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# The Relationship Between Certified Nurse Aides' Staffing Hours and Resident Medicare Quality Measure Outcomes in Missouri Long-Term Care Facilities

Sharletta Idella Jackson  
*Walden University*

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# Walden University

College of Management and Human Potential

This is to certify that the doctoral study by

Sharletta Jackson

has been found to be complete and satisfactory in all respects,  
and that any and all revisions required by  
the review committee have been made.

Review Committee

Dr. Cheryl Cullen, Committee Chairperson, Health Sciences Faculty

Dr. Kourtney Nieves, Committee Member, Health Sciences Faculty

Chief Academic Officer and Provost

Sue Subocz, Ph.D.

Walden University  
2024

**Abstract**

**The Relationship Between Certified Nurse Aides' Staffing Hours and Resident  
Medicare Quality Measure Outcomes in Missouri Long-Term Care Facilities**

by

Sharletta Jackson

MHA, Walden University, 2020

BS, Southeast Missouri State University, 2016

AA, Three Rivers Community College, 2011

AGS, Colorado Technical University, 2010

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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## Abstract

Poor resident quality measure (QM) outcomes are a severe concern for patients and long-term care facilities (LTCFs). Certified nurse aides (CNAs) are tasked with most patient care hours at LTCFs. Understanding how CNA hours per resident day (HPRD) influence QM outcomes will help fill an existing research gap. Certified nursing home administrators (CNHAs), directors of nursing (DONs), and owners of LTCFs may also play a role in poor QM outcomes. The Donabedian model, specifically the structure, process, and outcome components, was the theoretical framework guiding this study. This quantitative study examined the relationships between CNA HPRD and resident QM outcomes for urinary tract (UTIs), pressure ulcers, and major falls in Missouri LTCFs. Publicly reported secondary data from the Centers for Medicare and Medicaid Services Provider Information dataset and Minimum Dataset QM dataset from January 1 to December 31, 2022, were analyzed using Spearman correlations and multiple regression. A total of 456 Missouri LTCFs were evaluated. An inverse relationship was observed between UTI and pressure ulcers  $\rho = -.161, p < .001$ , and a positive relationship was observed between UTIs and falls  $\rho = .330, p < .001$ . There was no correlation between CNAs' HPRD and resident QM outcomes (all  $p > .05$ ). Further research is needed to understand the factors responsible for poor resident QM outcomes. Interventions can create positive social change by informing CNHAs, DONs, owners, and healthcare policymakers about the relationship between CNA HPRD and the possibility of optimal resident QM outcomes.

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## Dedication

I dedicate my capstone study to God, Jesus Christ, and the Holy Spirit for their unwavering guidance, grace, mercy, and love throughout this process. This accomplishment would not have been possible without my spiritual relationship with them. I am blessed to have a strong support team that includes my son Temis; my daughters Temisha, Telisha, and Deondrea Watson; my granddaughter, Maliah Chalmers; my mom, Marilyn Jackson; my dad, Charles Jackson; my aunt, Louise Robinson; my son-in-law Meliek Chalmers; my sister Earlene McClorn; and my brother Charles Jackson III for their uplifting words and always having my back; on this journey. To all my friends for their support, especially Florene Jennings, who encouraged me to continue my education, and Chyneva Moore, who said, "A prayer delay is not a prayer denied." To my Pastor Greg Chauncey and the entire church family at Pavilion of Hope Ministry, who have prayed for me during this journey. Special thanks to Dr. MJ for her constant encouragement that motivated me to strive for success. I want to thank Christal Turner and Mrs. Sharon Thompson for guiding me through this process; you both are amazing, and I would not have made it without both of you. I sincerely thank the entire Walden faculty, mainly my advisor, Misty Luther, thanks for being patient with me. You were my guiding light throughout this journey; you always had a listening ear when I needed you; you are an amazing advisor. I want to thank Dr. Kristin Wiginton; you are amazing. I want to take the time to remember those I lost along the way: my grandmother, Elizar Ewing; my mother-in-law, Leora Thomas; and my stepfather, Larry Smith. I love you and miss all of you with all my heart.

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## Section 1: Foundation of the Study and Literature Review

### **Introduction**

Studies have shown that a significant percentage (approximately 70%) of elderly individuals will require extended care (Franzosa et al., 2022; Osteen, 2017). According to researchers, there will likely be a high demand for approximately 3.4 million additional long-term care workers by 2030 (U.S. Department of Health and Human Services, 2018). For the elderly population to receive proper care, other healthcare workers will be required. To ensure that residents receive the extended care they need, certified nursing home administrators (CNHAs), directors of nursing (DONs), and owners must prioritize comprehensive planning and investment by placing a greater emphasis on long-term care staffing hours to promote the overall health and well-being of the aging population in Missouri long-term care facilities (LTCFs) (Franzosa et al., 2022).

This study was needed to inform CNHAs, DONs, owners, and policymakers regarding the importance of hours per resident day (HPRD) among certified nurse aides (CNAs) and how it may be correlated to residents' quality measure (QM) outcomes. To effectively address staffing concerns and enhance residents' overall QM outcomes, CNHAs, DONs, and owners must collaborate, combining their expertise and knowledge to implement effective strategies and solutions to ensure that residents receive the highest level quality of care (QoC) possible (Franzosa et al., 2022). The results of this study may be used to inform Missouri policymakers about implementing a minimum staffing requirement for CNAs. The results of this study also have the potential to aid in developing effective policies to ensure that residents receive good QoC (The National

Consumer Voice for Quality Long-Term Care, 2021). Positive social change due to informing CNHAs and healthcare policymakers about the importance of increasing CNAs' HPRD in Missouri LTCFs to enhance residents' QoC may also be enacted because of the present study's findings.

Section 1 addresses the problem statement, purpose, research questions, hypotheses, theoretical framework, nature of the study, literature search strategy, literature review, definitions, assumptions, scope and delimitations, limitations, and significance and summary.

### **Background**

LTCFs have been facing a staff shortage since the 1980s. Despite ongoing research on reasons for a decrease in CNA workers, the CNA shortage remains a significant concern in healthcare. Previous studies by Harrington et al. (2020) and Gustafsson et al. (2019) addressed the issue of CNAs' short staffing in LTCFs, finding that inadequate staffing levels may cause what they deemed "missed care," resulting in poor resident QM outcomes. Gustafsson et al. (2019) defined *missed care* as occurring when residents' care is forgotten or prolonged. Missed care may cause adverse outcomes for residents when CNAs are short-staffed. Missouri needs to set state requirements for total staffing time for CNAs to prevent missed care from happening.

According to the Centers for Medicare and Medicaid Services (CMS, 2023), the staffing level of CNAs is measured by how many hours per day each resident is required to have according to their Minimum Dataset (MDS) 3.0 assessment. The MDS 3.0 assessment is a tool that measures residents' mental and physical health conditions

(Harrington et al., 2020). These results determine the amount of HPRD each resident is supposed to receive from registered nurses (RNs), licensed practical nurses (LPNs), and CNAs. According to the National Consumer Voice for Quality Long-Term Care (2021), a summary report showed that only the District of Columbia nursing staffing time met or exceeded the nursing staffing time of 4.16 HPRD, with 29 states requiring less than 3.5 HPRD. Of those 29 states, 15 fell below 2.5 HPRD, and 18 states, including Missouri, do not have a recommended number of CNAs' HPRD. See Table 1.

**Table 1**

*Variation in State Requirements for Total Staffing Time*

Total HPRD	Number of states	States
4.10 +	1	DC
3.50–4.09	6	CA, FL, IL, MA, NY, RI
3.00–3.49	6	AR, CT, DE, MD, VT, MD
2.50–2.99	8	ME, MS, NJ, NH, OH, OK, PA, WA
2.00–2.049	13	CO, GA, IA, ID, KS, LA, MI, MN, OR, SC, TN, WV, WY
1.50–1.99	1	MT
1.00–1.49	0	
< 1.00	1	AZ

*Note.* HPRD = hours per resident day. Adapted from *State Nursing Home Staffing*

*Standards Summary Report* by The National Consumer Voice for Quality Long-Term Care, 2021

The QoC provided by LTCFs can be adversely affected by substandard ratings (Perruchoud et al., 2022; Shin et al., 2021). The CMS 5-star quality rating system reliably measures a facility's performance. Facilities that fail to meet adequate staffing levels are typically rated below average, receiving a mere 1 or 2 stars. Facilities that prioritize

appropriate staffing levels and have fewer or reduced urinary tract infections (UTIs), pressure ulcers, and major falls are typically rated above average, receiving 4 or 5 stars (CMS, 2023; Ryskina et al., 2018). Studies conducted in LTCFs have shown that offering enough nursing HPRD has effectively reduced the probability of UTIs, pressure ulcers, and major falls (Harrington et al., 2020). According to researchers, staffing levels are substantial for the QoC that residents receive, and any facility that aims to improve its ratings must prioritize this aspect by focusing on CNAs' HPRD (CMS, 2023).

LTCFs must invest in CNAs and ensure they have enough time to provide residents with QoC, which may serve the dual purpose of improving resident QM outcomes and CMS 5-star quality ratings. There is a significant gap in knowledge regarding the potential correlation between CNAs' HPRD and the resident's QM outcomes in LTCFs (Harrington et al., 2020). Researchers have investigated this issue, but further research is needed to help close the gap concerning the relationship between CNA HPRD and resident QM outcomes in Missouri LTCFs. Little to no literature exists on the relationship between LTCFs' CNA HPRD and residents' QM outcomes (Griffiths et al., 2020; Harrington et al., 2020). Young et al. (2022) also contended that further research is needed to determine if low CNA HPRD is related to QM outcomes among LTCF residents. To fill this gap, I aimed in this study to provide a more in-depth and comprehensive analysis of the potential impact that low CNA HPRD may have on resident QM outcomes in Missouri LTCFs. By exploring this relationship, the study can inform LTCF leaders regarding the importance of CNAs' HPRD and its potential impact on the overall well-being and QoC of residents in Missouri LTCFs.



### **Problem Statement**

The research problem addressed in this study was the need to determine if a relationship exists between CNAs' HPRD and resident QM outcomes, including UTIs, pressure ulcers, and major falls among residents living in Missouri LTCFs. Low nursing HPRD may contribute to poor residents' QM outcomes, resulting in high UTIs, pressure ulcers, and major falls (Mukamel et al., 2022). LTCFs in Missouri do not have a state requirement for CNA total staffing time. LTCFs should provide minimum staffing requirements to meet resident demands (Harrington & Edelman, 2018; The National Consumer Voice for Quality Long-Term Care, 2021). This study's findings address the research gap concerning low HPRD among CNAs and its connection to poor resident QM outcomes in LTCFs (Harrington et al., 2020). The findings may also inform LTCF leaders and healthcare policymakers concerning how low CNA HPRD may affect resident QM outcomes in Missouri LTCFs and prompt policymakers to establish new standards and update policies concerning CNAs' HPRD.

### **Purpose of the Study**

In this quantitative analysis, I investigated the potential relationship between CNAs' HPRD and residents' QM outcomes in Missouri LTCFs using bivariate correlations and multiple regression analysis. The independent variable was CNA HPRD. The dependent variables were resident QM outcomes, including UTIs, pressure ulcers, and major falls. I evaluated data from 508 LTCFs in Missouri. The results of this study may inform CNHAs, DONs, owners, and policymakers about the relationship, if any,

between the independent variable, CNAs' HPRD, and the dependent variables, resident QM outcomes for the occurrence of UTIs, pressure ulcers, and major falls.

### **Research Questions and Hypotheses**

The three research questions that guided this study were as follows:

RQ1: What is the correlation between the occurrence of UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities?

*H<sub>0</sub>1*: There is no statistically significant correlation between the occurrence of UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities.

*H<sub>a</sub>1*: There is a statistically significant correlation between the occurrence of UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities.

RQ2: What is the correlation, if any, between the occurrence of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities?

*H<sub>0</sub>2*: There is no statistically significant correlation between occurrences of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities.

*H<sub>a</sub>2*: There is a statistically significant correlation between occurrences of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities.

RQ3: What is the correlation, if any, between the occurrence of major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities?

$H_03$ : There is no statistically significant correlation between the occurrence of major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities.

$H_a3$ : There is a statistically significant correlation between the occurrence of major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities.

### **Theoretical Framework**

The Donabedian model guided this study as the theoretical framework. The Donabedian model was used to evaluate QoC for Missouri LTCF residents. The secondary database gathered from the CMS website from the Provider Information dataset and Minimum Dataset (MDS) Quality Measure dataset was an appropriate resource for this study. In 1966, Avedis Donabedian introduced the structure/process/outcome (SPO) model to healthcare services. The Donabedian model is a highly effective tool for evaluating residents' overall healthcare outcomes in LTCFs. The model has been implemented in healthcare for over 50 years to ensure that residents receive good QoC (Berwick & Fox, 2016). The SPO model can be used to identify existing problems and improve the quality of healthcare services, ultimately leading to positive health outcomes for LTCF residents (Binder et al., 2021; Weech-Maldonado et al., 2019). LTCF leaders and managers utilize the SPO model in the following way:

**Structure Measure**

The structure measures focus on the facility's external (physical plant) and internal (staffing level) environmental characteristics that are essential to the performance of a facility (Stephens, 2018; Weech-Maldonado et al., 2019). The physical components include the building's layout, design, and infrastructure. The internal organizational environment consists of the number of staff members, the residents, the operating hours of the facility, and other facility traits such as ownership, size, and accreditation. All of these elements work together to create a cohesive and functional environment that supports the needs of the residents.

**Process**

The process measure is an essential aspect of providing high-quality care to residents. It involves utilizing various methods and routines to ensure residents receive the necessary care promptly by carefully documenting and addressing incidents, administering medication, and developing and executing treatment plans to meet each resident's needs. The duration of residents' waiting time for assistance is also a crucial aspect of the process components. By adhering to these procedures, healthcare providers can guarantee that residents receive optimal care (Berwick & Fox, 2016). The process focuses on delivering care each resident receives from LTCF staff (Stephens, 2018; Weech-Maldonado et al., 2019). The use of urinary catheters, prevention of pressure ulcers, and prevention of major falls with injuries are all part of the process. LTCF leaders must implement prevention plans for UTIs, pressure ulcers, and major falls to

improve resident QM outcomes in LTCFs (Boyle et al., 2016; Weech-Maldonado et al., 2019).

### **Outcome**

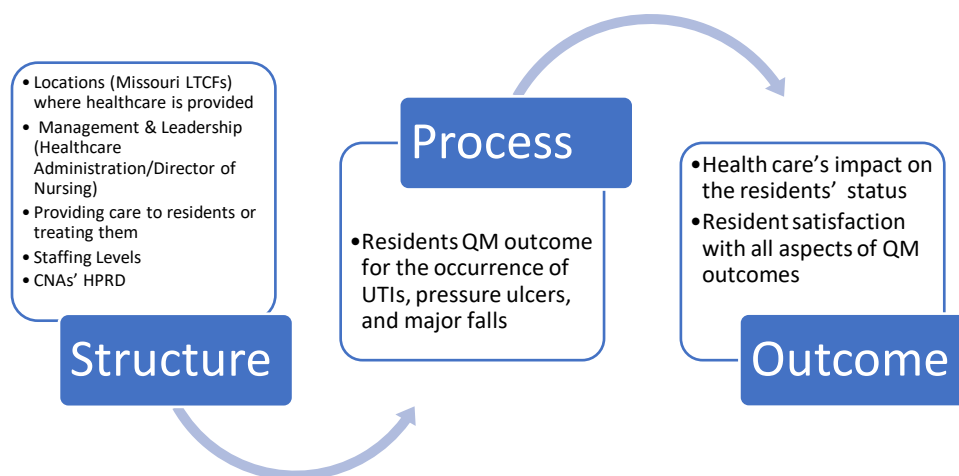
Outcomes in LTCFs are the percentage of residents with UTIs, pressure ulcers, and major falls (Stephens, 2018; Weech-Maldonado et al., 2019). The CNHAs and DONs must focus on the residents' well-being and satisfaction. To ensure that residents receive the best-expected outcome and highest QoC possible, LTCF leaders need to consider providing CNAs with the appropriate HPRD to care for each resident to prevent residents' missed care (Berwick & Fox, 2016; Gustafsson et al., 2019; The National Academies Press, 1996). The SPO approach may inform CNHAs and policymakers to implement policy changes in Missouri LTCFs to set recommendations to meet minimum requirements for total staffing time for CNAs' HPRD.

The SPO model was especially relevant to the study. The structure emphasizes the facility staffing level (i.e., CNA HPRD). The process focuses on the prevention measures taken to prevent residents from developing UTIs, pressure ulcers, and experiencing major falls. The outcome measure is the residents' UTIs, pressure ulcers, and major falls. The process and outcomes measures are based on how healthy or poorly residents' QM outcomes are. The SPO model can be used to evaluate residents' QoC and make improvements so that they receive the best possible QM outcomes. The SPO model was also directly related to this study's three research questions, which tested the relationship between CNAs' HPRD and residents' QM outcomes for UTIs, pressure ulcers, and major falls.

By implementing the SPO model, CNHAs and owners can ensure that residents living in LTCFs receive optimal care that may improve resident QM outcomes if CNAs' HPRD is increased. Ultimately, this could also lead to higher scores on the CMS 5-star quality rating system if the staffing level is increased, if staffing turnover is reduced, and if the number of UTIs, pressure ulcers, and major falls are reduced (Weech-Maldonado et al., 2019). To provide further clarity on the Donabedian model and its relevance to this study, please refer to Figure 1. This visual representation of the model will explain the three SPO components and how they correlate to resident QoC.

**Figure 1**

*The Donabedian Model for Quality Care*



**Nature of the Study**

I used a quantitative correlation design involving bivariate correlations and multiple regression to explore the potential relationship, if any, between CNAs' HPRD and residents' QM outcomes in Missouri LTCFs. This design is a suitable approach to determine if there is a correlation between multiple variables (Frankfort-Nachmias et al.,

2021). The study's data were gathered from a secondary analysis of the CMS Provider Information dataset and MDS Quality Measure dataset made public on the CMS website. The independent variable in the study was a measure of CNAs' HPRD; in contrast, the dependent variables are residents' QM outcomes for UTIs, pressure ulcers, and major falls in Missouri LTCFs. When testing a hypothesis, examining the correlations between the variables is essential. These variables were measured using instruments that allow for statistical analysis, as explained by Creswell and Creswell (2018). Researchers commonly use bivariate correlations and multiple regression analysis to determine the strength of the relationships between the four variables. The study provides insight for Missouri CNHAs, DONs, and owners to implement new policies that will increase CNAs' HPRD and, in turn, reduce residents' poor QM outcomes in Missouri LTCFs.

### **Literature Search Strategy**

The search strategy for this literature review involved electronic research databases such as CMS, Google Scholar, Walden University Library, PubMed, ProQuest, ScienceDirect, Health Affairs, BMC, Sage Journals, and Ovid. The search keywords included *CNA staffing ratio*, *patient QoC*, *directors of nursing*, *certified nursing home administrators*, *leadership*, *management role in patient outcome*, *long-term care facility*, *Quality Measures*, and *CMS 5-star quality rating system*. Each article's reference list was scanned to identify additional studies within the publication date range. Scholarly peer-reviewed journals from 2018 to 2023 were included in this study.

## Literature Review

Dreher et al. (2019) and Harrington et al. (2020) investigated decades-long challenges experienced by LTCFs concerning CNA shortages and their potential impact on resident QoC. I aimed to examine the relationship, if any, between CNAs' HPRD and residents' QM outcomes in Missouri LTCFs. Bivariate correlation and multiple regression analysis were used to measure connections between CNA HPRD, the independent and dependent variables, and resident QM outcomes: UTIs, pressure ulcers, and major falls. A justification and rationale for this study were to identify what is known about CNAs' HPRD and how it may impact resident QM outcomes. Evidence for these potential relationships remains mixed and controversial among some researchers (Griffiths et al., 2020; Harrington et al., 2020; Young et al., 2022). An existing research gap in the area of CNA workload and resident health remained to be studied, as did the impact of CNHAs and DONs on these outcomes.

The literature review includes four sections addressing the following: (a) federal and state regulations, (b) services provided by LTCFs, (c) total nursing staff (HPRD), and (d) the CMS 5-star quality rating system. Each section provides findings from other researchers to support links between CNA HPRD and resident QM outcomes in LTCFs. The four sections also address how LTCF CNHAs, DONs, owners, and policymakers may affect resident QM outcomes in LTCFs.

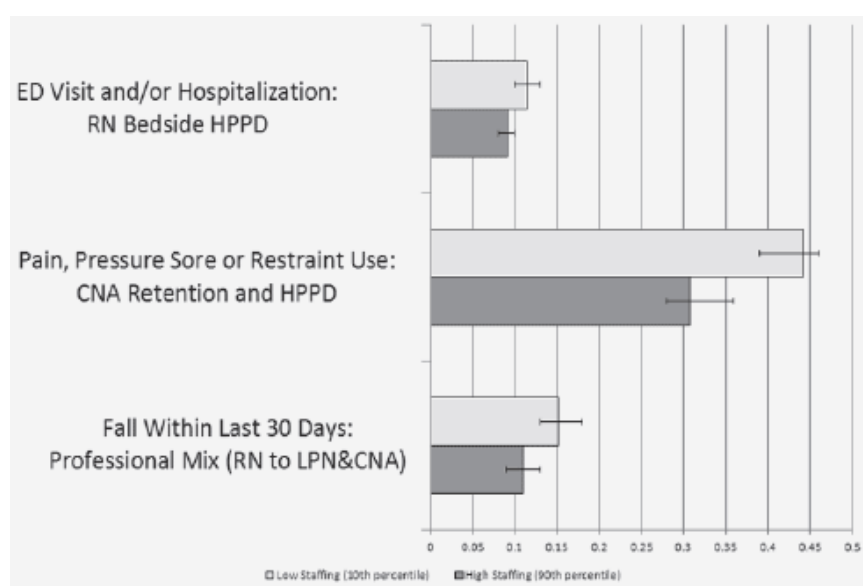
Findings from this literature review and overall study may inform LTCF leaders on addressing the growing issues concerning low staffing and poor resident health outcomes. LTCF leaders must stay informed about new federal and state regulations,



policies, or modifications related to CNA HPRD. Staying current on new or modified policies will help LTCF leaders develop strategies and implement new care plans for each resident that may help reduce the occurrence of resident UTIs, pressure ulcers, and major falls (Kimmey & Stearns, 2015). See Figure 2.

**Figure 2**

*Effects of Staffing Characteristics on Resident Outcomes*



*Note.* From “Improving Nursing Home Resident Outcomes: Time to Focus on More Than Staffing?” by L. D. Kimmey and S. C. Stearns, 2015, *The Journal of Nursing Home Research*, 1, p. 94

### **Federal and State Regulations**

LTCFs participating in Medicare and Medicaid programs must adhere to federal and state regulations regarding adequate staffing and resident QM outcomes (CMS, 2023; Mukamel et al., 2022). CMS established strict guidelines that LTCFs must follow to receive approval for Medicare and Medicaid. LTCFs must comply with the 42 Code of

Federal Regulations 483.35, which mandates that CNHAs hire more staff when residents require additional primary and skilled nursing care (Franzosa et al., 2022; Harrington & Edelman, 2018). The CNHAs', DONs', and owners' responsibility is to comply with these regulations to ensure that residents receive the QoC they need by providing adequate staffing.

In 1987, the U.S. Congress passed the Nursing Home Reform Act to ensure high-quality care for LTCF residents. In 1990, the U.S. Congress amended the Nursing Home Reform Act, stating that LTCFs must maintain adequate staffing levels to optimize resident QoC. Research findings by Fashaw et al. (2020), Grabowski (2020), and Zhang and Grabowski (2004) determined that this act has had a significant positive impact on residents' QoC. Challenges remain in LTCFs concerning short staff and poor resident QM outcomes. Clemens et al. (2021) indicated that increasing staffing hours to achieve better resident QM outcomes is well worth the effort. This study contributes to the literature on CNAs' HPRD and resident QM outcomes in LTCFs.

The MDS 3.0 was implemented in October 2010 by CMS (MDS, 2021). The MDS 3.0 assessment is done on each resident every 90 days and includes vital information on health conditions and services needed. Once this information is collected and compiled, the facility must electronically submit the MDS form to CMS (Carr-Marcel, 2014). It is the responsibility of the CNHA to assess the medical conditions of potential and current residents. The CNHA must ensure that each resident's diagnosis is documented on the MDS 3.0 form as required by the federal government. The goal of this document is to carefully assess the needs, abilities, objectives, physical and personal

situations, and preferences of individuals living in the facility, which the staff uses to create a thorough care plan that specifically identifies and addresses each resident's needs, services, and preferences (Harrington et al., 2020). The MDS 3.0 documentation process increases the likelihood of each resident receiving appropriate HPRD and the best QoC based on their needs (Bowblis, 2022; CMS, 2023).

The National Consumer Voice for Quality Long-Term Care (2021) asserted that continuous and reliable support is needed on both federal and state levels to provide residents with the QoC they deserve. Reith (2018) investigated the crucial role of adherence to federal regulations in ensuring that CNHAs allocate sufficient staff hours for CNAs to meet the needs of each resident. CNAs must receive enough staffing hours to give residents the appropriate QoC needed to reduce the occurrence of UTIs, pressure ulcers, and major falls. LTCFs, CNHAs, DONs, owners, and policymakers need to prioritize residents' QM outcomes better by focusing on their etiology. Conducting facility-specific investigations on reasons for poor QM outcomes may provide evidence of ongoing issues for CNHAs and DONs to address. Ensuring that residents receive QoC can be achieved if LTCF CNHAs, DONs, owners, and policymakers recognize the significance of providing CNAs with proper HPRD, sharing accurate data, and collaborating to solve existing problems.

### **Services Provided by Long-Term Care Facilities**

LTCFs are specialized residences home to more than 1.2 million elderly adults aged 65 years and older who require skilled and nonskilled nursing services and rely on them for QoC and support. Of the elderly adults receiving care in LTCFs, approximately

60% are physically incompetent, and 68% have moderate to severe cognitive impairment (Gaugler et al., 2014; Yuan et al., 2021). The care services offered to residents in LTCFs are designed to meet their individual needs and ensure that they receive the highest quality of care possible. However, meeting residents' needs can be very challenging without adequate staffing.

LTCFs rely on diverse clinical and non-clinical staff to provide resident QoC. The clinical staff includes highly trained nursing staff such as DONs, RNs, LPNs, licensed vocational nurses (LVNs), certified medication technicians, and CNAs. Nonclinical staff includes CNHAs, social workers, activity directors, occupational and physical therapists, psychiatrists, doctors, maintenance workers, housekeepers, laundry workers, and the dietary department (Armstrong et al., 2023; Bhattacharyya et al., 2022; Bowblis & Hyer, 2013; Musumeci et al., 2022).

The role of a CNHA in managing LTCFs is a critical one that requires unparalleled dedication, extensive knowledge, and an unwavering commitment to providing the best resident care possible. As the overseer of the entire facility, the CNHA has the responsibility to ensure that the residents' needs are met, the staff is well-trained and equipped, and the facility is in compliance with all regulations (Franzosa et al., 2022; Gaines, 2023b; Harrington & Edelman, 2018; Reith, 2018).

Previous research has demonstrated that CNHA leadership styles and qualities can significantly impact residents' QoC. CNHAs must exhibit effective leadership by complying with federal regulations and providing adequate staffing to meet the needs of each resident (Carr-Marcel, 2014; Franzosa et al., 2022; Harrington & Edelman, 2018;

Peerman, 2019). Research conducted by Carr-Marcel (2014) and Peerman (2019) suggested that the CNHA leadership style plays a significant role in the QoC that residents receive from LTCF staff members. Effective leadership and staff communication may lead to better resident QM outcomes, an improved CMS 5-star quality rating system, and a better QoC for residents (Carr-Marcel, 2014).

More research is needed to fully understand the level of CNHA involvement concerning CNAs' HPRD and how it may impact residents' QM outcomes. CNHAs can improve living experiences among LTCF residents and employment experiences among CNAs, provided that they keep up to date with the latest developments in long-term care and follow all regulations and standards. To ensure that residents receive the best possible care, CNHAs must remain knowledgeable and compliant. CNHAs need to keep up to date with the latest developments in long-term care and follow all regulations and standards to ensure that residents receive the necessary level of care while living in LTCFs.

#### **Total Nursing Staff (Hours per Resident Day)**

Total nursing staff hours are measured by dividing the total number of nursing staff by the total number of residents. The nursing staff's HPRD is calculated and serves as the minimum staffing requirement. HPRD is the daily care given to each resident by the nursing staff. While CNAs conduct the bulk of face-to-face patient care, the total nursing staff is the number of nurses (i.e., RNs, LPNs/LVNs, CNAs, and DON time) needed to care for each resident. DONs are included when calculating total nursing staffing hours; it has been mandated that DONs work 5 days a week. A DON's duties

primarily revolve around hiring and managing the nursing department (Gaines, 2023a; The National Consumer Voice for Quality Long-Term Care, 2021). DONs are responsible for staffing the nursing department and assigning CNAs to the appropriate HPRD to prevent missed care.

According to Gustafsson et al. (2019), high levels of missed care can lead to adverse outcomes among residents. Also, due to missed care, the number of falls among residents may increase, and pressure ulcers may not heal properly. DONs can ensure residents receive high-quality care by scheduling adequate RN, LPN, and CNA HPRD. It can be helpful to compare a state's staffing standards with the recommended 4.1 HPRD (including DON time) to ensure that residents receive the best possible QM outcome. The recommended staffing standard for total nursing HPRD is 4.1 for all nursing staff. When split by profession, total nursing hours are as follows: RNs receive 0.75 HPRD, LPNs/LVNs receive 0.55 HPRD, and CNAs receive 2.8 HPRD (The National Consumer Voice for Quality Long-Term Care, 2021).

### ***RNs' HPRD***

LTCFs must provide licensed nursing services 24/7, with an RN present for 8 consecutive hours daily, 7 days a week (Harrington & Edelman, 2018; Musumeci et al., 2022). RNs are responsible for providing QoC to residents by conducting thorough assessments of their physical and psychological well-being, creating evidence-based care plans according to their health status, and collaborating with physicians for optimum results. RNs supervise other nursing staff, including LPNs and CNAs (Shin et al., 2021). RNs are essential to LTCFs because of their expertise in helping ensure that residents

receive good QM outcomes. Researchers have suggested that increasing RN HPRD may reduce residents' QM outcomes for the occurrence of UTIs, pressure ulcers, and major falls (The National Consumer Voice for Quality Long-Term Care, 2021; Perruchoud et al., 2022; Shin et al., 2021).

### ***LPNs' HPRD***

LPNs play a vital role in the healthcare industry by providing compassionate care to residents and supervising CNAs. LPNs' responsibilities are critical in ensuring positive QM outcomes for residents. Increasing LPNs' HPRD may reduce the occurrence of UTIs, pressure ulcers, and major falls among LTCF residents. LPNs' dedication and commitment to performing their duties efficiently and effectively can significantly affect resident QM outcomes (Harrington et al., 2020; Perruchoud et al., 2022).

### ***CNAs' HPRD***

CNAs assist RNs/LPNs with the daily care of residents. CNAs are responsible for residents' activities of daily living, which include bathing, eating, dressing, toileting, transferring, and continence (Zhu et al., 2019). CNAs provide 76.5% of resident care hours; this may be correlated to residents' QM outcomes (Boscart et al., 2018; Mukamel et al., 2022; Travers et al., 2021). CNAs' HPRD is based on the health condition of each resident (Harrington & Edelman, 2018). Musumeci et al. (2022) suggested that LTCFs with light workloads require 2.8 CNA HPRD, while those with heavy workloads need 3.6 CNA HPRD. Missouri has yet to set requirements for the number of CNAs' HPRD to meet total staffing time. Heavy workloads may increase burnout among CNAs, leading to many residents having the occurrence of UTIs, pressure ulcers, and major falls

(Musumeci et al., 2022). LTCFs, CNHAs, DONs, and owners need to be aware of the importance of having appropriate staffing for the nursing staff's workload to help decrease any possibility of burnout among the nursing staff and help reduce poor resident QM outcomes. To further enhance residents' QM outcomes, policymakers can set a requirement for total staffing time for CNAs' HPRD.

### **Certified Nurse Aide Turnover**

The CNA shortage has been decades-long (Dreher et al., 2019; Harrington et al., 2020). A shortage of CNAs in Missouri LTCFs may be due to many factors, but all are likely connected to high CNA turnover, low pay rates, burnout, and a lack of respect from leadership (CHNAs, DONs, RNs, and LPNs) (Medicare and Medicaid Programs; Minimum Staffing Standards for LTCFs and Medicaid Institutional Payment Transparency Reporting, 2023). High turnover rates are problematic for residents regardless of etiology and may contribute to poor resident QM outcomes. The National Consumer Voice for Quality Long-Term Care (2022) indicated that high turnover rates can lead to poor resident outcomes. Nearly 50% of LTCFs in the United States face a 40–60% annual turnover rate, and the consistently changing nature of staffing in these organizations is cause for alarm.

According to Kittles (2021), one potential cause of high turnover rates is employees' perceived lack of respect. When leaders (i.e., CNHAs, DONs, RNs, and LPNs) fail to give CNAs the respect they deserve, they are less likely to stay in their positions because they feel unappreciated and underpaid. Low pay rates can also lead to high turnover rates. According to the National Consumer Voice for Quality Long-Term

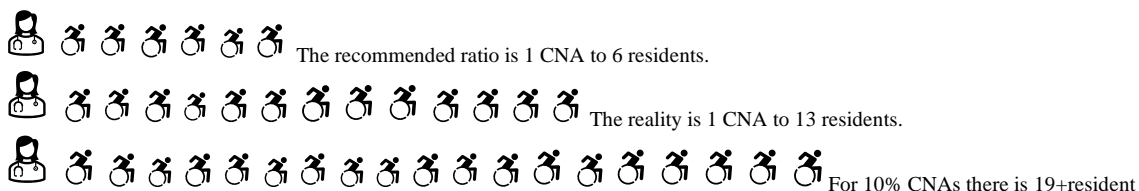


Care (2022) and Medicare and Medicaid Programs; Minimum Staffing Standards for LTCFs and Medicaid Institutional Payment Transparency Reporting (2023), 58% of CNAs are African American, and the average CNA yearly income is \$25,200, a low pay rate that leads 34% of these individuals to rely on government assistance. Low pay rates could also lead to poor resident QM outcomes in Missouri LTCFs (Medicare and Medicaid Programs; Minimum Staffing Standards for LTCFs and Medicaid Institutional Payment Transparency Reporting, 2023).

Burnout caused by heavy workloads is another factor that leads to high turnover rates. The National Consumer Voice for Quality Long-Term Care (2022) suggested that the CNA-resident ratio should be one CNA for every six residents. Currently, LTCFs have a higher ratio of CNAs to residents than the recommended ratio. One CNA frequently cares for 13 or more residents at any given time. Changes need to be made to help reduce the number of residents that each CNA cares for. Decreasing CNAs to resident ratio has the potential to decrease the workload of CNAs, reducing turnover rates and improving resident QM outcomes. See Figure 3.

**Figure 3**

***Recommended Ratio of Certified Nurse Aides to Residents***



*Note.* From *High Staff Turnover: A Job Quality Crisis in Nursing Homes* (p. 8), by The National Consumer Voice for Quality Long-Term Care, 2022

The National Consumer Voice for Quality Long-Term Care (2022) stated that CNAs should receive 120 hours of training. CNAs are only required to receive 75 hours of training. Lack of training can also lead to high turnover among CNAs in LTCFs (The National Consumer Voice for Quality Long-Term Care, 2022). When CNAs are adequately trained, it may lead to better resident QM outcomes. The National Consumer Voice for Quality Long-Term Care (2022) stated that CNAs have no advancement and do not play any leadership role, which could also cause them to leave their position. Implementing CNA into resident care plans might reduce turnover and improve resident care.

### **Centers for Medicare and Medicaid Services 5-Star Quality Rating System**

In December 2008, the CMS introduced the 5-star quality rating system comprising state health inspections, staffing levels, turnover, and resident QM outcomes. LTCFs are subject to a rigorous evaluation process that utilizes a CMS 5-star quality rating system. Facilities are evaluated by a team of healthcare specialists that evaluate each LTCF annually without prior notice, assessing the facility's overall condition, staffing level, turnover, and residents' QM outcomes, including UTIs, pressure ulcers, and major falls. Facilities that do not meet the staffing requirements and have documents of high numbers of residents with UTIs, pressure ulcers, and major falls may receive a low rating when scored by the CMS 5-star quality rating system (CMS, 2023).

The CMS system is based on several performance indicators, including staffing levels, staffing turnovers, and resident QM outcomes. The ratings range from 1 to 5, with a score of 1 or 2 indicating below-average performance, three indicating average, and 4

or 5 displaying above-average performance. Each facility evaluates performance; the system considers the number of CNAs on duty per hour and the QoC provided to residents. This evaluation process is divided into four parts: (a) an overall rating, (b) a health inspection result, (c) staffing levels and turnover rates, and (d) QM data on resident care; however, this study will focus on staffing levels and residents' QM outcomes (CMS, 2023).

The CMS 5-star quality rating system is essential for CNHAs, DONs, and owners, as it can significantly affect LTCFs in various ways. A poor rating can impact Medicare and Medicaid payments, potentially preventing new admissions, employee turnover rates, and CNA staffing levels. If LTCF leaders increased staffing levels and implemented prevention measures to reduce the number of adverse health outcomes among residents, facilities could improve their CMS 5-star quality rating system scores (Carr-Marcel, 2014). Four- and five-star ratings are desired by LTCFs. The research indicates that such ratings will likely be maintained if facilities increase CNAs' HPRD and implement strategies to reduce residents' poor QM outcomes.

Missouri LTCF policymakers must implement a policy that will set a minimum requirement for total staffing time for CNAs. New policies concerning CNAs HPRD were implemented for Missouri LTCFs. Adequate staffing may benefit both staff and residents. Adequate staffing will reduce CNA turnover rates and increase the chance of residents receiving good QM outcomes. By implementing these policies, LTCFs are more likely to receive a top rating when evaluated by a team of healthcare specialists. Good ratings increase the chances of attracting new residents, receiving higher Medicare and

Medicaid payments, and retaining their staff. The CMS 5-star quality rating system is a valuable tool for evaluating the performance of LTCFs and ensuring that residents receive the best possible care. See Table 2.

**Table 2**

***Point Ranges for Rating Staff***

Number of stars	Points
1	<155
2	<155–204
3	<205–254
4	<255–319
5	<320–381

*Note.* Maximum possible score = 380 points. It is adapted from *Design for Care Compare*

*Nursing Home Five-Star Quality Rating System: Technical Users' Guide* (p. 15).

**Definitions**

*Certified nursing assistant:* This individual provides nursing care to patients, including feeding, walking, and personal hygiene (Beynon et al., 2021).

*Certified nursing home administrator:* Nursing home administrators oversee daily operations of long-term care facilities, ensuring compliance with regulations and maintaining a secure environment for residents and staff (Gaines, 2023b).

*CMS 5-star rating system:* CMS rates nursing homes/LTCFs one star, the lowest score, to five stars, the highest score. This information is publicly available (CMS, 2023).

*Director of nursing:* Registered nurses with years of education and clinical experience; they work in nursing homes/LTCFs and other healthcare organizations and oversee the whole nursing department. Nurse directors are responsible for hiring and terminating nursing staff (Gaines, 2023a).

*Long-term care facility:* LTCF is an organization whose staff provides long-term care to residents who require assistance with daily living activities. In LTCFs, individuals with chronic health conditions or dementia can maintain as much independence as possible (Harris-Kojetin et al., 2019).

### **Assumptions**

I used secondary data from the CMS Provider Information dataset and MDS Quality Measure dataset registered with CMS. It was assumed that the data entered in the Provider Information and MDS Quality Measure datasets by the Missouri LTCFs was free from biases or preconceptions. To ensure the accuracy and reliability of the research, I verified the availability of specific variables, such as CNA's HPRD and residents' QM outcomes (i.e., UTIs, pressure ulcers, and major falls), through the CMS database codebook.

The CMS agency ensures that the information displayed on the website is trustworthy and precise. The data contains all of LTCF's for-profit and nonprofit owners. The assumptions I made in this study were appropriate, considering that the data collection was solely based on Provider Information as the source. The main objective of this research was to thoroughly examine the relationship, if any, between CNAs' HPRD and residents' QM outcomes for UTIs, pressure ulcers, and major falls. Conducting such an in-depth analysis helped to gain a more comprehensive understanding of the relationship between the variables.

### **Scope and Delimitations**

The present study's parameters have been meticulously established to ensure the research's accuracy and validity. This research was limited to the 508 LTCFs in Missouri, as these facilities are included in the CMS database. The findings and conclusions may not apply to other states. The study results may not be transferable to states with significantly different standards for CNAs' HPRD. I used a secondary dataset from the CMS Provider Information and MDS Quality Measure datasets. The main focus of the research was to investigate the correlation between CNAs' HPRD and residents' QM outcomes in Missouri LTCFs. I was limited to investigating three of the nine long-term stay QM outcomes: UTIs, pressure ulcers, and major falls contracted by residents in Missouri LTCFs. I exclusively concentrated on LTCFs and did not include hospitals or other healthcare facilities. By limiting the scope of the research, the study aimed to provide more accurate and reliable findings that inform LTCF leaders regarding the relationship between CNAs' HPRD and the number of UTIs, pressure ulcers, and major falls in Missouri LTCFs.

### **Limitations**

Limitations include that the secondary data were filtered to include LTCFs in Missouri and may not be generalizable to the rest of the United States. Other challenges included finding the information to prove that LTCF CNHAs can affect residents' QM outcomes. One challenge was to find unbiased and current information on how Missouri LTCF leaders and policymakers can make changes to help resolve the low CNAs' HPRD and set minimum requirements for total staffing time for Missouri LTCFs. Another

limitation was incomplete data, so some LTCFs were not considered. Another potential limitation was finding unbiased and current information on how low CNAs' HPRD may affect resident QMs' outcomes in Missouri LTCF.

### **Significance**

Poor QM outcomes among LTCF residents may be correlated to low CNA HPRD (Harrington et al., 2020). New policies, such as the 42-code requiring CNHAs to hire more staff, aim to reduce poor resident QM outcomes by increasing CNAs' HPRD (Franzosa et al., 2022; Harrington & Edelman, 2018). Another federal policy implemented to ensure residents receive good QM outcomes and for the facility to provide enough staff to cover residents' needs is the CMS 5-star quality rating system. The CMS 5-star quality rating system was implemented to rate facilities based on nursing staffing, staff turnover, and residents' QM outcomes (CMS, 2023). States abide by federal regulations, but they also have rules concerning staffing, such as the state requirements for total staffing time policy (The National Consumer Voice for Quality Long-Term Care, 2021). The only downside of this policy is that most states, like Missouri, still need a state requirement for HPRD for CNAs.

Healthcare providers may benefit from a deeper understanding of the relationships between CNAs' HPRD and LTCF resident QM outcomes, which may lead to positive social change. The study's outcomes may also influence nursing staffing decisions, policies, and laws regarding minimum staffing time for CNAs' HPRD. Researchers emphasized the importance of LTCFs having adequate CNA staffing to provide residents with optimal QM outcomes (Griffiths et al., 2020; Harrington et al., 2020). By providing

comprehensive data on residents' QM outcomes in Missouri LTCFs, this study will be a valuable and much-needed contribution to the current literature on the subject. This may also pave the way for implementing evidence-based strategies so policymakers will know the importance of setting minimum staffing time for CNAs HPRD in Missouri LTCFs.

### **Summary and Conclusions**

Despite technological advancements, there is still a need to reduce the number of adverse QM outcomes among residents in Missouri LTCFs. CNHAs, DONs, and owners of Missouri LTCFs must prioritize establishing new policies that mandate a total nursing staffing time requirement specific to CNAs. Previous policies related to CNAs' HPRD and resident QM outcomes have been enacted, but substantive changes have yet to occur in LTCFs. Despite CMS ratings, there remains a high variability rate in adverse resident health outcomes between LTCFs. No number of UTIs, pressure ulcers, or major falls in Missouri's LTCFs are acceptable. Through this initiative, it may be possible to reduce resident QM outcomes for UTIs, pressure ulcers, and major falls in Missouri LTCF by providing CNAs with more HPRD.

To better understand how low CNAs' HPRD may impact resident QM outcomes in Missouri LTCFs, the CMS Provider Information and MDS Quality Measure datasets of secondary data were utilized. While previous studies have attempted to examine the correlation between CNAs' HPRD and residents' QM outcomes in Missouri LTCFs by reviewing the four variables (one independent and three dependent), I sought to determine the specific impact of low CNAs' HPRD on residents' QM outcomes in Missouri LTCFs, by filling the existing research gap. Setting a minimum total staffing



time for CNAs' HPRD in Missouri LTCFs may reduce the occurrence of UTIs, pressure ulcers, and major falls, ultimately enhancing the QoC for Missouri LTCF residents.

This research may contribute to healthcare leaders' and policymakers' knowledge of the importance of adequate CNAs' HPRD to ensure that residents receive good QM outcomes. It is essential to recognize the significance of this initiative and take appropriate action to ensure that Missouri LTCF residents receive the best possible care. Missouri LTCF leaders and owners will act on this research's findings and take necessary measures to ensure adequate staffing for CNAs to improve residents' QM outcomes.

Section 1 focused on the research problem, the purpose of the study, the research question and hypotheses, the theoretical framework, the nature of the study, the literature search strategy, the literature review, definitions, the assumptions of the study, the scope, and delimitations of the study, limitations, significance, and the summary of the study. Section 2 provides insight into the research design, data collection, and methodology guiding this study.

## Section 2: Research Design and Data Collection

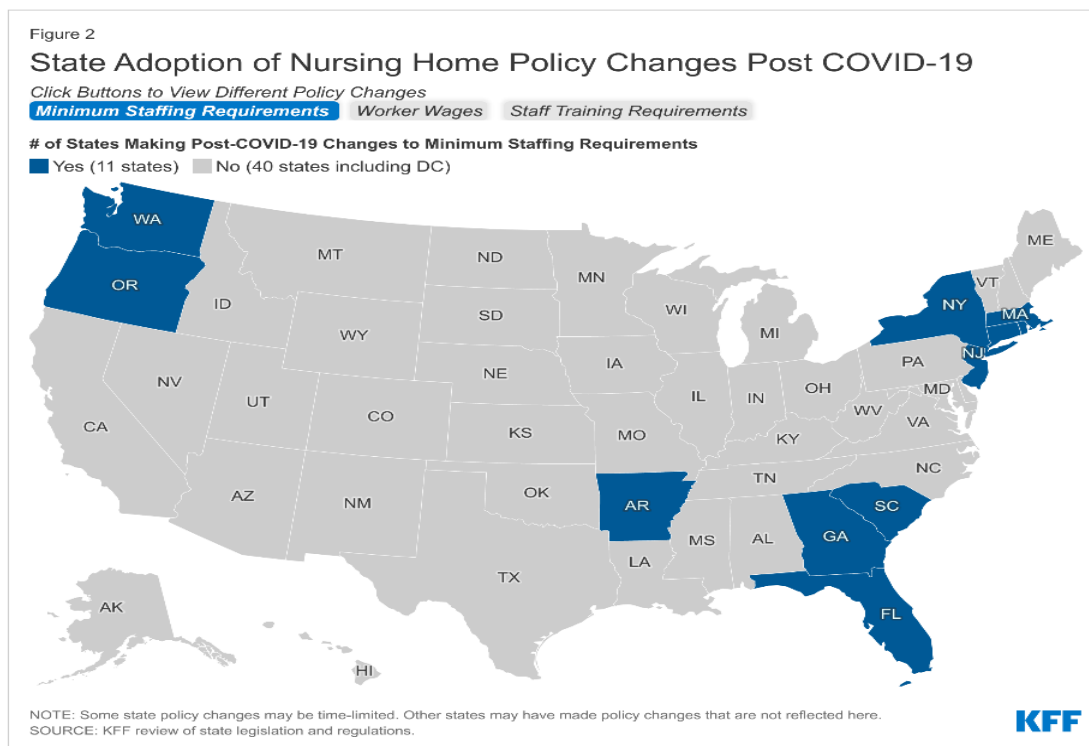
### **Introduction**

Through this comprehensive research, I aimed to thoroughly investigate and determine the potential correlation between CNAs' HPRD and resident QM outcomes in Missouri LTCFs. Missouri does not have a minimum staffing requirement for CNAs, as specified in the Musumeci et al.'s (2022) report (see Figure 4). Missouri does not have a minimum staffing requirement set for CNAs in LTCFs; the significance of this research can shed light on the importance of CNAs' HPRD and the impact it may have on resident QM outcomes in Missouri LTCFs. I used the structure, process, and outcome (SPO) aspects of the Donabedian model to determine these findings. Using the SPO model, researchers can examine different aspects of an organization's structure, such as leadership, management, and staffing hours (in this case, CNAs' HPRD), and organizational processes, such as those involved in preventing UTIs, pressure ulcers, and major falls. The goal was to understand how these measures affect the overall quality of care and outcomes for residents regarding the occurrence of UTIs, pressure ulcers, and major falls.

The findings of this study may provide valuable insights for CNHAs and policymakers. According to the research, implementing a minimum requirement for staffing hours for CNAs in Missouri LTCFs could enhance the QoC for residents. By increasing the HPRD for CNAs, the QM outcomes for residents in these facilities could also be improved. The information from this study may contribute to shaping policies that promote better care for residents residing in Missouri LTCFs.

## Figure 4

### *State Adoption of Nursing Policy Changes Post COVID-19*



*Note.* It is adapted from *State Actions to Address Nursing Home Staffing During COVID-19*, by M. Musumeci, E. Childress, and B. Harris, 2022, KFF.

The topics covered in this section include research design, rationale, methodology, and data analysis. It is essential to begin with a clear understanding of the study's design and rationale, enabling me to effectively develop the methods and data analysis plan. To accomplish this, I describe the study design and the structure that directed the research initiative. The reasoning behind the study is also discussed to aid in defining the research's ultimate goal and intent. Once the design and rationale of the study are established, the methodology is discussed, including the population, sampling,

sampling procedures, power analysis, instrumentation, and data analysis plan. It was essential to ensure that the methodology was sound and well-structured, as it would serve as the foundation for all subsequent stages of the research. In addition, I touch on potential threats to validity and ethical procedures, which are essential considerations for any research project.

Finally, Section 2 was summarized, highlighting the key points covered and reinforcing the significance of the research design, rationale, methodology, and data analysis components. This section provides a comprehensive overview of the critical components of a successful research project.

### **Research and Design Rationale**

I used a quantitative correlational secondary data analysis to answer the research questions. A quantitative methodology was the most appropriate approach for this study, given that the CMS dataset is presented in quantitative form. Conducting a qualitative study would not have allowed for a large-scale study of Missouri LTCFs such as this. This cross-sectional quantitative study used CNAs' HPRD as the independent variable and residents' QM outcomes for UTIs, pressure ulcers, and major falls as dependent variables. CMS is responsible for initiating and maintaining its website, where the source of the data were collected.

Through this study, I aimed to provide specific information on the relationship between CNAs' HPRD and residents' QM outcomes in Missouri LTCFs. Three QM outcomes were considered, including (a) the percentage of UTIs, (b) pressure ulcers, and (c) major falls experienced by residents in Missouri LTCFs. I collected the data from the

Provider Information and MDS Quality Measure national datasets and filtered out Missouri LTCFs. A cross-sectional or correlational research design was the most appropriate choice for this study, given the single data collection timepoint available from the CMS dataset. A cross-sectional study is a practical approach to advancing knowledge in this field. Understanding the importance of CNAs' HPRD can help review factors affecting residents' QM outcomes in Missouri LTCFs.

### **Methodology**

I conducted a quantitative study on LTCFs in Missouri. I adopted a cross-sectional study design approach and aimed to analyze secondary data from the Provider Information dataset and MDS Quality Measure dataset retrieved from the CMS website (see Appendix A). I also explored the relationships between the number of CNAs' HPRD and residents' QM outcomes. Five hundred and eight Missouri LTCFs from the CMS dataset provided data during the 2022 fiscal year. I examined three QM outcomes for UTIs, pressure ulcers, and major falls that may have occurred in each facility.

I investigated correlations between CNAs' HPRD and residents' QM outcomes for UTIs, pressure ulcers, and major falls in Missouri LTCFs for the 2022 fiscal year. To achieve this goal, I utilized bivariate correlations and multiple regression analysis, statistical methods that were suitable for determining the association between the four variables (see Frankfort-Nachmias et al., 2021). To ensure the accuracy and validity of the findings, I utilized the Statistical Package for the Social Sciences (SPSS) Version 28 to address any inquiries and assumptions that might arise during the investigation (see Frankfort-Nachmias et al., 2021). CNA HPRD may influence QM outcomes within

Missouri LTCFs. I sought to contribute to the existing body of knowledge by examining this correlation in-depth and making recommendations based on the findings.

The three research questions and hypotheses were as follows:

RQ1: What is the correlation between UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities?

$H_01$ : There is no statistically significant correlation between the occurrence of UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities.

$H_a1$ : A statistically significant correlation exists between UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities.

RQ2: What is the correlation between pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities?

$H_02$ : There is no statistically significant correlation between occurrences of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities.

$H_a2$ : There is a statistically significant correlation between occurrences of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities.

RQ3: What is the correlation between major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities?

*H<sub>0</sub>3*: There is no statistically significant correlation between the occurrence of major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities.

*H<sub>a</sub>3*: A statistically significant correlation exists between major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities.

These questions were based on the findings from CMS (2023) and Young et al. (2022), who suggested that if CNHAs, DONs, owners, and policymakers would increase the number of CNAs' HPRD, it might reduce poor resident QM outcomes such as UTIs, pressure ulcers, and major falls in Missouri LTCFs.

### **Population**

This research project was a comprehensive and in-depth analysis of 508 Missouri LTCFs. The main objective was to evaluate the performance of each facility based on the independent variable of CNAs' HRPD and the dependent variable of resident QM outcomes of UTIs, pressure ulcers, and major falls. The study included a large dataset of Missouri LTCFs, ensuring the study's reliable and precise evaluation.

To ensure the accuracy of the analysis, the study utilized data on these variables from January 1 to December 31, 2022. This data collection period permitted a comprehensive understanding of the overall performance of Missouri's LTCFs during that fiscal year. A thorough evaluation of Missouri LTCFs involved assessing and analyzing data collected from these facilities. The primary objective of this exercise was to provide a detailed and unbiased report on the performance of these facilities. The

evaluation had the potential to identify any research gaps and highlight areas that require improvement. By conducting this evaluation, CNHA owners and policymakers may better understand the overall QoC provided in Missouri's LTCFs, and measures can be implemented to ensure that residents receive the best possible care.

### **Sampling and Sampling Procedures**

The main objective of this study was to conduct an extensive analysis of 508 LTCFs in Missouri. In this investigation, I examined the CNAs' HPRD and residents' QM outcomes in Missouri LTCFs. The data were gathered from the national database of the CMS website. This database contains valuable information about CNAs' HPRD and residents' QM outcomes in Missouri LTCFs, which were utilized in this study. Only Missouri LTCFs listed on the Provider Information dataset and MDS Quality Measure dataset retrieved from the CMS website were selected for this study. Only facilities with complete data were included in the analysis. This study exclusively focused on Missouri LTCFs. This information may help obtain a comprehensive understanding of the QoC delivered to residents in these facilities.

The data sets used in this study are highly reliable and accurate, providing staffing information that may help increase CNAs' HPRD and reduce resident adverse QM outcomes. The datasets are publicly available with no restrictions. My goal was to identify whether or not CNAs' HPRD correlates to residents' QM outcomes in Missouri LTCFs. This study may provide valuable insights and recommendations for CNHA, DONs, and owners to strive for improvement and develop effective strategies to enhance



the overall QoC delivered to residents in Missouri LTCFs by thoroughly investigating all relevant data.

### **Power Analysis**

A power analysis is highly recommended to prevent type II errors. G-Power version 3.1.9.7 was used for this study's power analysis (see Faul et al., 2009). A sample size of 55 Missouri LTFCs was adequate, given an effect size of 0.15, alpha level of 0.05, and a power level of 0.80.

### **Instrumentation and Operationalization**

The CMS offers a comprehensive list of registered LTCFs across the United States. The CMS Provider Information and MDS Quality Measure datasets provide valuable insights to analyze the performance and quality of LTCFs (see Appendix A). This report features a CMS 5-star quality rating system that evaluates critical aspects of certified beds, resident quality of life outcomes, CNAs' safety, health records, and staffing.

To conduct this study, I utilized these specific data. I focused on two organizational characteristics: (a) CNAs' HPRD and residents' QM outcomes for UTIs, pressure ulcers, and major falls. These factors provided critical insights into the relationship, if any, between CNAs' HPRD and resident QM outcomes. This approach can inform LTCFs CNHAs, DONs, and owners to observe and manipulate the data, collecting valuable insights that might otherwise be challenging.

## Data Analysis Plan

Employing a comprehensive and varied research approach, the primary objective of this study was to provide significant insights into the relationship between CNAs' HPRD and resident QM outcomes in Missouri LTCFs. A thorough examination of the study was conducted using SPSS software to analyze the data. The statistical analysis significance level was determined by examining the  $p$ -value and the confidence intervals between the independent and dependent variables based on an alpha level of 0.05. Using bivariate correlation coefficients and multiple regression analysis helped to determine the strength of the relationships between the independent variable of CNAs' HPRD and the dependent variables of resident QM outcomes, including pressure ulcers and major falls in Missouri LTCFs.

The data gathered from Provider Information and MDS Quality Measure datasets for this study were cleaned to omit missing and incomplete information. A data screening procedure was done by only using complete and accurate data to conduct this study.

The three research questions and hypotheses for this study were as follows:

RQ1: What is the correlation between UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities?

$H_0$ 1: There is no statistically significant correlation between the occurrence of UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities.

*H<sub>a1</sub>*: There is a statistically significant correlation between the occurrence of UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities.

RQ2: What is the correlation between pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities?

*H<sub>o2</sub>*: There is no statistically significant correlation between occurrences of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities.

*H<sub>a2</sub>*: There is a statistically significant correlation between occurrences of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities.

RQ3: What is the correlation between major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities?

*H<sub>o3</sub>*: There is no statistically significant correlation between the occurrence of major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities.

*H<sub>a3</sub>*: A statistically significant correlation exists between major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities.

### **Threats to Validity**

CMS is a well-known and established system of methods and practices used to collect and analyze data. According to the official CMS website, the dataset used in this

study is accurate and easily accessible to the public. However, as Frankfort-Nachmias et al. (2021) pointed out, although data are essential in supporting or refuting a hypothesis, they should not be the sole basis for conclusions. During the examination, it was necessary to be vigilant for any signs of invalid or missing data.

There are reasonable concerns about correlational designs that can affect a study's validity. I considered these concerns and thoroughly examined any possible correlations in the dataset. The findings ensure that the conclusions are based on solid evidence and that the study produces dependable and precise results.

### **Ethical Procedures**

Confidentiality and data protection ethics must always be upheld to maintain the highest professionalism and ethical conduct standards. Given this emphasis, contacting participants for this study was unnecessary, as the Provider Information dataset and MDS Quality Measure dataset required for analysis of this study are publicly available on the CMS website. The data retrieved for this study results may be biased due to underreporting and other unknown factors, but the degree to which bias is present cannot be evaluated. To proceed with the study, obtaining permission for data recovery or analysis from the Walden IRB was granted after the study was approved. This approach helps ensure that the study proceeds with the highest scientific rigor and ethical conduct standards.

### **Summary**

Section 2 of the research proposal provided a comprehensive overview of the research design, methodology, and potential threats to the study's validity. This research

aimed to establish a correlation between CNAs' HPRD and residents' QM outcomes in Missouri LTCFs. To ensure the validity of the findings, I included the 508 LTCFs in the study for the year January 1 to December 31, 2022. All variables must be present for each facility to be included in the study analysis.

Section 3 provides an outline of the data collection process and analysis methods that will be used to obtain and analyze the data. I was committed to adopting sound research practices to provide reliable and accurate results. I recognized that the validity of this study depended on the data's quality, and I took measures to ensure its accuracy and reliability.

### Section 3: Presentation of the Results and Findings

#### **Introduction**

Through this quantitative study, I aimed to investigate whether there was a correlation between CNA HPRD and the QM outcomes for Missouri LTCF residents. This study focused on three QM outcomes: UTIs, pressure ulcers, and major falls with injuries. The study research questions and hypotheses were as follows. The research problem addressed in this study was the need to determine if a relationship exists between CNAs' HPRD and resident QM outcomes, including UTIs, pressure ulcers, and major falls among residents living in Missouri LTCFs.

RQ1: What is the correlation between UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities?

$H_01$ : There is no statistically significant correlation between the occurrence of UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities.

$H_{a1}$ : There is a statistically significant correlation between the occurrence of UTIs and certified nurse aides' hours per resident day in Missouri's long-term care facilities.

RQ2: What is the correlation between pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities?

$H_02$ : There is no statistically significant correlation between occurrences of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities.

*H<sub>a2</sub>*: There is a statistically significant correlation between occurrences of pressure ulcers and certified nurse aides' hours per resident day in Missouri long-term care facilities.

RQ3: What is the correlation between major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities?

*H<sub>o3</sub>*: There is no statistically significant correlation between the occurrence of major falls and certified nurse aides' hours per resident day in Missouri long-term care facilities.

*H<sub>a3</sub>*: There is a statistically significant correlation between the occurrence of certified nurse aides' hours per resident day in Missouri long-term care facilities.

Section 3 addresses the secondary dataset's data collection, the results of testing the study's research questions, hypotheses, and a summary.

### **Data Collection**

The information about Missouri LTCFs was obtained from the Provider Information database and MDS Quality Measures dataset on the CMS website. Provider Information and MDS Quality Measure datasets are public databases containing information about Missouri LTCFs from January 2022 through December 31, 2022. Variables obtained from these databases were the percentage of UTIs, percentage of pressure ulcers, percentage of major falls, and reported CNA's HPRD. This study was based on secondary data collected by CMS and updated in September 2023. The dataset included 508 Missouri LTCFs. The September 2023 update was the most current dataset

accessible to the general public during this study. The discrepancies in the use of the secondary data were missing data, and after removing missing data, a total of 456 Missouri LTCFs were included in the analysis. This sample is representative of the population of LTCFs in Missouri during the data collection period from January 2022 to December 31, 2022. The sample cannot be extrapolated to LTCFs in other states or countries. I analyzed the data to identify variables for the correlation, if any, between the occurrence of UTIs, pressure ulcers, major falls, and CNAs' HPRD in Missouri's LTCFs.

Descriptive statistics, bivariate correlations, and coefficient and multiple regression analysis were used to evaluate the four variables. SPSS Version 28.0 was used to analyze the data. Descriptive statistics for the 456 Missouri LTCFs without missing data are shown in Table 3. These values were computed to portray the study sample.

The LTCFs within the study dataset reported having an average of 69.9 residents daily ( $SD = 33.75$ ) and had a 2.25 average staffing rating ( $SD = 1.28$ ). CNAs made up the bulk of hours per resident per day, with an average of 2.12 ( $SD = 0.62$ ) hours compared to the total staff hours of 2.87 ( $SD = 0.91$ ). The percentage of residents with UTI, pressure ulcers, and falls with major injuries varied substantially in the dataset. The mean percentage of residents with UTIs was 3.24 ( $SD = 3.34$ ), ranging from 0 to more than 17%. The percentage of residents with pressure ulcers was higher than that with UTIs, ranging between 0 and 32.14% and having a mean value of 8.82 ( $SD = 5.3$ ). An average of 3.98% ( $SD = 2.68$ , Range 0.00-15.85) of residents had one or more falls with major injuries.

Facility-reported incidents, substantiated complaints, citations from infection



control inspections, fines, and penalties are also included in Table 3. These values also varied widely in the sample. The 456 LTCFs reported an average of 1.5 incidents ( $SD = 3.12$ ). Substantiated complaints were much higher than self-reported incidents. On average, nearly eight complaints were logged per LTCF, ranging from 0 to 162. Infection control inspection citations were below one per facility ( $M = 0.74$ ,  $SD = 1.52$ ), on average, while fines ( $M = 2.98$ ,  $SD = 5.04$ ) and penalties ( $M = 3.35$ ,  $SD = 5.27$ ) were closer to three per facility.

**Table 3**

*Descriptive Statistics for 456 Missouri Long-Term Care Facilities Without Missing Data*

	<i>N</i>	Mean	<i>SD</i>	Min-Max
Average number of residents per day	456	69.90	33.75	6.30-257.00
Staffing rating	451	2.25	1.28	1.00-5.00
Total staff hours per resident per day	456	2.87	0.91	0.02-7.24
CNA hours per resident per day	456	2.12	0.62	0.00-5.25
Residents with a UTI (%)	456	3.24	3.34	0.00-17.39
Residents with pressure ulcers (%)	456	8.82	5.30	0.00-32.14
Residents with 1+ falls with major injury (%)	456	3.98	2.68	0.00-15.85
Number of facility-reported incidents	456	1.50	3.12	0.00-39.00
Number of substantiated complaints	456	7.98	17.32	0.00-162.00
Number of citations from infection control inspections	443	0.74	1.52	0.00-15.00
Number of fines	456	2.98	5.04	0.00-57.00
Total number of penalties	456	3.35	5.27	0.00-57.00

*Note.* Data were obtained from the CMS dataset, 2022–2023.

## Results

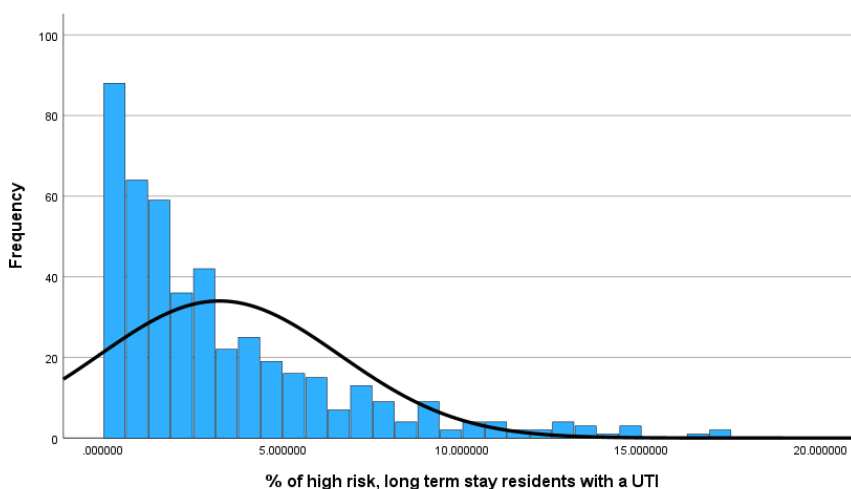
I entered secondary data into SPSS Version 28 and checked for missing values and errors using the frequencies procedure. There were 508 Missouri LTCFs in the data file, of which 54 had missing data. After I removed the 54 missing cases, the total sample size was 456.

## Variable Distribution and Descriptive Statistics

Figures 5–8 depict the distribution of study variables. Figure 5 is a histogram showing the distribution of the percentage of residents with a UTI. These values were positively skewed, with most on the lower end of the numeric scale ( $M = 3.24$ ,  $SD = 3.34$ ). The percentage of residents with pressure ulcers is portrayed in Figure 6. This variable was not as positively skewed as UTIs, but the percentages of pressure ulcers at the various LTCFs were higher ( $M = 8.82$ ,  $SD = 5.3$ , range = 0–32.14). Figure 7 shows the distribution of the percentage of residents with one or more falls with major injuries. As with the other outcome variables, the mean fall percentage ( $M = 3.98$ ,  $SD = 2.68$ ) was less than 10 and skewed positive. CNA HPRD is depicted in Figure 8. These values ranged between 0.00 and 5.25 hours with a mean of 2.12 ( $SD = 0.62$ ).

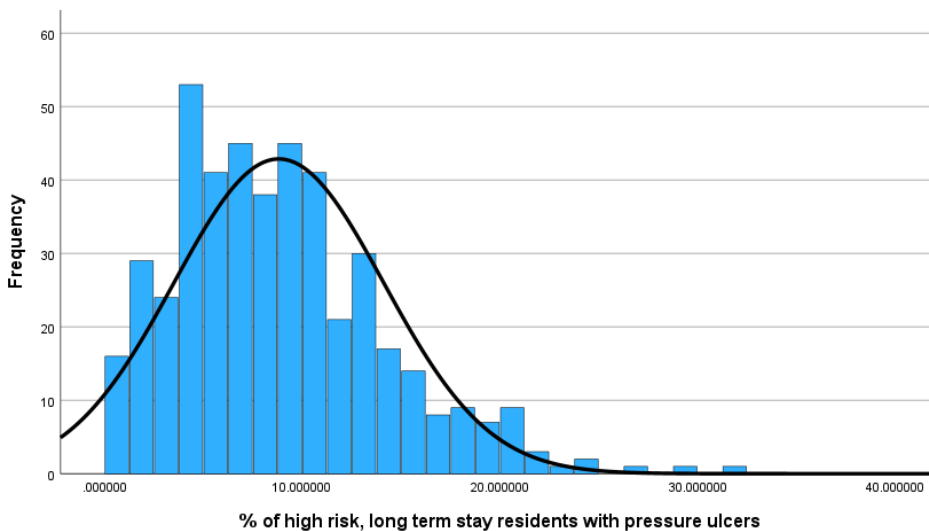
### Figure 5

*Histogram of Percentage of Residents With a Urinary Tract Infection*



**Figure 6**

*Histogram of Percentage of Residents with Pressure Ulcers*



**Figure 7**

*Histogram of Percentage of Residents With 1+ Falls With Major Injury*

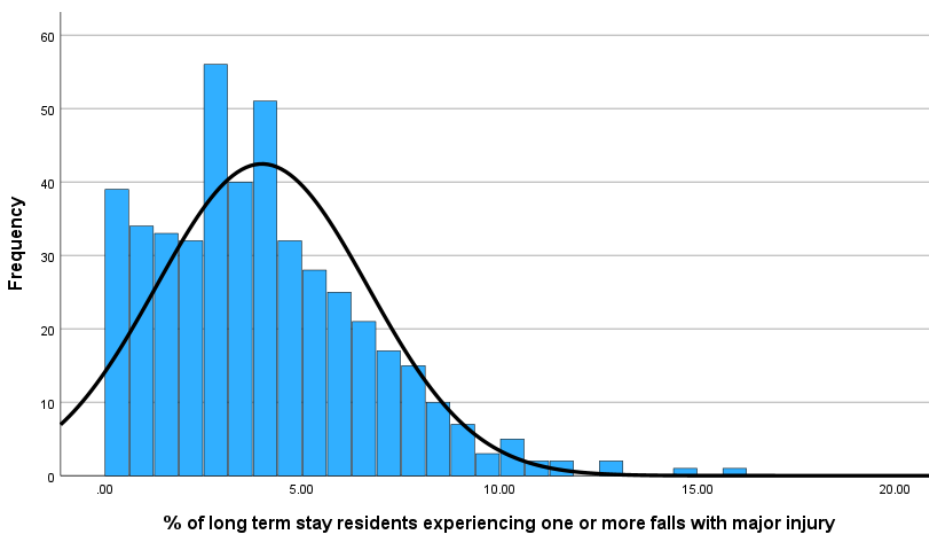
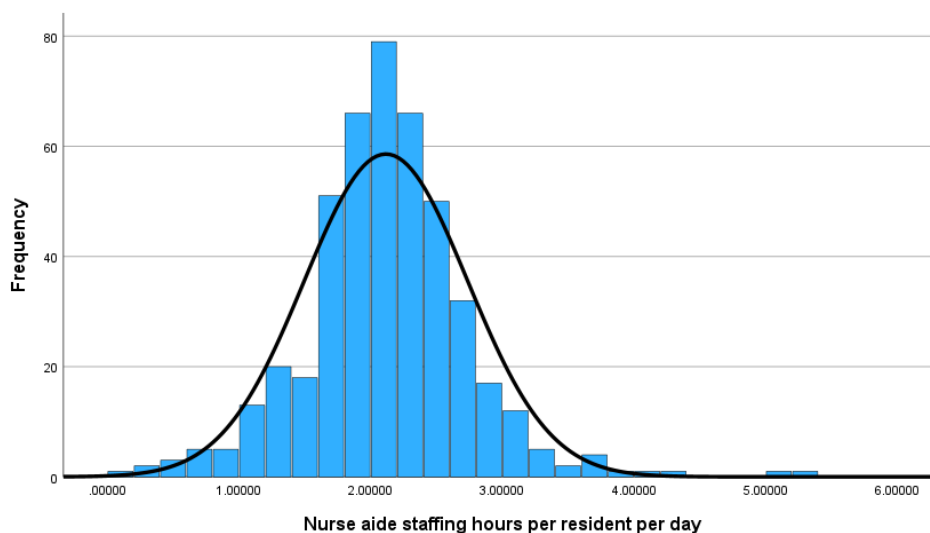


Figure 8

*Histogram of Certified Nurse Aides' Hours per Resident Day*

Variables of interest were tested for normality before analysis using histogram visual inspection and the Shapiro-Wilk test. All variables were nonnormally distributed. Shapiro-Wilk statistics for the nontransformed variables ranged from 0.829 for the percentage of residents with UTIs to 0.964 for CNA HPRD, and all tests had  $p$ -values  $<.001$  (see Table 4). Significant  $p$ -values indicate that the null hypothesis that the variables are typically distributed must be rejected. Nonnormality remained after the log + 1 variable transformation. After transformation, the Shapiro-Wilk statistics increased for all four variables, but the  $p$ -values remained significant. As the variables continued to be nonnormal after transformation, the original nontransformed variables were used in subsequent analyses.

**Table 4***Shapiro-Wilk Analysis for Study Variables*

Variable	Statistic	<i>n</i>	<i>p</i> -value
CNA hours per resident per day	.961	456	< .001
CNA hours per resident per day transformed	.935	456	< .001
Residents with a UTI (%)	.829	456	< .001
Residents with a UTI (%) transformed	.973	456	< .001
Residents with pressure ulcers (%)	.957	456	< .001
Residents with pressure ulcers (%) transformed	.942	456	< .001
Residents with 1+ falls with major injury (%)	.954	456	< .001
Residents with 1+ falls with major injury (%), transformed	.959	456	< .001

**Bivariate Correlations**

Two-tailed bivariate correlations were conducted to evaluate relationships between variables of interest. The nonnormal distribution of variables is required using the nonparametric Spearman's rank correlation (see Table 5). CNA hours per resident per day were unrelated to the percentage of residents with a UTI, pressure ulcers, and one or more falls with major injury (all  $p > .05$ ). Percentage of long-stay residents with a UTI was weakly inversely related to the percentage of long-stay residents with pressure ulcers ( $\rho =$

-.161,  $p < .001$ ) but weakly positively associated with the percentage of long-stay residents with one or more falls resulting in major injury ( $\rho = .330$ ,  $p < .001$ ).

**Table 5**

*Spearman Rank Correlation Analysis for Study Variables*

		CNA hours per resident per day	Residents with a UTI (%)	Residents with pressure ulcers (%)	Residents with 1+ major injury falls (%)
CNA hours per resident per day	$\rho$	1			
	<i>P</i> -value				
Residents with a UTI (%)	$\rho$	.530	1		
	<i>P</i> -value	.263			
Residents with pressure ulcers (%)	$\rho$	-.025	-.161	1	
	<i>P</i> -value	.593	< .001		
Residents with 1+ major injury falls (%)	$\rho$	.017	.330	-.077	1
	<i>P</i> -value	.720	< .001	.100	

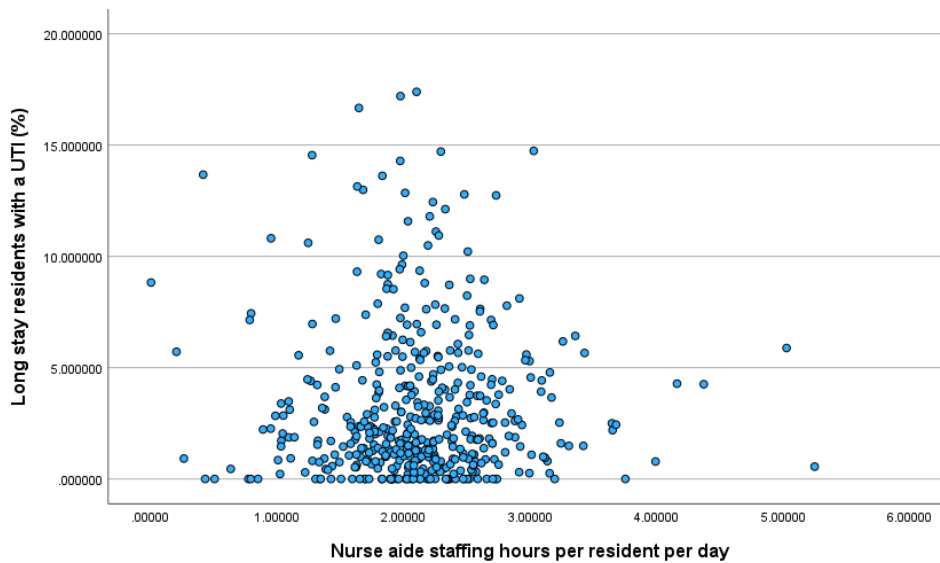
*Note.* Statistical analyses were performed on nontransformed variables. UTI = urinary tract infection.

Figures 9–11 are the scatterplots showing the relation between CNA HPRD and study outcomes. Resident outcomes are on the y-axis, and CNA HPRD is on the x-axis. Figure 9 depicts the lack of significant correlation between the percentage of UTIs and CNA HPRD. The values are clustered close between  $x = 1-3$  and  $y = 0-5$ , with no apparent linear relationship between variables. Figure 10 is a scatterplot with the values for the percentage of pressure ulcers among residents. This figure also shows no visible relationship between variables. Finally, Figure 11 is a scatterplot for the percentage of

residents with one or more major falls and CNA HPRD. The values were clustered around  $x = 1-3$  and  $y = 0-10$ , displaying no linear relationship.

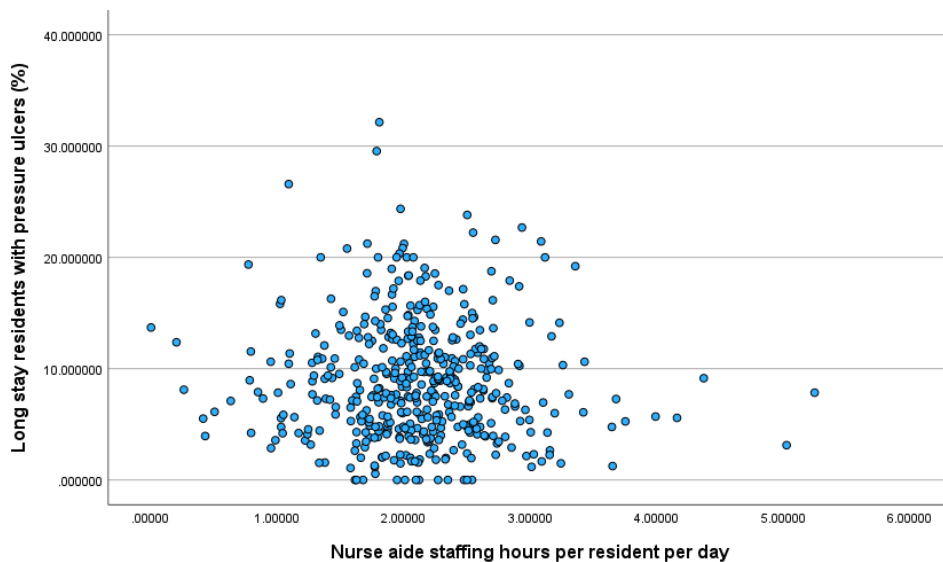
**Figure 9**

*Scatterplot of the Percentage of UTIs on Certified Nurse Aides' Hours per Resident Day*

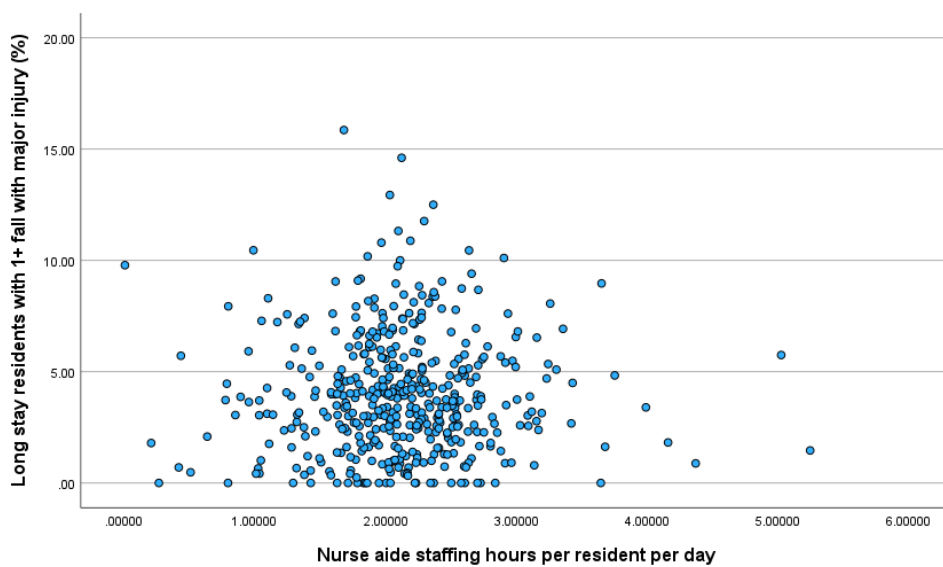


**Figure 10**

*Scatterplot of the Percentage of Pressure Ulcers on Certified Nurse Aides' Hours per Resident Day*

**Figure 11**

*Scatterplot of the Percentage of Major Falls on Certified Nurse Aides' Hours per Resident Day*





## Multiple Linear Regression

A multiple regression analysis was performed to determine whether the percentage of UTIs, pressure ulcers, and major falls with injuries predicted reported CNA's HPRD. The model captured 2% of the variance in CNA HPRD, as indicated by the  $R^2$  value. The F-test and  $p$ -value showed that the overall model of all four variables was insignificant,  $F(3, 452) = .366, p = .777$ . The regression coefficients were low for all outcomes:  $B = -.003$  ( $SEM = .009$ ) for the percentage of residents with a UTI,  $B = -.006$  ( $SEM = .006$ ) for the percentage of residents with pressure ulcers, and  $B = .002$  ( $SEM = .011$ ) for the percentage of residents with one or more falls with a major injury. The negative regression coefficients for UTIs and pressure ulcers indicate a negative relationship with CNA HPRD, and the positive regression coefficient for falls indicates a positive relationship with CNA HPRD. However, none of the relationships between the individual predictors and CNA HPRD were significant. This lack of significance is shown in Table 6 with  $p$ -values  $>.05$  and 95% confidence intervals that contain the number zero for all predictors.

**Table 6**

*Regression Coefficients for Quality Measures Outcomes and Certified Nurse Aides'*

*Hours per Resident Day*

	B	SEM	t	p-value	95% CI
Constant	2.167	.077	28.114	< .001	2.016, 2.319
Residents with a UTI (%)	-.003	.009	-.345	.730	-.021, .015
Residents with pressure ulcers (%)	-.006	.006	-1.02	.308	-.017, .005
Residents with 1+ falls with major injury (%)	.002	.011	.199	.843	-.020, .025

*Note.* Multiple regression analyses were performed on nontransformed variables.

### **Summary**

Spearman bivariate correlations and multiple regression analysis were conducted to address the research questions focused on the percentage of UTIs, pressure ulcers, major falls with injuries, and reported CNA HPRD in a total of 456 Missouri LTCFs. The results of the statistical analysis showed a nonnormal distribution of variables and no relationships between CNA hours per resident per day, percentage of long-stay residents with a UTI, percentage of long-stay residents with pressure ulcers, and percentage of long-stay residents with one or more falls resulting in major injury. The null hypotheses for all the RQs failed to be rejected.

Section 4 is a summary of this study. It will reiterate the purpose and nature of the study in the introduction section. Section 4 will also include an interpretation of the findings discussed in Section 3, limitations of the study, recommendations for future research on this topic, implications for professional practice, social change, and a conclusion.

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

### **Introduction**

For this quantitative secondary data analysis, I examined the relationship between reported CNA HPRD and resident QM outcomes, including the percentage of UTIs, pressure ulcers, and major falls with injuries in Missouri LTCFs. I used Spearman's correlation and multiple regression analysis to examine these relationships. The study's data were gathered from the publicly available CMS Provider Information and MDS Quality Measure datasets.

I conducted this study to enhance scholarly understanding of the connections between adverse resident health-related outcomes and HPRD among CNAs in Missouri LTCFs to inform CNHAs, DONs, owners, and policymakers. In this section, I interpret the findings and discuss the study's limitations. Section 4 also includes recommendations for future studies with similar goals and the implications of this study for positive social change.

### **Interpretation of the Findings**

This study observed no statistically significant relationships between resident QM outcomes and CNA HPRD among this sample of Missouri LTCFs. Evidence suggests that CNA HPRD may impact resident QM outcomes. Kimmey and Stearns (2015) showed that low CNA staffing hours increased the percentage of pressure ulcers and falls among residents, whereas a high level of staffing hours among CNAs decreased the percentage of adverse QM outcomes. Nelson (2023) suggested that increasing CNA HPRD may reduce the number of UTIs among residents. Researchers stated that research

is lacking in this area and that further work is needed to determine if HPRD among CNAs is correlated to resident QM outcomes such as the ones evaluated in this study (Griffiths et al., 2020; Harrington et al., 2020; Young et al., 2022).

The Donabedian model was used as a framework for this study. Although the literature indicates that LTCFs have successfully applied the Donabedian model to their organizational practices to improve resident QoC (Berwick & Fox, 2016), null findings were present in this study report. Another potential concern discussed by Konetzka et al. (2020), Konetzka et al. (2022), and Perrailon et al. (2019) is that facilities may not be reporting comprehensive information to the Nursing Home Compare (NHC) website, as maintaining high ratings is highly valued for bringing in new admissions from residents and family members. If facilities are not reporting adequate information, this could also affect the data that CMS collects, which may have altered the results of this study.

While this study did not expressly incorporate CNA turnover as a dependent variable in its statistical analyses, other studies have indicated that this turnover is a critical issue to consider when discussing HPRD. LTCFs continue to experience a CNA shortage; high turnover rates, low compensation, and heavy workload-related burnout are likely culprits. LTCF leaders must address systemic problems to mitigate burnout. Raising pay rates and increasing HPRD are two meaningful steps these leaders can take to improve working conditions in LTCFs, which will better attract and keep a CNA workforce. Increasing training hours from 75 to 120, as the National Consumer Voice for Quality Long-Term Care (2022) recommended, and involving CNAs in resident care

plans may also improve the ongoing turnover and shortage issues by showing these individuals that they are an essential part of the patient care team.

Previous evidence points to a CNA HPRD threshold of 2.8 to increase resident QoC. Missouri does not have a minimum staffing requirement for CNAs, as specified in the Musumeci et al.'s (2022) report (see Figure 3). Research conducted by the National Consumer Voice for Quality Long-Term Care (2021) and the Federal Register (Medicare and Medicaid Programs, 2023) supported this claim, indicating that if CNAs' HPRD were increased to a minimum of 2.8 or 3 HPRD, it would decrease the occurrence of UTIs, pressure ulcers, and major falls. Descriptive statistics shown in Table 1 show that the mean staffing HPRD is 2.12, a meager value according to federal recommendations. The Federal Register (Medicare and Medicaid Programs, 2023) stated that an HPRD of 2.8 or 3.2 is optimal when the workload is low or heavy, respectively.

### **Limitations of the Study**

While this study had many strengths, it also had some potential limitations that should be discussed. One limitation of this study was that it utilized secondary self-reported data, including LTCF self-report data, to the NHC website. Quality rating scores are of serious concern to these organizations. LTCFs are incentivized to maintain high-quality rating scores to appeal to new residents. The reported information might not be completely accurate. The degree to which reported information is falsified cannot be determined (Konetzka et al., 2022; Perrailon et al., 2019). Another limitation of this study was that only reported CNA HPRD was used and not total nursing staff HPRD, including RN and LPN HPRD. CNAs were selected for this study because they spend the

most time conducting patient care out of any LTCF staff member. Incorporating the total HPRD for all nursing positions may have altered the study results. The use of a 1-year time frame from January 1 to December 31, 2022, was another potential limitation of this study. Temporal shifts may cause variation in annual results. Comparing study variables across a 5-year time frame might have shown a relation between the four variables. Lastly, only Missouri LTCFs were included in this study. The results of this study cannot be extrapolated to other U.S. states or internationally.

### **Recommendations**

This study showed no significant relationships between reported CNA HPRD, UTIs, pressure ulcers, and major falls, results that conflict with other studies in the available literature. Additional qualitative and quantitative data must be evaluated to help fill the gap between CNA HPRD and resident QM outcomes in Missouri LTCFs. Directly observing a facility and gathering information from CNAs, other staff, and residents would improve the accuracy of whether CNA HPRD correlates to resident QM outcomes for UTIs, pressure ulcers, and major falls resulting in injuries.

Another recommendation would be for leadership such as CNHAs, DONs, and policymakers to implement new policies to increase Missouri CNA HPRD to ensure that residents receive adequate hours of QoC from CNA staff. Also, CNHAs, DONs, RNs, and LPNs need to understand better and listen to CNAs' concerns about patient care. Better communication skills between CNAs and their supervisors would help improve the QoC that residents receive.

CNAs conduct more patient care tasks than any other nursing staff member. Including these individuals in resident care planning and decision-making is a logical next step to improve resident QM outcomes and subsequent CMS 5-star quality ratings. The CMS 5-star quality rating system was implemented to rate facilities based on nursing staffing, staff turnover, and QM outcomes among residents (CMS, 2023). If CNAs were more closely involved in resident care plans, LCTF turnover rates might decrease low CNA HPRD and poor resident QM outcomes.

### **Implications for Social Change**

Although this study showed no significant relationship between the four variables (UTIs, pressure ulcers, major falls, and CNA HPRD), other researchers have indicated these correlations exist. Kimmey and Stearns (2015) asserted that there are probable relationships between these variables (see Figure 2). Other researchers (Griffiths et al., 2020; Harrington et al., 2020; Young et al., 2022) contended that more research is needed to close the gap in knowledge concerning CNA HPRD and QM outcomes such as UTIs, pressure ulcers, and major falls among LTCF residents.

Previous studies have shown that low HPRD among CNAs can lead to poor QM outcomes in LTCFs, such as UTIs, pressure ulcers, and major falls (Griffiths et al., 2020; Harrington et al., 2020; Kimmey & Stearns, 2015; Young et al., 2022). This is why healthcare providers need to understand the relationship between these variables in LTCFs. By doing so, healthcare providers can implement strategies that will help improve residents' QM outcomes in Missouri LTCFs.

This finding may impact positive social change by ruling out a correlation between UTIs, pressure ulcers, and major falls. However, further study is needed to consider other variables that may impact QoC. The social change impact is that continued investigation is required to discover what factors affect resident QoC, such as CNA turnover, resident weight loss, or health citations. Further investigation is needed to determine what influences resident care, which may lead to positive social change.

### **Conclusion**

The primary objective of this research was to examine the relationship between CNA HPRD and resident QM outcomes for residents in Missouri LTCFs. This study investigated the occurrence of three QM (i.e., UTIs, pressure ulcers, and major falls) outcomes and their correlation with CNA HPRD. The research methodology employed a quantitative approach, utilizing Spearman's correlation and multiple regression analysis to analyze the relationship between the four variables. The analysis included data collected from January 1 to December 31, 2022, and the findings showed no significant relationships between the four variables.

This study provides insight into the impact of CNA staffing on resident QM outcomes and may help inform CNHAs, DONs, and policymakers on the importance of CNA HPRD. Missouri LTCFs, CNHAs, DONs, and policymakers must realize the importance of CNAs within their organization and their value toward resident QoC. Future studies must also acknowledge the significance of CNAs in LTCFs. Suppose greater emphasis is placed on CNAs through providing better employment settings, wages, and inclusion in resident care plans. In that case, the number of UTIs, pressure



ulcers, and major falls resulting in injuries among residents may decrease. Although the roles of RNs and LPNs are also important, they lack the same resident-focused workload as CNAs. CNAs can be considered the first responders in an LTCF. They can report if residents show signs of confusion, which may indicate a UTI; they are the first to observe a red spot before it develops into a pressure ulcer, and they can prevent residents from falling by getting to them promptly. This is why it is vital to increase CNAs' HPRD to allow them more time to care for each resident.

## References

- Armstrong, P., Armstrong, H., & Bourgeault, I. L. (2023, January). Teaming up for long-term care: Recognizing all long-term care staff contributes to quality care. In *Healthcare management forum* (Vol. 36, No. 1, pp. 26–29). SAGE Publications. <https://doi.org/10.1177/08404704221115811>
- Berwick, D., & Fox, D. M. (2016). “Evaluating the quality of medical care”: Donabedian’s classic article 50 years later. *The Milbank Quarterly*, *94*(2), 237–241. <https://doi.org/10.1111/1468-0009.12189>
- Beynon, C., Supiano, K., Siegel, E. O., Edelman, L. S., Hart, S. E., & Madden, C. (2021). It is all about nurse aides. *Journal of Long-Term Care*, *2021*, 356–364. <https://doi.org/10.31389/jltc.103>
- Bhattacharyya, K. K., Craft Morgan, J., & Burgess, E. O. (2022). Person-centered care in nursing homes: Potential of complementary and alternative approaches and their challenges. *Journal of Applied Gerontology*, *41*(3), 817–825. <https://doi.org/10.1177/07334648211023661>
- Binder, C., Torres, R. E., & Elwell, D. (2021). Use of the Donabedian model as a framework for COVID-19 response at a hospital in Suburban Westchester County, New York: A facility-level case report. *Journal of Emergency Nursing*, *47*(2), 239–255. <https://doi.org/10.1016/j.jen.2020.10.008>
- Boscart, V. M., Sidani, S., Poss, J., Davey, M., d’Avernas, J., Brown, P., Heckman, G., Ploeg, J., & Costa, A. P. (2018). The associations between staffing hours and

- quality of care indicators in long-term care. *BMC Health Services Research*, 18(1), Article 750. <https://doi.org/10.1186/s12913-018-3552-5>
- Bowblis, J. R. (2022). The need for an economically feasible nursing home staffing regulation: Evaluating an acuity-based nursing staff benchmark. *Innovation in Aging*, 6(4), 1–11. <https://doi.org/10.1093/geroni/igac017>
- Bowblis, J. R., & Hyer, K. (2013). Nursing home staffing requirements and input substitution: Effects on housekeeping, food service, and activities staff. *Health Services Research*, 48(4), 1539–1550. <https://doi.org/10.1111/1475-6773.12046>
- Boyle, D. K., Jayawardhana, A., Burman, M. E., Dunton, N. E., Staggs, V. S., Bergquist-Beringer, S., & Gajewski, B. J. (2016). A pressure ulcer and fall rate quality composite index for acute care units: A measure development study. *International Journal of Nursing Studies*, 63, 73–81. <https://doi.org/10.1016/j.ijnurstu.2016.08.020>
- Carr-Marcel, T. (2014). *The relationship between nursing home administrator leadership styles and quality measures in Medicare 3.0* (Publication No. 1615348807) [Doctoral dissertation, Capella University]. ProQuest Dissertations and Theses Global.
- Centers for Medicare and Medicaid Services. (2023, September). *Design for care compare nursing home five-star quality rating system: Technical users' guide*. <https://www.cms.gov/medicare/provider-enrollment-and-certification/certificationandcompliance/downloads/usersguide.pdf>

Centers for Medicare and Medicaid Services. (n.d.). *MDS quality measures*.

<https://data.cms.gov/provider-data/dataset/djen-97ju>

Centers for Medicare and Medicaid Services.

(2023, June 28). *Provider information*. <https://data.cms.gov/provider-data/dataset/4pq5-n9py>

Clemens, S., Wodchis, W., McGilton, K., McGrail, K., & McMahon, M. (2021). The relationship between quality and staffing in long-term care: A systematic review of the literature 2008–2020. *International Journal of Nursing Studies*, *122*, Article 104036 <https://doi.org/10.1016/j.ijnurstu.2021.104036>

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed method approaches*. SAGE Publications.

Dreher, M. M., Hughes, R. G., Handley, P. A., & Tavakoli, A. S. (2019). Improving retention among certified nursing assistants through compassion fatigue awareness and self-care skills education. *Journal of Holistic Nursing*, *37*(3), 296–308. <https://doi.org/10.1177/0898010119834180>

Fashaw, S. A., Thomas, K. S., McCreedy, E., & Mor, V. (2020). Thirty-year trends in nursing home composition and quality since the passage of the Omnibus Reconciliation Act. *Journal of the American Medical Directors Association*, *21*(2), 233–239. <https://doi.org/10.1016/j.jamda.2019.07.004>

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G\* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>

- Frankfort-Nachmias, C., Leon-Guerrero, A., & Davis, G. (2021). *Social statistics for a diverse society*. SAGE Publications.
- Franzosa, E., Mak, W., R Burack, O., Hokenstad, A., Wiggins, F., Boockvar, K. S., & Reinhardt, J. P. (2022). Perspectives of certified nursing assistants and administrators on staffing the nursing home frontline during the COVID-19 pandemic. *Health Services Research*, 57(4), 905–913.  
<https://doi.org/10.1111/1475-6773.13954>
- Gaines, K. (2023b, April). *Nursing home administrator*. Nurse.  
<https://nurse.org/healthcare/nursing-home-administrator/>
- Gaines, K. (2023a, April 9). *7 steps to becoming a director of nursing*. Nurse.  
<https://nurse.org/resources/nursing-director/>
- Gaugler, J. E., Yu, F., Davila, H. W., & Shippee, T. (2014). Alzheimer’s disease and nursing homes. *Health Affairs*, 33(4), 650–657.  
<https://doi.org/10.1377/hlthaff.2013.1268>
- Grabowski, D. C. (2020, August). *Strengthening nursing home policy for the post-pandemic world: How can I improve residents’ health outcomes and experiences?* New York: Commonwealth Fund.  
[https://www.commonwealthfund.org/sites/default/files/2020-08/Grabowski\\_strengthening\\_nursing\\_home\\_policy\\_postpandemic\\_ib.pdf](https://www.commonwealthfund.org/sites/default/files/2020-08/Grabowski_strengthening_nursing_home_policy_postpandemic_ib.pdf)
- Griffiths, P., Saville, C., Ball, J., Jones, J., Pattison, N., Monks, T., & Safer Nursing Care

- Study Group. (2020). Nursing workload, nurse staffing methodologies and tools: A systematic scoping review and discussion. *International Journal of Nursing Studies*, *103*, Article 103487. <https://doi.org/10.1016/j.ijnurstu.2019.103487>
- Gustafsson, N., Leino-Kilpi, H., Prga, I., Suhonen, R., & Stolt, M. (2019). Missed care from the patient's perspective – a scoping review. *Patient Preference and Adherence*, *14*, 383–400. <https://doi.org/10.2147/PPA.S238024>
- Harrington, C., Dellefield, M. E., Halifax, E., Fleming, M. L., & Bakerjian, D. (2020). Appropriate nurse staffing levels for US nursing homes. *Health Services Insights*, *13*. <https://doi.org/10.1177/1178632920934785>
- Harrington, C., & Edelman, T. S. (2018). Failure to meet nurse staffing standards: A litigation case study of a large US nursing home chain. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *55*.  
<https://doi.org/10.1177/0046958018788686>
- Harris-Kojetin, L. D., Sengupta, M., Lendon, J. P., Rome, V., Valverde, R., & Caffrey, C. (2019, February). *Long-term care providers and services users in the United States, 2015-2016*. Centers for Disease Control and Prevention.  
<https://stacks.cdc.gov/view/cdc/76253>
- Kimmey, L. D., & Stearns, S. C. (2015). Improving nursing home resident outcomes: Time to focus on more than staffing? *The Journal of Nursing Home Research*, *1*, 89–95. <https://doi.org/10.14283/jnhrs.2015.18>
- Kittles, D. V. (2021). *Examining Nursing Home Staff Turnover Rate in Long-Term Care Organizations in the United States* (Doctoral dissertation, Walden University).

Konetzka, R. T., Davila, H., Brauner, D. J., Cursio, J. F., Sharma, H., Werner, R. M., Park, Y. S., & Shippee, T. P. (2022). The quality measures domain in nursing homes compare: is high performance meaningful or misleading? *The Gerontologist*, 62(2), 293–303. <https://doi.org/10.1093/geront/gnab054>

Konetzka, R. T., Yan, K., & Werner, R. M. (2020). Two decades of nursing home compare: What have we learned? *Medical Care Research and Review*, 78(4), 295–310. <https://doi.org/10.1177/1077558720931652>

Medicare and Medicaid Programs; Minimum Staffing Standards for Long-Term Care Facilities and Medicaid Institutional Transparency Reporting, 88 F.R. 61352 (proposed September 6, 2023).

<https://www.federalregister.gov/documents/2023/09/06/2023-18781/medicare-and-medicaid-programs-minimum-staffing-standards-for-long-term-care-facilities-and-medicaid>

*Minimum Data Set (MDS) - Nursing Home Assessment - SEER-Medicare*. (2021, April 30).

<https://healthcaredelivery.cancer.gov/seermedicare/medicare/mds.html#:~:text=In%20October%202010%2C%20the%20Centers,prior%20versions%20of%20the%20MDS.>

Mukamel, D. B., Saliba, D., Ladd, H., & Konetzka, R. T. (2022). Daily variation in nursing home staffing and its association with quality measures. *JAMA Network Open*, 5(3), Article e222051. <https://doi.org/10.1001/jamanetworkopen.2022.2051>

Musumeci, M., Childress, E., & Harris, B. (2022, May 16). *State actions to address*

*nursing home staffing during COVID-19*. KFF.

<https://www.kff.org/medicaid/issue-brief/state-actions-to-address-nursing-home-staffing-during-covid-19/>

The National Academies Press. (1996). *Staffing and quality of care in nursing homes*.

Nursing staff in hospitals and nursing homes - NCBI Bookshelf.

<https://www.ncbi.nlm.nih.gov/books/NBK232673/>

The National Consumer Voice for Quality Long-Term Care. (2022, September 8). *High staff turnover: A job quality crisis in nursing homes*.

<https://theconsumervoice.org/news/detail/all/nh-staff-turnover-report>

The National Consumer Voice for Quality Long-Term Care. (2021, November). *State nursing home staffing standards summary report - The consumer's voice*.

[https://theconsumervoice.org/uploads/files/issues/CV\\_StaffingReport\\_summary.pdf](https://theconsumervoice.org/uploads/files/issues/CV_StaffingReport_summary.pdf)

Nelson, N. (2023). *The correlation between nurse staffing and quality of care outcomes within nursing homes in Mississippi* (Publication No. 30419280)

[Doctoral dissertation, Walden University]. ProQuest Dissertations and Theses Global.

Osteen, S. R. (2017, April 1). *Understanding long-term care*. Oklahoma State University.

<https://extension.okstate.edu/fact-sheets/understanding-long-term-care.html>

Peerman, C. H. (2019). *Leadership styles among Virginia nursing home administrators: A quantitative investigation* (Order No. 27664244) [Doctoral dissertation,

Concordia University]. ProQuest Dissertations and Theses Global.



- Perrailon, M. C., Brauner, D. J., & Konetzka, R. T. (2019). Nursing home response to nursing home compare: The provider perspective. *Medical Care Research and Review*, 76(4), 425–443. <https://doi.org/10.1177/1077558717725165>
- Perruchoud, E., Weissbrodt, R., Verloo, H., Fournier, A., Genolet, A., Amoussou, J. R., & Hannart, S. (2022). The impact of nursing staffs' working conditions on the quality of care received by older adults in long-term residential care facilities: a systematic review of interventional and observational studies. *Geriatrics*, 7(1). <https://doi.org/10.3390/geriatrics7010006>
- Reith, T. P. (2018). Burnout in United States healthcare professionals: A narrative Review. *Cureus*, 10(12), Article e3681. <https://doi.org/10.7759/cureus.3681>
- Ryskina, K. L., Konetzka, R. T., & Werner, R. M. (2018). Association between 5-star nursing home report card ratings and potentially preventable hospitalizations. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 55. <https://doi.org/10.1177/0046958018787323>
- Shin, J. H., Renaut, R. A., Reiser, M., Lee, J. Y., & Tang, T. Y. (2021). Increasing registered nurse hours per resident day for improved nursing home residents' outcomes using a longitudinal study. *International Journal of Environmental Research and Public Health*, 18(2), Article 402. <https://doi.org/10.3390/ijerph18020402>
- Stephens, T. K. (2018). *The relationship between nurse staffing and quality outcomes in Georgia nursing homes* [Doctoral dissertation, Walden University]. <https://scholarworks.waldenu.edu/dissertations/5421>

- Travers, J. L., Caceres, B. A., Vlahov, D., Zaidi, H., Dill, J. S., Stone, R. I., & Stone, P. W. (2021). Federal requirements for nursing homes to include certified nursing assistants in resident care planning and interdisciplinary teams: A policy analysis. *Nursing Outlook*, 69(4), 617–625. <https://doi.org/10.1016/j.outlook.2021.01.004>
- U.S. Department of Health and Human Services. (2018). *Long-term services and supports: Direct care worker demand projections, 2015-2030*. <https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/data-research/hrsa-ltts-direct-care-worker-report.pdf>
- Weech-Maldonado, R., Pradhan, R., Dayama, N., Lord, J., & Gupta, S. (2019). Nursing home quality and financial performance: Is there a business case for quality? *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 56. <https://doi.org/10.1177/0046958018825191>
- Young, C. C., Kesler, S., Walker, V. G., Johnson, A., & Harrison, T. C. (2022). An online mindfulness-based intervention for certified nursing assistants in long-term care. *Journal of Holistic Nursing*, 41(2), 130–141. <https://doi.org/10.1177/08980101221105709>
- Yuan, Y., Lapane, K. L., Tjia, J., Baek, J., Liu, H., & Ulbricht, C. M. (2021). Trajectories of physical frailty and cognitive impairment in older adults in United States nursing homes. *BMC Geriatrics*, 22(1), Article 339. <https://doi.org/10.1186/s12877-022-03012-8>
- Zhang, X., & Grabowski, D. C. (2004). Nursing home staffing and quality under the

Nursing Home Reform Act. *The Gerontologist*, 44(1), 13–23.

<https://doi.org/10.1093/geront/44.1.13>

Zhu, A., Yan, L. L., Wu, D., James, P., Zeng, Y., & Ji, J. S. (2019). Residential greenness, activities of daily living, and instrumental activities of daily living: A longitudinal cohort study of older adults in China. *Environmental Epidemiology*, 3(5), Article e065. <https://doi.org/10.1097/EE9.0000000000000065>

## Appendix A: Data Sources

Provider Information. *Data. CMS.gov Centers for Medicare and Medicaid Services.*

<https://data.cms.gov/provider-data/dataset/4pq5-n9py>

MDS Quality Measures. *Data. CMS.gov Centers for Medicare and Medicaid Services.*

<https://data.cms.gov/provider-data/dataset/djen-97ju>