient satisfaction quality-of-care measures) communication with nurses and doctors, the responsiveness of hospital staff, communication about medicines; and the 30-day readmission rates for COPD patients in California, Illinois, and New York. These results could be beneficial in recognizing how investing in quality and performance improvement, communication, executive education, and reassessment may improve quality-of-care measures related to patient satisfaction and prevent or reduce 30-day readmissions for COPD patients.

Limitations of the Study

The study's generalizability is limited to acute care hospitals listed in the CMS datasets for California, Illinois, and New York. I obtained the factors associated with the data related to the relationship between hospitals' Medicare reimbursement, quality-of-care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients from the publicly available Medicare.gov database. The analysis only included organizations that met all analysis requirements. The study was limited to only findings concerning the variables hospital Medicare reimbursement for COPD, quality-of-care measures related to patient satisfaction (communication with nurses, communication with doctors, the responsiveness of hospital staff, and communication about medicines), and 30-day readmissions rates for COPD patients.

Research Question 1 did not explain the actual reason behind the performance ratio for hospital Medicare readmission, although there was a correlation between the variables. Without further research involving specific performance interventions, it will remain a project to assess, plan, communicate, execute, and re-evaluate new ideas.

Recommendations

This study focused on COPD readmissions and patient satisfaction issues in the states of California, Illinois, and New York. The following three recommendations could further explore the variables discussed in this research. One recommendation includes quantitative research with a focus on performance improvement, communication, education, and the effect on hospital Medicare reimbursement, quality of care, and reduction of 30-day readmissions for COPD patients and other HRRP diagnoses. A second recommendation concerns the possibility of broadening the scope of this study, in which I looked at readmissions in three states, and include all fifty states in a study to determine ways to reduce HRRP diagnoses. The third recommendation suggests research using a theoretical framework such as Rogers's DOI to determine whether there is a correlation between strategies that focus on effective ways to reduce 30-day readmissions of COPD patients and improvements with Medicare reimbursement and patient satisfaction. The fourth recommendation concerns the need for additional quantitative or qualitative research concerning the differences in COPD readmissions and quality outcomes for the states of California, Illinois, and New York.

Implications for Professional Practice and Social Change

Professional Practice

Hospital administrators attempt to adhere to the guidelines concerning readmissions established by CMS and explore ways to prevent financial penalties for excessive 30-day readmissions for COPD (Boulding et al., 2011; CMS, 2014, 2016, 2020b; CAPS, 2014). This research is significant to professional practice because it may provide additional information to address healthcare administrators' concerns about quality and performance improvement for COPD patients in California, Illinois, and New York. This study shows the possibility of a relationship between hospitals' Medicare reimbursement performance trends and the quality of care related to patient satisfaction and 30-day readmissions. This study could offer researchers a theoretical framework of innovative solutions that assess the importance of investing in quality healthcare and education, which could prevent or reduce readmissions. Furthermore, studies that focus on readmissions will benefit healthcare administrators by providing information that may decrease 30-day readmissions and improve hospital reimbursement, reputation, and the quality of life for patients. Focusing on cultural differences in hospitals and seeking to understand the demographics of different states may necessitate different approaches to solving problems related to readmissions through established and innovative performance improvement methods.

Positive Social Change

According to Krishnan et al. (2015), innovative solutions are needed in healthcare organizations to reduce the risk of 30-day readmissions to receive total payment

incentives from CMS. Therefore, the results of this study could produce social change by generating effective and regular use of QA assessment measures related to patient satisfaction to decrease COPD 30-day readmissions, which may improve Medicare reimbursement and patient satisfaction (CMS, 2014, 2020a). Patient satisfaction plays a vital role in hospital Medicare reimbursement and decreasing COPD 30-day readmissions; therefore, monitoring and communicating quality initiatives is a must for implementing effective social change (Rogers, 2003).

Conclusion

The purpose of this quantitative study was to determine whether there is a correlation between hospital Medicare reimbursement, quality-of-care measures related to patient satisfaction, and 30-day readmissions rates for COPD patients in California, Illinois, and New York. The quality-of-care measures include communication with nurses, communication with doctors, the hospital staff's responsiveness, and medicine communication. This study suggests relationships between hospitals' Medicare reimbursement and 30-day readmission rate differences for COPD in California, Illinois, and New York; and quality-of-care measures related to patient satisfaction in their communication with hospital staff, and 30-day readmission rate differences for COPD in California, Illinois, and New York. A suggestion for future research is to use a theoretical framework such as Rogers's DOI to determine whether there is a correlation between strategies that focus on effective ways to reduce 30-day readmissions of COPD patients and improvements with Medicare reimbursement and patient satisfaction.

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