THE ASSOCIATION BETWEEN POOR PERFORMING SKILLED NURSING FACILITY QUALITY STAR RATINGS AND 30-DAY ALL-CAUSE READMISSION RATES: A LONGITUDINAL RETROSPECTIVE NATIONAL STUDY; 2017 – 2022

by

VICTOR B. JONES

(Under the Direction of Cham Dallas)

ABSTRACT

The impact of 30-day readmissions is a challenging crisis from both a cost as well as a quality perspective. For nearly four decades, Medicare beneficiaries have had the Centers for Medicare and Medicaid Services (CMS) Nursing Home Compare (NHC) website to use as a tool to identify quality rating information for any certified skilled nursing facilities (SNFs) in the United States (US). With 30-day readmission costs for Medicare beneficiaries in the billions, the urgency to improve SNF quality and reduce costs was ushered in under the Affordable Care Act (ACA) (2012) as CMS has made reducing 30-day readmissions a national priority. The ACA allows CMS to reward SNFs with low 30-day readmission rates, while penalizing SNFs with excessive 30-day readmission rates. As of this writing, seventy-three percent of US SNFs have been penalized for excessive 30-day readmissions. While there may be quality of care differences between lower-rated and higher-rated SNFs, the current study finds that the probability of being readmitted into a hospital within 30 days is virtually the same, regardless of SNF star rating, a significant finding. Using data from the Nursing Homes Including Rehab

Services files on the CMS.gov website, this longitudinal retrospective study will examine the relationship between the SNF 5-star quality rating and 30-day readmission rates for 2017 – 2022. This study, using secondary data to create regression analysis, correlation, simple comparisons, charts, and graphs, assigns the SNF star rating as the independent variable and the SNF readmission rate as the dependent variable. The strength of this study is its scope and reach. The current study is a national study of all certified SNFs operating during the study period.

Abbreviations:

SNF – Skilled Nursing Facility

CMS – Center for Medicare and Medicaid Services

NHC – Nursing Home Compare

ACA – Affordable Care Act

INDEX WORDS: Skilled nursing facility star ratings and 30-day readmission, Medicare 30-day readmissions, Skilled nursing facility readmissions, Longitudinal Retrospective Medicare 30-day readmissions, Skilled nursing facility all-cause 30-day readmissions, National skilled nursing facility 30-day readmissions

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By

VICTOR B. JONES

B.S., Florida Agricultural and Mechanical University, 1989
M.S., Mercer University, 1997

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by

VICTOR B. JONES

Major Professor:	Cham Dallas
Committee	Daniel Jung Christa-Marie Singleton Brian Steele

Electronic Version Approved:

Ron Walcott

Vice Provost for Graduate Education and Dean of the Graduate School
The University of Georgia
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To the actors, production crews, and fans of CSN Productions films, thank you for your patience. While our movies are like fine wine, there is more work. I look forward to being back on set, creating beautiful stories to share with the masses.

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When I would attend a screening of one of my films it wasn't unusual for me to say to the audience that there's nothing special about me. And then they would all look at me as if nothing could be further from the truth. I will try it again today and end by saying that while I have completed the requirements for the DrPH, there is nothing special about me. I agree with the audiences, and I concede that there is something about me, but I still stand by the statement that there is nothing special about me. It's not an attempt to minimize any accomplishments, but more so to inspire others who may not feel like they are special. As a senior in high school, when the graduating class was trying to figure out who to vote for as the most likely to succeed, or who was the most likely to do this or that, my name never came up. Ever. I was extremely shy, never asked questions in class, and had a grade point average that wasn't the least bit impressive. AT ALL!!! Like a 2.1 not impressive if I round up. Perhaps I was saving academic

abilities until I was in college. It made sense that some people were surprised when they learned that I was enrolled in classes at a junior college. After two and a half years of learning how to study, I opted not to participate in the graduation ceremony because I had more to do. Some people were surprised yet again when I enrolled for classes at an HBCU. My grade point average wasn't great, but it was better than it was when I was in high school. Imagine the shock that people had when they found out that I obtained a master's degree. Of course, the biggest shock of all was when the shy kid from high school returned to Tallahassee to screen a film that he wrote and starred in was being screened at IMAX theater. And now, the same kid who graduated from high school with a 2.1 grade point average has earned a doctorate degree. While I say that I am not special, when it comes to the goals that I've set for myself I pursue them relentlessly. My message to anyone who needs it is, it's not just the intelligent or gifted people, or those who have greater access to financial resources, who accomplish great things. Go, discover your goals, and pursue them, RELENTLESSLY!

Finally, somewhere along the way of graduating from universities or winning awards at film festivals, I lost the desire to stop to smell the roses. It was always an attitude of pursuing the next thing. Looking back, it makes sense that I opted not to participate in the graduation ceremony at Tallahassee Community College when I was awarded my AA degree. My attention had already turned to what was next. For anyone still reading, I encourage you to go forward and do great things, big and small. And with each accomplishment, take time to celebrate yourself ☺.

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CHAPTER 1

INTRODUCTION

The United States (US) faces significant challenges as an increasing percentage of its citizens are becoming > 65 years old. In order to meet the needs of its aging population the required changes include the transformation of the healthcare delivery system to incorporate strategies aimed at meeting the needs of an aging citizenry. This will also entail a transformation in a societal attitude towards a willingness to embrace the idea that the demographic may require increased governmental funding at state and federal levels. With the baby boomer generation, defined as those born between 1946 and 1964, reaching retirement age at an estimated 10,000 persons per day through 2030, when combined with the fact that US citizens are living longer, the size of the 65+ population is growing at an unprecedented rate. The healthcare system, as currently structured, is underprepared for the onslaught of demands this aging population will impose (Jones & Dolsten, 2024).

Approximately 42% of all hospitalized Medicare beneficiaries receive post-acute care (PAC) after discharge (Cao et al., 2020). For Medicare beneficiaries needing short-term inpatient rehabilitation services, skilled nursing facilities (SNFs) are the most common PAC setting. SNFs, commonly called nursing homes, provide short-term rehabilitation services and are often associated with accommodating population members needing long-term care. Recognizing the dual services offered under SNFs, this study focuses only on Medicare beneficiaries needing short-term rehabilitation following an inpatient hospitalization by examining SNF data from 2017 to 2022.

At the time of this writing, there are 14,814 certified SNFs in the United States, a decrease of over 700 facilities compared to the number of SNFs operating in 2017. With an

aging population, the decreasing number of SNFs is cause for alarm if the short-term rehabilitation needs are going to be addressed in a manner consistent with the expected need. Even as the need for short-term rehabilitation grows, the availability of beds, especially high-quality beds, is actually decreasing. As the percentage of US citizens >65 continues to rise, so will the need for high-quality short-term rehabilitation beds.

Improving quality has been an ongoing effort for CMS for more than five decades. In an effort to provide SNF quality information to patients/families and healthcare providers/facilities, in 1998, the Centers for Medicare and Medicaid Services (CMS) introduced Nursing Home Compare (NHC). NHC is a web-based report card on all Medicare- and/or Medicaid-certified nursing homes in the United States, and the goal is to provide consumers with quality information that will inform their choice of nursing homes and increase the probability of going to a high-quality provider (Konetzka et al., 2022). In December 2008, CMS greatly enhanced the website's usability by adding an easy-to-understand 5-star rating. As an overall quality indicator, each certified nursing home in the US receives a rating of one to five stars. The star rating system is based on how SNFs perform in three key quality domains (health inspections, reported staffing levels, and quality measures derived from mandated assessments of resident health and well-being), plus an overall quality rating. Calculation of ratings requires integration of information from both facility and resident-level data sources (Williams et al., 2010). Nursing home care in the US is part of the costliest healthcare system in the world, and yet it is a heavily regulated industry that is still struggling to maintain quality care nationwide. In the 1980s, quality of care became an important concern, which led to significant reform and the passage of new regulations under the law known as OBRA-87. During this time, the Minimum Data Set (MDS), which is a comprehensive assessment tool, was introduced. It continues to be a vital tool

for both payment and research. The reform also ushered in the state survey process, which scrutinizes nursing homes yearly and assesses financial penalties for substandard care (Eskildsen & Price, 2009).

The use of readmission rates to inform reimbursement relates to the introduction of the Medicare inpatient prospective payment system (IPPS) in 1983, in which hospitals received a predefined payment rate based on diagnosis-related groups (DRGs). As this system focused on the payment of costs associated with an inpatient hospitalization, it can be argued that hospitals had limited incentive to decrease readmission rates. Additionally, some studies observed unfavorable consequences, including increased readmission rates attributed to lower quality of care during index admission (James et al., 2023). Unnecessary hospital readmissions from skilled nursing facilities (SNFs) are gaining attention as a quality improvement focus due to their financial expense and association with increased patient complications. Approximately 20% – 25% of patients discharged to SNFs are readmitted to acute care hospitals within 30 days of discharge in the US (Mileski et al., 2017), and yet it is concluded that two-thirds of these readmissions may be preventable (Neuman et al., 2014). As a quality measure for CMS, 30-day readmissions represent poor quality, often leading to higher healthcare costs annually. In 2018, the costs to the CMS were more than a staggering $52 billion for Medicare patients being readmitted to hospitals within 30 days of a hospital discharge.

According to NHC, a stunning 45% of US SNFs operate at a 2-star quality rating or below as of this writing. In 2030, when 20% of the US population will be at least 65 years of age and eligible for health insurance coverage under Medicare, the availability of high-quality rehabilitation beds is likely to be extremely limited. With the stated goal of NHC being to assist patients with finding SNFs with better quality scores, there is an urgent need to understand

whether there is a relationship between SNF star-rating scores and 30-day readmissions. An estimated 77 million Americans will be eligible for coverage under Medicare in 2030, with on average 40% of them (30.8 million) requiring inpatient hospitalization. Unless the current estimates of 25% of Medicare beneficiaries transferring to SNFs are reduced, with the average cost of $15,000 per readmission, 30-day readmission may exceed $43 billion in 2030 and beyond, which in view of continuing budget deficits is likely to be problematic.

History/Background

The desire to improve SNF quality for short-term and long-term residents has been underway since the 1970s. CMS added to the effort by introducing publicly available information concerning SNF quality through its 5-star rating system. Around 2010, 30-day readmission data were used as an indicator of quality for hospitals and, a few years later, for SNFs as well. The Hospital Readmission Reduction Program (HRRP) of 2014 initially focused on acute myocardial infarction (AMI), congestive heart failure (CHF), and pneumonia (PN); more recently, it has expanded to include readmissions for chronic obstructive pulmonary disease (COPD), total hip and/or knee arthroplasty (THKA), and coronary artery bypass graft surgery (CABG) (Thompson et al., 2016). Disagreements exist concerning whether 30-day readmission data should be used as a quality measure. Where there may be agreement to use 30-day readmission data as a quality measure, there may be disagreement on whether specific conditions should be used to calculate readmission rates for SNFs, or if the data should be based on all-cause readmissions. Further debate can be found in the literature that questions whether 30-day readmission rates are an appropriate quality measure.

Under the CMS 5-star quality rating system, hospitals and families needing inpatient rehabilitation services can identify average and above-quality performing SNFs (3-star and

above) from below-average quality facilities (2-star and below). For Medicare beneficiaries, the SNF benefit is the same for short-term inpatient rehabilitation services (100% for days 1-20, 20% for 21-100), no matter where the services are rendered or the facility's star rating. In some cases, the SNF selected for rehabilitation services may be based on the star quality rating. In addition to informing the public of the SNF quality performance, CMS uses readmission data to penalize SNFs with excessive 30-day readmissions and reward SNFs with lower 30-day readmissions.

It is known that 30-day readmission rates can be influenced by various factors, including patients failing to follow discharge protocols. Social determinants of health may also play a role in determining the probability that a Medicare beneficiary will be readmitted to a hospital within 30 days. While the current study does not explore conditions outside of the SNF setting, it does acknowledge that readmissions occur in other settings.

The area of focus for this study will be a national review of 30-day readmission rates for Medicare beneficiaries transitioning from an inpatient hospitalization to a skilled nursing facility for short-term rehabilitation care (2017 – 2022). Using CMS, which is publicly available from Nursing Home Compare (NHC), skilled nursing facility star rating and readmission data is employed from November of each performance year (2017 – 2022). The significance of this study is that it examines whether there is a relationship between the SNF star rating and the probability of a Medicare beneficiary being readmitted to a hospital within 30 days of discharge. As a retrospective longitudinal non-experimental study, affirming the study hypothesis cannot confirm causality. However, the results are expected to suggest a relationship between SNFs with low star ratings and 30-day readmissions.

Significance

Hospitals and SNFs with excessive readmissions are subject to CMS fines. In order to reduce the likelihood of patients returning to a hospital within 30 days, both entities have a financial and quality measure interest in reducing readmissions. In addition, patients/families hoping to avoid readmission may also seek better-performing SNFs for rehab services. If the hypothesis of this study is confirmed, with 45% of US SNFs operating at 2-star or below overall quality ratings, it would suggest the need to increase efforts to improve SNF overall quality scores to meet the inpatient rehabilitation needs of an aging American population.

Research Aims

The aim of the current study is to review SNF overall quality star ratings, 2017 – 2022, examining the 30-day readmission rates based on star rating. The research is intended to determine whether the SNF overall quality rating for short-term rehabilitation Medicare patients indicates the likelihood of a patient being readmitted to a hospital within 30 days of the hospital discharge date. The data examined in this study will capture year-over-year SNF overall star ratings by conducting a longitudinal retrospective study. The following research question will be addressed upon examination: Can hospital readmissions be predicted based on the overall SNF star rating?

Hypothesis: As implied by the NHC 5-star rating system, it is hypothesized that skilled nursing facilities with quality star ratings of 2-star and below have higher 30-day readmission rates than skilled nursing facilities with quality star ratings of 3-star and above.

This national study aims to evaluate the influence of SNF quality star rating on all-cause readmissions. As designed, this study does not consider other factors, such as diagnoses,

comorbidities, age, or gender, as this information is not available in the data set. However, this study recognizes that SNF adjusted star rating information considers the acuity levels of patients admitted for short-term rehabilitation services.

CHAPTER 2

REVIEW OF THE LITERATURE

30-Day Readmissions and an Aging US Population

Reducing hospital readmission rates has understandably captured the imagination of US policymakers because readmissions are common and costly, and their rates vary. At least, in theory, a reasonable fraction of readmissions should be preventable. Policymakers, therefore, believe that reducing readmission rates represents a unique opportunity to simultaneously improve care and reduce costs (Joynt & Jha, 2012). Hospital readmission from SNFs is considered harmful because SNF residents experience disruptions to their care plans, stress, and adverse health outcomes. It has been shown that hospital readmission from an SNF has a higher risk of mortality and multiple hospitalizations than hospital readmission from the community (Yoo et al., 2015). In addition to adverse health outcomes, 30-day readmissions are often used as quality-of-care indicators. Early hospital readmissions have been recognized as a common and costly occurrence, particularly among elderly and high-risk patients. One in 5 Medicare beneficiaries is readmitted within 30 days, for example, at a cost of more than $26 billion annually. To encourage improvement in the quality of care and a reduction in unnecessary health expense, policymakers, reimbursement strategists, and the US government have made reducing 30-day hospital readmissions a national priority (Leppin et al., 2014). Based on current NHC data, Medicare patients needing rehabilitation services following an inpatient hospital stay have greater than a 45% chance of being offered a below-average quality SNF bed for recovery. Of the nearly 15,000 SNFs in the US, more than 45% operate at a below-average or lower overall quality rating. Because patients tend to seek rehabilitation services at better-performing SNFs, this inevitably results in that the remaining available beds will be at lower-performing SNFs once

all high-quality beds are taken. The selection of better-quality facilities is a part of the design of the CMS website, Nursing Home Compare (NHC). Improving the quality of care in nursing homes has been a goal and a challenge for CMS. Publicly reporting information about nursing home quality is one of the most prominent efforts aimed at improving nursing home quality in the past four decades. The Centers for Medicare and Medicaid Services (CMS) has implemented public reporting through NHC, a web-based report card on all Medicare- and/or Medicaid-certified nursing homes in the United States. In 1998, the first version of the NHC website was launched with information limited to nursing home regulatory deficiencies. In 2000, the available information was expanded to include nurse staffing data. While these quality measures were publicly available, they were not widely disseminated or publicized. Then, in 2002, through the Nursing Home Quality Initiative, CMS released what became widely known as NHC, a web-based guide detailing the quality of care at over 17,000 Medicare- or Medicaid-certified nursing homes (CMS, 2002). It included 10 clinical quality measures, six of which measure quality for long-stay residents with chronic care needs and four of which measure quality for patients in post-acute care with skilled needs. (Konetzka et al., 2022). Thanks to the publicly available SNF quality scores, Medicare beneficiaries needing a high-quality rehabilitation SNF bed also face the rehabilitation needs of non-Medicare eligible patients. Medicare patients being discharged to below-average SNF beds is increasing as non-Medicare eligible patients are also seeking high-quality SNF beds for rehab services. In 2003, CMS added quality measures to the site's health inspection and staffing information. In 2008, CMS implemented a Five Star Nursing Home Quality Rating System to summarize much of the detailed information on Nursing Home Compare so that consumers could more easily distinguish among nursing homes (CMS). With

an increasing Medicare population in the US, it is essential to determine if low-performing SNFs influence hospital 30-day readmissions.

The global demographic landscape is undergoing a significant transformation, characterized by an increasing proportion of elderly individuals relative to younger populations. This shift, often referred to as population aging, presents profound socio-economic, political, and cultural challenges and opportunities. In countries such as China and Japan, this has even more of a potential impact accompanied by steadily low birth rates. An aging population presents numerous challenges that impact various aspects of society. One of the primary challenges is the increased demand for healthcare services (Tohit et al., 2024). Much like the rest of the world, the United States is undergoing a demographic and health transformation that will have profound implications for its healthcare system and society. The population is aging at an unprecedented rate, with the baby boomer generation, defined as those born between 1946 and 1964, reaching retirement age and living longer than ever before (Jones & Dolsten, 2024). Unfortunately, this is accompanied by a parallel lower birth rate, diminishing the number of individuals to actually support the steadily increasing number of elderly needing care. The longer people live, the more important aging biology becomes as a primary risk factor in determining both the length and quality of life. In long-lived populations, a substantial part of life, and certainly most deaths, now occur in a period in the lifespan when the risk for frailty and disability increases exponentially (Olshansky, 2018). The number and proportion of older persons in the United States is rapidly increasing, even as the number of people being born to support them is declining. Therefore, significant deficiencies are projected in the country's capacity to deliver the medical, public health, and support services needed for the future frail and ill older population, and the nation is not investing sufficiently in keeping people healthy late in life (Rowe et al., 2016).

Administered by the Centers for Medicare and Medicaid Services (CMS), Medicare is the largest health insurance payer in the United States (U.S.). Seventy-seven million Americans will be 65 or older in 2030 and eligible for health insurance coverage through Medicare. In addition to those who are eligible for healthcare coverage through Medicare due to age, millions more will also be eligible for health insurance coverage through Medicare due to disability. As the US prepares for the swelling number of people covered by Medicare, the need to assess the ability of the healthcare delivery system to meet the needs of an aging population is critical. A significant concern for the US healthcare delivery system is Medicare beneficiaries' hospitalizations and the care they receive following the hospital stay. As the US population ages, it can be anticipated that the number of Medicare beneficiaries requiring inpatient hospitalization will increase. The primary concern for CMS and US lawmakers is the number of Medicare beneficiaries who are readmitted to a hospital within 30 days of discharge. Early hospital readmissions have been recognized as a common and costly occurrence, particularly among elderly and high-risk patients (Leppin et al., 2014). Reducing hospital readmission rates has captured the imagination of US policymakers because readmissions are common and costly, and their rates vary. At least, in theory, a reasonable fraction of readmissions should be preventable. Policymakers, therefore, believe that reducing readmission rates represents a unique opportunity to simultaneously improve care and reduce costs (Joynt & Jha, 2012).

Nursing homes represent an important group of healthcare providers subject to public reporting. Most nursing homes in the United States provide two distinct types of services: (1) post-acute care to patients who require short-term rehabilitation or skilled nursing care after discharge from the hospital; and (2) long-term care to patients with significant functional impairments who are no longer able to manage independently in the community. Nursing home

care accounts for significant Medicare and Medicaid spending. In 2015, Medicare fee-for-service spending for post-acute care stays accounted for $29.8 billion, and state Medicaid programs spent $54.8 billion on long-term care in nursing homes. Despite a long history of stringent regulatory and reporting requirements, numerous studies document persistent deficits in nursing home quality (Ryskina et al., 2018). In 2018, about 1.6 million fee-for-service (FFS) Medicare beneficiaries used skilled nursing facilities (SNFs) at least once (Simning et al., 2020). One in five Medicare beneficiaries discharged to an SNF will be readmitted to a hospital within 30 days. In 2018, the costs to the Centers for Medicare and Medicaid Services (CMS) for 30 days were more than $52 billion for Medicare patients being readmitted to hospitals within 30 days of a previous hospital discharge date.

The rehospitalization of Medicare beneficiaries has emerged as an important area of interest for policymakers. These rehospitalizations have been shown to be frequent, costly, and often preventable. This high rate of rehospitalization is due to numerous factors, including the Medicare services received following discharge, such as post-acute care (i.e., recuperative or rehabilitative services provided to beneficiaries after acute-care hospital stays) delivered by a skilled nursing facility (SNF), home health care agency or inpatient rehabilitation facility. Roughly 40% of Medicare beneficiaries are discharged to a post-acute setting, with roughly half of these to a SNF, which is a nursing home (or distinct part of a nursing home) devoted to providing skilled nursing care or rehabilitation services (Mor et al., 2010).

Former Almshouses to Skilled Nursing Facilities

Institutions in the past were established for the “deserving” poor and were called public almshouses- also referred to as poorhouses – and housed those with disabilities, mental illness, contagious diseases, incurable illnesses, and alcoholism. Almshouses were also intended to

protect society from the corrupting influence of the poor and feeble. Admission was provided grudgingly for fear it would foster dependence and laziness, and almshouses were typically undesirable places where only those who had nowhere else to go sought help. Administered and financed by towns and counties, aid tended to be ad hoc, decentralized, and often erratic (Watson, 2009). From their inception in this country, almshouses were stigmatized as sorry, inhospitable places that sheltered the lowest-ranking members of society. County governments ran many and were therefore controlled by local elected officials whose main goals were to keep undesirables off the streets at the lowest possible public expense. In some communities, civic authorities contracted with private individuals to house and care for the poor. These profit-making, private alms-houses relied on public funds for income, foreshadowing the proprietary nursing homes of today (Schell, 1993).

Nursing homes in the United States are a product of American federalism and reflect the complexities and variabilities of that system. Over time, institutional long-term care for frail elders has shifted from local government funding and administration to state-level oversight and support to a shared federal-state concern. The unsystematic American approach produces haphazard quality, equity, and efficiency results. Nursing homes reflect American federalism, a complicated, dynamic system that presumes and facilitates differences among the states, leads to inconsistent policies between and among states, and produces muddled policymaking and policy directives at the federal level (Ogden & Adams, 2009). Over time, institutional long-term care for frail elders' has shifted from being seen as an exclusively local problem supported by local funds to a state concern funded (in part) and overseen (often laxly) by middle-tier governments to a shared federal-state matter (funded by a combination of federal and state monies and regulated by states under federal standards). With the graying of the American population and

the increased demand that will result for long-term care services, pressure is mounting for a more coherent policy response (Ogden & Adams, 2008).

Nursing homes evolved during the 20th century without any articulated national policy. Before the Great Depression, locally run poorhouses provided most institutional long-term care. Investigations of the poorhouses "found them filthy and badly ventilated, their inmates lacking adequate medical care, their management negligent, corrupt, and often brutal." The public accepted poor quality as the norm to discourage the use of these facilities. Eventually, poorhouses were transformed into public old age homes, the precursor to today's nursing homes, though they were still viewed as institutions of last resort (Winzelberg, 2003).

Nursing homes and the residents who reside at the facility fall under the name of long-term care. Long-term care can be provided to anyone at any age, but older adults aged 65 and older who cannot be independent use long-term care services and live in these facilities, where medical and personal care services are provided. According to the Centers for Medicare and Medicaid Services, a skilled nursing facility is "a facility (which meets specific regulatory certification requirements) which primarily provides inpatient skilled nursing care and related services to patients who require medical, nursing, or rehabilitative services but does not provide the level of care or treatment available in a hospital (Heiks, 2022). Long-term SNF residents are covered by Medicaid. Conversely, Medicare covers beneficiaries for short-term rehabilitation services in an inpatient setting, in most cases, at a SNF.

Introduction of Skilled Nursing Facility Quality

In 1865, the 13th Amendment of the US Constitution abolished the practice of slavery in the United States. However, during the Jim Crow Era, approximately 1877 to 1954, the federal government sponsored and supported the racially separate and unequal distribution of resources,

including, but not limited to, education, housing, employment, and healthcare (Yearby, 2018). The repercussions of systemic racial disparities can be found in many aspects of the US healthcare delivery system. SNFs were not immune to inequities, even as they were transitioning from poorhouses to nursing homes beginning in the 1950s when the Social Security Act (SSA) of 1935, which initially prohibited federal assistance to residents of poorhouses, was amended to allow federal funds to be used to make payments to licensed public nursing homes. This policy change created the spark that led to SNF growth in the US. While the number of SNFs improved, the foundational care issues were more complicated, and in many ways, they still exist.

Systemic failings, such as neighborhood segregation, racism, and ageism, have had a long-standing impact on healthcare practices and policies, including those involved with nursing home care (Bowblis et al., 2021; Sloane et al., 2021). A systematic review of racial and ethnic disparities found that most are among long-term care facilities rather than within facilities, reflecting inequities in resources and infrastructure associated with residential segregation (Konetzka & Werner, 2009). Other studies have shown extensive racial segregation among nursing homes (Mack et al., 2020; Mauldin et al., 2020) and described the key factors driving it: (1) race-based facility preferences, (2) systemic racism, (3) disparities in funding, and (4) unequal distributions of staff (Mack et al., 2020) (National Academies of Sciences, Engineering, and Medicine, 2022).

The Medicare and Medicaid Act of 1965 established federal health insurance programs for elderly citizens and US citizens with limited income. As it relates to SNF coverage, Medicare provides coverage for Medicare beneficiaries who need short-term rehabilitation services (100 days per benefit period), and Medicaid provides coverage for long-term nursing home stays. Combined with the SSA, Medicare, and Medicaid, short-term rehab services and

long-term SNF placement are made affordable. In 1977, a new federal organization, the Health Care Financing Administration (HCFA), was created to coordinate Medicare and Medicaid. As part of this coordination, HCFA assumed jurisdiction over the nursing home certification process and development of standards for certification (Castle et al., 2010). In 1987, Congress passed the Nursing Home Reform Act (NHRA) as part of the Omnibus Budget Reconciliation Act of 1987 with the goal of improving the quality of care in nursing homes through greater government regulation. Implemented in part in October of 1990, the NHRA mandated the most comprehensive legislative requirements to date in terms of the provision of nursing home care (IOM, 1996), (Zhang & Grabowski, 2004). In 1998, the first version of the NHC website was launched with information limited to nursing home regulatory deficiencies. In 2000, the available information was expanded to include nurse staffing data. While these quality measures were publicly available, unfortunately they were not widely disseminated or publicized. Then, in 2002, through the Nursing Home Quality Initiative, CMS released what became widely known as NHC, a web-based guide detailing the quality of care at over 17,000 Medicare- or Medicaid-certified nursing homes (CMS, 2002). It included 10 clinical quality measures, six of which measure quality for long-stay residents with chronic care needs and four of which measure quality for patients in post-acute care with skilled needs. In June 2008, CMS announced it would significantly change the NHC rating system by introducing five-star summary ratings. Starting on December 18, 2008, CMS began publicly rating each nursing home with a star rating ranging from one to five stars, which is still used today. The star ratings give consumers a simplified, composite look at nursing home quality. (Konetzka et al, 2022)

30-Day Readmission Legislation

Unnecessary hospital readmissions from skilled nursing facilities (SNFs) are gaining

attention as a quality improvement focus due to their financial expense and association with increased patient complications (Mileski et al., 2017). The use of readmission rates to inform reimbursement relates to the introduction of the United States Medicare inpatient prospective payment system (IPPS) in 1983, in which hospitals received a predefined payment rate based on diagnosis-related groups (DRGs). As this system focused on costs related to inpatient services, it may be argued that hospitals had limited incentive to decrease readmission rates. Additionally, some studies observed unfavorable consequences, including increased readmission rates attributed to lower quality of care during index admission (James et al., 2023). In an effort to reduce 30-day readmissions, a host of legislative actions were taken. The acts were initially focused on penalizing hospitals for 30-day readmissions; in time, SNFs were also an area of focus.

The Affordable Care Act (ACA) – 2012

Hospital Readmission Reduction Program (HRRP): Hospitals *are financially penalized if they have higher than expected risk-standardized 30-day readmission rates for acute myocardial infarction, heart failure, and pneumonia.*

The Hospital Readmissions Reduction Program (HRRP) intends to encourage hospitals to reduce readmissions or face financial penalties. One of the program's unintended consequences is that hospitals serving minority and underserved communities are often penalized (Figueroa, 2024) (Joshi, 2019). Due to these penalties, many under-resourced and financially strained hospitals may face more pressure to treat their population as they struggle to meet the financial cost of the penalties even as they try to help their patients.

The Protecting Access to Medicare Act – 2014

CMS will implement the Skilled Nursing Facility Value-Based Purchasing (SNF VBP) Program, which links Medicare Part A payments to an SNF's rehospitalization rate. All SNFs will receive a payment adjustment to their SNF Medicare Part A claims ranging from a 2 percent cut to potentially a 1.5 percent increase based on rehospitalization rates in prior years.

With 30-day readmission costs in the billions, the enacted legislation encourages hospitals and SNFs to reduce readmissions or face penalties for excessive readmissions. The legislation also highlights the relationship between hospitals, SNFs, and the patients that they share, as both entities are interested in keeping the patient from being readmitted within 30 days.

Under HRRP, 2,920 hospitals have been penalized at least once over the program's lifetime. As a percentage of all hospitals, this is actually quite high, with 93% of the 3,139 general acute hospitals subject to HRRP evaluation and 55% of all hospitals. Moreover, 1,288 have been punished in all ten years. Incredibly, only 219 eligible hospitals have avoided payment reductions since the program started in 2013 (Rau, 2021). For skilled nursing facilities, the Skilled Nursing Facility Value-Based Purchasing (SNF VBP) program was enacted as the first value-based purchasing program in the nation focused on post-acute care. This program aims to reduce readmission rates by withholding 2% of all Medicare fee-for-service SNF revenues and redistributing a portion as incentive payments tied directly to an SNF's all-cause, unplanned, 30-day hospital readmission rate. Financial incentives can range from SNFs losing the total 2% penalty (all the funds held back are not returned) to gaining a 2% bonus (on top of receiving their 2% withhold back) via an incentive multiplier, calculated based on a performance score (Burke et al., 2022).

Several studies question using 30-day readmissions as a quality measure. The 30-day readmission measures created by the Centers for Medicare and Medicaid Services (CMS) are risk adjusted to account for case mix differences between hospitals (Keenan et al., 2008; Bratzler et al., 2011; Krumholz et al. 2011). These measures assume that, after risk adjustment, any remaining hospital-level variation in 30-day readmission rates are due to underlying differences in hospital quality (Normand, Glickman, and Gatsonis 1997). One issue of particular concern is whether the CMS measures are able to discriminate systematic differences in hospital readmissions from statistical noise, referred to as measure reliability (Michael et al., 2016). While some health policy experts question the validity of 30-day hospital readmissions as a quality measure, it is admitted that understanding factors contributing to acute hospital transfers shortly after admission to a SNF can shed light on care transition problems that result in unnecessary and potentially avoidable hospitalizations and their associated complications and costs. Information transfer at the time of hospital discharge may be incomplete or lack critical details (Ouslander et al., 2016). Further complicating 30-day readmissions as a valid quality measure is the concern that hospitals may hold Medicare beneficiaries who would be a 30-day readmission in observation status, and SNFs may keep Medicare beneficiaries who should be returned to the hospital.

5-Star Rating Process as an Indicator of Quality

Numerous articles question the 5-star Rating process and whether the overall star rating score can accurately predict the quality of the services the facility will render. Although the published readmission rates are risk-adjusted, there is concern that the risk-adjustment methodology is imperfect (Kansagara et al., 2011). If the published rates reflect actual differences across SNFs, then hospitals should use this new information and consider directing

patients to SNFs with low-risk-adjusted readmission rates. However, if the published rates are the result of selection (low hospital readmission rates are due entirely to the admission of healthier patients to the SNF), then sending patients to SNFs with low rates will not improve the readmission rate to that hospital; the information will therefore be misguided in its application (Rahman et al., 2016). The primary quality measure for SNFs is the Nursing Home Compare star rating, collected by the Centers for Medicare and Medicaid Services (CMS) and posted publicly on a website. Nursing homes (including SNFs) are rated on a variety of measures. This information is summarized in one overall rating, from one star (worst) to five stars (best). Given that Nursing Home Compare's overall star rating is intended to provide consumers accurate information about quality of care, it is important to know if a patient's outcomes will improve if she chooses a higher-rated nursing home (Rahman et al., 2016). As CMS has adopted value-based care principles, accountable care organizations use overall star ratings to identify SNFs with which to work. It has become a proxy [for quality] for many others [besides consumers], who are looking at Five-Star and making contracting and other decisions based on it." This trend, in turn, is exacerbating concerns about the accuracy and reliability of the system in assessing nursing home quality, and in particular, the methodology used to calculate a facility's overall star rating (Kilgore, 2017).

Knowledge Gap in Literature

Study models that are designed to examine limited patient data or that focus on analyzing specific illnesses/diseases may conclude that SNF overall star ratings are not statistically significant or may suggest slight significance in determining the probability of a Medicare beneficiary needing short-term rehabilitation being readmitted to a hospital within 30 days. While the NHC website includes information in addition to the SNF's overall star rating,

the website does not include 30-day readmission data. Medicare beneficiaries needing short-term rehabilitation can select the SNF to which they will transfer in some cases. Although the preference may be to transfer from the hospital to a high-quality SNF bed for short-term rehabilitation services, the reality is that Medicare beneficiaries are not permitted to remain hospitalized while waiting for a high-quality SNF bed to become available. In study designs that are not retrospective, the year-over-year fluctuations in SNF star ratings therefore cannot be observed or taken into consideration. Simultaneously, SNFs are often seen as homogeneous entities, and the thought may be that any SNF can meet a patient’s needs. Without information outlining the care capabilities available to patients, SNFs should only offer a bed to patients for whom they can provide proper care. However, if the need to get a patient in a bed is the priority, a bed offer made in good faith may result in a 30-day readmission if the SNF cannot meet the needs of the patient. For these compelling reasons, factors influencing the discharge process and SNF selection may be challenging to capture and will not be a focus of this study.

A cursory review of the data used for this study shows that 5-star SNFs have higher readmission rates in many cases than the lower-star-rated SNFs. The data also indicates that SNF star ratings tend to fluctuate yearly. For 2017 -2022, some facilities were ranked at almost every star level, confirming that the factors used to create the star ratings are not stagnant. While readmission rates are the focus of this study, the instability of the other components used to determine overall star ratings should be assessed in future studies.

SNFs offer a very unique service. Literature shows that at one point, there were more than 17,0000 certified SNFs in the US. That number has declined to 14,814. According to a 2019 study examining readmission penalties, 72% (10,436) of SNFs were penalized; 21% (2,996) received the maximum penalty of 1.98%, where n=14,588 (Qi et al., 2020). SNF

penalties may have the unintended but very real consequence of expediting the loss of short-term rehabilitation beds when the need for those beds increases. The value-based purchasing program (VBP) may not be offering sufficient incentives for nursing homes to improve, particularly for low-performing facilities in areas with underserved populations. Only 0.7% of poor-performing skilled nursing facilities were able to improve enough to avoid a financial penalty under VBP, a JAMA study found – the program didn't "offer a viable path" for such facilities to avoid penalties using readmission rate data (Stulick, 2024). There are growing concerns that the supply of nursing home beds may be declining faster than the demand for them warrants, a problematic issue that has grown with the increase in nursing home closures during the pandemic. The supply of nursing home beds may be declining partly because of individual preferences to remain in the community for as long as possible rather than receiving care in a nursing home. It may also be declining in the context of increasing availability of home- and community-based care (Miller et al., 2023). As the availability of SNF beds declines, the costs of 30-day readmissions will increase, as studies show that 30-day readmission rates are higher for patients who are discharged home with home healthcare than for patients discharged to a SNF.

The impact of social determinants of health are challenging to measure, as a variety of seemingly extraneous factors may influence the decision-making process when selecting a SNF. For example, a patient selects a 1-star SNF over a 5-star SNF because, while low-performing, the 1-star facility is accessible by city transportation services. The facility's location and racial makeup may also be factors. The ability to gather patient-level information on factors that influenced their SNF decision may be challenging. If the selection is being made by a

family member, the SNF that is most convenient to where the family member lives or works may also play a role in the decision-making process.

Summary of the Literature

The transition from unregulated almshouses to skilled nursing facilities has not been free from challenges. In addition to the challenges of patient care management and staffing, as indicated in the literature, people in the US and in many other countries around the world are living longer and living longer with illnesses or chronic health conditions. How the healthcare delivery system will meet the needs of aging Americans is a priority, despite the challenges. As the literature suggests, with a shortage of Primary Care Providers, Geriatricians, and SNF staffing challenges, it is safe to say that the US delivery system is not ready to take on the challenges of the senior population, with special emphasis on the citizens over 85 years old.

CHAPTER 3

METHODOLOGY

STUDY DESIGN

University of Georgia's IRB Committee reviewed and approved this study, ID: PROJECT00011417. Because this research does not include human subjects, it is defined as a non-human study, and consent is not required. This study aims to analyze skilled nursing facility data (2017 -2022) obtained from the CMS.gov website to examine whether there is a relationship between SNFs' overall 5-star quality scores and readmission rates. As a longitudinal retrospective study, the findings of this study cannot determine causality. However, it will add to the knowledge of the relationship between SNF overall star ratings and readmission rates.

Study Population

The study population will consist of Medicare beneficiaries who, following an inpatient hospitalization, were transferred to a skilled nursing facility for short-term rehabilitation care and readmitted to a hospital within 30 days of the original hospital discharge date. Using CMS data, this study includes all US-certified skilled nursing facilities. To eliminate patient bias in readmission data that may be found when examining for specific conditions, the current study will use all-cause readmission data.

Data Source

The current study will use data in the Nursing Homes Including Rehab Services files located on the CMS.gov website for 2017 – 2022. Each file includes approximately 20 reports that provide detailed information about every certified skilled nursing facility in the United States. This quantitative longitudinal retrospective study uses secondary data to create regression analysis, correlation, simple comparisons, charts, and graphs. For this study, the

independent variable is the SNF star rating, and the dependent variable is the SNF readmission rate. This study will use data from all US-certified skilled nursing facilities operating from 2017 to 2022 (See Figure 1).

Figure 1: Skilled Nursing Facilities in Study Period 2017 – 2022

Year	*Number of SNFs*
2017	N = 15,654
2018	N = 15,600
2019	N = 15,471
2020	N = 15,348
2021	N = 15,270
2022	N = 15,147
2017 – 2022	N = 92,490

Study Setting

The current study will use CMS data for Medicare beneficiaries discharged from an inpatient hospital stay to a skilled nursing facility and readmitted to a hospital within 30 days. No patient information is collected or used for this study.

Insurance Coverage

- Medicare

Population

- US Population
- All races/ethnicities/genders covered by Medicare were discharged from a hospital and were readmitted to a hospital within 30 days.

Setting

- All US-certified skilled nursing facilities

Inclusion and Exclusion Criteria

Inclusion

US citizens are eligible for Medicare coverage at age 65. However, US citizens under 65 with qualifying illnesses or conditions may also be eligible for Medicare coverage. As this study uses information provided by CMS data for skilled nursing facilities, it is not possible to determine if the readmission data includes Medicare beneficiaries under age 65. For this reason, data for Medicare beneficiaries under age 65 will likely be included in the study data. As the primary variable under consideration is insurance coverage by Medicare, data for US citizens who are dual eligibles, being eligible for Medicare and Medicaid, where Medicare is the primary and Medicaid secondary, are also likely to be included.

Exclusion

The data for this study do not include US citizens eligible for Medicare coverage who are enrolled in a Medicare Advantage plan.

Recruitment

Using data from US certified used data from US-certified study period 2017 – 2022, the researcher for this study completed study recruitment by completing a random sample.

Sample size

The current study's sample size includes all US-certified skilled nursing facilities operating from 2017 to 2022. However, after reviewing the data, we found that not all uniquely named SNFs were in operation for the entire study period. In preparation for this study, the researcher used data found on the CMS.gov website in the

"nursing_homes_including_rehab_services_current_data" reports for 2017 – 2022. In an effort to avoid utilization patterns that seasonal changes may impact, the researcher used the November report for each year of consideration, where possible. If not possible, the closest report before or after November was used. Each nursing_homes_including_rehab_services_current_data" contained approximately 20 individual SNF reports covering various measures. The specific reports included in the nursing_homes_including_rehab_services_current_data" reports of interest to the researcher and were downloaded and saved as File 1, File 2, and File 3. The elements of interest are as follows;

File 1.NH_ProviderInfo November Report 2017 - 2022

- CMS Certification Number (CCN)
- Provider Name
- Provider Address
- City/Town
- State
- Zip Code
- County/Parrish
- Ownership Type
- Overall Rating
- Processing Date

File 2. NH_QualityMsr_Claims November Report 2017 -2022

- CMS Certification Number (CCN)
- Adjusted Score
- Observed Score

File 3. Skilled_Nursing_Facility_Quality_Reporting_Program_Provider_Data Report November 2017 - 2022

- CMS SNF Region

CMS data files were extracted and downloaded as Excel (XMS) files by processing date, which represented the year under consideration. All files were established for each performance year using the elements of consideration demonstrated in File 1, followed by adding information demonstrated by File 2, and concluding with data from File 3. Once all data elements of interest were present, the file was imported into StataSE18.

Methods and Procedures

Studies suggest that over 60% of SNFs certified in the US have been fined for excessive 30-day readmissions. In addition, some studies show significance when examining SNF star ratings and readmission rates with Medicare beneficiaries with specific illnesses/diseases. As intended by CMS, the purpose of the Nursing Home Compare website is to inform patients, providers, and hospitals of better-performing SNFs with the expectation that better-performing facilities will have better outcomes. On the NHC website, 30-day readmission data is included as a factor in the overall 5-star rating methodology for SNFs. If 5-star SNFs perform better, a reasonable expectation is for lower-performing SNFs to have higher readmission rates than better-performing SNFs. For this reason and using this rationale, the researcher selected as a hypothesis for this study;

Hypothesis: Skilled nursing facilities with quality star ratings of 2-star and below have higher 30-day readmission rates than skilled nursing facilities with quality star ratings of 3-star and above.

The principal tool used to analyze the data used for the current study was StataSE18. The study results include graphs to aid with data visualization and regression models to determine the statistical significance of findings. The study included SNF data from 2017 to 2022, which resulted in 92,640 lines of data for consideration. Since Medicare beneficiaries can be admitted to any Medicare-certified SNF in the US following a qualifying hospitalization, this study does not consider beneficiary demographic information (race, age, gender) or specific illnesses or diseases. However, the researcher will use the CMS adjusted readmission rate data to conduct this study to account for factors that influence the probability of a Medicare beneficiary returning to an inpatient hospital status within 30 days. CMS readmission data variables include:

- Variable 1 – Observed Readmission Rate.
- Variable 2 – Adjusted Readmission Rate. (Adjusted for patient condition, age, and gender.)
- Variable 3 – Expected Readmission Rate.

The researcher used the adjusted readmission rate along with all-cause readmission data in an effort to replicate the real-world process of SNF selection by patients as well as the decision to offer a short-term rehab bed by a SNF. As a study focused on all-cause readmissions, this study does not single out specific illnesses, genders, or conditions. It will instead conduct tests using the CMS-adjusted readmission rate to examine the hypothesis of this study. Using the CMS adjusted readmission rate takes into consideration the various factors that could lead to a negative outcome, such as, in the case of this study, a hospital readmission within 30 days. By using the adjusted readmission data, while it does not identify these elements specifically, the study design does consider age, functional state, and other factors that consider the patient's needs through the CMS adjusted readmission process.

Statistical Analytics

In order to measure the statistical relationship between SNF star ratings and 30-day readmissions, this research used two analyses: 1. Linear regression, and 2. Correlation between the two variables. In both instances, the SNF star rating was the independent variable, and the readmission rate was the dependent variable. The analysis used linear regression and correlation analysis were used to estimate the strength of the relationship between the independent and dependent variables.

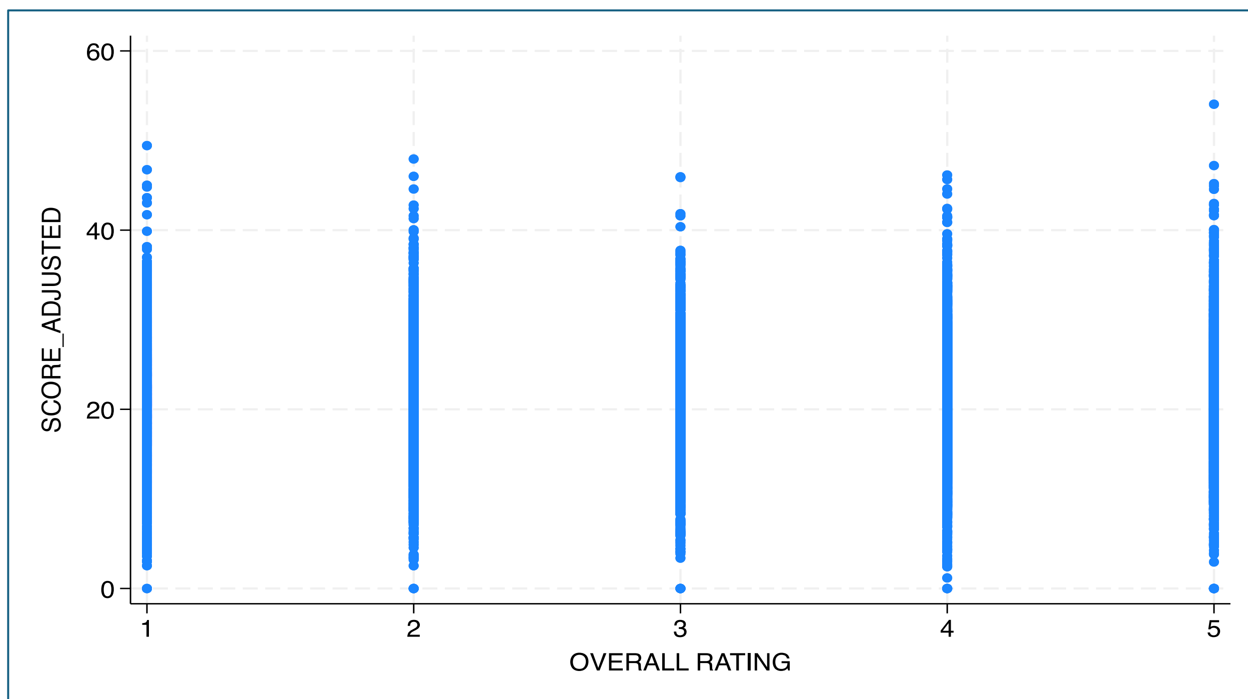
To perform the analyses for this study, the researcher used StataSE 18.

Outcomes

Study Hypothesis: *Skilled nursing facilities with quality star ratings of 2-star and below have higher 30-day readmission rates than skilled nursing facilities with quality star ratings of 3-star and above.*

2017

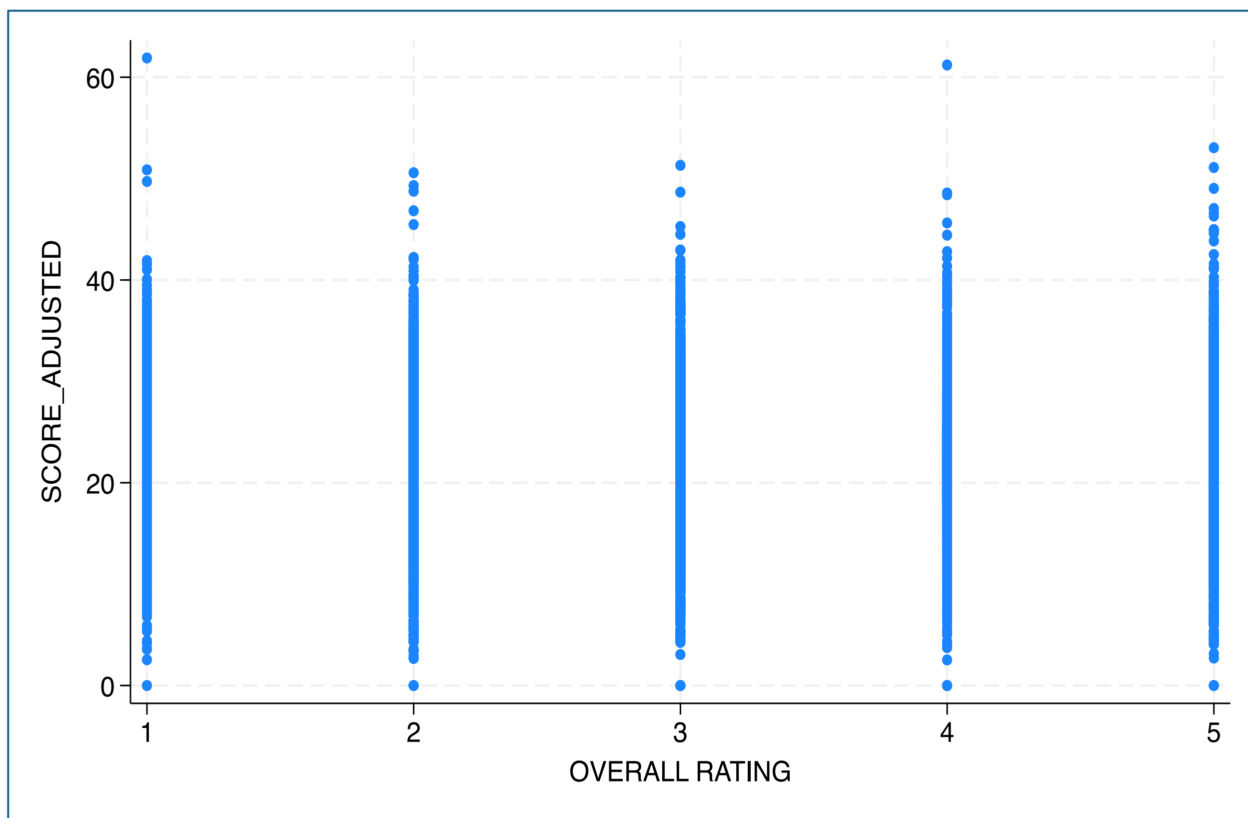
Figure 2: 2017 Skilled Nursing Facility Adjusted Score by Overall Rating



The 2017 graph of adjusted readmission rates does not support the hypothesis of the current study concerning the assumption that lower performing SNFs (2 Stars and below) have higher readmission rates than better performing SNFs (3 Stars and above).

2018

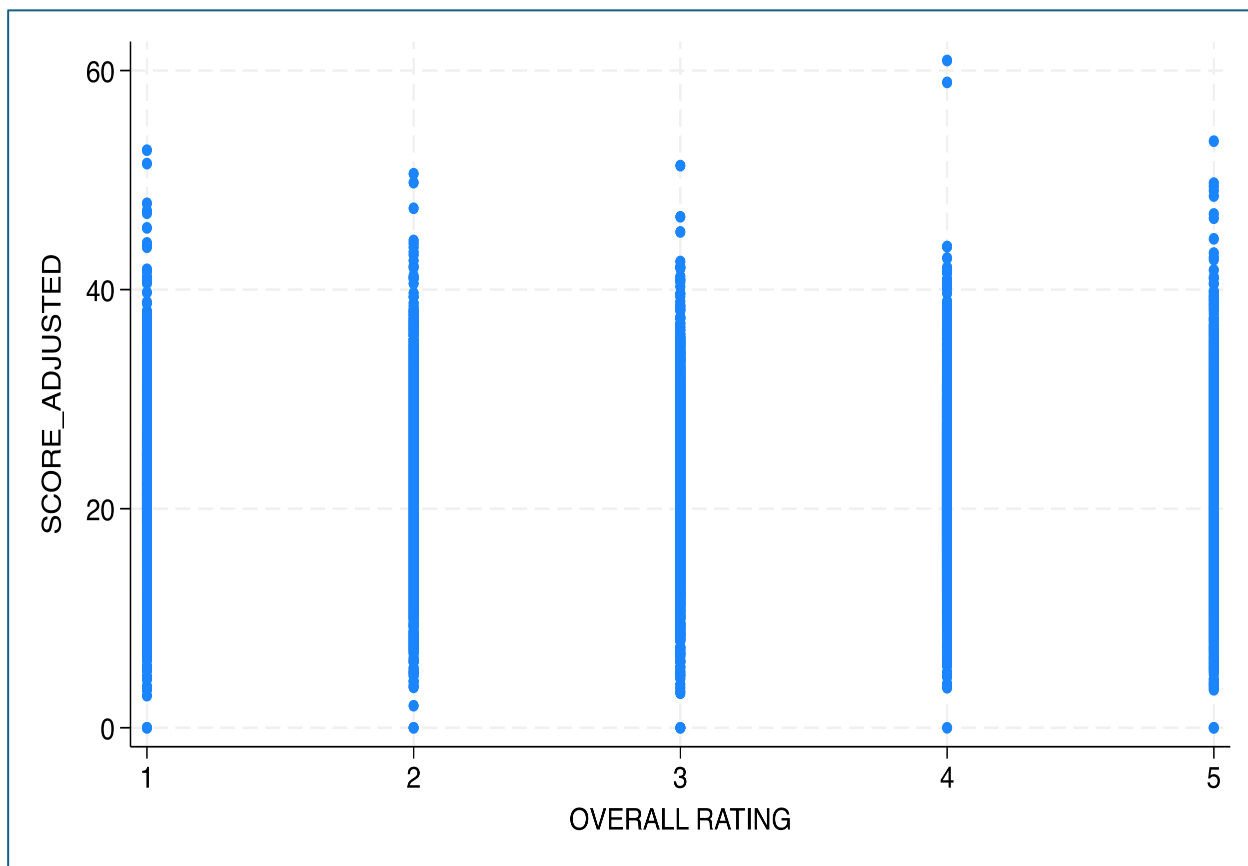
Figure 3: 2018 Skilled Nursing Facility Adjusted Score by Overall Rating



The 2018 graph of adjusted readmission rates does not support the hypothesis of the current study concerning the assumption that lower performing SNFs (2 Stars and below) have higher readmission rates than better performing SNFs (3 Stars and above).

2019

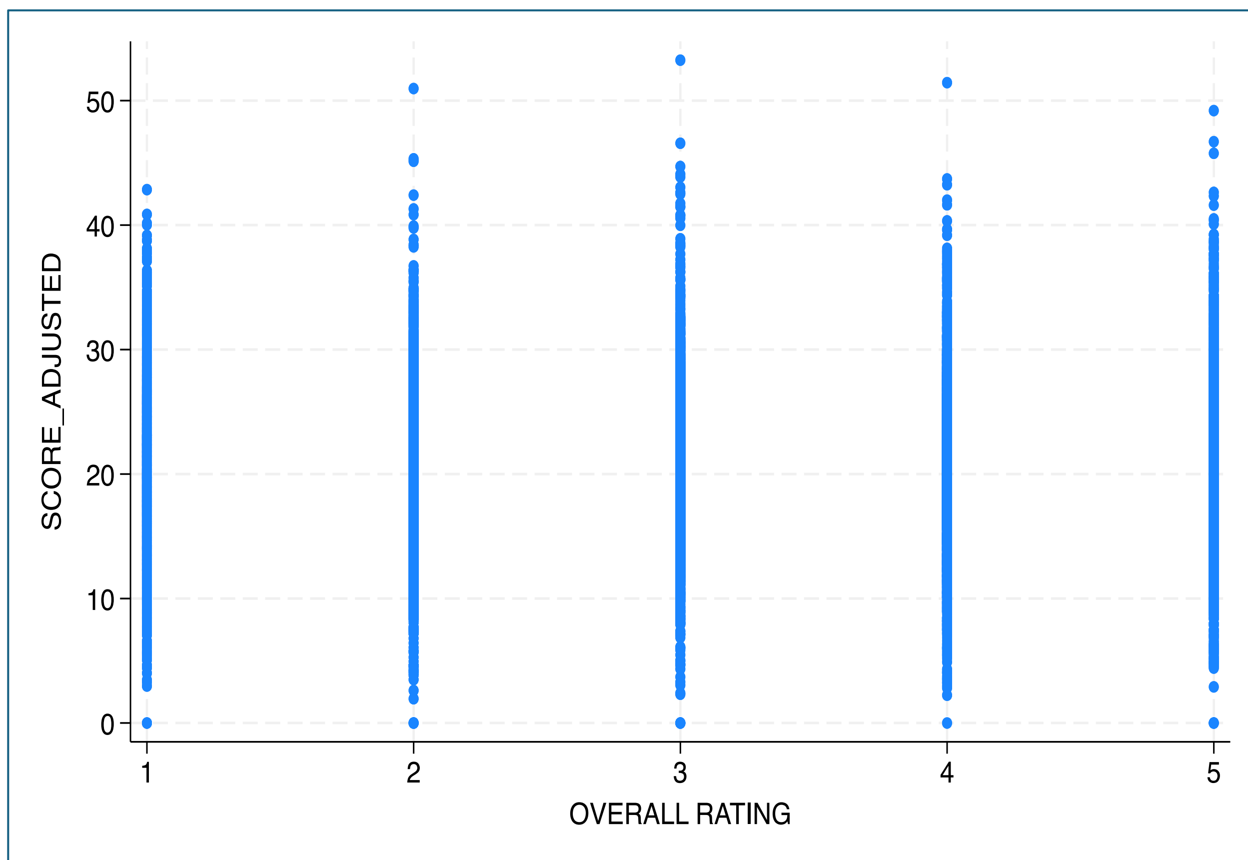
Figure 4: 2019 Skilled Nursing Facility Adjusted Score by Overall Rating



The 2019 graph of adjusted readmission rates does not support the hypothesis of the current study concerning the assumption that lower performing SNFs (2 Stars and below) have higher readmission rates than better performing SNFs (3 Stars and above).

2020

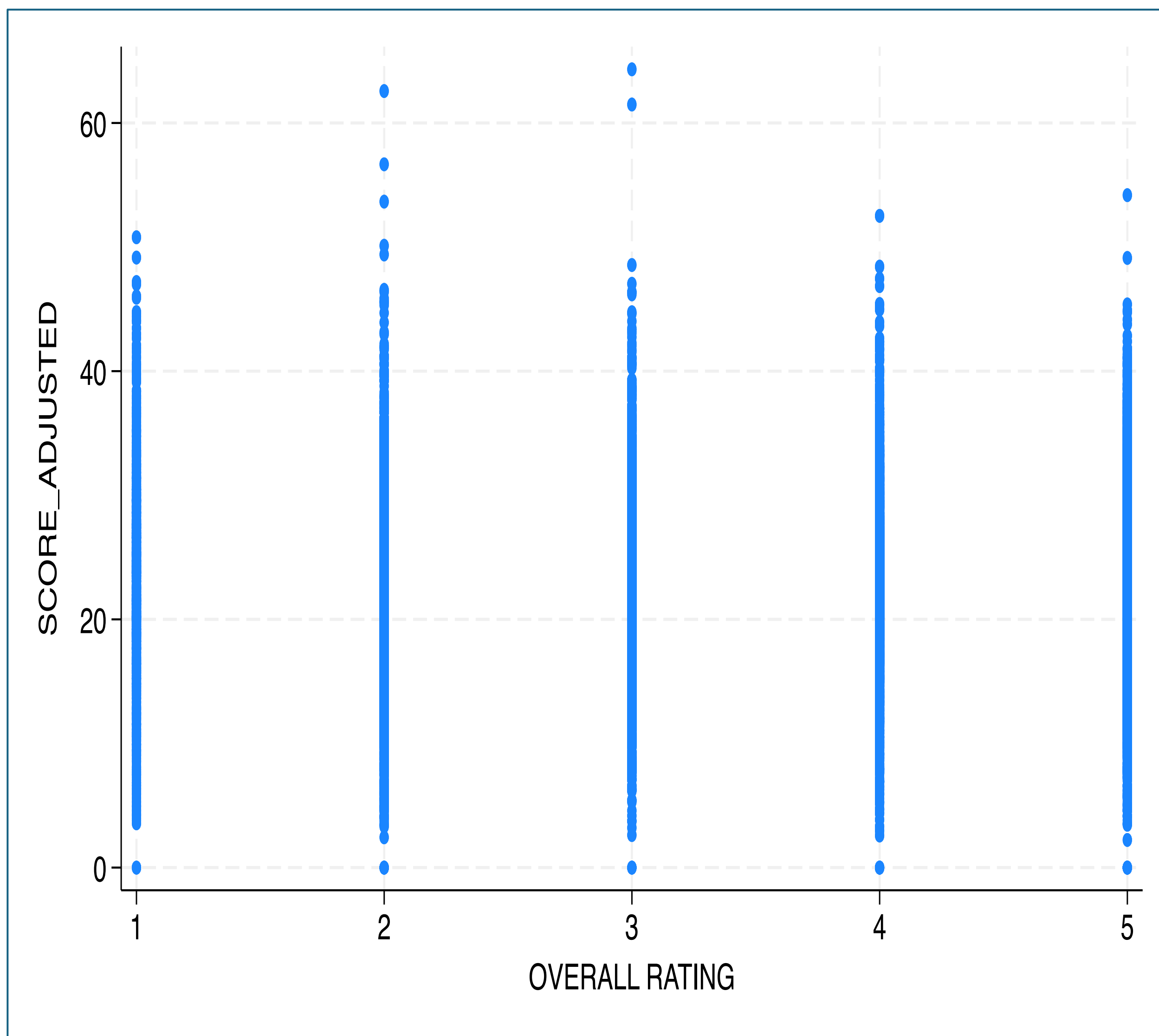
Figure 5: 2020 Skilled Nursing Facility Adjusted Score by Overall Rating



The 2020 graph of adjusted readmission rates does not support the hypothesis of the current study concerning the assumption that lower performing SNFs (2 Stars and below) have higher readmission rates than better performing SNFs (3 Stars and above).

2021

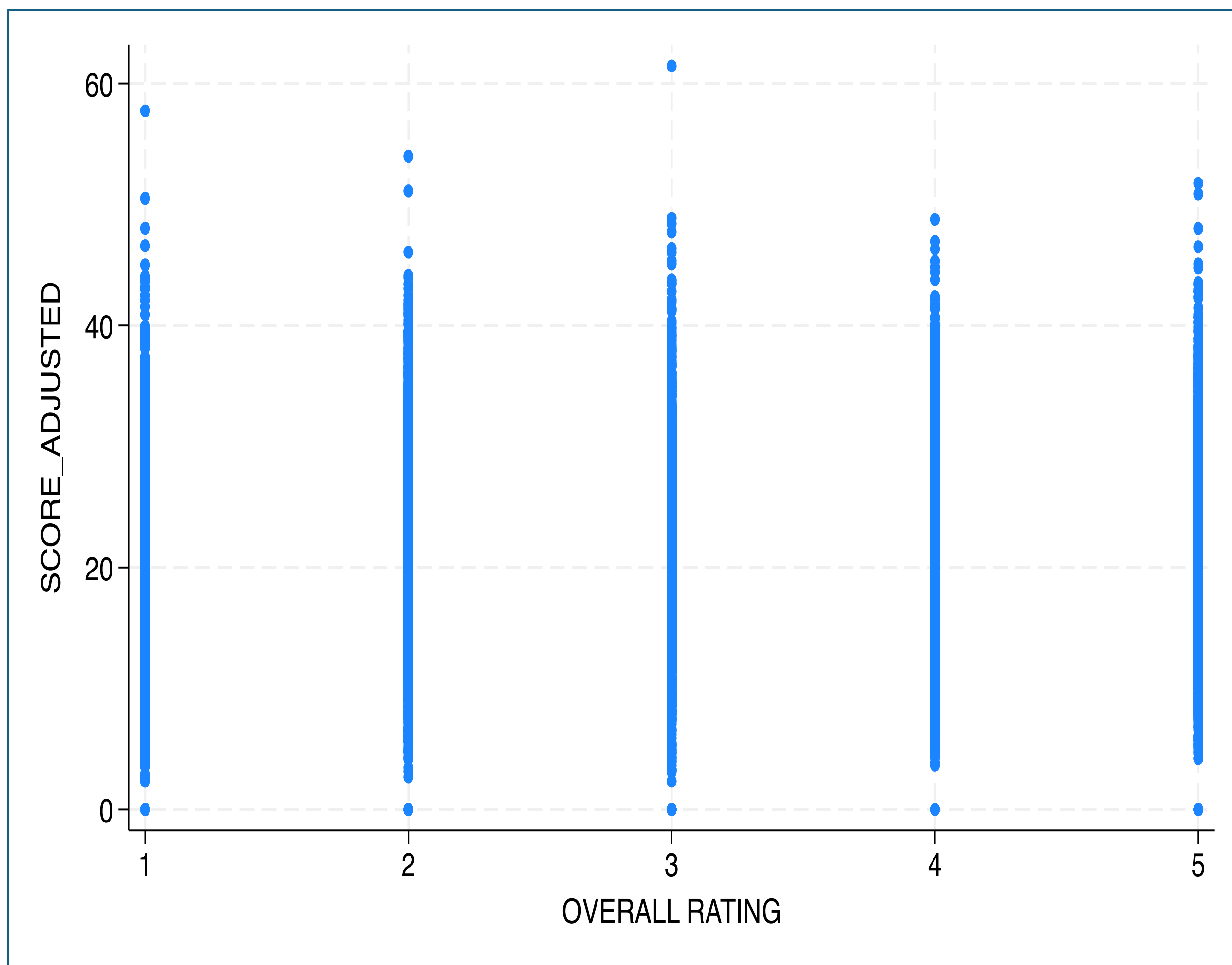
Figure 6: 2021 Skilled Nursing Facility Adjusted Score by Overall Rating



The 2021 graph of adjusted readmission rates does not support the hypothesis of the current study concerning the assumption that lower performing SNFs (2 Stars and below) have higher readmission rates than better performing SNFs (3 Stars and above).

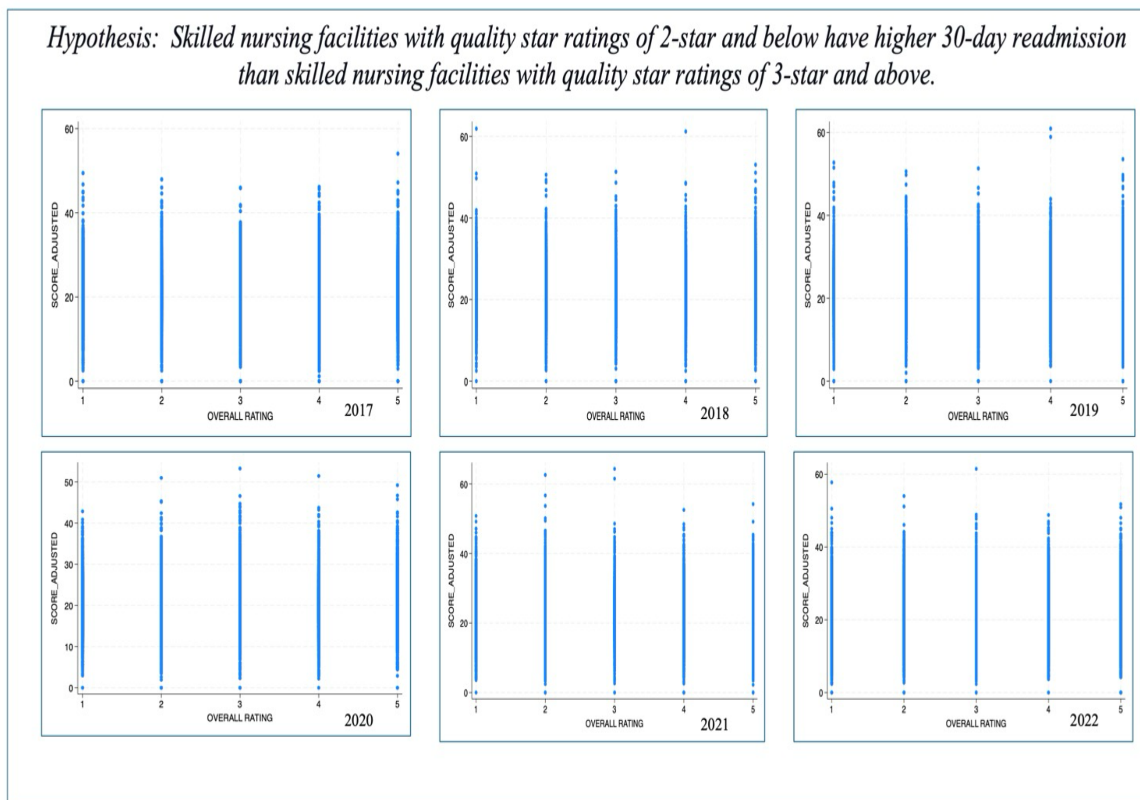
2022

Figure 7: 2022 Skilled Nursing Facility Adjusted Score by Overall Rating



The 2022 graph of adjusted readmission rates does not support the hypothesis of the current study concerning the assumption that lower-performing SNFs (2 Stars and below) have higher readmission rates than better-performing SNFs (3 Stars and above).

Figure 8: 2017 - 2022 Summary Skilled Nursing Facility Adjusted 30-Day Readmission



Overall Star Rating

In addition to using the graphs to examine the hypothesis, the researcher also computed the average adjusted readmission rate for each study year based on SNF star rating (See Figure 9).

Figure 9: 2017 – 2022 SNF 30-Day Adjusted Readmission Rates

Average SNF 30-Day Readmission Rates 2017 - 2022						
Year/Star	**1 Star**	**2 Star**	**3 Star**	**4 Star**	**5 Star**	**No Star**
2017	20.97	21.12	21.1	21.13	21.09	21.27
2018	21.75	22.03	21.89	21.89	21.89	22.21
2019	22.86	22.38	22.07	22.22	22.18	22.09
2020	20.6	20.81	20.84	20.61	20.92	20.88
2021	22.79	22.64	22.78	22.78	22.84	22.92
2022	22.02	21.88	21.96	22.15	22.14	22.64

Based on the observed outcomes, the study hypothesis fails. Admittedly, this outcome was not expected by the researcher for several reasons, including over a decade of policy decisions and quality initiatives, with one of the goals being to reduce 30-day readmission rates. Contrary to the study hypothesis, lower-performing SNFs had lower 30-day readmission rates than higher-performing SNFs in every year of the study period, with the exception of 2019. During the study period, regardless of SNF star rating, the adjusted readmission rates were higher in 2022 than they were in 2017 for all SNFs. Having an increasing percentage of 30-day readmissions is dual-pronged;

1. The 30-day adjusted readmission rate percentage increased every year from 2017 to 2022.
2. The number of US citizens eligible for Medicare increased every year from 2017 to 2022.

For example, in 2017, with 500,000 US citizens eligible for Medicare coverage, 42% transferring to a SNF with 20% readmitted to a hospital within 30 days, at $15,000 per readmission, the 2017 readmission cost would be $630 million. In 2018, with 550,000 US citizens eligible for Medicare coverage and all other numbers remaining the same, the 30-day readmission cost

would be $693,000,000, an increase of $63 million as a result of ineffective 30-day readmission initiatives.

Despite efforts in 2012 to reduce 30-day readmissions, readmission rates were higher at the end of the study period than they were at the beginning. From the quality of the services perspective, it is reasonable to expect measurable outcome differences between 1-Star and 5-Star SNFs. From the perspective of reducing the probability of 30-day readmissions, based on the outcome of the study, Medicare beneficiaries needing short-term rehabilitation services in a SNF following an inpatient hospital stay are just as likely, if not more likely, to return to an inpatient hospital status from a 5-star than a 1-star SNF. Like skilled nursing facilities, hospitals can be penalized financially for excessive readmissions and may prefer higher-performing SNFs over lower-performing SNFs. While doing so may solve quality concerns, the 30-day readmission crisis remains.

As a country with an aging population, the US is in the same uncharted territory that many other countries find themselves in. An increasingly aged as well as aged with illnesses population, is going to require innovation unlike any initiatives in the past. Specifically, to the US, due in part to systemic racism, health inequities amongst different demographics, and ongoing political battles over access to healthcare, resolving the 30-day readmission crisis will be especially daunting. However, this is the challenge that must be taken on as the Medicare roster continues to expand.

Linear Regression Models

The following linear regression models will be created using CMS SNF data for 2017 – 2022. To decrease inconsistencies that could be caused by seasonal differences in Medicare beneficiaries seeking healthcare services, each report is from the month of November. In the

event the November report was not available, the report from the closest month, October or December, was used. The elements under consideration are as follows:

Skilled Nursing Facilities (2017 – 2022)

- Dependent variable – adjusted score
- Independent variable – star rating

2017

Figure 10: 2017 Linear Regression Model

```
regress adjscore star

      Source |       SS           df       MS      Number of obs   =    13,568
-------------+----------------------------------   F(1, 13566)     =      0.48
       Model |  17.6626281         1  17.6626281   Prob > F        =    0.4876
    Residual |  497204.372    13,566  36.6507719   R-squared       =    0.0000
-------------+----------------------------------   Adj R-squared   =   -0.0000
       Total |  497222.034    13,567  36.6493723   Root MSE        =     6.054

------------------------------------------------------------------------------
    adjscore | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
        star |   .0253843   .0365662     0.69   0.488    -.0462905    .0970591
       _cons |   21.85869   .1275389   171.39   0.000      21.6087    22.10869
------------------------------------------------------------------------------
```

The 2017 linear regression model confirms that the SNF star rating cannot be used as a predictor of 30-day readmission probability.

2018

Figure 11: 2018 Linear Regression Model

```
regress adjscore star

      Source |       SS           df       MS      Number of obs   =    13,568
-------------+----------------------------------   F(1, 13566)     =      0.48
       Model |  17.6626281         1  17.6626281   Prob > F        =    0.4876
    Residual |  497204.372    13,566  36.6507719   R-squared       =    0.0000
-------------+----------------------------------   Adj R-squared   =   -0.0000
       Total |  497222.034    13,567  36.6493723   Root MSE        =     6.054

------------------------------------------------------------------------------
    adjscore | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
        star |   .0253843   .0365662     0.69   0.488    -.0462905    .0970591
       _cons |   21.85869   .1275389   171.39   0.000      21.6087    22.10869
------------------------------------------------------------------------------
```

The 2018 linear regression model confirms that the SNF star rating cannot be used as a predictor of 30-day readmission probability.

2019

Figure 12: 2019 Linear Regression Model

```
regress adjscore star

      Source |       SS           df       MS      Number of obs   =    13,394
-------------+----------------------------------   F(1, 13392)     =      0.00
       Model |  .116087604         1  .116087604   Prob > F        =    0.9560
    Residual |  510569.567    13,392  38.1249676   R-squared       =    0.0000
-------------+----------------------------------   Adj R-squared   =   -0.0001
       Total |  510569.683    13,393  38.1221297   Root MSE        =    6.1745

------------------------------------------------------------------------------
    adjscore | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
        star |   -.002089   .0378568    -0.06   0.956    -.0762936    .0721157
       _cons |   22.20581    .132003   168.22   0.000     21.94706    22.46455
------------------------------------------------------------------------------
```

The 2019 linear regression model confirms that the SNF star rating cannot be used as a predictor of 30-day readmission probability.

2020

Figure 13: 2020 Linear Regression Model

```
regress adjscore star

      Source |       SS           df       MS      Number of obs   =    11,935
-------------+----------------------------------   F(1, 11933)     =      0.42
       Model |  21.4533514         1  21.4533514   Prob > F        =    0.5152
    Residual |   604535.13    11,933  50.6607835   R-squared       =    0.0000
-------------+----------------------------------   Adj R-squared   =   -0.0000
       Total |  604556.583    11,934  50.6583361   Root MSE        =    7.1176

------------------------------------------------------------------------------
    adjscore | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
        star |   .0298666   .0458959     0.65   0.515    -.0600968    .1198299
       _cons |   22.67972   .1602369   141.54   0.000     22.36563    22.99381
------------------------------------------------------------------------------
```

The 2020 linear regression model confirms that the SNF star rating cannot be used as a predictor of 30-day readmission probability.

2021

Figure 14: 2021 Linear Regression Model

```
regress adjscore star

      Source |       SS           df       MS      Number of obs   =    11,935
-------------+----------------------------------   F(1, 11933)     =      0.42
       Model |  21.4533514         1  21.4533514   Prob > F        =    0.5152
    Residual |   604535.13    11,933  50.6607835   R-squared       =    0.0000
-------------+----------------------------------   Adj R-squared   =   -0.0000
       Total |  604556.583    11,934  50.6583361   Root MSE        =    7.1176

------------------------------------------------------------------------------
    adjscore | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
        star |   .0298666   .0458959     0.65   0.515    -.0600968    .1198299
       _cons |   22.67972   .1602369   141.54   0.000     22.36563    22.99381
------------------------------------------------------------------------------
```

The 2021 linear regression model confirms that the SNF star rating cannot be used as a predictor of 30-day readmission probability.

2022

Figure 15: 2022 Linear Regression Model

```
regress adjscore star

      Source |       SS           df       MS      Number of obs   =    12,195
-------------+----------------------------------   F(1, 12193)     =      1.69
       Model |  78.3487393         1  78.3487393   Prob > F        =    0.1936
    Residual |  565134.201    12,193  46.3490692   R-squared       =    0.0001
-------------+----------------------------------   Adj R-squared   =    0.0001
       Total |   565212.55    12,194  46.3516935   Root MSE        =     6.808

------------------------------------------------------------------------------
    adjscore | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
        star |   .0563539    .043344     1.30   0.194    -.0286071     .141315
       _cons |   21.86727   .1523596   143.52   0.000     21.56862    22.16592
------------------------------------------------------------------------------
```

The 2022 linear regression model confirms that the SNF star rating cannot be used as a predictor of 30-day readmission probability.

This study failed to show that lower-performing SNFs have higher readmission rates than higher-performing SNFs. It also suggests that SNF star ratings cannot be used as a predictor of 30-day readmissions. The linear regression models confirm no significance between variables under consideration as a reliable indicator of 30-day readmission probability. Based on the study findings, the researcher concluded that running a correlation analysis would yield results consistent with the findings already presented.

CHAPTER 4

RESULTS

30-day readmissions are a national crisis that will continue to expand if efforts to understand better causality are not introduced. Studies suggest that the threat of financial penalty and current policies are not meeting the intended expectations. CMS has created 10 regions for US-certified skilled nursing facilities, as seen in Figure 16.

Figure 16: CMS Skilled Nursing Facility Regional Locations Map

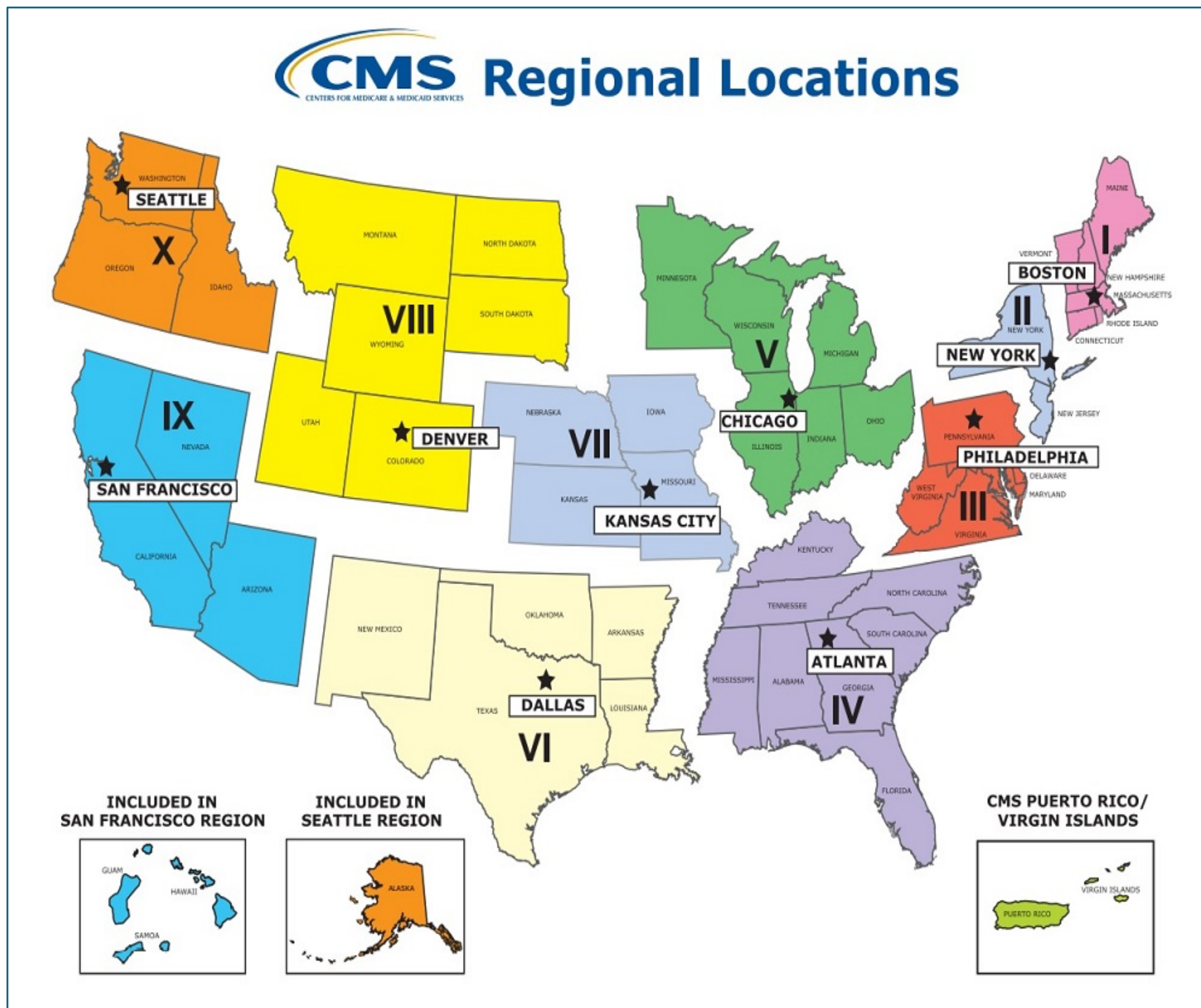


Figure 17: CMS Skilled Nursing Facility Regional Locations By State

As a longitudinal retrospective study of US-certified SNFs in operation between 2017 and 2022, the researcher deviated from the study design to examine whether differences could be found in

the various CMS Regions. Although all regions were included, the data used for this study was from the contiguous states and did not include data from:

- Virgin Islands
- Puerto Rico
- American Samoa
- Guam
- The Commonwealth of the Northern Mariana Islands
- Federated States of Micronesia
- Marshall Islands
- Republic of Palau

Regional Map Breakdown

2017

Figure 18: 2017 SNF Regional Breakdown

region	Freq.	Percent	Cum.
1	929	5.93	5.93
2	991	6.33	12.27
3	1,401	8.95	21.22
4	2,709	17.31	38.52
5	3,461	22.11	60.63
6	2,112	13.49	74.12
7	1,508	9.63	83.75
8	632	4.04	87.79
9	1,457	9.31	97.10
10	454	2.90	100.00
Total	15,654	100.00	

2018

Figure 19: 2018 SNF Regional Breakdown

region	Freq.	Percent	Cum.
1	910	5.83	5.83
2	990	6.35	12.18
3	1,397	8.96	21.13
4	2,702	17.32	38.46
5	3,444	22.08	60.53
6	2,115	13.56	74.09
7	1,504	9.64	83.73
8	632	4.05	87.78
9	1,455	9.33	97.11
10	451	2.89	100.00
Total	15,600	100.00	

2019

Figure 20: 2019 SNF Regional Breakdown

region	Freq.	Percent	Cum.
1	875	5.66	5.66
2	987	6.38	12.04
3	1,396	9.02	21.06
4	2,708	17.50	38.56
5	3,396	21.95	60.51
6	2,096	13.55	74.06
7	1,510	9.76	83.82
8	619	4.00	87.82
9	1,446	9.35	97.17
10	438	2.83	100.00
Total	15,471	100.00	

2020

Figure 21: 2020 SNF Regional Breakdown

region	Freq.	Percent	Cum.
1	857	5.61	5.61
2	975	6.39	12.00
3	1,381	9.04	21.04
4	2,708	17.73	38.78
5	3,329	21.80	60.58
6	2,075	13.59	74.17
7	1,469	9.62	83.79
8	611	4.00	87.79
9	1,435	9.40	97.18
10	430	2.82	100.00
Total	15,270	100.00	

2021

Figure 22: 2021 SNF Regional Breakdown

region	Freq.	Percent	Cum.
1	857	5.61	5.61
2	975	6.39	12.00
3	1,381	9.04	21.04
4	2,708	17.73	38.78
5	3,329	21.80	60.58
6	2,075	13.59	74.17
7	1,469	9.62	83.79
8	611	4.00	87.79
9	1,435	9.40	97.18
10	430	2.82	100.00
Total	15,270	100.00	

2022

Figure 23: 2022 SNF Regional Breakdown

region	Freq.	Percent	Cum.
1	840	5.55	5.55
2	969	6.40	11.94
3	1,378	9.10	21.04
4	2,689	17.75	38.79
5	3,300	21.79	60.58
6	2,054	13.56	74.14
7	1,456	9.61	83.75
8	602	3.97	87.73
9	1,429	9.43	97.16
10	430	2.84	100.00
Total	15,147	100.00	

Since star rating/adjusted readmission variables failed to produce any significance, the researcher used the CMS Regional map to understand differences that might exist in different areas of the country. The researcher found no significant findings for Medicare beneficiary 30-day readmission rates based on regions. 30-day readmissions are a national crisis. While the regional comparison failed to show significant differences between 30-day readmission rates, it did show another caveat to the 30-day readmission crisis. The number of skilled nursing facilities available in the US is declining.

CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

Conclusion

The aim of the current study was to use a retrospective longitudinal survey to assess the relationship between poor-performing SNFs and 30-day readmission rates to determine if SNFs with ratings of 2 stars and below have higher readmission rates than better-performing SNFs. The study examined CMS data and how information on the Nursing Home Compare website might influence SNF selection despite the inability of the website to predict readmission probabilities. The results of the graphs, linear regression analysis models, and a review of the data from a regional perspective consistently demonstrated that there was no significant relationship between SNF overall star scores and 30-day adjusted readmission rates. This study also concludes that initiatives implemented to reduce 30-day readmissions that use readmission rates as a penalty or reward have been ineffective. As this study has shown, even if readmission rates remain constant, the cost of 30-day readmissions will increase significantly year over year due to the increasing number of US citizens becoming eligible for healthcare coverage under Medicare. While SNF star ratings may play a role in successfully transitioning home for 75% of Medicare beneficiaries seeking short-term rehabilitation, the star rating may mean very little for the 25% who will return to the hospital. Without question, there are beneficial and necessary aspects to tracking, tracing, and reporting 30-day readmission rates for hospitals and skilled nursing facilities. Still, new initiatives are needed to reduce the number of readmissions.

Recommendations

Notably, the model used for the current study suggests no significance between lower-performing and higher-performing SNFs and the probability of a Medicare beneficiary being readmitted to the hospital within 30 days. The stated goal of the CMS Nursing Home Compare website is to inform patients and providers about the quality of SNFs. While the higher star ratings suggest better quality, according to this study, patients or hospitals cannot use the Nursing Home Compare website information to predict whether a patient will be readmitted to a hospital. Although SNF VBP is designed to fine or reward SNFs based on 30-day readmission rates, this study suggests no relationship between the two variables. As it relates to 30-day readmissions and the information on NHC, while it may appear that the information does not play a role in readmission rates, reviewing SNF data for the study period of this study may offer an indication that NHC works.

For decades, CMS used the fee-for-service (FFS) payment model. As a model, FFS did not inspire or encourage efficiency, effectiveness, or quality outcomes, as providers were reimbursed based on the number of services performed. The introduction of the Affordable Care Act brought with it a new payment reimbursement model called value-based care (VBC) focused on Medicare beneficiaries covered by traditional Medicare. Unlike FFS, VBC is focused on improving quality. In 2012, Accountable Care Organizations (ACOs) appeared, which are collections of providers (physicians, hospitals) who have opted to become ACO Participants and take on the Triple Aim philosophy of improving quality, reducing costs, and improving communications between providers and their patients. The Triple Aim has been replaced by the Quadruple Aim, which adds Provider Satisfaction as an element. As mentioned, the Hospital Readmissions Reduction Program (HRRP) and the Skilled Nursing Facility Value-

Based Purchasing (SNF VBP) Program are also under the Affordable Care Act. The urgency to increase quality or improve patient outcomes in the healthcare system for Medicare beneficiaries is evident. While much of what drives quality today was introduced in 2012, the impact of the Nursing Home Compare website continues to play a significant role.

The current study's model found no statistical significance between lower and higher SNF overall star ratings and the probability of 30-day readmissions. Medicare beneficiaries needing short-term rehabilitation services may be just as likely to be readmitted to a hospital within 30 days, no matter the star rating of the SNF to which they transfer. However, several factors go into the overall star rating of the SNF, and all things are equal in terms of readmission probabilities. Therefore, the expectation that the care that the Medicare beneficiary receives in a 5-star SNF compared to a 1-star SNF is a valid expectation. Suppose NHC aims to provide SNF quality scores to encourage the selection of better-performing facilities. In that case, the researcher suggests that there may be a pattern that illustrates the effectiveness of NHC.

As a longitudinal retrospective, this study's strength is that it considers data for all-cause readmissions for a 6-year study period and includes data from every US-certified SNF operating in the US during the study period 2017 - 2022. As Medicare beneficiaries identify SNFs for short-term rehabilitation, the higher performing facilities may become targeted, which may lead to higher readmission rates than lower performing SNFs. The following observations can be found when reviewing a sample created from the dataset. The red numbers show how common it was for SNFs that at one point were considered high performing that also spent time as a lower performing SNF during the study period.

Figure 24: SNF Year over Year Star Fluctuation Comparison 1 – 57

	2017 star rating	2018 star rating	2019 star rating	2020 star rating	2021 star rating	2022 star rating	2017 readmission rate	2018 readmission rate	2019 readmission rate	2020 readmission rate	2021 readmission rate	2022 readmission rate
1	4	5	3	5	1	5	23.090926	25.980392	23.786947	20.328888	21.991045	24.098052
2	4	5	2	3	3	4	19.938974	23.773585	20.536226	25.616152	19.046206	23.241161
3	3	5	2	1	3	1	26.849088	21.052632	19.592055	6.165374	16.09437	21.821438
4	3	1	4	5	3	5	11.316729	17.948718	18.941243	26.298453		14.214864
5	5	1	3	5	3	5	19.896382	13.432836	16.97492	16.44785		23.479378
6	5	4	2	3	5	5	15.624353	11.111111	25.922108	20.284739	13.330852	19.09188
7	3	2	3	5	1	4	21.613292	19.512195	14.403341	17.283691	21.317282	23.673189
8	3	2	2	2	4	2	17.111306	19.230769				
9	4	1	4	4	4	3	16.885912	12.962963	18.677521	19.53121	23.30429	18.296567
10	2	5	2	5	1	3	23.743205	20.577617	25.265273	20.232567	26.299519	22.065872
11	5	5	5	5	3	2	34.852636	15.068493	23.781161	21.966911	30.718445	24.674245
12	2	1	3	2	3	4	27.832049	30	24.058111	19.829609	31.840625	23.948648
13	3	5	1	2	3	5	27.595705	27.329193	34.35758	27.409634	33.18109	22.971671
14	3	2	4	5	3	5	10.4165	28.571429	18.481571	28.034959	20.641736	15.484076
15	2	2	4	3	3	5	31.124407	43.661972	26.01425	25.625108	18.84382	25.816858
16	3	1	2	3	5	4	28.762987	24.253731	26.836004	27.553484	26.647738	32.112067
17	5	4	3	5	3	3	25.189272	25.490196	24.523326	23.853106	20.934168	21.759357
18	4	5	5	4	5	3	23.620605	22.222222	26.511746	27.909563	30.730389	15.884591
19	2	5					14.42069					
20	3	4	1	2	1	5	19.538493	18.248175	23.871742	24.325876	22.608487	19.32174
21	1	5	4	5	3	2	30.461293	19.2	26.665347	21.976208	13.230618	17.927279
22	4	4	5	5	5	5	12.757041	23.557692	23.120851	20.450666	27.120629	23.459824
23	3	2	5	5	5	5	21.842507	23.809524	14.112303	18.449241	20.490822	17.20356
24	1	3	3	5	1	3	21.106194	28.658537	24.348942	20.479683	25.40642	18.539374
25	2	5	2	1	5	1	19.273309	12.953368	18.169835	20.785673	28.921593	17.42636
26	2	4	2	5	1	3	20.308746	28.691983	25.040729	24.733201	29.631991	26.591781
27	1	3	1	2	4	5	22.424555	22.164948	22.045732	23.740908	25.652151	25.253383
28	1	2	3	1	2		21.805097	25.352113	22.135534	20.882066	15.729295	
29	3	3	2	5	3	5	19.712342	26.903553	18.030119	20.071912	28.225538	18.853343
30	4	1	4	5	4	4	18.581083	23.863636	29.34961	19.940278	32.070919	21.114069
31	5	3	5	1	4	5	16.961692	18.209877	18.932205	15.407813	22.823648	18.825441
32	3	5	3	2	3		25.731695	28.030303	33.736552	27.396336	21.661333	26.868022
33	5	5	4	5			14.308859	4.878049	10.542276	14.823553		
34	2	2	5	1	5	1	14.233257	13.071895	11.211619	12.488532	14.322114	15.073738
35	5	3	3	3	2	5	24.074841		22.544932	18.026245	31.398208	27.893257
36	5	5	4	5	5	5	16.725837	20.10582	23.898452	20.11816	15.272983	21.130441
37	3	3	5	4	4	4	11.151174	16.923077	10.888149	10.665516	23.535843	33.275448
38	3	1		4	4	5	20.336355	19.711538	27.125015	20.003245	18.946372	29.685616
39	4	4	4	2	5	2	28.14095	24.242424	16.15579	15.972969	20.914794	17.998315
40	5	4	2	5	5	3	30.640948	19.366197	21.673753	22.564923	26.398445	30.380516
41	4	3	4	4	3	4	17.630506	17.941176	24.265737	19.562478	31.482711	26.469775
42	5	4	5	3	5	3	22.26781	23.417722	20.751937	20.014387	31.142062	20.704865
43	5	5	3	3	5	2	22.110946	20.308483	25.719214	23.193296	26.637341	18.227649
44	5	4	2	5	4	2	34.795865	17.142857	20.388824	24.531069	22.958877	19.703381
45	4	1	1	4	5	3	28.947031	24.358974	26.522124	21.564121	30.443208	21.455929
56	2	3	3	2	4	4	22.61975	27.542373	20.635255	23.950743	26.057796	23.654283
47	2	2	3	2	5	4	32.26535	36.842105	16.460518	14.069965	24.110699	24.875755
48	2		4	4	5	1	15.372355	25.757576	15.343547	18.409643	22.143246	13.445954
49	3	4	1	5	1	3	24.757782	29.62963	28.705296	29.980644	35.486379	29.989528
50	2	1	5		2	5	23.713718	15.846995	17.904224	15.508393	17.858515	22.76184
51	2	1	5	5	4	2	22.758159	22.196796	23.531955	19.336862	27.910006	21.768096
51	5	4	3	4	4	2	24.644361	20.5	23.485507	22.251029	26.65787	23.358674
53	5	2	4	5	5	5	21.548642	23.012552	23.817287	22.157806	25.923226	22.51371
54	3	2	5	5	2	3	18.728028	19.844358	19.344365	24.372953	25.789759	23.959637
55	5	4	4	5	2	3	27.255216	32.394366	25.319406	24.545887	23.985689	27.290312
56	5	4	5	4			17.658944	16.82243	23.070412	22.447123	24.4062	
57	3	1	5	4	4	4	18.583319	24.731183	30.881396	25.407726	19.160607	14.006326

Figure 25: SNF Year over Year Star Fluctuation Comparison 58 – 114

	2017 star rating	2018 star rating	2019 star rating	2020 star rating	2021 star rating	2022 star rating	2017 readmission rate	2018 readmission rate	2019 readmission rate	2020 readmission rate	2021 readmission rate	2022 readmission rate
58	2	5	5	4	2	3	28.690466	27.729258	27.351424	30.353598	31.768407	34.949929
59	5	5	2	5	2	4	26.026803	31.666667	33.281015	25.731042	30.525879	28.598782
60	5	3	1	2	4	4	22.27385	22.324159	21.750501	18.254966	22.157266	19.277747
61	1	4	4	5		5	26.479572	35.92233	23.120006	23.202677	37.83306	22.549995
62	3	4	2	3	4	2	21.594979	30.700637	25.680226	22.632018	26.55809	30.034376
63	2	2	2	4	3	5	24.962117	14.565826	19.648254	21.088111	28.134733	19.089243
64	2	5	2	2	2	2	29.223394	33.670034	28.425851	24.256404	31.689513	31.261229
65	2	2	2	4	1	1	22.901776	22.021661	28.425851	22.608902	25.083098	23.302091
66	1	5	5	4	4	3	20.819572	21.019108	21.529133	16.913071	18.537693	24.506322
67	4	3	4	4	2	5	24.762824	25.984252	23.090724	15.929387	24.61063	31.086634
68	3	2	3	5	4	3	23.170608	18.895349	24.649453	28.125341	26.568365	28.344306
69	4	5	4	2	3	5	25.677896	15.670436	22.548804	23.940205	27.230977	28.733173
70	5	5	4	4	5	2	13.037385		13.142789	3.217291	12.388736	18.826028
71	5	5	1	4	5	1	18.073811	18.666667	19.427567	21.253259	19.297829	26.581809
72	1	3	3	1	3	2	26.436388	27.350427	14.883195	18.058807	15.346285	15.552757
73	4	4	4	3	5	1	19.553174	22.368421	18.088487	15.946835	20.027564	27.965319
74	1	4	4	4	5	5	29.353493	23.239437	29.231099	22.198089	29.360695	27.415652
75	5	3	5	2	5	5	27.51376	17.142857	19.583118	15.355337	19.926567	
76	5	2	1	5	1	5	14.282295	9.183673	15.522957	16.410662	15.085553	12.510999
77	5	5	4	4	4		19.851692	16.037736	18.04277	12.856961	14.096418	29.760868
78	4	2	1	5	5		26.060164	32.53012	31.29095	26.077545	22.582381	31.78268
79	4	4	1	3	5	3	20.828125	22.018349	12.63897	18.602605	19.533918	20.283613
80	4	2	5	2	2	5	14.107879	16.666667	6.431351	13.554989	29.096893	
81	5	3	4	5	5	1	24.450839	21.276596	12.441587	15.412476		
82	5	4					18.393134	19.10828				
83	1	5	1	5	3	5	28.643274	27.272727	22.311154	24.922292	19.575368	22.787983
84	3	5	1	1	2	2	33.783972	27.768313	31.476342	25.224772	24.755161	24.858022
85	2	3	5	2	4	5	28.27726	17.58794	26.743008	24.972214	28.329722	29.371798
86	4	4	3	5	5	4	30.362755				16.856429	28.422499
87	2	4	5	2	3	5	22.685255	28.571429	27.037069	29.219265	29.19556	24.033953
88	5	4	4	5	5	3	23.028202	24.371859	24.696338	20.239069	21.431637	17.496907
89	5	5	2	5	4	5	18.294159	20.164609	21.714909	20.79075	23.572705	18.103942
90	1	4	1	2	4	1	17.908685	15.625	12.34462	17.412285	13.46574	14.91469
91		5	4	2	4	5	28.241014	29.565217	20.874401	21.226734	23.435754	28.382435
92	1	3	4	3	4	4	17.457998	10.909091	24.192357	22.450102	23.300172	22.443285
93	5	5	3	4	4	5	21.991332	28.518519	24.992189	21.578655	22.457847	30.827924
94	5	1	5	2	2	2	24.118069	27.848101	27.027832	25.30798	23.060882	28.673268
95	5	4	1	1	5	4	23.601888	36.363636	12.140082	18.940761	28.423301	15.300303
96	5	4	2	5	4	1	22.306655	17.021277	14.340011	27.674713	27.762965	25.393255
97	4	1	5	5	2	5	18.07752	27.710843	15.933101	16.086369	14.297068	23.977829
98	2	5	2	1	4	5	19.212483	21.666667	15.329946	30.548022	17.895759	37.976942
99	4	2	5	5	4	2	22.341737	26.845638	20.998631	20.304941	24.398291	39.485766
100	4	1	4	5	5	2	13.440363	13.461538	12.446408	15.088438	16.702412	29.455087
101	3	3	4	5	3	2	14.873415	18.518519	19.491584	20.69514	17.901959	31.600794
102	3	4					23.79688	28.421053				
103	5	5	5	3	5	3	17.783399	13.157895	15.608616	8.083028		
104	3	4	2	5	2	2	26.582792	20.779221	23.060795	18.209358	22.778545	16.008292
105	4	1	3		1	5	17.291848	22.222222	29.553144	21.029336	22.18001	11.260786
106	4	5	5	5	5	2	12.707779	17.777778	10.236624	17.220469	13.679573	16.391544
107	2	1	2	2	5	5	17.965512	16.504854	21.202928	18.129108	21.313638	24.550409
108	4	4	5	3	3	5	18.936995	24.390244	20.138276	26.882476	20.701175	16.264856
109	3	1	5	2	2	5	16.385563	21.73913	33.620681	24.485052	36.283003	14.285406
110	4	3	3	2	5	4	10.859232	14.102564	12.270258	15.115033	21.265963	20.848868
111	5	2	2	5	5	5	20.734036	20	24.286063	22.094723	32.814137	24.108078
112	5	5	4	3	2	3	21.142249	21.296296	15.842054	23.219434	24.456671	21.597417
113	4	2	2	4	5	5	36.146942	8.108108	38.210966	20.15389		16.903161
114	3	2	2	4	2	2	19.467191	9.090909	17.142748	22.249176	22.303899	25.83274

Figure 26: Study Sample SNF Star/Adj Readmission Fluctuation

SNF

4	3	1	4	5	3	5	11.316729	17.948718	18.941243	26.298453		14.214864
5	5	1	3	5	3	5	19.896382	13.432836	16.97492	16.44785		23.479378

In 2018, SNF 4, as a low-performing 1-star SNF, had a readmission rate of 17.948, and as a high-performing 5-star SNF, had a readmission rate of 26.29. Similarly, SNF 5 2017, as a high-performing 5-star SNF, had a readmission rate of 19.89, and as a low-performing 1-star SNF, the following year had a readmission rate 13.43. This pattern can be found throughout the sample data. Star ratings are fluid, and, as illustrated by SNF 4, stars can move from 1 star in one year to 4 stars in the next. As illustrated by SNF 5, overall star ratings can increase or decrease by two or more stars every year. Also illustrated by SNF 5, readmissions for the facility were highest when the facility had a 5-star overall rating. Suppose NHC has the desired impact, and patients actively seek rehabilitation beds in higher-performing facilities. In that case, the website that encourages using high-performing SNFs also creates low-performing SNFs.

As Medicare patients needing inpatient skilled nursing search for high-quality SNFs, if NHC is utilized and the 5-star quality system factors into the decision, the higher-performing SNFs may be preferred over the lower-performing SNFs. For hospitals seeking to avoid 30-day readmission penalties, in the same manner as the Medicare beneficiaries, hospital discharge planners may include star rating information for the patient to consider, even while offering the choice. As this process is repeated, higher-performing SNFs get more and more short-term rehabilitation patients, while lower-performing SNFs get fewer short-term rehabilitation patients. The lower performing SNFs may get patients based on geographic location over star rating, for example. The result is that higher-performing SNFs receive more patients than lower-performing SNFs for short-term rehab, and the number of Medicare beneficiaries under

consideration for 30-day readmission is higher for better-performing SNFs. In addition, the high census numbers that the higher performing SNF may enjoy because of their preferred selection status may also cause challenges for the staff, resulting in Medicare beneficiaries returning to inpatient hospital stays within 30 days. Lower-performing SNFs, as a result of not receiving as many short-term rehabilitation Medicare beneficiaries as the higher-performing facilities, may enjoy lower 30-day readmission rates due to fewer admissions. While the influence of star rating and SNF selection was not included in this study, the examination of whether star rating influences SNF selection and whether an increased census increases the probability of a Medicare beneficiary returning to a hospital within 30 days may be the next step in research to understand 30-day readmissions.

As illustrated, it is more common for SNF star ratings to fluctuate year by year, and simultaneously, they may have their highest readmission rates when they have a 5-star rating. Because higher performing SNFs may be selected by patients/facilities using the NHC website, facilities may show lower 30-day readmission rates when their star rating is low. If the NHC website is used and, as a result, higher performing SNFs are selected and potentially increase readmission rates, the reduction of skilled nursing facilities and short-term rehabilitation beds will only worsen the problem. As seen in Figure 23, there were 507 fewer CMS certified SNFs at the end of the study period.

Figure 27: SNF Overall Star Ratings During Period SNF Year by Year

Year/Star	1	2	3	4	5	0	Total	Change
2017	2459	3086	2789	3366	3713	241	15654	
2018	2530	2997	2756	3269	3783	265	15600	-54
2019	2378	3093	2769	3215	3783	233	15471	-129
2020	2427	2871	2682	3262	3841	265	15348	-123
2021	2431	2988	2680	3190	3712	269	15270	-78
2022	2410	2875	2672	3206	3757	227	15147	-123

Compared to the number of CMS certified SNFs at the time of this study, that number has increased to over 700 fewer SNFs in 2025 than in 2017. An increasing Medicare population with a decreasing SNF bed availability indicates that the US is not prepared to address the needs of an aging population. As this study and others have shown, Medicare beneficiaries discharged from hospitals to home health care have higher readmission rates than those readmitted from SNFs. In the same manner that some Medicare beneficiaries successfully transfer to home settings without being readmitted to a hospital, the same can be said for Medicare beneficiaries under home health care. However, as a matter of reducing readmission rates, causality remains the most difficult variable to capture.

Implications

In the case of Nursing Home Compare, two things can be accurate simultaneously. NHC provides information intended to inform consumers about the quality of certified US SNFs, but the availability of SNFs to choose from has been declining for decades. Failure to grasp the changing demographics of the US population may delay discharge if there is no available bed at

an SNF, and 30-day readmission probabilities will increase regardless of the star rating. Another point for consideration may be whether or not information other than the information used to create the star rating is needed. According to the literature, the lack of patient satisfaction is cited as a missing data element from the NHC website. While true and considering that US citizens are living longer with various conditions or illnesses, other than the quality star rating, SNFs have been referred to in a manner that suggests that an SNF is an SNF. In an effort to meet the needs of the US population, it may be beneficial to grade skilled nursing facilities based on the acuity of patients that they can accommodate, as well as to evaluate which specific conditions the SNF has demonstrated proficiency in. Using the mindset that all SNFs are created equal may also lead to patients with certain illnesses and/or comorbidities being negatively impacted by the lack of a facility that can adequately treat their problem, which may become more and more common.

Limitations

As is usually the case, the researcher acknowledges that the findings of the current study are limited. The CMS data that is available to conduct this study does not include information such as race, gender, age, or elements that may be related to social determinants of health. As a result, any disparities or nuances that patient demographics may exacerbate are not included in the resulting study. The researcher also acknowledges a limitation of the current study in that it does not include hospital 30-day readmission data for all discharged patients. Therefore, it cannot be determined if hospital readmission rates for all patients influences the probability of Medicare beneficiaries transferred from poor-performing hospitals, influences 30-day readmission probabilities. Whether considered low performing or high performing, SNF star ratings are in reality a snapshot from past performance that patients/facilities are attempting to

use to make present-day decisions. Unfortunately, Medicare beneficiaries cannot use past performance to predict present or future outcomes. The researcher also recognizes that selection bias may be prevalent, causing patients with more complications opting to transfer to SNFs with the highest quality available bed. As a national study, the methodology of this study does not include detailed SNF information that may offer insight to other aspects of care that may positively or negatively impact the facility's overall star rating or readmission rates.

The Path Forward

If the US could hold readmission rates steady, the cost of 30-day readmissions would still increase by billions of dollars for decades. For the remainder of the current decade, it is estimated that 10,000 US citizens per day will reach the age of 65 and become eligible for Medicare coverage. While the expectation is that some will enroll in a Medicare Advantage program, at the current rate, by 2030, over 18 million US citizens will be eligible for coverage under Medicare. Whether Medicare beneficiaries are discharged with home health care or transferred to a SNF following an inpatient hospitalization, the challenge for the US healthcare delivery model will be determining how to reduce the number of 30-day readmissions.
Facing penalties from CMS, it is a reasonable assumption that if hospitals and skilled nursing facilities could reduce 30-day readmission rates, in most cases, they would. The failure to see significant change suggests that the threat of CMS penalties due to excessive 30-day readmissions do not appear to effectively address the issue for SNFs or hospitals. If CMS penalties for excessive 30-day readmissions become a line item in SNF budgets, 30-day readmission rates would cease to be important and accepted as a cost for doing business. For SNFs in fragile financial conditions, CMS penalties may have had the unintended consequences of exacerbating the closure of over 700 facilities since 2017. Consideration should be given to

examining current SNFs in fragile financial conditions to determine how to ensure those facilities remain viable. As the 65+ roster of US citizens continues to increase, the need is for more, not less, high-quality rehabilitation beds, if the US is to meet the needs of its aging population. The financial stability of the SNF industry must be a priority if the US is going to be able to meet the needs of its aging population. While much has been made about the quality star rating in the SNF selection process, there are a few harsh realities to contend with from the industry perspective.

SNF reimbursement is determined by geographic location, and SNFs with low readmission rates may be eligible for a bonus payment from CMS. While SNF star ratings are not significant as they relate to 30-day readmissions, they may be important when examining the success rate of Medicare beneficiaries who can transfer to a home setting, absent a 30-day readmission. Under the current reimbursement model, SNFs located in the same geographic area are reimbursed the same, regardless of star rating. Now may be the time to consider financial incentives for the SNF reimbursement model.

A 1-star SNF and a 5-star SNF located in the same geographical area are reimbursed at the same rate by CMS. CMS may fine or reward SNFs based on 30-day readmission rates, but this subsequently does not incentivize SNFs financially for improved star quality ratings. In rural counties, there may be a single SNF to serve the needs of the area. From a financial perspective, the quality star rating of the facility is nearly irrelevant, as Medicare beneficiaries in need of inpatient short-term rehab will have to use the SNF if they wish to remain in the area or select an SNF that may negatively impact the ability of their family to visit. This situation is not unique to rural areas. In urban areas, where a 5-star and a 1-star SNF are relatively close to one another, if NHC successfully encourages Medicare beneficiaries needing short-term

rehabilitation to select the 5-star SNF, there is a finite number of beds available. Similar to the SNF in the rural area, if the Medicare beneficiary selects a SNF based on star rating and geographical concerns, the 1-star facility may be the best second option if they wish to remain in the area. This phenomenon addresses the uniqueness of the short-term rehabilitation services offered by SNFs. When short-term inpatient rehabilitation services are needed, discharge is made to the available SNF bed.

In theory, whether a 1-star SNF is located in a rural county or a 1-star SNF in a highly desired area, there is no incentive to improve the star rating because CMS payment is based on geographic location and not star rating. Using the current CMS reimbursement model, where SNFs are not reimbursed less than they are now, SNFs having the ability to earn half of a percent more based on star rating creates a system where a 5-star facility will earn 2% more than it would have earned as a 1-star facility. Even with the increased SNF payments based on star rating, daily SNF bed costs would be lower than the daily cost of a Medicare beneficiary who has been readmitted to a hospital. While this may present an administrative and financial challenge for CMS, the benefits outweigh the challenges if it slows the closure of SNFs.

Rising from the soil as almshouses, the reputation of the nursing homes, as they are often referred to, as an industry, has not been without its challenges. Even with the availability of the NHC star quality scores, some of the issues may be that nursing homes are used to suggest that they are all the same. Almshouse residents were routinely denied sufficient care and access to medication. As almshouses transitioned into the SNF industry, state and federal regulations brought standardization. However, whether the smell, negative news stories, or personal experience, avoiding placement into an SNF, even for short-term rehabilitation, may be met with resistance from the Medicare beneficiary.

Without question, the makeup and the needs of the US population in 1965, when the Medicare/Medicaid Acts were passed, were different than the needs of the US population today. In 1965, perhaps the former almshouses were the best facilities available for Medicare beneficiaries needing short-term rehabilitation services, but the needs of today's population may call for an alternative. Rather than combining Medicare beneficiaries needing short-term rehabilitation facilities with long-term SNF residents, creating facilities dedicated to short-term rehabilitation may be a viable alternative.

Free-standing facilities dedicated to short-term rehabilitation patients may be a step in the right direction to begin to solve the 30-day readmission crisis. These facilities may also be hospital-affiliated, allowing Medicare beneficiaries needing inpatient short-term rehabilitation services to benefit from the dedicated short-term rehabilitation facilities and avoid the potential stigma of transferring to a traditional SNF. Whether patient care is the responsibility of the facility staff or the facility staff taking the lead with assistance from staff from the admitting hospital, the goal is to provide the services needed to allow the patient to return home successfully.

The inevitable conclusion is that the key to reducing 30-day readmission rates will not be found by focusing on star ratings alone. As found in the literature, it is often suggested that 66% of readmissions are avoidable. If true, it's not found in the literature, the entity that made the determination, and who the entities are that had the responsibility of maintaining the patient's care. Resolving the 30-day readmission crisis will require a concerted national effort, should the country develop the will to explore the needs of its aging population and how best to reduce the cost of caring for this portion of the population while improving access to programs designed to maintain patients at home. There needs to be a national effort that will capture 30-day

readmission data for every FFS Medicare beneficiary that categorizes age, condition, comorbidities, social determinants of health issues, living arrangements, primary cause of the readmission, etc. The goal is to create a repository of data from which patterns may emerge, suggesting which patients, which conditions, under what living arrangements, and following which discharges were most likely to be readmitted to a hospital. The next step would be creating telephonic, remote, or in-person teams to follow those patients for the first 30 days upon discharge. Teams complete with physicians, nurses, CNAs, pharmacists, etc., who will monitor high-risk patients by ensuring they have what they need to remain out of the hospital successfully. The creation and development of these teams addresses who will be accountable for avoidable readmissions, as these teams will lead the effort. CMS addresses the question of who and how the teams will be funded. CMS, working with ACOs and health plans, offers programs funding for this national initiative that, if successful, will cost far less than the billions of dollars that will be spent on 30-day readmissions.

Public Health Implications

Improving the care of the aged population by reducing 30-day readmissions is a recognizable and important goal in public health. Reducing readmissions does not mean denying care or attempting to prevent Medicare beneficiaries from accessing inpatient hospitalization services. Preventing 30-day readmissions in this context means establishing services and conditions that reduce the need for Medicare beneficiaries to return to an inpatient hospital status within 30 days of discharge from a hospital. Reducing cost and improving quality can coexist to address and satisfy the population's needs without the fear of rationalizing or denying access to care. Innovation is needed if the US is to meet its aging population's current and future demands. If building facilities for short-term rehabilitation is not the solution, discovering ways

to improve how the current SNFs operate is therefore even more essential. If reimbursement based on star rating is not financially feasible, an increase in SNF payments at the base level may be needed to reduce the SNF closure rate.

Some studies have questioned using 30-day readmission information as a quality measure. While not addressed in the current study, there may be an unfortunate and essentially inaccurate tendency to see Medicare beneficiaries as a monolithic population. A 91-year-old Medicare beneficiary in poor condition with several comorbidities may have more challenges than a healthier 68-year-old Medicare beneficiary undergoing the same procedure. In human development, stages have been identified based on age. Infancy 0 -1, toddler 1-3, early childhood 3-6, middle childhood 6-12, adolescence 12-18, early adulthood 18-40, and middle adulthood 40-65. However, regarding the final category of late adulthood, the age description is 65+. If efforts are made to understand the needs of an aging population, more brackets are needed at the upper end of the age model. In a similar manner, skilled nursing facilities suffer from the same monolithic categorization. Rather than star ratings being the driving force, perhaps SNFs should earn certifications that alert the public to which facilities are certified in wound care, hip surgery recovery, etc. In addition to being selected because of star rating, facilities are chosen because the facility is certified in the primary condition that the patient has. While this system would not prevent any CMS-certified SNF from making a bed offer and accepting a Medicare beneficiary for short-term rehabilitation, the goal is to inform the public as much as possible about the services in which an SNF has demonstrated above-average proficiency.

It is undeniable that 30-day readmissions are costly; therefore, a path forward represents one of the most significant challenges in the ever-evolving US healthcare delivery system. As a

quality measure, the researcher finds that 30-day readmission rates are appropriate from a quality-of-care perspective. Although this study focused primarily on SNF-generated readmissions, since Medicare beneficiaries must first have an inpatient hospitalization that makes them eligible for inpatient rehabilitation services, a prequel to examining SNF readmissions would be to examine hospital readmission data. While the current study does not consider hospital readmission data, it does acknowledge that hospital discharge methods may play a role in SNF readmission rates.

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