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Relationship Between Nurse Staffing and Quality of Care in Louisiana Nursing Homes

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2016

Abstract

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MA, University of Sacred Heart, 2009

BS, University of Puerto Rico, 2005

Dissertation Submitted in Partial Fulfillment

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Abstract

In 2014, Louisiana experienced substantive issues with quality of care in nursing homes. The state had the lowest nurse staffing level among all states, and 7,666 deficiencies for immediate jeopardy violations were recorded from 2011 to 2013. Despite ample research on nurse staffing and quality of care, there is no consensus on how higher nurse staffing relates to quality. The purpose of this quantitative, correlational research was to determine the relationship between nurse staffing levels and quality measures in Louisiana. Donabedian's category structure, process, and outcome was the conceptual framework used to develop the research questions. The data included the quality of care deficiency score and the quality measures found in the Centers for Medicare and Medicaid datasets. The quality measures were the deficiencies and the prevalence of nursing home residents with pressure ulcers, urinary tract infections, and physical restraints. Generalized linear models were used to analyze the relationship between nurse staffing levels and the quality measures. The findings suggested that RNs, nonprofits, chain-affiliated nursing homes, and smaller facilities are important to improve the quality of care in Louisiana nursing homes. These variables were associated with fewer quality of care deficiencies and fewer pressure ulcers. These findings have implications for social change. This information may help inform and direct policy makers in the development and implementation of Medicaid-managed long-term services and supports programs in order to improve the quality of care of a vulnerable population: the elderly and disabled.

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Dedication

To my grandfather in heaven, Raul Santana-Vidal, “Paparul,” who called me “doctor” even before I knew I was going to study a Ph.D. To you in heaven, I love you.

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I am very grateful of my committee chair, Dr. Robert Hoye, for his continuous guidance and support through out this journey. I will always appreciate his honesty, patience, words of motivation, quick responses, and guidance to meet Walden University high standards. Dr. Hoye demonstratred that he cares about his students, their academic progress, and their achievements. In addition, I want to aknowledge my committee member, Dr. Jim Goes, for his high expectations and for guiding me to achieve excellence.

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Chapter 1: Introduction to the Study

Introduction

Concurrent with the increase in the cost of health care in the United States, the number of elderly people in the country is expected to double by the year 2030 (United States Census Bureau, 2014a). This population increase will require additional nursing home services, further adding to the 2012 $2.8 trillion total annual cost of health care (Centers for Medicare & Medicaid Services [CMS], 2014a). In addition to financial constraints, the quality of care in nursing homes continues to be a concern for residents, families, federal and state government, and policy makers (Castle & Ferguson, 2010). The U.S. Government Accounting Office (GAO, 2003) determined that in 2000, residents in nearly one third (29%) of nursing homes were harmed or their health was jeopardized because of poor quality of care.

The growing costs of health care, economic constraints, and demands for improved quality of care in nursing homes are forcing states to provide better care but with fewer resources (Shi & Singh, 2008). To improve quality of care in this setting at costs, state legislatures have been planning to change or changing Medicaid and long-term care services (CMS, 2013a), including managed care programs for the elderly and disabled, which are the costliest and most vulnerable population. Among all states, Louisiana ranks low in nurse staffing levels and several other quality of care outcomes, and it has one of the highest percentages of residents over the age of 85 (Purpera, Pendas, & Edmonson, 2014). The state's legislators are in the process of planning Medicaid-

managed long-term services and supports (MLTSS) programs for the elderly and for Medicaid beneficiaries who are both elderly and disabled (Purpera et al., 2014).

Donabedian (1988) stated that the structure of care (e.g., staffing) may have an effect on the processes of a health care facility (e.g., physical restraint use) and on the outcomes of care (e.g., pressure ulcers). Although Abt Associates, Inc. (2001) suggested higher nurse staffing is associated with good quality of care, Backhaus, Verbeek, van Rossum, Capezuti, and Hamers (2014), among others, have found less favorable results with regard to nurse staffing and restraint use, among others. The contradictory findings may reflect the different ways in which staffing and quality of care have been measured in different studies (Arling & Mueller, 2014; Backhaus et al., 2014).

The purpose of the study was to determine whether there is a relationship between nurse staffing and process measures (quality of care deficiencies and restraint use) and between nurse staffing and outcome measures (pressure ulcers and urinary tract infections). These measures are contained within the CMS Nursing Home Compare database (CMS, 2012a). The study was undertaken to help Louisiana's policy makers establish an appropriate nurse staffing level to improve the quality of care offered residents of nursing homes.

Funding constraints in the health care industry and quality of care in nursing homes concern policymakers, health care organizations, administrators, residents, and families (Castle & Ferguson, 2010). The results of this study are expected to advance understanding of the relationship between nurse staffing levels and nursing home quality of care in Louisiana; the results may help Louisiana's policy makers make better-

informed decisions about developing and implementing the Medicaid MLTSS programs. Data were obtained from the CMS Nursing Home Compare datasets, which has scores for deficiency citations, quality measures, and staffing levels for each nursing home certified for Medicare and Medicaid (CMS, 2012a).

In Chapter 4 I will present descriptive statistics showing the median and standard deviation of nurse staffing hours per resident day (HPRD), deficiencies, and quality measures in Louisiana nursing homes. I had planned to use separate multiple regression analyses to assess the relationship of nurse staffing levels and nursing home quality measures. However, as further discussed in Chapter 4, I used generalized linear models (GLM) because the data violated the multiple regression assumptions. I also evaluated for possible nonlinear relationships by comparing the nursing facilities that are in the first and fourth quartiles of staffing levels to assess whether the nurse staffing level predicts deficiency citations and quality measure outcomes (Rafferty et al., 2007). The results are expected to provide policy makers, governmental agencies, nursing home owners, and administrators with empirical evidence for making informed decisions about nurse staffing in relation to deficiency citations and quality measures in Louisiana and in other states.

This chapter includes a review of the problems that affect nursing homes, the background of staffing level regulations in nursing homes and Medicaid MLTSS programs, the purpose of the study, the research questions and hypotheses, the Donabedian (1988) framework, the nature of the study, the definition of relevant

concepts—such as quality of care and nurse staffing—and the assumptions, scope, delimitations, and limitations of the study.

Background

Quality of care in nursing homes has been a growing concern since the 1970s. The Omnibus Budget Reconciliation Act of 1987 (OBRA), also known as the Nursing Home Reform Act, was created after the Institute of Medicine found in 1986 that some residents were "abused, neglected, and given inadequate care" (Singh, 2010, p. 32). This act emphasized the quality of care and quality of life of residents and the importance of their reaching their highest level of physical, social, and mental health.

The federal government, through OBRA 1987, requires that all nursing homes provide a minimum number of nurse workforce hours per resident (Hyer, Thomas, Mehra, Johnson, & Harman, 2009). The act mandated a minimum staffing level of 0.08 HPRD for registered nurses (RNs) and 0.3 HPRD for licensed nurses (Lin, 2014). Since the passage of the OBRA 1987, researchers, consumers, and legislators have advocated for establishing higher minimum standards overall, including via nurse licensure status (Hyer et al., 2009). As a result, many state legislatures have mandated a higher minimum staffing level (Lin, 2014).

Louisiana has the lowest nurse staffing levels in the United States, and ranks poorly in several quality of care measures compared to all other states (Purpera et al., 2014). The state legislature has authorized development of Medicaid MLTSS programs, state Medicaid programs that pay a capitation fee to managed care organizations [MCOs] (Saucier, Kasten, Burwell, & Gold, 2012). These MCOs, in turn, pay nursing homes,

which are responsible for offering and coordinating health services that meet the standards of care for their long-term services (Saucier et al., 2012). The quality measures and other standards are set in the contracts between the state and managed care plans and hold MCOs and health providers accountable for the care offered (Saucier et al., 2012). According to the CMS (2013a), the number of states implementing these programs doubled between 2004 and 2012. This trend and fast growth toward managed care for long-term services and supports bring the relationship between nurse staffing and quality of care to the forefront.

Although Abt Associates, Inc. (2001) suggested that nurse staffing levels are associated with better quality of care, three systematic reviews showed mixed results on the association between nurse staffing and quality of care and a lack of uniformity among quality measures (Arling & Mueller, 2014; Backhaus et al., 2014; Spilsbury, Hewitt, Stirk, & Bowman, 2011). Several findings about the relationship between higher nurse staffing and better quality outcomes were inconclusive. For example, Lin (2014) and Duffield et al. (2011) found that increasing the number of RNs was significantly associated with better quality of care, as measured by deficiency citations. Other researchers, however, found a negative relationship between RN staffing and certain quality of care outcomes (Caro, Monane, Porell, & Silva, 1998; Castle, 2011; Staggs, Knight, & Dunton, 2012; Zhang & Grabowski, 2004).

Spilsbury et al. (2011) found 42 different ways to measure quality of care and 52 ways to measure staffing. Researchers have measured quality of care using only deficiency citations (Hyer et al., 2011) or quality indicators, such as pressure ulcers, use

of restraints, infections, or hospitalizations, among others (Castle & Anderson, 2011). In this research, I assessed both quality measures and deficiency citations, including their scope and severity. In only one available study had researchers considered both the number of deficiencies as well as their scope and severity (Hyer et al., 2011).

In this study, I used the Nursing Home Compare database, one commonly used to assess nursing home performance (Hyer et al., 2011). The database includes standard quality measures for assessing nursing care that are endorsed by the National Quality Forum (NQF) for public reporting (Montalvo, 2007). CMS creates these datasets to compile information from the Certification and Survey Provider Enhanced Reports (CASPER), the former Online Survey, Certification and Reporting (OSCAR) database, and the Minimum Data Set 3.0 (MDS 3.0). The former offers information about deficiencies and staffing, and the latter offers information about residents' outcomes. Researchers who have compared staffing levels with quality of care measures in different states found different findings (e.g., Lee, Blegen, & Harrington, 2014; Konetzka, Stearns, & Park, 2008). In addition, there were no available published studies of staffing and quality specifically in Louisiana, which, as has been noted, has the lowest nurse staffing levels and health care results in the United States—a condition that suggests a lower quality of care compared with other states (Purpera et al., 2014). Furthermore, every state has different regulations regarding long-term care and nursing homes. For example, some but not all states have minimum nurse staffing. According to Lin (2014), understanding the relationship between nurse staffing level and quality of care is important to policy makers interested in helping the legislature make informed decisions. Louisiana is

planning Medicaid MLTSS programs in order to contain health care costs and improve the quality of care of nursing home residents. According to Wagner, McDonald, and Castle (2013), increasing nurse staffing levels can be expensive. It may be that at least the minimum nurse staffing levels could provide cost containment without risking the safety and health of residents in these facilities. Results were designed to help policy makers, governmental agencies nursing home owners, and administrators make informed decisions about nurse staffing in relation to deficiency citations and quality measures in Louisiana.

Problem Statement

In 2014 Louisiana had lower scores than many other states in quality of care offered in nursing homes (Agency for Healthcare Research and Quality [AHRQ], 2014). According to the AHRQ (2014), the state had several quality measures that were "far away from benchmark" (para. 2). It is also one of the five states that serve the highest percentage of the frailest population: residents over the age of 85 (Purpera et al., 2014). This issue is compounded because Louisiana has the lowest nurse staffing levels in the nation (Purpera et al., 2014). It ranked 51st for RN staffing HPRD and all nurse staffing HPRD, and received 7,666 deficiencies for immediate jeopardy violations from 2011 to 2013 (Purpera et al., 2014).

Louisiana state regulations mandate a minimum nurse staffing level in nursing homes of 1.5 HPRD (Louisiana Administrative Code 48-97-9811). Although all its nursing facilities comply with state mandates, they rank poorly in both nurse staffing levels and several quality outcomes (e.g., residents with pressure ulcers; Purpera et al.,

2014). Researchers who have evaluated the relationship between staffing and quality outcomes have reached different conclusions (Backhaus et al., 2014). Spilsbury et al. (2011) found that these inconsistent results might be the result of researchers using different methods and variables to measure nurse staffing and quality of care. Hyer et al. (2011) studied licensed practical nurses (LPNs) and certified nurse assistants (CNAs) staffing levels, while Wagner et al. (2013) included RNs, LPNs, and nurse assistants (NAs) staffing levels. Other researchers used deficiency citations to assess quality of care (Hyer et al., 2011), while still others used different quality measures, such as falls, use of restraints, and mortality. No research was identified that used both deficiency citations and quality measures to study the quality of care in nursing homes.

Studying both the quality measures and the deficiency citations addressed the quality of care in Louisiana nursing homes and provided a better picture of the quality of care offered in this state. Consequently, I included these variables in the research to study quality from different perspectives. Furthermore, the study was specific to Louisiana, which ranked 43rd in quality measures among states and whose legislature is planning to develop Medicaid MLTSS programs (Purpera et al., 2014). An important social change may occur if the results favor higher staffing levels, since policy makers may establish a higher minimum nurse staffing mandate in Louisiana.

Purpose

The purpose of this quantitative, correlational research was to determine the relationship in Louisiana, if any, between (a) nurse staffing levels and (b) deficiency citations and (c) nurse staffing levels and (d) quality measures. The independent variable

was the nurse staffing levels (adjusted RN staffing HPRD and adjusted CNA staffing HPRD). The adjusted staffing HPRD are the reported staffing levels that nursing personnel submit to CMS, reflecting the nursing homes' patient acuity (Abt Associates Inc., 2014). The dependent variables were the nursing home deficiency citations and nursing home quality measures. The total quality of care deficiency score was used to measure the deficiency citations. The nursing home quality measures that I studied were those used by CMS to calculate the Nursing Home Compare five-star ratings.

The American Nurses Association (ANA, 2014) stated that many quality measures are nurse sensitive. This means that nurses have a direct effect on patients' outcomes (ANA, 2014). The CMS includes nurse-sensitive measures to assess the quality of care in nursing facilities. These measures apply to residents whose need for help with activities of daily living has increased, high-risk residents with pressure sores, residents who were physically restrained, residents with a urinary tract infection, and residents experiencing one or more falls with major injury, among others (Smith et al., 2012). Smith et al. (2012) found that these quality measures are reliable and valid, and they have received full endorsement from the National Quality Forum (NQF). Nursing homes' health care professionals use the MDS 3.0 to gather these quality measures. The covariates were those used by Hyer et al. (2011): size of facility, chain membership, and ownership.

Research Questions and Hypotheses

The following research questions guided the research:

RQ1: What is the relationship, if any, between nurse staffing levels and process measures (i.e., deficiency citations and physical restraint use)?

$H_0$1: Nurse staffing levels are not significantly associated with deficiency scores after controlling for facility characteristics.

H_a1: Nurse staffing levels are significantly associated with deficiency scores after controlling for facility characteristics

RQ2: What is the relationship, if any, between nurse staffing levels and outcome measures (i.e., pressure ulcers and urinary tract infections)?

$H_0$2: Nurse staffing levels are not significantly associated with the fraction of residents who were physically restrained after controlling for facility characteristics.

H_a2: Nurse staffing levels are significantly associated with the fraction of residents who were physically restrained after controlling for facility characteristics.

$H_0$3: Nurse staffing levels are not significantly associated with the fraction of high-risk residents with pressure ulcers after controlling for facility characteristics.

H_a3: Nurse staffing levels are significantly associated with the fraction of high-risk residents with pressure ulcers after controlling for facility characteristics.

$H_0$4: Nurse staffing levels are not significantly associated with the fraction of residents with a UTI after controlling for facility characteristics.

H_a4: Nurse staffing levels are significantly associated with the fraction of residents with a UTI after controlling for facility characteristics.

Conceptual Framework

Donabedian's (1988) structure, process, and outcome (SPO) model was the conceptual framework used in this study. Researchers commonly use the SPO to study the quality of care in health care facilities (Gardner, Gardner, & O'Connell, 2013). The first of the three elements, *structure*, is commonly used to evaluate the setting in which the care is provided. It includes the physical environment and the organizational characteristics (e.g., HPRD, number of beds, number of residents per licensed nurse, and skill mix). The second element, *process*, is used to address the way health professionals and health organizations provide health care services. Examples are whether physical restraints are used with patients or residents and whether staff administered the appropriate vaccinations. The third category, *outcomes*, is the influence of the structure and processes on patients or residents (Gardner et al., 2013). Outcome measures are used to assess the residents' health status. Three examples are the prevalence of residents with pressure ulcers, the prevalence of falls, and the rate of infections. According to Donabedian, the structure of a health organization and the care processes in an organization affect the residents' health outcomes.

Donabedian (1988) also suggested that a facility or an organization should have desirable outcomes if it provides an adequate environment and care according to practice

standards. State and federal agencies, as well as health insurance companies, use this approach to assess quality of care. Among these agencies are the National Center for Nursing Quality (NCNQ), the National Quality Forum (NQF), the American Nurse Association (ANA), and the CMS. The CMS requires that all nursing home organizations that participate in Medicaid and Medicare submit electronically information regarding the structure, processes, and outcomes in their facilities on a quarterly basis (CMS, 2012a). Nursing home administrators must provide information such as the number of beds and private rooms, staffing levels, use of restraints, and residents' health status. The quality measures computed by CMS are nurse-sensitive (Abt Associates Inc., 2001), that is, the outcomes are influenced by nurses' practices. They include preventable adverse outcomes, so considered because nurses should have a degree of control over conditions.

According to Zimmerman (2003), quality measures can be used to help identify the aspects of care that affect quality. The Purpera et al. (2014) audit indicated the care outcomes and care processes that should be improved in Louisiana. These are measured by (a) residents whose activities of daily living (ADLs) have increased, (b) residents who were physically restrained, (c) residents with pressure ulcers, (d) residents with moderate to severe pain, and (e) residents who had a catheter inserted into and left in their bladder.

Because Donabedian's (1988) elements are interconnected, improvements in structure may be needed to improve quality processes and outcomes. Researchers have found mixed results from analyzing the two variables of staffing and quality (Backhaus et al., 2014; Spilsbury et al., 2011). The Donabedian SPO framework was appropriate for this research because I designed the study to evaluate the relationship between nurse

staffing HPRD (structure) and nursing home deficiencies (outcomes) in Louisiana. I also assessed the relationship between nurse staffing HPRD (structure) and quality measures that capture both processes of care (i.e., prevalence of residents with physical restraints) and outcomes of care (i.e., prevalence of residents with pressure ulcers). The covariates provided structural characteristics of nursing homes, such as the size of facility, ownership, and chain membership.

Nature of the Study

A quantitative, correlational study is a method commonly used to measure quality in health care organizations (Chang, Li, & Porock, 2013) and to test theories and beliefs by evaluating the association between variables (Creswell, 2009). Chang et al. (2013) assessed the relationship between the type of nursing home unit and the quality of care. They also evaluated the effects of a household model within a traditional nursing home on residents' physical and psychological outcomes. To assess the quality of care, Chang et al. (2013) used the MDS 2.0, an instrument often used in quantitative studies to compare nursing home resident outcomes between and within facilities or units. Furthermore, both Hyer et al. (2011) and Lin (2014) used quantitative methodology to measure the association between nurse staffing levels and quality of care. These researchers assessed quality by using the number of deficiency citations and their total score derived from the OSCAR dataset.

Researchers such as van Spronsen (2011) have also used qualitative and mixed methods to measure quality of care. Qualitative research is the best approach when the researcher wants to study a phenomenon that people do not know much about and that

has not been studied in depth (Frankfort-Nachmias & Nachmias, 2008). However, researchers have studied the quality of care concept for some time, producing different quality indicators or factors that may have an effect on quality. Therefore, I was more interested in assessing whether some of these quality measures were significantly related to nurse staffing levels. A qualitative methodology is considered subjective and would have been useful to study the lived experiences and beliefs of residents, family members, and staff but not the relationship between quality and nurse staffing levels. As stated by Frechtling (2002), "Quantitative and qualitative techniques provide a tradeoff between breadth and depth" (p. 43).

Other scholars have used mixed methods to assess a problem or phenomenon from different perspectives (Driscoll, Appiah-Yeboah, Salib, & Rupert, 2007). Driscoll et al. (2007) commented that the process of examining, coding, and combining qualitative data with quantitative data is both complex and lengthy. A retrospective design uses existing data (Portney & Watkins, 2000). In this type of study, researchers examine and analyze data collected by others. Mann (2003) stated that when the data are already available, the use of a retrospective design is more convenient to researchers who have time constraints. Both Chang et al. (2013) and van Spronsen (2011) used the MDS, which uses existing data collected by nursing home health care professionals. For the study, I judged that it would be more efficient to use a retrospective approach.

I used a cross-sectional design, an approach that is easier to conduct than a longitudinal study (van Spronsen, 2011). Statistical analysis in a cross-sectional study involves a snapshot in time (Portney & Watkins, 2000). In addition, the activities of this

type of design typically take less time to complete than a longitudinal one and may be less expensive (Portney & Watkins, 2000). The tradeoff in use of a cross-sectional design is the inability to ascertain whether an independent variable had an effect on the dependent variable, or whether the independent variable resulted from the dependent variable (Portney & Watkins, 2000). Because of time and monetary constraints, a cross-sectional study was selected to examine a snapshot of the staffing levels, quality of care, and their relationship, in Louisiana. The quality measures were the deficiency citations, and the prevalence of residents who were physically restrained, who had pressure ulcers, and who had UTI.

I gathered secondary data from the Nursing Home Compare website (CMS, n.d.a) and employed descriptive statistics to establish the characteristics of Louisiana nursing homes, such as ownership (i.e., for profit or nonprofit), number of certified beds, and number of residents in certified beds. I planned to perform separate multiple regression analyses for each of the quality measures (i.e., deficiencies, restraint use, pressure ulcers, and UTIs) to evaluate the effect of nurse staffing levels on each of these quality measures (see, e.g., Lee et al., 2014). Multiple regression is used to study how a dependent variable is affected by the independent variable, while controlling for other variables, and as a method of control in quasi-experimental designs (Frankfort-Nachmias & Nachmias, 2008). However, as further discussed in Chapter 4, I used GLM because the data violated the assumptions of multiple regression.

I planned to perform separate logistic regression analyses for each of the four quality measures to evaluate for potential nonlinear relationships. I recoded nurse staffing

levels as a categorical variable and grouped and compared nursing homes in the first quartile with those in the fourth quartile of staffing level (see, e.g., Rafferty et al., 2007). I controlled for facility size, chain membership, and ownership.

Definitions of Terms

For purposes of this research, the following definitions were used.

Falls with major injury: Falls since admission, readmission, or prior assessment that have caused a major injury such as bone fractures, joint dislocations, or head injuries with altered consciousness (Smith et al., 2012).

Long-stay resident: Residents who have lived in a nursing home for more than 100 cumulative days (Smith et al., 2012).

Minimum data set: A comprehensive assessment of each resident in nursing homes participating in Medicare and Medicaid (Hawes, Morris, Phillips, & Mor, 1995).

Nurse staffing level: Nurse staffing hours per resident day (Hyer et al., 2011). It includes all categories of nurses (Abt Associates Inc., 2001).

Ownership status: Nonprofits, for-profits, and government facilities (Bowblis, 2011).

Pressure ulcers: High-risk residents who have had Stage 2 to 4 pressure ulcers (Smith et al., 2012).

Quality measures: Mechanism for evaluating the quality of care processes and care outcomes (of health care facilities) based on scientific evidence and experts' consensus (Brook, McGlynn, & Clearly, 1996). Quality measures are collected from the MDS (Chang et al., 2013).

Quality of care: Degree to which health care facilities achieve a desirable level of care based on quality measures of the structure, processes, and outcomes of care (Leonardi, McGory, & Ko, 2007).

Total number of residents: Number of residents living in the nursing home during the 2 weeks prior the inspection. CMS uses this number, which captures only a specific point in time, to calculate staffing.

Urinary tract infection: A urinary tract infection diagnosed in the last 30 days (Smith et al., 2012).

Assumptions

I assumed the following in this research endeavor:

1. Health care professionals assessing residents and submitting information to CMS knew how to complete the MDS correctly. Both the MDS 3.0 and CASPER reports include instructions on how to compile and submit residents' health status and staffing data to CMS. Nurses who assessed the residents and collected, compiled, and submitted these reports were trained professionals.
2. The quality measures of the MDS 3.0 and the deficiencies and staffing level data from the CASPER reflected accurately the facilities' quality measure outcomes in Louisiana's nursing homes.
3. Louisiana nursing home residents reported accurately their health status to health professionals.

4. Nursing staff correctly collected and reported to CMS the residents' health status and quality measures.
5. Data from MDS 3.0 and CASPER were reliable. In their datasets CMS does not include information from nursing facilities that have unreliable data (CMS, 2012b).
6. The quality of care was the same for residents staying in either certified or non-certified beds.

Scope and Delimitations

The CMS database for Louisiana contains information on 281 nursing homes from 61 parishes (hereafter referred to as counties). In it, CMS provides for each facility the federal provider number, provider name and address, social security administration county and its code, ownership, number of certified beds, number of residents in certified beds, provider type (i.e., Medicare, Medicaid, or both), the reported and adjusted nurse staffing HPRD, and the deficiencies and quality measures, among other variables. CMS does not report information from nursing homes that have 30 or fewer certified beds. The research focused on Louisiana nursing homes and assessed the whole population of these facilities that met the inclusion criteria.

Nursing homes to be included were those licensed as skilled nursing facilities that were listed in the CMS database. Excluded were any facility that is not a Medicare and Medicaid participant, any facility without nurse staffing hours or quality measures data, and facilities that changed ownership (e.g., for profit, nonprofit) in the last 12 months.

Many researchers have discovered that facility ownership can affect quality of care and results might skew findings (Hyer et al., 2011; Wagner et al., 2013).

I also excluded hospital-based facilities since Grabowski and Castle (2004) noted that these facilities might differ significantly from other nursing facilities in regard to organizational attributes, staff, and resident case-mix. Hospital-based nursing homes are smaller and offer more short-term services for post-acute patients (Hyer et al., 2009). The facility-level data did not include short-term residents, such as those who received post-acute care in the period under study. On the other hand, the use of a cross-sectional design delimited the findings of this research to a single point in time. Therefore, I was unable to conclude how the relationship between staffing and quality was going to behave over time.

Another limitation was that secondary data, such as those in the Nursing Home Compare datasets, may not present all information for all facilities. For example, CMS does not present the quality measures for nursing homes that have 30 or fewer certified beds. Therefore, the study was also limited to the available data. Nursing homes without information for staffing HPRD or quality measures were excluded, as were nursing homes that were only Medicare certified, because they offer services mostly to short-term residents.

Although quality of care can be assessed in many ways by using many different quality indicators, I followed other researchers' paths (e.g., Arling, Kane, Mueller, Bershadsky, & Degenholtz, 2007; Lee et al., 2014). Some authors studied two process measures and three outcome measures to evaluate the quality of care in nursing facilities

(e.g., Arling et al., 2007; Lee et al., 2014). Therefore, another delimitation was the study's four quality measures (two processes and two outcomes). The two process measures were the deficiencies and physical restraint use, and the two outcome measures were pressure ulcers and urinary tract infections. Other residents' health outcomes outside the scope of the study—behavior, active diagnoses, medications, treatments, and quality of life measures—were excluded.

Limitations

The limitations of this research were those usually related to a cross-sectional design. Because the findings were gathered from one point in time, it was impossible to evaluate how the variables were going to behave longitudinally (Portney & Watkins, 2000). I also used correlational analysis, commonly used in cross-sectional studies. This type of study also cannot show causal associations (Wagner et al., 2013). Therefore, I was unable to establish causal relationships between nurse staffing and process measures and between nurse staffing and outcome measures. As Donabedian (1988) stated, multitudes of factors influence outcomes; hence, it is not possible to know conclusively "the extent to which an observed outcome is attributable to an antecedent process of care" (p. 1746).

Many factors might affect nursing home quality of care outcomes other than those that I studied—for example, nurse training, years or kinds of experience, consistent assignment, or turnover rates (Arling & Mueller, 2014). I did not evaluate whether the nursing facilities had advanced medical equipment or efficient care management (Lin, 2014). I did include covariates (confounding factors) used in past studies that have been

found to have an influence on quality measures. Among these were facility ownership and being part of a chain of facilities (Hyer et al., 2011; Wagner et al., 2013).

Another limitation was that the data did not state whether a nursing facility was in an urban or rural location. It might be that the location of the nursing home could have affected the results, as some authors argue (e.g., Bowblis et al., 2013; Lutfiyya et al., 2013), but I could not verify that. The Nursing Home Compare datasets are derived from the CASPER and the MDS 3.0. Castle (2008) stated that staffing levels from the OSCAR (now called CASPER) and residents' outcomes from the MDS 3.0 are self-reported and might have a systematic reporting bias. Nursing home health care professionals may underreport or overreport residents' health outcomes, either intentionally or accidentally. Harrington, Swan, and Carrillo (2007), on the other hand, stated that OSCAR quality-of-care data about nursing homes are accurate and reliable. I compensated for possible limitations by including data from health surveys, also derived from the CASPER, which provided the deficiencies of each nursing home per year. According to Lin (2014), these data are considered the most reliable and accurate in regard to quality in long-term care facilities.

I also used data at the facility level. Castle (2008) suggested that facility level analysis might introduce an ecological fallacy that assumes that aggregate data apply to each individual resident. To counteract that limitation, I studied the processes and outcomes derived from the MDS 3.0 that are endorsed by the NQF, those that are reliable and valid, and those that are considered to have at least acceptable variability to differentiate between good and bad quality of care (Smith et al., 2012).

Significance of the Study

According to CMS (2014b), "Quality health care is a high priority for the President, the Department of Health and Human Services (HHS), and the CMS" (para. 1). The elderly population is growing and is expected to double by the year 2030 (United States Census Bureau, 2014); the need to provide better health services for this vulnerable population is immediate. The knowledge of the relationship between staffing and quality is necessary in order to improve quality and reduce health care costs (Lin, 2014). Montalvo (2007) stated that an appropriate workforce in nursing facilities is critical to providing the required care in order to enhance or maintain residents' health outcomes. This study may be important for increasing understanding of the relationship between nurse staffing levels and quality of care, particularly in Louisiana's nursing facilities, as measured by deficiency citations and the CMS Nursing Home Compare quality measures.

Results of the study may help inform and direct policy makers in the development and implementation of Medicaid MLTSS programs. Had higher staffing levels predicted better quality of care in Louisiana, policy makers could have determined the need for higher minimum nurse staffing levels. This could create a positive social change for nursing home residents in Louisiana. The results of this study may be relevant to this time of growth of an aging population. In the past decade, various stakeholders have advocated to mandate minimum staffing requirements to help improve the care offered to the elderly and disabled people living in nursing homes nationwide (Lin, 2014). It is imperative to understand the relationship between staffing and quality in order to guide policy interventions to enhance quality care and cost effectiveness in these facilities and

potentially create a positive social change for a vulnerable population (Lin, 2014). If the appropriate nurse HPRD could be identified, this information could be of use to Louisiana policy makers seeking to improve the quality of care in nursing homes in this state.

Summary

Policy makers are modifying the way health care delivery is offered because of demographic changes in the United States and the economic implications of those changes. Although the Louisiana legislature is developing Medicaid MLTSS programs to reduce health care costs and improve coordination of services, the state has the lowest staffing levels in the United States and ranked low on several nursing home quality measures. Because of these problems, this correlational study focused on determining the relationship between nurse staffing levels and nursing home quality of care in Louisiana. Policy makers could use the findings to develop and implement MLTSS programs and establish, if needed, new staffing mandates.

I obtained the data from the CMS Nursing Home Compare database, which presents nursing home deficiency citations, staffing levels, and quality measure outcomes of every Medicare and Medicaid certified nursing facility. I used descriptive statistics to determine the deficiency citations and the quality measures across Louisiana's nursing homes in fiscal year 2013. Even though I had planned to use multiple regression analysis to assess whether nurse staffing level predicts deficiency citations and quality measure outcomes, I ended up using generalized linear models because the data violated the multiple regression assumptions. With this study, empirical evidence may be available to

policy makers, governmental agencies, nursing home owners, administrators, and directors of nursing so they may make better-informed decisions regarding nurse staffing in relation to deficiency citations and quality measures. Most importantly, the vulnerable population living in nursing homes could experience better quality of care, more positive health outcomes, and improved wellbeing.

In Chapter 2, I present the literature reviewed for this research, which includes the conceptual frameworks, methodology, and the literature related to quality of care, quality measures, deficiency citations, nurse staffing levels, resident health outcomes, Medicaid MLTSS programs, nursing home physical and organizational characteristics, and research methods used in past studies. In Chapter 3, I present the research design and rationale and the methodology used in this study, including the population, the data that were used, the procedure for gaining access to the data sets, the data analysis plan, the potential ethical issues, and the threats to internal and external validity. Details of the alternative data analysis path appear in Chapter 4, along with a further discussion of how the data were gathered and the results. Lastly, in Chapter 5, I discuss, analyze, and interpret the findings based on the Donabedian (1988) framework and the findings in the peer-reviewed literature. I also describe the limitations of the study, the recommendations for future research, and the potential impact on positive social change.

Chapter 2: Literature Review

Introduction

The purpose of this quantitative, correlational research was to determine the relationship, if any, between (a) nurse staffing levels and (b) quality of care deficiency citations and between (c) nurse staffing levels and (d) quality measures in Louisiana. Since OBRA 1987, policy makers have mandated minimum staffing hours in nursing homes with the hope of improving quality of care to residents (Singh, 2010). Louisiana has experienced problems with the quality of care in nursing homes, even though its nursing facilities comply with the state minimum direct care staffing level (Purpera et al., 2014). Specifically, the state (a) has lower scores in quality measures than other states, (b) is among the five states that serve the highest percentage of residents over the age of 85, (c) has the lowest nurse staffing levels of all other states, and (d) received 7,666 deficiencies for immediate jeopardy violations from 2011 to 2013 (Purpera et al., 2014).

Schnelle, Karuza, and Katz (2013) stated that most of the nursing facilities in Louisiana have reported low staffing HPRD. The authors noted this might suggest potential problems in quality of care. Hyer et al. (2011) examined the relationship between nurse staffing levels and quality indicators to assess whether there is an association or correlation among these variables. Such studies have had mixed results, likely because of the many different ways researchers have measured staffing and quality (Backhaus et al., 2014; Spilsbury et al., 2011).

Literature Search Strategy

In this chapter, I will review the current literature and research studies related to nursing homes, nurse staffing, deficiencies, and quality of care. The literature review for the study included peer-reviewed articles and books, which were identified by using the following databases: ProQuest Central, ProQuest Dissertations, PubMed, Medline, CINAHL Plus, Academic Search Complete, Soc Index, ScienceDirect, American Medical Directors Association, Google Scholar and Sage Premier. Articles were from peer-reviewed journals, CMS, and others. The following keywords were used: *nurse staffing levels, nurse staffing, nursing home quality of care, residents' health outcomes, nursing home quality measures, quality indicators,* and *nursing home deficiencies.* The search included a wide range of years with a focus on the last 3 years, although some citations are older because of the unavailability of more recent information. I gathered and reviewed 123 articles relevant to the research topic. This chapter was based on 44 sources, summarized in the literature review matrix (Table 1).

Conceptual Framework

The Donabedian (1988) model was suitable for this study because it is a conceptual framework that researchers and administrators use to evaluate the quality of care in health care organizations (Chang et al., 2013; Hakkarainen, Ayoung-Chee, Alfonso, Arabi, & Flum, 2015; Kane, Lum, Cutler, Degenholtz, & Yu, 2007; Gardner et al., 2013). Donabedian (1988) classified quality of care in three categories: structure, process, and outcome (SPO). Researchers have used this approach to evaluate

Table 1

Literature Review Matrix

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
Abt Associates Inc. (2001) Appropriateness of minimum nurse staffing ratios in nursing homes. Phase II Final. Volume 1.	QMs	Abt report argued that RN, LPN, and NA staffing improves quality up to some threshold at which point there is no further significant quality improvement. For the long-stay NH population, these thresholds were 0.75 RN HPRD, 1.3 LPN HPRD, and NA 2.78 HPRD. If these thresholds were instituted as minimum staffing standards, 52% of all nursing homes would fail to meet all their standards and 97% would fail to meet one or more.
Lee, Blegen, & Harrington (2014) The effects of RN staffing hours on NH quality: A two stage model	Examined the factors associated w/ 5 QIs in Colorado NHs. Donabedian approach Cross-sectional All NHs in Colorado in 2000 Separate regression analyses were conducted for each QI.	Sig. Assoc.: ↑RN HPRD = 11% of ↓(lower rates or prevalence) of PUs ↑Facility size = ↓UTIs (inversely assoc.) No Assoc.: RN HPRD and UTIs, weight loss, antipsychotic drug use, catheter use.
Lin (2014) Revisiting the relationship between nurse staffing and quality of care in nursing homes: An instrumental variables approach	Staffing mandates Arkansas, California, Delaware, Florida, Iowa, Maine, Mississippi, Ohio Deficiencies QIs Longitudinal Count of total deficiencies Deficiency score: Followed Matthews-Martin (2003) in assigning each letter a numeric score.	Sig. Assoc.: RN and QoC LN and QoC ↑RN HPRD = ↓PUs, ↓contractures No Assoc.: NA and QoC "increasing RN staffing by 0.3 HPRD would increase quality by more than 16%" (p. 18).

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
Temkin-Greener, Zheng, Cai, Zhao, & Mukamel (2010) Nursing home environment and organizational performance: Association with deficiency citations	Consistent assignment New York Deficiencies Cross-sectional Multivariate linear and logistic regressions	Sig. Assoc. ↑Work-effectiveness = ↓QoC deficiencies, ↓G-L deficiencies ↑Self-managed teams (prevalence) = ↓QoC defic. Consistent assignment = ↓QoC defic. ↑RN staffing = ↓QoC defic. ↑ADL index = ↑QoC defic.
Wagner, McDonald, & Castle (2013) Nursing home deficiency citations for physical restraints and restrictive side rails	Deficiencies National Longitudinal Multivariate	Sig. Assoc.: ↓deficiencies for phys restraint = ↑RN, ↑LPN, for-profit, chain membership, ↑Medicaid reimbursement, ↑# elderly in county, ↑deficiencies for phys restraint = ↑NA, ↑levels of restraint use, facility size
Castle, Wagner, Ferguson, & Handler (2011) Nursing home deficiency citations for safety	Deficiencies National Longitudinal panel analyses	Sig. Assoc.: ↓deficiencies for safety = ↑RN, ↑Medicaid reimbursement rate ↑deficiencies for safety = ↑def. percentiles (poor quality), ↑Medicaid occupancy, (↑Medicaid occupancy +↓Medicaid reimbursement), ↑facility size, chain membership
Castle, Wagner, Ferguson-Rome, Men, & Handler (2011) Nursing home deficiency citations for infection control	Deficiencies Multivariate analysis	Sig. Assoc.: ↑ likelihood of rec. Deficiency F441 = ↓NA, ↓LPN, ↓RN, for-profit, ↑Medicaid occupancy rate, ↑QoC deficiencies, ↑J,K,L deficiencies, areas with ↑proportion of elderly res. No Assoc.: Deficiency F441 and phys. restraint, size, for-profit, chain membership
Castle & Anderson (2011) Caregiver staffing in nursing homes and their influence on quality of care	QIs National Longitudinal Regression analysis	Sig. Assoc.: Increasing levels: ↑RN = ↓PUs, ↓phys. restraint, ↓catheter ↑NA = ↓PUs, ↓phys. restraint ↑LPN = ↓PUs, ↓phys. restraint (lower coefficient = less influence than RN and NA) No Assoc.: Increasing levels: NA and catheter, LPN and catheter showed that ↓RN staffing was related to ↑catheter use in NHs (p. 411 as stated in Lee et al., 2014)

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
Castle (2011) Nursing home deficiency citations for abuse	Deficiencies National Multivariate analyses	Sig Assoc. ↑RN = ↑ in 2 out of 4 deficiency citations. No Assoc. NA and LPN and deficiency citations for abuse
Hyer, Thomas, Branch, Harman, Johnson, & Weech-Maldonado (2011) The influence of nurse staffing levels on quality of care in NHs	Deficiencies Florida Longitudinal Quartiles Repeated measures multivariate analyses	Sig. Assoc.: ↑CNA HPRD = ↓deficiencies With every 6 min increase in CNA HPRD, there is a 3% reduction in the quality of care deficiency score. No Assoc.: LNs and deficiencies scores when controlling for CNA HPRD.
Staggs, Knight, & Dunton (2012). Understanding unassisted falls: Effects of nurse staffing level and nursing staff characteristics	QI Longitudinal National	Sig. Assoc.: NHs w/ lower staffing levels: ↑Total nurse = ↑falls (unassisted) Nhs around and above median: ↑Total nurse = ↓falls (unassisted)
Hyer, Thomas, Mehra, Johnson, & Harman (2009). Analyses on outcomes of increased nurse staffing policies in Florida nursing homes: Staffing levels, quality and costs (2002-2007)	Deficiencies Mandate Florida Longitudinal	Sig. Assoc. After staffing mandate: Mandate for CNA = ↑QoC, ↓deficiencies ↑Min. Staffing Standard Citations for the more deficiencies have decreased dramatically and remain lower than the national average. RN staffing in Florida averaged .28 hours of care per resident day. Hyer et al. (2009) said that in literature review that a consistent finding is that ↑RN = ↓falls, ↓PUs, and other patient outcomes.
Graboswki, Feng, Hirth, Rahman, & Mor (2013) Effect of nursing home ownership on the quality of post-acute care: An instrumental variables approach	QMs Ownership	Sig. Assoc. Nonprofits = ↓30-day hospitalization ↑ADLs improvement, Non-sig. Assoc. Nonprofits = mobility, pain improvement post-acute (short-stay) patients in nonprofit nursing facilities improved more in regards to mobility, pain, and functioning. They also had fewer 30-day hospitalizations. Nonprofits provided better quality for short-stay patients.

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
Bowblis (2011) Staffing ratios and quality: And analysis of minimum direct care staffing requirements for NHs	QMs Deficiencies Mandate National Longitudinal 2 Regression models	<u>Sig. Assoc.:</u> ↑MDCS = ↓ phys. restraint, ↑phys. restraint acquiring them in facility, ↑catheter use, ↑antipsychotic meds use, ↓ PUs, ↓ rashes, worst bowel incontinence, worst sig weight change, ↓ deficiencies, lower probability of receiving a specific deficiency ↑MDCS = ↑RNs only for NHs more reliant on Medicaid larger MDCS = larger effects on care practices NHs more reliant on Medicaid are more likely to show greater improvements in health outcomes after increases in MDCS requirements.
Park & Stearns (2009) Effects of state minimum staffing standards on nursing home staffing and quality of care	QMs Deficiencies 16 States in US	<u>Sig. Assoc.:</u> After change in staffing standards: Nonprofits = ↑RN, ↑NA, total staff HPRD For-profits w/ high staffing levels = ↓total staff ↑Min. Staff. Stand. = ↓phys. restraint for all facilities (declined), total deficiency citations (except for-profits w/ high staffing), <u>No Assoc.:</u> ↑Min. Staff. Stand. and PUs, contractures, incontinence, catheter use mandated staffing standards seem to primarily affect facilities at the low-end of the staffing spectrum.
Duffield, Diers, O'Brien-Pallas, Aisbett, Roche, King, & Aisbett (2011). Nursing staffing, nursing workload, the work environment and patient outcomes.	Deficiencies 7 States in Australia	<u>Sig. Assoc.:</u> ↑ RNs = better quality of care
Konetzka, Stearns, & Park, (2008) The staffing-outcomes relationship in NHs	QMs Ohio, Kansas, Maine, Mississippi, South Dakota Longitudinal Resident-level	<u>Sig. Assoc.:</u> ↑RN HPRD = ↓ PUs, ↓UTI

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
Rafferty, Clarke, Coles, Ball, James, McKee, & Aiken (2007) Outcomes of variation in hospital nurse staffing in English hospitals: Cross-sectional analysis of survey data and discharge records	4 regions in English hospitals Cross-sectional Logistic regression Quartiles (4 even groups)	Upper quartile (heaviest workload) = surgical patients were 26% more likely to die overall and 29% more likely to die following complicated hospital stays than those in lowest quartile; 71% and 92% more likely to show more burnout and job dissatisfaction; worst perception of QoC Patients and nurses in the quartile of hospitals with the most favorable staffing levels (the lowest patient-to-nurse ratios) had consistently better outcomes than those in hospitals with less favorable staffing (p. 179. Large and consistent effect of nurse staffing on mortality outcomes in surgical patients as well as on nurse job outcomes and nurse ratings of QoC (p. 179).
Arling, Kane, Mueller, Bershadsky, & Degenholtz (2007). Nursing effort and quality of care for NH residents	QIs (MDS) Colorado, Indiana, Mississippi, Minnesota Regression Multilevel model Quartiles	<u>No Assoc.:</u> RN/LPN/NA HPRD and functional decline in ADLs, continence, and behavioral problems Unit staffing HPRD and care processes and outcomes QIs
Harrington, Swan, & Carrillo (2007) Nurse staffing levels and Medicaid reimbursement rates in nursing facilities	Reimbursement rates	Can influence organizational priorities, spending decisions, and the availability of financial resources, all of which have the potential to influence a facility's tendency to use physical restraints.
McGrail, McGregor, Cohen, Tate, & Ronald (2007). For-profit versus not-for-profit delivery of long-term care.	Ownership	In different studies made in Canada researchers found that nonprofit long-term care facilities had better outcomes than for-profit facilities.
Horn, Buerhaus, Bergstrom, & Smout (2005) RN Staffing Time and Outcomes of Long-Stay Nursing Home Residents: Pressure ulcers and other adverse outcomes are less likely as RNs spend more time on direct patient care	QIs National Logistic regression analyses Bivariate analyses	<u>Sig. Assoc.</u> ↑RN time (30-40 min RN stronger predictor) = = ↓PUs, ↓UTIs (no when adjusted for catheterization), ↓catheterization, ↓hospitalizations, less weight loss, less ADLs deterioration ↑LPN time = ↓PUs, (↑ADLs deterioration, and ↑catheter use were Sig. associated in bivariate analyses but not in bivariate analyses when controlled for other variables) ↑NA time = ↓PUs (not sig. when controlled for nonprofit) CNA 2.25 hours or + =↓PUs (incidence)

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
		Nonprofits = ↓PUs, ↓ADLs deterioration The greatest reductions in adverse outcomes and improvements in care processes resulted when RNs spent 30 to 40 minutes per resident per day on direct resident care"
Bostick (2004) Relationship of nursing personnel and nursing home quality	QMs National Separate logistic regressions for each of the 6 QI measures.	<u>Sig. Assoc.</u> RN hours = ↓PUs (prevalence) "6 min. increase in RN time was assoc. w/ a 3% reduction in the chance of one resident developing a PU" (p. 134). LPN = ↑PUs, ↑late loss ADL decline NA = ↓stages 1 to 4 PUs, ↑incontinence <u>Non-sig. Assoc.</u> ↑RN hours = ↑phys. restraint, ↑incontinence, <u>No Assoc.</u> RN, LPN, NA staffing and phys. restraint, weight loss, behavioral symptoms. RN and incontinence, late loss ADL decline NA and late loss ADL decline
Zhang & Grabowski (2004) Nursing home staffing and quality under the nursing home reform act	QMs	<u>Sig. Assoc.</u> After mandate = ↑PUs (increased 8%), ↓catheters (from 10% to 8%), ↓phys. restraint (from 39% to 23%), ↑pt. bedfast (confined to bed), ↑chairbound. <u>Sig Assoc. NHs at lowest quartile</u> ↑RN HPRD in lowest Q NHs = ↓phys. restraint (p. 19) ↑LPN HPRD at lowest Q NHs = ↓PUs (sig at 10% level), ↑catheter use ↑NA HPRD at lowest Q NHs = ↓phys. restraint <u>Sig Assoc. NHs at top quartile</u> ↑NAs in top quartile NHs = ↓phys. restraint (less use) <u>Non-sig. Assoc.</u> RN, LPN, NA = were associated w/ fewer catheters for NHs in the bottom quartile of these staffing measures.
Bates-Jensen, Schnelle, Alessi, Al-Smarrai, & Levy-Storms (2004) The effects of staffing on in-bed times of nursing home residents	California	<u>Sig. Assoc.</u> Lower staffed = ↑day-time sleeping "resident functional measures and NH staffing level predicted observed time in bed according to hourly observations, with staffing level the most powerful

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
		predictor. Neither of these predictors justifies the excessive in-bed times observed in this study"
Grabowski & Castle (2004) Nursing homes with persistent high and low quality	QIs National	↑RNs, ↑LNs, and↑NAs = ↑catheter use, ↑physical restraints Classified NHs into high quality and poor quality groups found that more RNs and licensed nurses were related to more catheter use in the poor quality group but the relationship was not found in the high quality group" (p. 411 as stated in Lee et al., 2014) Areas with a greater nonprofit market share had a lower likelihood of poor quality measures including the prevalence of pressure ulcers and indwelling catheter use "found that less competition within a geographical market was associated with low quality when measured by an increase in the use of catheters, but differences in pressure ulcers rates were not statistically significant" (as stated in Lee et al., 2014, p. 411)
Rantz, Hicks, Grando, Petroski, Madsen, Mehr,... & Maas (2004) Nursing home quality, cost, staffing, and staff mix	QIs Mixed-methods Missouri	<u>Sig. Assoc.:</u> Among groups - Bed size (smaller fac. = better outcomes) <u>Doesn't say whether Sig. or not:</u> Facilities w/ poor outcomes – ↑several times more acquired PUs. Facilities w/ better outcomes - ↓costs <u>No Assoc.:</u> NHs w/ good or bad QIs, and Phys. Restraint, Staffing mix, and staffing level, catheters, UTI, decline in late loss ADLs, ownership, admission case-mix Facilities with a median of 80 beds had better outcomes than facilities with a median of 120 beds.
Burgio, Fisher, Fairchild, Scilley, & Hardin (2004) Quality of care in the nursing home: Effects of staff assignment and work shift	Observational Birmingham, Alabama	<u>Sig. Assoc.:</u> evening shifts = ↑hygiene and grooming, ↑disruptive behaviors, ↑CNA turnover morning shifts = ↑CNA burnout, ↑absenteeism

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
		Assoc. but not sig.: Hygiene and grooming = higher scores in PA NHs No Assoc.: CNAs hour/week and staff outcomes QoC outcomes were similar among the two types of NHs, despite significantly different staffing patterns (p. 368). However, staffing ratio were similar.
Zimmerman et al. (2002) Nursing home facility risk factors for infection and hospitalization: Importance of registered nurse turnover, administration, and social factors.		Found a negative association between RNs and quality of care
Castle (2000) Deficiency citations for physical restraint use in NHs	Deficiencies Multivariate logistic regression function w/ structure, process, census, and control factors as indep. variables.	Sig. Assoc.: ↑ Restraint citations = ↑catheters, ↑phys. restraints, ↑# of beds (larger facilities), for-profit, ↑occupancy rates ↓Restraint citations = ↓rate of phys. restraints, ↑specialist FTE/resident, ↑NA training, ↓catheters use, ↓physical restraints ↑Restraint citations = Assoc- Don't know if Sig. Assoc. or not: Restraint citations = ↓RN, ↓LPN, ↓NA
Intrator, Castle, & Mor (1999) Facility Characteristics Associated With Hospitalization of Nursing Home Residents: Results of a National Study		No Assoc: RN, LPN, NA and hospitalization and mortality.
Aaronson, Zinn, & Rosko (1994) Do for-profit and not-for-profit nursing homes behave differently?	Ownership	Sig. Assoc.: Nonprofit nursing homes had better staffing and better outcomes than for-profit ones.
Backhaus et al. (2014) Nurse staffing impact on quality of care in nursing homes: A systematic review of longitudinal studies	Literature review	Found mixed results. The contradictory findings could be due to different ways in which staffing and quality of care were measured in different studies.

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
Spilsbury, Hewitt, Stirk, & Bowman (2011) The relationship between nurse staffing and quality of care in nursing homes: A systematic review.	Literature review	There is not conclusive evidence regarding the association between nurse staffing and quality.
Hakkarainen, Ayoung-Chee, Alfonso, Arbabi, & Flum (2015) Structure, process, and outcomes in skilled nursing facilities: understanding what happens to surgical patients when they cannot go home. A systematic review	Literature review	Evaluate the quality of care in health care organizations using the Donabedian (1988) model.
Castle (2008) Nursing home caregiver staffing levels and quality of care: A literature review	Literature Review	120 out of 302 (40%) quality indicators had a significant positive relationship with staffing levels, while 5% had a significant negative association with staffing levels.
Bostick, Rantz, Flesner, & Riggs (2006) Systematic review of studies of staffing and quality in NHs	Literature Review	Found that nurse staffing levels was significantly associated with pressure ulcers, functional ability, and weight loss.
Stanton & Rutherford (2004) Hospital nurse staffing and quality of care		"A broad array of research on this topic has found an association between lower nurse staffing levels and higher rates of some adverse patient outcomes" (p. 3).
Leonardi, McGory, & Ko (2007) Quality of care issues in colorectal cancer		Defined quality of care as the degree to which healthcare facilities achieve a desirable level of care based on quality measures of the structure, processes, and outcomes of care.
Chang, Li, & Porock (2013) The effect on nursing home resident outcomes of creating a household within a traditional structure		Residents living in the household units had better outcomes in regards to physical function, less daytime sleepiness, and improvement on pressure ulcer frequency. The household unit also was significantly related to less use of restraints.
Molony, Evans, Jeon, Rabig, & Straka (2011) Trajectories of at-homeness and health in usual care and small house nursing homes.		Compared the trajectories of health of residents living in traditional nursing homes and those living in small house nursing facilities in the Midwest. They found that residents living in small house nursing homes had a higher functional decline.

(table continues)

Author(s)/Title	Overview (Design, Sample, Analysis)	Results/Conclusions
Kane, Lum, Cutler, Degenholtz, & Yu (2007) Resident outcomes in small-house NHs: A longitudinal evaluation of the initial GH program		Found that the type of nursing home had an effect on the residents' quality of life and functional status favoring small-scale nursing facilities.
Lutfiyya, Gessert, & Lipsky (2013) NH quality: A comparative analysis using CMS NH compare data to examine differences between rural and nonrural facilities	To compare the quality of rural and nonrural nursing homes by using aggregate rankings on 5 measures of quality calculated by the CMS and reported on the NH Compare Website. It explored what NH characteristics were associated with a higher overall quality rating. Regression	Found that health facilities that are nonprofit had fewer adverse events and better health outcomes.
Zimmerman & Cohen (2010) Evidence behind the green house and similar models of nursing home care	Literature review	Literature favored small nursing homes. These facilities had better outcomes in quality indicators such as less anxiety and depression, less pressure ulcers and restraint use, and less infection rates.

the care offered to patients and nursing home residents (see Table 1). Leonardi et al. (2007) defined quality of care as the degree to which health care facilities achieve a desirable level of care based on quality measures of the structure, processes, and outcomes of care. The elements of the Donabedian's SPO model are interdependent, and each one affects the one that follows (Donabedian 1988). This framework is most often used to study quality because of its relevance and usefulness to quality of care (Naranjo & Kaimal, 2011).

The first element is the structure of an organization. It influences the processes of care, while the processes itself influence the outcomes at the individual or facility level. According to Donabedian (1988), structure measures are those used to assess the

environment in which the care is provided. The facility's physical environment and its organizational attributes (e.g., ownership, chain membership, number of beds, staffing levels) are the structure of the organization. These factors generally do not change over time and are meant to support the processes of resident care (Donabedian, 1988).

The second element, process measures, refers to the organization's operational systems. It refers to the way in which health care organizations deliver and provide health care services (Donabedian, 1988). According to Kraft, Neubauer, and LeSage (1987), as cited in Rantz et al. (2004), process is the actual care that the staff offers or fails to offer. Bowblis (2011) stated that quality measures related to care practices are indicators of the processes the facility staff uses to provide health care. Examples of process measures in health care facilities are the rates of residents with physical restraints, rates of residents with catheters, and the rates of residents who received the appropriate vaccinations (Bowblis, 2011). These measures demonstrate whether a facility delivered care services followed evidence-based guidelines (Naranjo & Kaimal, 2011). Inspectors do health surveys at least annually to evaluate these processes of care in nursing facilities.

The third element, the outcome measures, assesses the residents' general health status (Donabedian, 1988). Castle and Ferguson (2010) defined an outcome as the end result of a process of care. Some examples of outcomes at the facility level are the incidence or prevalence of falls, the prevalence of pressure ulcers, and the rate of infections.

The Donabedian (1988) approach proposes that an organization that offers an adequate setting where residents are protected from hazards and that have protocols in

place to provide a good health care will obtain residents' outcomes that align with practice standards. State and federal agencies, accrediting bodies, and health organizations, such as the NCNQ, the NQF, the CMS, the American College of Surgeons (ACS), and the Surgical Review Corporation (SRC) use the components of the Donabedian's SPO approach to assess quality of care (Naranjo & Kaimal, 2011).

In conclusion, many researchers have used this conceptual framework to study quality of care in nursing homes. State and federal agencies, as well as health insurance companies, including the CMS, the NCNQ, the NQF, and the ANA, use this approach to assess quality of care. The CMS requires that all nursing home organizations that participate in Medicaid and Medicare submit information regarding the structure, processes, and outcomes in their facilities (CMS, 2012a). The CMS (2014b) uses quality measures to assess organizational structures, processes of health care that are related to high-quality health care services, and residents' health outcomes. Therefore, the most appropriate conceptual framework for this study was the Donabedian (1988) approach.

Louisiana Nursing Homes Overview

As stated earlier, nursing home quality remains a challenge in Louisiana. State legislators want to (a) improve the quality of care in nursing homes, (b) improve health outcomes, (c) improve coordination of care, and (d) balance the long-term care population's needs with the state expenditures (Purpera et al., 2014). In 2013, 24,920 (51%) of all the elderly individuals and people with disabilities received long-term care in nursing homes. Louisiana Department of Health and Hospitals (DHH) Office of Aging and Adult Services administers the Medicaid program, which funds the care in nursing

homes for Medicaid beneficiaries. The office oversees admissions and licenses and inspects the nursing homes according to federal regulations (Purpera et al., 2014). Nursing home services include medical care, nursing and rehabilitative services, room and board, and personal care. From 1999 to 2013, the population in their 60s increased 6%; those 80 years or older were 44% of the elderly population (Purpera et al., 2014). The occupancy rate in Louisiana nursing homes is lower than the national average. However, it increased 2.5% from 2011 to 2013.

Louisiana nursing homes were cited for 7,666 deficiencies from fiscal year 2011 to 2013. Deficiencies are categorized into different levels of severity. Louisiana was cited for 284 immediate jeopardy deficiencies, which means that the violation was likely to cause serious injury to the resident. Most deficiencies had to do with implementing residents' plans of care and failing to develop care plans to attend such issues as pressure ulcers (Purpera et al., 2014).

Louisiana had the lowest overall nurse staffing among all states, with an average of 3.59 hours per resident per day (Purpera et al., 2014). The national hours of nursing care per resident per day is 4.02. Its regulations require that Medicaid-certified facilities have a minimum of 2.35 hours of minimum nursing care per resident per day. These hours include all the nurse staff of RN, LPN, and CNA (Purpera et al., 2014). This state also ranked poorly when compared to the nation for quality indicators. It ranked 50th on percent of high-risk patients with pressure sores and ranked 48th for the percent of long-stay nursing facility residents who were physically restrained (Purpera et al., 2014). These statistics demonstrate a need to study the relationship, if any, between nurse

staffing, and physical restraints, deficiencies, pressure sores, and urinary tract infections in the nursing homes of Louisiana.

Literature Review Related to Key Variables and Concepts

Nurse Staffing

The OBRA 1987 requires that nursing facilities have sufficient staff providing health care services that lead to residents' highest possible well-being (Abt Associates Inc., 2001). Researchers and governmental agencies measure nurse staffing by determining the nursing hours per resident per day (HPRD), the nurse-to-resident ratio, or the nurse-to-bed ratio (Stanton & Rutherford, 2004; Tilly et al., 2003). Different states use one of these methods or a combination of them. For example, CMS utilizes the HPRD in all of the national data. A national mandate through OBRA 1987 established that nursing facilities must have LN staffing with at least 0.30 HPRD and RN staffing with 0.08 HPRD. By 2010, 41 states had implemented minimum staffing mandates (Harrington, 2010). Louisiana has a minimum staffing standard of direct care staff of 1.5 HPRD (Louisiana Administrative Code 48-97-9811). Other states, such as Massachusetts and New Jersey, have more detailed, specific, and rigorous standards (Harrington, 2010).

Nurses have critical roles in the care of residents in nursing homes. There are different levels of these professionals according to their education, skills, and knowledge. The nurse workforce comprises registered nurses (RNs), licensed practical nurses (LPNs) or licensed practical nurses (LPNs), certified nurse assistants (CNAs), and nurse assistants (NAs). RNs have a bachelor's degree in nursing and are licensed by the state where they work (Castle & Anderson, 2011). Their training is more comprehensive than

the training of nurses with a lower education. During their schooling, they acquire more administrative and critical thinking skills. Therefore, their main roles in health care facilities are supervisory.

According to Lin (2014), RNs evaluate the residents' health status and health needs, develop care plans, assign nurses to work schedules, supervise other nurses, and give direct care to residents when is needed. They are also the main contact with physicians if they need assistance with medical treatment. Castle and Anderson (2011) stated that RNs delegate, direct, and evaluate the care offered by LPNs and NAs. They have clinical knowledge, coordinate the care, and provide oversight of other nurses (Castle & Anderson, 2011). RNs' expertise in clinical illnesses and diseases, care coordination, leadership, and management make them fundamental in the provision and quality of health care (Lin, 2014).

In contrast, LPNs generally have an associate's degree (Castle & Anderson, 2011). They obtain a diploma or certification in nursing after a 12-month program. These nurses have more education and training than the NAs. They are under the direction of the RN and provide care for the basic medical needs of residents, such as patients' vital signs, medication management, and supervision of NAs (Lin, 2014). According to Castle and Anderson (2011), they have a narrower range of tasks than both RNs and NAs.

Nurse aides include those who are certified (CNAs) and those who are not. All NAs usually have a high-school diploma and must take 75 hours of training and pass a competency exam (Castle & Anderson, 2011). CNAs have an education that takes from 4 weeks to a full semester and a state certification exam. NAs provide direct patient care,

and their main roles are to help residents with their personal care and daily living needs, such as eating, dressing, bathing, and taking medications (Lin, 2014, p. 14). They also assist residents during walks, wheelchair transportation, and exercises.

Castle and Anderson (2011) commented that RNs and NAs seem to have more influence on quality of care than LPNs do. RNs are more involved in the decision-making process regarding the residents' conditions and care (more clinical knowledge, care coordination, and professional oversight), while the NAs offer 80% to 90% of direct care services (Castle & Anderson, 2011). Therefore, Lin (2014) focused his study on RNs and NAs and their association to quality. Castle et al. (2011) speculated that LPNs and NAs are less important than RNs regarding resident safety since the latter have more education, training, skills, and leadership roles.

Nursing Home Building

Nursing home size is generally measured by a facility's number of beds. Various researchers found that this factor may be associated with quality of care. Zimmerman and Cohen (2010) did a literature review, which favored small nursing homes. These facilities had better outcomes in quality indicators, such as less anxiety and depression, less pressure ulcers and restraint use, and lower infection rates (Zimmerman & Cohen, 2010). In another study, nursing homes that had better outcomes had a median size of 60 beds, while those that had poor outcomes were larger facilities of a median size of 130 beds (Rantz et al., 2004). Nursing facilities with consistent good quality of care for two consecutive periods had also fewer beds (median size of 80 beds). Facilities with consistent poor quality in these two consecutive periods had a median of 120 beds.

Rantz et al. (2004) stated that the association between the size of the facility and good quality might be related to consistent staff assignment.

Chang et al. (2013) studied small-scale units within a traditional nursing home (called households) and how they affected the residents' outcomes. They discovered that the residents living in the household units had better outcomes in regards to physical function, less daytime sleepiness, and improvement on pressure ulcer frequency. The household unit also was significantly related to less use of restraints. Kane et al. (2007) compared Green House homes (a type of small nursing home) and traditional nursing homes and their relationship to the processes of care and the residents' outcomes. The authors found that the type of nursing home had an effect on the residents' quality of life and functional status favoring small-scale nursing facilities.

Nursing Home Ownership and Chain Membership

According to Grabowski, Feng, Hirth, Rahman, and Mor (2013), roughly two thirds of nursing homes are for-profit in the United States. A corporation, a partnership, or an individual may own a for-profit organization (Grabowski et al., 2013). Churches or nonprofit corporations, on the other hand, for the most own nonprofit nursing home organizations (Grabowski et al., 2013). Nursing facilities that are run by hospital district, city, county, state, or federal government are considered government-owned nursing facilities. These facilities constitute 6% of all nursing homes (Grabowski et al., 2013).

Nursing Home Quality Measures

The CMS developed tools to measure the quality of care in nursing homes. The quality measures (QMs) derived from the MDS 3.0 are based on residents' assessment

data that licensed health professionals from nursing homes collect at specified intervals (Singh, 2010). They provide important information to consumers and family members to compare quality of care between nursing homes, to nursing home organizations to improve care processes, and to state and federal agencies to create or modify health policies that affect these facilities.

The NQF endorsed 16 QMs of the MDS 3.0. As Castle and Ferguson (2010) noted, these QMs are presented as process and outcome measures. These QMs are the percent of residents who self-report moderate to severe pain (short stay and long stay), have pressure ulcers that are new or worsened (short stay), were assessed and appropriately given the influenza vaccination (short stay and long stay), were assessed and appropriately given the pneumococcal vaccination (short stay and long stay), experienced one or more falls with major injury (long stay), are high-risk residents with pressure ulcers (long stay), have urinary tract infection (long stay), are low-risk residents who lose control of their bowels or bladder (long stay), have/had a catheter inserted and left in their bladder (long stay), were physically restrained (long stay), need for help with activities of daily living has increased (long stay), lose too much weight (long stay), and have depressive symptoms (long stay) (NQF, 2013; Smith et al., 2012).

CMS calculates these measures once a quarter and presents them in the Nursing Home Compare website. As stated before, the CMS uses this approach to measure nursing homes' outcomes and regulate these facilities. According to Smith et al. (2012), these QMs "have scores which vary widely enough to discriminate between facilities with different levels of quality of care and are reliable and valid" (pp. 22-23). Therefore,

in this study, I used the long-stay quality measures because the population I studied included nursing home residents who have been living in the facility for at least 100 cumulative days. The MDS is an instrument used by licensed health professionals to assess nursing home residents' "physical, psychological, and psychosocial functioning" (CMS, 2012b, para. 1). This instrument is commonly used in quantitative studies that compare nursing home residents' outcomes between and within facilities or units (Chang et al., 2013; Kane et al., 2007; Yoon, 2013).

Kraft et al. (1987), as cited in Rantz et al. (2004), argued that process measures are the best way to assess the care that residents receive. Deficiencies represent flaws in the processes of care. They are also citations and represent violations of specific codes or standards (Hyer et al., 2009). Federal regulations have 15 major categories of deficiencies related to health (Temkin-Greener, Zheng, Cai, Zhao, & Mukamel, 2010). One of these is related to quality of care and has 26 standards (tags). For example, F tag 314 means that the nursing staff did not offer treatment or services to prevent or heal pressure ulcers, while F tag 315 means that the staff did not make good use of catheters or did not give care to prevent UTI.

Researchers generally use deficiencies as a quality measure for nursing homes (Hyer et al., 2011). CMS does not obtain the deficiencies from the MDS 3.0, but from the CMS' Certification and Survey Provider Enhanced Reports (CASPER). According to Lin (2014), deficiencies "are considered reliable indicators for overall quality of care" (p. 19). Inspectors scrutinize and certify nursing homes that bill Medicaid and Medicare for the services offered to their beneficiaries. Surveyors do health inspections to these facilities

annually to evaluate whether they are in compliance with standards or present a substandard care (Castle et al., 2011). If a facility's personnel violate a regulation, then that is considered a deficiency. Health surveyors cite a deficiency for each standard that is not met (Singh, 2010). The CMS established a 12-category system to classify the deficiencies based on their scope and scale (Castle et al., 2011). CMS summarizes data from the inspections in its Nursing Home Compare website, which provides information to consumers about factors related to the quality of care residents receive.

Nurse Staffing and Quality Measures: The Relationship

The Colorado Foundation for Medical Care (2005), along with universities and other institutions, created staffing measures as a measure of quality with the intention of reporting them to the public. In germinal staffing sources, researchers linked higher levels of nurse staffing to patient quality (Anderson, Hsieh, & Su, 1998). Despite all the literature on nurse staffing and the regulations on minimum staffing, researchers have not arrived at a consensus regarding the association between nurse staffing levels and quality measures in nursing homes. For example, some researchers found that higher RN staffing was associated with better health outcomes as measured by different groups of quality indicators (Castle, 2000; Castle & Anderson, 2011; Lin, 2014; Zhang & Grabowski, 2004). Other researchers, however, did not find such relationship (Arling et al., 2007; Intrator et al., 1999); indeed, Zimmerman, Gruber-Baldini, Hebel, Sloane, and Magaziner (2002) found a negative association between RNs and quality of care. Researchers who have evaluated LNs and NAs staffing and their relationship to quality have found more mixed results (Castle, 2000; Lin, 2014).

Rantz et al. (2004) studied the differences between nursing homes with good and poor quality of care as measured by quality indicators and found no significant difference between these two groups. The authors concluded that quality indicators were not associated with nurse staffing HPRD. Researchers who did systematic literature reviews found mixed results in regards to nurse staffing and quality indicators (Backhaus et al., 2014; Spilsbury et al., 2011). Backhaus et al. (2014) focused his revision of literature only in longitudinal studies. The authors found that there was no consistency among the findings of different studies. The results showed that higher levels of nurse staffing was associated with better and worse outcomes.

Spilsbury et al. (2011), on the other hand, concluded that there is no conclusive evidence regarding the association between nurse staffing and quality. However, they stated that there is a provisional indication that RN and NA staffing influence positively the quality of care in nursing facilities. In Castle's (2008) review of literature, 120 out of 302 (40%) quality indicators had a significant positive relationship with staffing levels, while 5% had a significant negative association with staffing levels. Lastly, in another literature review, Bostick, Rantz, Flesner, and Riggs (2006) found that nurse staffing levels was significantly associated with pressure ulcers, functional ability, and weight loss.

Lin (2014) studied the causal relationship between policy changes that required minimum staffing for RNs and NAs and residents' quality of care in eight states. Lin found that RN staffing was significantly associated with fewer adverse events, while LPNs had a non-significant association with quality of care. However, LN (RN and LPN

together) had a large and significant effect on quality, while NAs were not associated with quality of care. Lee et al. (2014) also studied the quality of care in Colorado nursing homes and found that increasing the RNs HPRD was related to lower rates of only one out of five quality indicators. In the following sections, I present more literature regarding the relationship between nurse staffing levels and processes and outcomes of care.

Nurse Staffing and Deficiencies: The Relationship

Various scholars (e.g., Castle et al., 2011; Lin, 2014; Wagner et al., 2013) have studied the association between staffing levels and deficiency citations as a quality measure. Higher RN staffing levels were associated with lower deficiencies (Castle, 2000; Castle et al., 2011; Temkin-Greener et al., 2010; Wagner et al., 2013; see Table 1). Castle (2000) found that facilities with no restraint deficiencies had significantly a higher full-time equivalent for RN, LPN, and NA. In another study, Castle et al. (2011) assessed quality as measured by deficiencies for environmental and care safety issues. The authors found that low staffing levels of RNs and poor quality of care were significantly related to a greater likelihood of receiving a deficiency for safety violations. In other words, higher RN staffing was significantly associated with lower deficiencies. Castle et al. concluded that one unit increase of RN resulted in 5% fewer citations.

Temkin-Greener et al. (2010) studied the association between the nursing facilities' work environment and quality of care in New York nursing homes. To measure quality, the authors used the deficiencies for quality of care and quality of life, and the severity of these deficiency citations. Temkin-Greener et al. found an inverse relationship

between RN staffing and deficiencies: the higher the RN staffing, the fewer the quality of care deficiencies. Wagner et al. (2013) studied the effect of nurse staffing levels on quality as measured by deficiencies for physical restraints including restrictive side rails. The authors found a strong relationship between higher levels of licensed nurses (RNs and LPNs) and fewer deficiency citations for physical restraints. However, the opposite occurred in Wagner et al. (2013) study: As the NA staffing increased, the deficiencies for physical restraints increased as well.

Hyer et al. (2011) studied the relationship between CNA and LN HPRD and the quality of care in Florida nursing homes (see Table 1). To measure quality, Hyer et al. used the quality of care deficiency score and the total deficiency score and found that higher CNA HPRD had a significant association with lower deficiency scores for quality. The authors concluded that increasing the CNA HPRD by 6 minutes decreases the quality of care deficiency score by 3%. However, Hyer et al. found no association between LN HPRD and deficiencies scores when they controlled for CNA HPRD.

Castle's (2011) findings contradict these studies. Examining the relationship between nurse staffing levels and four deficiency citations for abuse, Castle found that higher RN staffing was significantly associated with an increase in two out of four deficiencies (i.e., F-225, criminal screening investigating and reporting, and F-226, abuse prevention and policy development and implementation). Nursing facilities with a higher RN staffing had a higher likelihood of having one of these deficiencies for abuse. Furthermore, NA and LPN staffing were not associated with any of the deficiencies for abuse.

Researchers have also studied the association between state or national staffing requirements and deficiencies. Overall, all the studies available in the literature had similar findings: Minimum staffing requirements have been significantly associated with fewer deficiency citations (Bowblis, 2011; Hyer et al., 2009; Lin, 2014; Park & Stearns, 2009) (see Table 1). In a longitudinal study, Lin (2014) studied the causal relationship between policy changes that required minimum staffing for RNs and NAs and residents' quality of care in nursing homes from eight states. Lin assessed quality as measured by the number of deficiencies and their score that accounted for the severity and scope of each violation. An increase of 0.3 hours of RNs per resident day lowered the average of deficiencies from 7.4 to 6.2, a 16% of improved quality (Lin, 2014). Fewer deficiencies were significantly associated with higher RN staffing but not with NA staffing. LPNs had an association with quality of care deficiencies but this relationship was not significant (Lin, 2014).

Bowblis (2011), in a national study, evaluated the effect of minimum direct care staffing requirements on nurse staffing levels and quality of care in nursing homes. Bowblis used both seven individual deficiencies and the total number of deficiencies. Higher staffing requirements were related to fewer regulatory deficiency citations. Hyer et al. (2009) wrote a preliminary legislative report to study the effects of a new minimum nursing home staffing mandate for CNAs in Florida in the quality of care in these facilities. The authors examined the quality among facilities below and above 2.9 CNA HPRD for the years 2002-2006. The facilities above 2.9 CNA HPRD had consistently

lower deficiencies than the comparison group (Hyer et al., 2009). This means that more CNA direct care time was associated with lower number of citations (see Table 1).

Park and Stearns (2009) assessed the effect of state minimum staffing requirements on nurse staffing levels and quality of care in nursing homes. The authors investigated states that increased their staffing standards from 1998 to 2001. They found that after the implementation of the staffing standards, the total number of deficiency citations declined significantly only in nursing facilities that had the lowest nurse staffing HPRD (Park & Stearns, 2009). However, the effect of state requirements on the total deficiency citations was small.

Nurse Staffing and Physical Restraints: The Relationship

According to Wagner et al. (2013), "physical restraints have been used for many decades in nursing homes, with the aim of protecting residents from vulnerabilities (susceptibilities)" due to their incapability of protecting themselves from hazards (p. 547). However, Wagner et al. (2013), in their literature review, stated that the inappropriate use of physical restraints is deemed as substandard care since "physically restrained residents have an increased likelihood of developing depression, pressure ulcers, contractures, and agitated behaviors" (p. 547). Falls, entrapment, strangulation, and death are other adverse events that have been associated with the use of restraints (Hamers & Huizing, 2005). The U.S. Food and Drug Administration (FDA, 2014) stated that beds with certain types of side rails have caused strangulations and entrapments with some of those leading to the patient's death (FDA, 2014). These are some reasons of why a Louisiana regulation states the following: "The resident has the right to be free from

any physical or chemical restraints imposed for purposes of discipline or convenience and not required to treat the resident's medical symptoms" (Louisiana Register, 2014, p. 910).

Scholars have assessed the effect of nurse staffing levels on the use of physical restraints and have had mixed results. Researchers have found an association between higher nurse staffing and lower physical restraint use (Bowblis, 2011; Park & Stearns, 2009) (see Table 1). Others have found no relationship (Arling et al., 2007; Bostick, 2004) and others an adverse association (Bostick, 2004; Grabowski & Castle, 2004). For example, Bowblis (2011), in a national study, evaluated the effect of minimum direct care staffing requirements on nurse staffing levels and quality of care in nursing homes. Higher staffing requirements were associated with a reduction in the prevalence of physical restraint use.

Park and Stearns (2009) examined data from states that increased their staffing standards from 1998 to 2001. The authors found a significant association between higher minimum standards and a decline for physical restraints. The increase in minimum nurse staffing standards had a positive effect on physical restraint use since they declined after the implementation of the new minimum standards.

Zhang and Grabowski (2004) evaluated whether a nursing home reform act in 1987 affected the proportion of residents with physical restraints, among others, in nursing facilities in 22 states. These researchers discovered that after the mandate, the prevalence of restraints declined from 39% to 23%. However, they also found that the residents on bedfast and chairbound increased significantly. The authors asserted that this finding might be the result of the same residents getting older and having a lower

physical function. NAs in top quartile nursing homes for staffing were associated significantly with a reduction in the use of physical restraints after the mandate. Higher RN and NA HPRD in the bottom quartile nursing homes for staffing had a significant association with a reduction of restraint use. In a national study, Castle and Anderson (2011) found that for the years 2003 to 2007, higher RN, LPN, and NA staffing were significantly associated with less prevalence of restraint use.

On the other hand, Arling et al. (2007) examined the association between nursing facility staffing levels and the care processes related to quality and residents' functional outcomes in four states. The authors' conclusions contradicted other work (Bowblis, 2011; Castle & Anderson, 2011; Park & Stearns, 2009): Nurse-staffing HPRD was not associated with the care processes studied (i.e., physical restraint use and ADL training). In other words, RN, LPN, and NA staffing were not associated with the use of physical restraints or ADL training (see Table 1).

On the contrary, researchers from two studies found a relationship between higher staffing and higher use of physical restraints (Bostick, 2004; Grabowski & Castle, 2004). Bostick (2004) discovered an association, albeit nonsignificant, between higher RN hours and higher use of physical restraint. Total staffing (RN, LPN, and NA) had no association with physical restraint use. Castle (2000) studied the relationship between deficiency citations for physical restraint use in nursing homes and various processes of care and found that fewer citations were significantly associated with a lower rate of physical restraints (see Table 1). In contrast, Grabowski and Castle (2004) found that more RNs,

LNs, and NAs per resident day had an association with more use of physical restraints, as contrary to other studies (e.g., Bowblis, 2011; Park & Stearns, 2009).

Nurse Staffing and Catheter Use: The Relationship

Researchers have also studied the use of catheters in nursing homes as a quality process measure. Lee et al. (2014) assessed the quality of 195 nursing homes in Colorado; specifically, the authors evaluated the association between RN staffing HPRD and five quality indicators using the Donabedian's (1988) SPO approach. Of these quality indicators, two were process measures: catheter use and antipsychotic drug use. The researchers found that RN HPRD had no association with either of these process measures (Lee et al., 2014) (see Table 1). Park and Stearns (2009) established that there was no association between an increase in state minimum staffing requirements and catheter use. The increase in minimum nurse staffing standards did not affect the catheter use in nursing homes.

Castle and Anderson (2011) found in their longitudinal study that increasing RN staffing levels was associated with less use of catheter, but the same did not occur for LPNs or NAs. Horn, Buerhaus, Bergstrom, and Smout (2005) studied the effect of RN direct care on catheter use in nursing home residents. The authors discovered that 30 to 40 minutes of RN direct care had a significant association with fewer catheterizations (see Table 1), in contrast to the other findings (e.g., Lee et al., 2014; Park & Stearns, 2009). Zhang and Grabowski (2004) found that catheter use declined from 10% before a minimum staff mandate to 8% after the mandate. Higher LPN HPRD in the lowest quartile nursing homes had a significant increase of catheter use after the regulation

(Zhang & Grabowski, 2004). Total staffing was associated nonsignificantly with fewer catheters for nursing facilities in the bottom quartile. The catheter use declined from 10% before the mandate to 8% after the mandate (Zhang & Grabowski, 2004). Bowblis (2011) found higher minimum direct care staffing standards were significantly related with higher catheter use, while Castle (2000) concluded nursing homes that had higher deficiency citations for physical restraint also had significantly higher catheterizations.

Nurse Staffing and Outcomes: The Relationship

The following quality indicators are among the most studied by researchers to assess quality in nursing homes: prevalence or incidence of pressure ulcers, urinary tract infections, falls, contractures, incontinence, and ADLs. These are also known as the outcomes of care. Staffing levels and processes of care like physical restraint prevalence may affect positively or negatively the probability of adverse events like UTI, pressure ulcers, depression, decline in ADLs, and other health issues, including death (Park & Stearns, 2009; Zhang & Grabowski, 2004). According to Park and Stearns (2009) pressure ulcers can be avoided and treated. In most occasions they are preventable irrespective of the resident's health status. Physical restraints may immobilize residents and therefore, increase the probability of acquiring a pressure ulcer. Zhang and Grabowski (2004) stated that repositioning the resident could prevent this health issue.

Pressure ulcers. Pressure ulcers are areas of dead skin created when the blood does not flow correctly to an area in the body creating a skin injury (Hyer et al, 2009; Park & Stearns, 2009). This lack of blood flow happens most of the time on bony prominences because of a constant friction or pressure on the skin that is caused by a lack

of movement. In nursing homes, this health issue is created if a resident stays in the same position for a long time. When this occurs, people assume that nurses or NAs did not offer an appropriate health service and did not take care of the resident in accordance to quality standards.

Often scholars use the prevalence of pressure ulcers as an indicator of quality. Different researchers found that higher RN HPRD was significantly associated with a lower prevalence of this health issue (e.g., Castle and Anderson, 2011; Lee et al., 2014; Lin, 2014; Konetzka et al., 2008). Lee et al. (2014) discovered that higher RN HPRD was related with 11% of lower rates of pressure ulcers, while Konetzka et al. (2008) discovered in their longitudinal study that an increase of RN HPRD by 50% caused a decline in the prevalence of pressure ulcers by 66%. Furthermore, Castle and Anderson (2011) also showed an inverse relationship between RN hours and pressure ulcers. Lower RN staffing hours were associated with a higher amount of pressure ulcers.

Bostick (2004) found that higher RN hours and higher NA hours was associated with a lower prevalence of pressure ulcers. They concluded that a "6-minute increase in RN time was associated with a 3% reduction in the chance of one resident developing a pressure ulcer" (Bostick, 2004, p. 134). Horn et al. (2005) found that higher RN time was associated with fewer rates of pressure ulcers. The authors discovered that the strongest predictor for fewer pressure ulcers was 30 to 40 minutes of RN direct care. In another study, Grabowski and Castle (2004) found a small but significant association between RN and LPNs and pressure ulcers. NAs were not associated with this adverse health outcome.

Other researchers had mixed results regarding the relationship between minimum nurse staffing mandates and pressure ulcers (e.g., Bowblis, 2011; Park & Stearns, 2009; Zhan & Grabowski, 2004). Lin (2014) and Bowblis (2011) found an inverse relationship between minimum direct care staffing requirements and pressure ulcers. Higher minimum direct care mandates were associated to lower rates of pressure ulcers in nursing facilities. However, Park and Stearns (2009) found no such association. The Zhang and Grabowski (2004) results contradicted these findings: After the implementation of a staffing mandate, the prevalence of pressure ulcers increased by 8%. Zhang and Grabowski found no association between LPN HPRD and pressure ulcers in facilities with the highest staffing levels after the implementation of a minimum staff requirement.

Furthermore, higher LPN HPRD at nursing homes at the lowest quartile of staffing was not significantly associated with a lower probability of having pressure ulcers (Zhang & Grabowski, 2004). This association was at the 10% level of significance. Rantz et al. (2004) found that facilities with poor outcomes had several times more acquired pressure ulcers. However, the authors did not state whether this association was significant or not.

Urinary tract infection. Researchers (e.g., Konetzka et al. 2008) have also studied UTI as an outcome measure. Konetzka et al. (2008) found an inverse relationship between RN staffing and UTI prevalence. Higher RN HPRD was significantly associated with lower rates of UTI. Horn et al. (2005) found that higher RN time was associated with less prevalence of UTIs. Thirty to 40 minutes of RN direct care time was a stronger

predictor for fewer UTIs. However, this relationship disappeared when the results were adjusted for catheterizations. Lee et al. (2014) stated that catheter use could lead to UTIs. The Lee et al. (2014) findings differed from those in other studies (e.g., Konetzka et al., 2008; Horn et al., 2005). Lee et al. found no relationship between RN staffing and UTIs. Higher staffing hours did not lead to fewer UTIs. Regarding LPNs and NAs, Horn et al. (2005) did not discover an association between nurse staffing and UTIs, while Rantz et al. (2004) found that nursing homes with good or bad quality indicators had no significant relationship with UTIs.

Falls. Other quality indicators that researchers have used in past studies of quality of care are the prevalence of falls, unwanted weight loss, contractures, incontinence, functional decline in ADLs (ADLs deterioration, decline in ADLs), and hospitalizations. An exhaustive review of the research showed only one study that assessed the relationship between nurse staffing and falls (Staggs et al., 2012). Staggs et al. (2012) studied the relationship between total nurse hours per patient day and unassisted falls in hospitals. The authors found that these variables did not have a linear relationship. Among hospitals with lower staffing levels, Staggs et al. found that a higher total nurse per patient day was significantly associated with more unassisted falls. Among hospitals that were around and above the median for staffing levels, a higher nurse staffing was significantly related with fewer unassisted falls.

Weight loss. Research findings regarding nurse staffing and weight loss have been more mixed. Horn et al. (2005) discovered that more RN time with nursing home residents was significantly related to less unwanted weight loss. On the other hand, Lee et

al. (2014) and Bostick (2004) found no relationship between any staffing level and residents' weight loss, while Bowblis (2011) found that after a mandate to increase the minimum direct care staffing, there was a significant rise of residents with unwanted weight change.

Contractures and incontinence. Lin (2014) found that higher RN HPRD was associated with fewer contractures. In his study, the same relationship did not exist with LNs or NAs. On the contrary, Park and Stearns (2009) did not find an association between a higher minimum staffing standard and contractures. In regards to incontinence, neither Park and Stearns (2009) nor Arling et al. (2007) found a relationship between any of the nurse staffing levels and this quality indicator. In contrast, Bostick (2004) found that higher NAs and RNs direct care hours were associated with a higher prevalence of incontinence. However, the RN-incontinence association was nonsignificant (Bostick, 2004).

Activities of daily living (ADLs). Horn et al. (2005) found a significant association between more RN direct time with residents and less ADLs deterioration. Higher LPN time was associated with this variable outcome in bivariate analysis, but it did not hold up when controlled for other variables (Horn et al., 2005). In contrast to Horn et al. (2005), other researchers found no association between RN, LPN, or NA HPRD and functional decline in ADLs (Arling et al., 2007), while Bostick (2004) found that more LPN hours was significantly associated with a higher prevalence of late loss ADL decline. Castle (2008) and Lin (2014) suggested this association may be due to endogeneity, that is, it is uncertain whether nurse staffing influences the quality indicators

or whether these influence the nurse staffing. In the Bostick study, this relationship of worst outcomes did not exist with RNs and NAs.

Hospitalizations and mortality. Only a few scholars have evaluated the association between nurse staffing levels and hospitalizations, and staffing levels and mortality (Horn et al., 2005; Intrator et al., 1999). Horn et al. (2005) found a significant association between higher RN time in direct care and fewer hospitalizations; in contrast, Intrator et al. (1999) found no association either between nurse staffing levels and hospitalizations or between nurse staffing levels and mortality.

Ownership and Quality Measures: The Relationship

Some researchers have found that nonprofit health facilities had fewer adverse events and better health outcomes (e.g., Grabowski et al., 2013; Horn et al., 2005; Lutfiyya, Gessert, & Lipsky, 2013), while others' findings were not consistent with such results (Castle, 2000; Rantz et al., 2004; Wagner et al., 2013). Grabowski et al. (2013), for example, found that post-acute patients in nonprofit nursing facilities were less likely to be hospitalized within 30 days and more likely to have ADL improvements. Nonprofit facilities also did better in regards to mobility and pain, but this association was nonsignificant (Grabowski et al., 2013). In their study, nonprofits were associated with a better quality of 9.5% to 19.9%.

In Horn et al. (2005), residents living in nonprofit nursing homes had significantly fewer pressure ulcers and less ADLs deterioration. Lutfiyya et al. (2013) also found that nonprofits and government owned facilities had higher ratings than for profits. In another study, Aaronson, Zinn, and Rosko (1994) found that nonprofit nursing homes had better

staffing and better outcomes than for-profit ones. The population in this study was nursing facilities with Medicaid residents and self-pay residents at a higher probability for adverse outcomes. Grabowski and Castle (2004) found that residents living in nonprofit nursing homes had a lower likelihood of having pressure ulcers, physical restraints, and catheters. This was especially true when the nonprofit market share was higher. The researchers found that "nonprofit market share was associated with persistent high-quality surveys in all quality measures" (Grabowski & Castle, 2004, p. 108). Park and Stearns (2009) found that nonprofit nursing homes increased RN, NA, and total staff HPRD after a change in staffing standards. In contrast, for-profit nursing facilities with high staffing levels before the staffing mandates decreased the total nurse staffing HPRD after the mandate.

The findings in Wagner et al. (2013) and Rantz et al. (2004) were not consistent with the articles mentioned above. Rantz et al. (2004) found no association between ownership and nursing homes with good and bad quality of care, while Wagner et al. (2013) and Castle (2000) found that for-profit nursing homes were associated with better performance as measured by deficiencies for physical restraints. Castle (2000) noted that nonprofits had significantly higher restraint citations, while in the Wagner et al. (2013) study, for-profit nursing homes and those that were part of a chain membership had a decreased likelihood of having a deficiency for restraints. The authors argued that this decrease likely resulted from the ability of chain organizations to have more resources (e.g., investment, training) and distribute them better among their facilities (Wagner et al., 2013). Bowblis (2011) argued that the care practices from these chain-member

facilities might be standardized, which in turn may have a positive effect on quality. Nevertheless, Castle et al. (2011), in contrast to Wagner et al. (2013), found that nursing homes that were part of a chain membership had worst performance, because these facilities were more likely to have a deficiency for safety.

McGrail, McGregor, Cohen, Tate, and Ronald (2007) commented that Canadian researchers have found that nonprofit, long-term care facilities had better outcomes than for-profit facilities. According to the authors, this difference in quality between nonprofits and for-profits may result from different spending decisions. For example, for-profits must keep a portion of the revenue to profits instead of investing it in residents' care (McGrail et al., 2007).

Nursing Home Building and Quality Measures: The Relationship

As mentioned earlier, facility size also may have an effect on residents' outcomes. Scholars have found a relationship between smaller nursing facilities and better processes of care and health outcomes (Castle, 2000; Castle et al., 2011; Rantz et al., 2004; Wagner et al., 2013). Some facilities with a larger number of beds had worst quality performance in regards to deficiencies for physical restraint use (Castle, 2000), and deficiencies for resident safety (Castle et al., 2011). Larger facilities were more likely to receive a deficiency citation.

Rantz et al. (2004) studied the differences between nursing homes with good and poor quality of care as measured by quality indicators. In their study, the only significant difference between high quality and low quality groups was the number of licensed beds. The researchers found that overall, facilities with a median of 60 beds performed

significantly better than the facilities with a median of 130 beds (Rantz et al., 2004). Nursing facilities with consistent good quality of care for two consecutive 60-day periods were also smaller (median size of 80 beds) than those with consistent poor quality (median of 120 beds).

Furthermore, Wagner et al. (2013) noted an association between larger facilities and more deficiencies for physical restraints and restrictive side rails. In their literature review, the authors argued that small nursing homes may promote less use of restraints indirectly because they facilitate better interactions between residents and staff, sense of teamwork, less bureaucracy, and patient-centered care, and ability to implement changes in the processes of care that could be replacing physical restraints with other alternatives. In their study, Wagner et al. found that facilities that had a higher number of beds had significantly more deficiencies for physical restraints. Nonetheless, other researchers had different results in two separate studies (Lee et al., 2014; Molony, Evans, Jeon, Rabig, & Straka, 2011). Lee et al. (2014) found and inverse relationship between facility size and UTIs. Molony et al. (2011) compared the trajectories of health of residents living in traditional nursing homes and those living in small house nursing facilities in the Midwest. They found that residents living in small house nursing homes had a higher functional decline. In these two studies, larger facilities were more likely to have better outcomes: fewer UTIs and lower functional decline.

Resident case-mix is also associated with quality of care. Case-mix means the level of residents' acuity or the level of assistance that they require with ADLs (Lee et al., 2014). According to Lee et al. (2014), facilities that have more residents that require

more assistance may be associated with poorer residents outcomes. Rantz et al. (2004) did not find an association between facilities with good and poor quality outcomes and admission case-mix. In all research articles reviewed, scholars controlled for case-mix.

Literature Review Related to Research Methods

The aim of the research was to study the relationship between nurse staffing levels and quality of care deficiencies and nurse staffing levels and CMS quality measures in Louisiana nursing homes. I considered different factors when choosing the most suitable methodology. First, a researcher uses quantitative methods to answer research questions regarding the relationship between certain variables by using statistical analyses (Morgan, 2013). Second, in the literature review available (see Table 1), the majority of researchers who studied quality of care in nursing homes used a quantitative methodology (see, e.g., Lee et al., 2014; Wagner et al., 2013) and only a few used a qualitative approach (e.g., Williams, 1998) or mixed methods (e.g,. Rantz et al., 2004).

Qualitative research. In qualitative research, the data are inductive and subjective (Morgan, 2013). Researchers use this approach when there is little information about a phenomenon or the attitudes, behaviors, experiences, beliefs, or perceptions of individuals. For example, Williams (1998) used this approach to understand the quality of care in a hospital from the nurses' perspective. Nurses expressed through interviews that they were unable to provide good quality care. They perceived that they lacked the time to provide all the necessary care to patients because of too few staff and resources (Williams, 1998). Because I used CMS quality measures that previous researchers have

proven to be valid and reliable (Smith et al., 2012), I determined that a qualitative approach was inappropriate for the study.

Mixed methods. In mixed methods, researchers combine both qualitative and quantitative methods. Rantz et al. (2004) used MDS quality indicators, cost, and staffing data to address the quality of care in Missouri's nursing homes. The authors also used qualitative methods to describe the processes of care delivery in facilities with good, average, and poor outcomes. After research nurses observed the facilities and the health care delivery, the data were coded and analyzed. I considered this approach for this study but I chose a quantitative method. First, I used quality measures that professionals have already determined to be reliable when comparing nursing homes' quality. Second, I did not study the experiences or perceptions of nurses or nursing home residents.

Quantitative methods. The vast majority of researchers who have studied quality in nursing facilities have used a quantitative approach (see Table 1). Many researchers used quality indicators such as the prevalence or incidence of pressure ulcers, physical restraints, and falls, among others (e.g. Lee et al., 2014; Wagner et al., 2013). Most of the researchers used the MDS as the data source (e.g. Grabowski et al., 2013; Lee et al., 2014). Therefore, I determined a quantitative study would be the best approach to study the quality of care in Louisiana nursing facilities.

The CMS presents nursing homes' quality measures through the Nursing Home Compare website. The public can access this webpage to compare the quality of care that residents receive in nursing homes that receive payments from Medicaid or both

Medicaid and Medicare. CMS takes into consideration the deficiency citations, the staffing, and the quality measures (CMS, 2012b).

The deficiency citations are the federal regulation violations that nursing facilities have incurred (Hyer et al., 2011). The staffing are the staff hours per resident per day (CMS, 2012b). The quality measures helps in evaluating the care provided to residents. The CMS process measures that I used in the study were the quality of care deficiency citations and the prevalence of physical restraints. The two outcome measures were the prevalence of long-stay residents with pressure ulcers and UTI. These quality measures represent processes of care and residents' health outcomes.

Summary

After reviewing the literature, I found that RNs, compared to LPNs and NAs, contribute the most to quality of care in nursing homes when measured by the rate of pressure ulcers and physical restraint use. The majority of researchers found that RN HPRD was significantly associated with a lower prevalence of pressure ulcers (Bostick, 2004; Bowblis, 2011; Horn et al., 2005; Konetzka et al., 2008; Lee et al., 2014; Lin, 2014). Researchers also found that minimum staffing mandates had a positive effect on physical restraint use (Bowblis, 2011; Park & Stearns, 2009; Zhang & Grabowski, 2004), although the minimum staffing HPRD to improve these quality measures is not known. Findings are mixed regarding nurse staffing and other processes of care and health outcomes, including nurse staffing levels and the prevalence of catheter use, UTIs, ADLs deterioration, unwanted weight loss, contractures, and incontinence.

Castle et al. (2011) identified some associations between staffing levels and quality in their literature review but stated that there were mixed results depending on the quality indicator and the type of staff. Hyer et al. (2009) stated that the research findings vary because researchers measure nurse staffing in different ways and use different indicators. The researchers also commented that the amount of RNs is important in regard to quality of care, but that it is unclear what the exact ratio of RNs should be to have a positive effect on quality.

Because different researchers have found inconsistent results with most of the quality indicators, I intended to increase the understanding of the relationship between nurse staffing levels and quality of care in Louisiana nursing homes. To achieve this goal, I used quality measures already endorsed by the NQF, used by CMS, and accepted by professionals and institutions. These measures have been accepted as potential variables influencing quality; moreover, no other researcher had used them in quality of care research. Furthermore, no researcher had studied this relationship in Louisiana. Therefore, I studied the association between nurse staffing HPRD and the quality of care specifically in Louisiana's nursing homes, as measured by deficiency citations and the CMS' Nursing Home Compare quality measures.

Louisiana's policy makers are planning to implement Medicaid LTSS programs to improve health outcomes in nursing facilities. Thus, the results were intended to address the question of whether nursing staff HPRD affects the quality of care in Louisiana's nursing facilities and at what level. If a significant relationship between nurse staffing levels and quality measures were to be found, Louisiana's legislators could make

informed decisions regarding nursing homes and consider whether they should establish a new minimum staffing mandate in these facilities.

In Chapter 2, I reviewed the literature related to nurse staffing ratios and other factors that may affect the quality of care in nursing homes, the processes of care in these facilities, and the residents' health outcomes that have been used by researchers as quality indicators. In Chapter 3, I present the research design and rationale and the methodology used in this study, including the population, the data that were used, the procedure for gaining access to the data sets, the data analysis plan, the potential ethical issues, if any, and the threats to internal and external validity. In Chapter 3 I also describe the method to be followed to collect secondary data from the CMS datasets to investigate whether nurse staffing levels have an association with the processes of care and residents' health outcomes used to assess quality.

Chapter 3: Methodology

Introduction

The purpose of this quantitative, correlational research was to describe the relationship between nurse staffing levels and quality of care measures in Louisiana, using the CMS Nursing Compare datasets. Louisiana is among the states with relatively low quality of care in nursing homes (AHRQ, 2014) and one of the lowest nurse staffing levels (Purpera et al., 2014). Researchers had not studied the association between nurse staffing levels and quality of care in Louisiana nursing homes. In addition, scholars have found mixed results regarding the association between staffing and most of the quality indicators studied. For these reasons, I evaluated in this research the relationship between nurse staffing hours per resident day (HPRD) and each of the quality measures under study, particularly in Louisiana nursing facilities.

A quantitative approach was well suited for the research because of its past use for assessing quality of care (e.g., Lee et al., 2014; Lin, 2014). In this chapter, I present the research design, instrumentation, and methodology. I also present the operationalization of constructs, the threads to validity, the data analysis plan, and the ethical issues and procedures.

Appropriateness of Research Method

Quantitative research is "deductive, objective, and general" (Morgan, 2013, p. 47). In this research method the researcher uses a deductive reasoning that starts with a premise and hypothesis, followed by standardized procedures, and ends with a logical conclusion. The researcher studies the relationship between variables and either rejects or

confirms the hypothesis depending on the observations and statistical analyses (Morgan, 2013).

Quantitative research is also objective because it minimizes the researcher's personal biases by using standardized measurements (Morgan, 2013). The purpose of standardized measurements is to separate the researcher's beliefs from the results and conclusions. Generality is another characteristic of quantitative research because the researcher can study a wider range of people and settings (Morgan, 2013). Generality leads the researcher to develop research questions based on the elements or variables found in theoretical or conceptual frameworks. It also leads him to focus on a set of variables and control for confounding factors (Morgan, 2013).

I chose a quantitative approach for the study because I studied objectively the relationship, if any, between nurse staffing HPRD and four quality measures (i.e., deficiencies, physical restraints, pressure ulcers, and UTI) in Louisiana nursing facilities. A quantitative approach was appropriate since other researchers have concluded that these variables are reliable to compare the quality of care between nursing homes (Smith et al., 2012). Since I did not study people or settings in depth and detail, I do not need to gather inductive and subjective data as in qualitative research (Morgan, 2013).

Appropriateness of Design

I used a quantitative, correlational design. In correlational studies, researchers want to know the relationship between specific variables. They also may want to know whether the independent variable predicts the dependent variable (Morgan, 2013). On the other hand, in a retrospective study, the researcher uses secondary data, data that others

collected it in the past. According to Chang et al. (2013), secondary data are especially useful when there are time and financial constraints since the data is already available. Researchers also use this type of dataset to conduct comparisons within and between groups (Frankfort-Nachmias & Nachmias, 2008). A prospective study takes more time than a retrospective study, since it is the researcher who has to collect the data over a long period.

The correlational study is retrospective since the data were collected in the past. Researchers use this type of design when it is unacceptable or unethical to manipulate participants or the setting under study. Since I cannot manipulate the characteristics of residents living in nursing homes, a correlational design was the most appropriate. I used a cross-sectional approach and secondary quantitative data that is in the Nursing Home Compare datasets. The data was collected by nurses within the two last quarters of 2013 and first quarter of 2014. These datasets are public and provide information about the nursing homes' staffing and the quality measures. Konetzka et al. (2008) found that the relationships between variables were stabilized with a broader date range.

Public data is also faster to access than private data because it is already available online for any person that is interested in it. Private data, such as the CMS research identifiable files, is difficult to obtain since it has restrictions on its use and needs a legal contract in order to protect the individuals' privacy and confidentiality (ResDAC, 2013a). Public data do not have this issue since the data is presented at the facility level and not at the resident level, therefore all the data is anonymous. The public and researchers can see the prevalence of the nursing home quality measures, but not the health outcomes of each

resident individually. CMS, in their public data, does not present information that might identify any resident. Part of the information that the CMS presents in its website is in Appendix A.

I studied the relationship between nurse staffing HPRD and process measures (i.e., deficiency citations and physical restraints) and the relationship between nurse staffing HPRD and outcome measures (i.e., pressure ulcers and UTI). The quality measures are based, according to Smith et al. (2012), on several criteria such as clinical importance, the extent to which the measure is under facility control, and statistical performance including variability, validity, and reliability. Studying all the elements of quality of care would be ideal, but for the purpose of this research, I studied two sets of quality measures: two care processes (i.e., deficiencies and physical restraint use), and two health outcomes (i.e., pressure ulcers and UTI). Both Lee et al. (2014) and Arling et al. (2007) evaluated in their research two process measures and three outcome measures, while Park and Stearns (2009) studied three processes and three outcomes.

The variables that I studied represent the categories of the Donabedian's (1988) framework. The independent variable represents the structure element of the Donabedian (1988) model. It is the nurse staffing HPRD as measured by the adjusted RN staffing HPRD and the adjusted CNA staffing HPRD (see Table 2). CMS calculates these metrics using data from the CASPER and MDS to adjust for differences in patients' acuity (i.e., health status, care needs, functional status; Abt Associates Inc., 2014). The dependent variables represent the process measures (i.e., quality of care deficiencies, physical restraints) and the outcome measures (pressure ulcers, and UTIs) (see Table 2).

Table 2

Description of Variables

Variables	Level of Measurement	Range
Structural factors		
RN HPRD	Ratio	1 – 100
CNA HPRD	Ratio	1 – 100
Facility size	Ratio	1 – 100
Ownership	Ordinal	1 – For-profit, 2 – Nonprofit
Chain membership	Ordinal	1 – Chain-affiliated, 2 – Nonchain
Process measures		
QoC Deficiencies	Ratio	0 – 1000
Physical restraints	Ratio	0 – 100
Outcome measures		
Pressure ulcers	Ratio	0 – 100
UTIs	Ratio	0 – 100

I studied four of the CMS quality measures since quality of care is multi-dimensional. Evaluating only one or two quality measures would not assess the concept of quality of care (CMS, 2012a). Mainz (2003) commented, "Because quality is multidimensional, understanding quality requires many different measures" (p. 524). However, I limited the number of quality measures that were considered to four of them (two care processes and two health outcomes) that according to the literature review may be associated to nurse staffing levels.

The outcome quality measures were the prevalence of high-risk residents with pressure ulcers and the prevalence of residents with a urinary tract infection. The process quality measures were the quality of care deficiencies and the prevalence of residents with physical restraints. To evaluate the relationship between nurse staffing HPRD and quality of care deficiencies, I used an aggregate score of all quality of care deficiencies.

The quality of care deficiency citations are a total of 28 F-tags. They are F309 to F-334, F-353 and F-354.

The covariates were those that are classified as a structure in the Donabedian's (1988) approach. They were those that Hyer et al. (2011) used in their study. These are the facility size (i.e., number of certified beds), chain membership, and ownership. Researchers have found that these factors may have an effect on the quality of care (e.g. Grabowski et al., 2013; Wagner et al., 2013).

Study Population

In 2012, more than 1.4 million residents were living in nursing homes in the United States (CMS, 2013b). In 2012, 92.5% of Louisiana nursing homes were dually certified, 80% were for-profit, 72.5% had between 100 and 199 beds, and had an average occupancy rate of 74.6% (CMS, 2013b). In 2013, Louisiana had 25,335 Medicaid beneficiaries living in nursing homes (Purpera et al., 2014). Currently, there are 281 nursing facilities in LA.

Inclusion Criteria

I used data from the CMS Nursing Home Compare datasets from the 2013 and 2014 archived datasets. I matched the nursing homes that have dates during the period of interest, which is the Cycle 1 of health deficiencies (Quarters 3 and 4 of 2013, and Quarter 1 of 2014). Those nursing homes that have dates out of this period were excluded.

Deficiencies citations and staffing levels are derived from the CASPER dataset, and the quality measures are derived from the MDS 3.0. The MDS 3.0 is the original

resident assessment that results in the data (see Appendix B). The latter is a current federally mandated assessment that all Medicare and Medicaid certified nursing homes in the United States need to fill out.

I gathered data collected by nurses in the last two quarters of 2013 and first quarter of 2014. For the purpose of comparison, the nursing homes that were included were those that have one health survey within the third and fourth quarter of 2013 or first quarter of 2014. The available nursing homes health surveys fall within this period (from Q3 2013 to Q1 2014). Nursing homes that have surveys dates out of this period were excluded.

I included only Louisiana because of the aforementioned issues with quality of care and because the statistical analysis may be affected due to state variations (Saliba & Buchanan, 2012). Various authors stated that there are significant variations among states (Lin, 2014; Tilly et al., 2003). Lin (2014) commented that states' minimum staffing requirements differ substantially. Furthermore, Tilly et al. (2003) studied the experiences of 8 states that underwent changes in their minimum staffing standards and their perceived effects. The authors found in their study that states differed considerably in regards to the way they measure, monitor, and enforce staffing ratios, and how they pay for it. Therefore, this variation across states might have an effect on the statistical analysis. Consequently, I delimited the bound of the study to Louisiana.

I included all the nursing homes located in Louisiana, excluding those with 30 or fewer residents, those that are not a Medicare and Medicaid participant, those that are hospital-based, those without nurse staffing hours, and those facilities that changed

ownership (e.g., for-profit, nonprofit) in the last 12 months. Many researchers have discovered that facility ownership can affect quality of care and results might skew findings (e.g., Hyer et al., 2011; Wagner et al., 2013). Lee et al. (2014), as well as Hyer et al. (2011), excluded hospital-based nursing homes. Hyer et al. (2011) asserted that the majority of nursing homes that are hospital-based are smaller and focus more on short-term services than the majority of the facilities in general.

I chose all the nursing homes in Louisiana that meet the criteria, because the total of facilities in this state is 281 facilities. Choosing the whole state population of nursing homes provides the reality of quality of care of these facilities in Louisiana. Researchers have stated that small sample sizes have been a methodological issue (Castle et al., 2011). Lee et al. (2014) included in their study all the nursing homes in Colorado except those that did not meet the inclusion criteria. They studied a total of 195 nursing homes in Colorado. Arling et al. (2007) studied 105 facilities in four states. Rantz et al. (2004) studied 92 Missouri's nursing homes out of 443 after excluding those that did not meet the inclusion criteria and after selecting the sample through randomization. Furthermore, Hyer et al. (2009) included all Medicaid and Medicare certified nursing homes in Florida that were considered to be community-based.

Therefore, had I taken a sample of nursing homes from Louisiana, the sample would be too small. To compensate for this limitation and increase reliability, I selected the whole population of nursing homes in this state.

Data Analysis Plan

Procedures for Data Acquirement and Data Cleaning

I obtained the data from the CMS Nursing Home Compare datasets from the 2013 and 2014 archived datasets. I matched the nursing homes that have dates during the period of interest, which is the Cycle 1 of health deficiencies (Quarters 3 and 4 of 2013, and Quarter 1 of 2014). Those nursing homes that have dates out of this period were excluded. Deficiencies citations and staffing levels are derived from the CASPER dataset, and the quality measures are derived from the MDS 3.0. The latter is a current federally mandated assessment that all Medicare and Medicaid certified nursing homes in the United States need to fill out.

Data Source and Operationalization of Constructs

The primary data sources for this study were the Nursing Home Compare datasets, which are derived from the MDS 3.0 and CASPER. The datasets present the nursing homes' characteristics and the process and outcome measures. Smith et al. (2012) asserted that the quality measures presented in these datasets have strong reportability.

Using the information from these datasets has the following strengths:

1. The datasets include quality measures used by CMS to measure staffing, deficiencies, and quality.
2. Researchers can save time since the data do not have any restriction on their use.
3. Various scholars have used them in past studies.
4. Auditors and state legislators use them to evaluate their state status.

The Nursing Home Compare datasets show the nursing homes characteristics, deficiencies, and quality measures at the facility-level. CMS derives these datasets from the MDS 3.0 and the CASPER. The former shows resident outcomes, and the latter presents data in regard to staffing and health inspections. However, for the purpose of the research, I used data at the facility level that the CMS presents in the Nursing Home Compare datasets. Each dataset is elaborated upon below.

MDS 3.0. The MDS 3.0 was developed by Saliba and Buchanan (2012) in 2010 to improve the MDS 2.0. The authors revised the reliability, validity, and clinical relevance of this instrument. To develop the MDS 3.0 items and test their performance, Saliba and Buchanan incorporated information from the literature, as well as health care providers, consumers, experts, the CMS, and a national Veterans Affair (VA) consortium of researchers. Saliba and Buchanan conducted a national testing in 71 communities and 19 VA nursing homes and evaluated the inter-rater agreement between research nurses, and between research nurses and facility nurses, along with the validity of eight sections of the MDS. The investigators concluded that the "MDS 3.0 items showed either excellent or very good reliability" (p. 606), and that they were often more reliable than MDS 2.0 items. Saliba and Buchanan found that the categorical agreement between facility and research comparisons was similar (p. 607). Furthermore, nursing home staff members were more satisfied with the MDS 3.0.

Quality measures. The quality measures represent the care offered to the residents in a nursing facility and the outcomes of that care. They show how nursing homes differ in regards to the way they care for the residents and ways that nursing homes differ from

each other. CMS adjusts the quality measures using an exclusion criteria and a resident-level adjustment based on scientific research (Medicare.gov, n.d.). CMS uses the most recent available data from the three most recent quarters (CMS, 2014c). These date periods increase the data available, improve the stability of estimates, and reduce missing data (CMS, 2014c). Konetzka et al. (2008) found that the relationships between variables were stabilized with a broader date range, and the power declined considerably with a smaller range. CMS posts adjusted data in their Nursing Home compare website. The data are already adjusted for case mix.

Pressure ulcers. The quality measure "percent of high-risk residents with pressure ulcers" (see Appendix C for the quality measure's specifications) represents long-stay residents who have Stage 2 to 4 pressure ulcers and who are at a high-risk of developing pressure ulcers (Smith et al., 2012). CMS considers that residents are at high-risk when they are either malnourished or at risk of being malnourished, comatose, or have impaired bed mobility or transfer (Smith et al., 2012). Saliba and Buchanan (2008) stated that the reliability between research nurses and facility nurses had a kappa of .937. The average gold-standard to gold-standard kappa was .905.

Urinary tract infections. The quality measure "percent of residents with a urinary tract infection" (see Appendix C) represents long-stay residents that had a UTI within the last 30 days of the target assessment (Smith et al., 2012). According to Smith et al. (2012), the CMS has acceptable variability across facilities (standard deviation of 5.7% and interquartile range of 7.3%). and good reliability. From quarter to quarter, 50% of facilities remained within same decile, and 90% had with rank changes within three

deciles (Smith et al., 2012). Urinary tract infection measure has validity because it has significant correlations with other quality measures that are related to the same care process (Smith et al., 2012). Saliba and Buchanan (2008) reported a kappa of .70 for this quality measure.

Physical restraints. The process measure "percent of residents who were physically restrained" (see Appendix C) represents the long-stay residents who had daily physical restraints in the target assessment (Smith et al., 2012). These residents had either a trunk or limb restraint and were either in bed or in chair. This measure has good variability (standard deviation of 4.2% and interquartile range of 3.2%). According to Smith et al., 2012, the quality measure is stable across time (from quarter to quarter). Saliba and Buchanan (2008) found that the average gold-standard to gold-standard kappa was from .857 to .934. The agreement from research nurses to facility nurses was from .66 to .873.

Deficiencies. CMS certifies nursing homes annually. In this certification process, state surveyors inspect the facilities and evaluate the quality of care (Castle et al., 2011). A deficiency occurs when a nursing home does not comply with the minimum standards (Castle et al., 2011). Surveyors give an F-tag citation for each deficiency. The CMS assesses deficiencies by the scope of the violation and by its severity (Hyer et al., 2011). The scope refers to the amount of residents who were or could have been affected by the actions of the nursing home staff. The scope of the violation has three categories: isolated, pattern, or widespread (see Appendix D). An isolated citation means that the nursing home's practice involved one or very few cases during a particular time frame

(e.g., limited number of residents, employees, or locations; Hyer et al., 2011). The second category, a pattern, occurs when the same citation occurred to more than a few individuals or it happened more than a few times (Singh, 2010). The third type of scope, widespread, means that the nursing home organization's actions affected or was likely to affect a large number of residents through the entire facility (Singh, 2010).

The other element to evaluate deficiency citations is the severity (see Appendix D). It refers to the level of harm or potential harm that affected or was likely to affect negatively the residents' well-being. This element has four levels. Level 1 is no harm with potential for minimal harm, which means that the violation had, or had the potential to have, a minor negative effect on residents (e.g., a resident did not receive a nutritious snack). The second level is no harm with potential for more than minimal harm, meaning that the standard violation had or could have had a minimal physical, mental, and psychosocial discomfort to the resident. The third level, actual harm, means that the noncompliance affected the health or quality of life of the residents. The fifth level, immediate jeopardy, means that the violation put in danger the residents' health and safety (Singh, 2010). This type of violation requires an immediate corrective action, given the nature of it can even lead to a patient's death (Singh, 2010).

In other words, a scope is the prevalence of a practice, and the severity is the impact of that practice on the residents' health (Temkin-Greener et al., 2010). The CMS assigns a severity score based on the combination of the scope and severity of the standard violation. The scores range from zero points for no actual harm to 150 points for a widespread issue that shows immediate jeopardy (Singh, 2010). Inspectors categorize

each deficiency into one of the 12 categories of scope and severity that range from A to L. Category A is the lowest of the deficiencies, while Categories J, K, and L are the most severe (Wagner et al., 2013). Surveyors give an F-tag to each federal requirement that the nursing home did not met (Wagner et al., 2013). For the purpose of the analysis, the dependent variable deficiencies were the aggregated score of all quality of care deficiency citations (i.e., F309 to F-334, F-353, and F-354).

CASPER. CASPER, formerly known as the Online Survey, Certification and Reporting (OSCAR), is a CMS data network that has compiled information from state health surveys (Research Department of American Health Care Association [RDAHCA], 2013). The CASPER system presents information at the facility level, such as patient census, the standard health deficiencies, and staff HPRD. According to RDAHCA (2013), CMS is responsible to assure data accuracy. State surveyors report the findings at the time of the inspection in the CASPER database and update any information when needed.

The staffing levels are derived from the CASPER system (CMS, 2012a). The CMS adjusts them by case-mix based on the MDS 3.0 assessments by RUG-III group. Staffing data include both full time and part time employees. This data do not include private nurses, hospice staff, or feeding assistants. The CMS excludes staffing data that are unreliable and displays "Data Not Available" in the datasets of the Nursing Home Compare website (CMS, 2012a).

Staffing. I used staffing HPRD to measure nurse staffing levels, as did other researchers (e.g., Lee et al., 2014). This measure represents the hours that nurse spent in

direct care with residents (Lee et al., 2014). The CMS states how it defines different methodological concepts that are used in the staffing calculation. Capturing a specific point in time, the total number of residents includes those people living in the nursing facility during the 2-week period prior to the inspection (CMS, 2012a). To calculate the staffing levels, CMS converts the nursing staff total hours to HPRD. CMS calculates the nursing staff HPRD by knowing the number of hours that nurses worked each day during the 2-week period before the inspections were computed, and dividing it by the number of residents. The total nursing HPRD is the time in hours that nurse staff (RNs, LPNs, and NAs) worked each day per resident at the nursing home.

Facility characteristics. The control variables were the structural factors or, in other words, facility characteristics, which according to the literature review are potentially associated with process and outcome measures. These were the facility size, ownership, and chain membership. The facility size was measured using the number of certified beds in each facility (Lee et al., 2014). Ownership was a dummy variable. I coded for-profit nursing homes as 1 and nonprofit nursing homes as 2 (Hyer et al., 2011; Lee et al., 2014; Wagner et al., 2013). I also coded the chain-affiliated facilities as 1, and nonchain facilities as 2 (Hyer et al., 2011; Lee et al., 2014).

Limitations of Datasets

CMS enters data in the Nursing Home Compare website datasets from the MDS 3.0 and CASPER. A limitation of both MDS 3.0 and CASPER is that nursing homes personnel themselves report these data. Nursing home surveyors examine the information, but they do not ensure their accuracy formally (CMS, n.d.b). However, the

CMS does not include in the Nursing Home Compare information from nursing homes that have a questionable credibility (CMS, 2012b). The CMS does not report staffing data or ratings for any nursing home that have unreliable CASPER data (CMS, 2012b).

Analysis Plan

I used a cross-sectional design to describe the relationships between nurse staffing and four quality measures (i.e., two process measures and two outcome measures). Of a total population of 281 nursing homes in Louisiana, 161 facilities met the inclusion criteria. I used the Statistical Package for the Social Sciences (SPSS, Version 21) to analyze the data, and employed data analyses used by other researchers (e.g., Hyer et al., 2011; Lee et al., 2014; Rafferty et al., 2007).

I had planned to use multiple regression analysis to measure the relationship, if any, of nurse staffing HPRD and quality of care as measured by quality of care deficiencies and CMS quality measures. Researchers who use regression analyses seek to determine whether an independent variable predicts a dependent variable (Portney & Watkins, 2000). According to Portney and Watkins (2000) this type of analysis has important implications for quality of patient care. It is a "powerful statistical approach for explaining and predicting quantifiable clinical outcomes" (Portney & Watkins, 2000, p. 509).

As did Lee et al. (2014), I had planned to use separate multiple regression analyses for quality of care deficiencies, restraint use, pressure ulcers, and UTIs to evaluate the effects of nurse staffing along with other structure factors, which were the covariates (size, ownership, chain membership). Several researchers have included

control factors and covariates as independent variables in their regression analyses (e.g. Arling et al., 2007; Castle, 2000).

The multiple regression model that I had planned to use for each quality measure was the following:

$$\check{Y} = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5$$

$\check{Y}$ was the dependent variable (either quality of care deficiency score, physical restraints, pressure ulcers, or UTI). X represented the independent variables (i.e., X_1 = RN HPRD, X_2 = CNA HPRD) and the covariates (i.e., X_3 = number of certified beds, X_4 = ownership, and X_5 = chain membership). B_0 was the constant or the mean of the dependent variable, and B_1 to B_4 was the regression coefficients for each one of the independent variables. I expected to have at least 32 data points for each independent variable, since 161 nursing homes in Louisiana met the inclusion criteria.

To calculate the quality of care deficiencies, I summed the scores that CMS gives to each quality of care deficiency. The more severe the deficiency, the higher the score is (e.g,. H = 35, I = 45, J = 50, K = 100, L = 150; see Appendix D). After I summed the scores, I planned to perform the multiple regression analysis for this variable using the model aforementioned. However, I used generalized linear models as further discussed in Chapter 4 because the data violated the assumptions of multiple regression. I interpreted the findings by using *p*-values to see if the relationship between variables was statistically significant *($p < .05$)*.

Furthermore, I used quartiles, as did some researchers (Arling et al., 2007, Hyer et al., 2011, Rafferty et al., 2007), to test for nonlinear relationships and possible thresholds.

For this, I recoded staffing HPRD as a categorical variable and grouped nursing homes into quartiles. I planned to perform separate logistic regression analyses for each of the four quality measures to evaluate for potential nonlinear relationships. Lin (2014) stated that staffing and quality might have a nonlinear association. Consequently, I compared the quality measures of nursing homes that had the lowest nurse staffing HPRD with those that had the highest nurse staffing HPRD. Rafferty et al. (2007) found in their research that it was clearer to identify the effects of hospital staff when they compared the hospitals with the lowest average workloads versus the hospitals with the highest average workloads. They found an inconsistent pattern among hospitals that were in the middle range of patient-to-nurse ratio (Rafferty et al., 2007).

I had planned to use Durbin–Wu–Hausman endogeneity test to check for possible endogeneity between staffing HPRD and pressure ulcers. Lee et al. (2014) found that staffing hours and pressure ulcers were endogenous statistically significant. The same did not occur with process measures. I did a F-test to verify for the normality assumption.

Threats to Validity

According to Portney and Watkins (2000), a weakness of a retrospective study is that it may contain incomplete or missing data. Therefore, a threat to validity is the missing data or dropouts of residents due to transfers, discharge, or death. However, Smith et al. (2012) stated that the missing data from various quality measures endorsed by the NQF does not pose a threat to validity, since each of these quality measures are not significantly associated with the missing rate.

Another type of threat to internal validity is the single-group threat, in which there is no control group (Tofthagen, 2012). I studied all Louisiana nursing homes except those that did not meet inclusion criteria. Studying only one state might bring a threat to external validity; the results are not generalizable to other states. Saliba and Buchanan (2008) reported that MDS 3.0 items had good reliability when facility-nurse assessments were compared with research-nurse assessments. The MDS 3.0 items had more clinical relevance and usefulness than the previous version (MDS 2.0), and it was more efficient. Nurses completed MDS 3.0 in almost half the time than it took to complete the MDS 2.0 (Saliba & Buchanan, 2008). In conclusion, the MDS 3.0 items are accurate, efficient, and clinically relevant.

Ethical Procedures

I used secondary data at the facility level, as did Lee et al. (2014). Because the data do not disclose residents' confidential information, their privacy and confidentiality is not at risk. All data in the Nursing Home Compare website are public information. These files, called Public Use Files (PUF) or Non-Identifiable Data files, present data at the facility level and not at the resident level (Research Data Assistance Center, ResDAC, 2013b). The CMS facility level data represents aggregate information on Medicare and Medicaid beneficiaries. The CMS removes all the information that may identify the residents and endanger their privacy and confidentiality. Thus, data protected by the Health Insurance Portability and Accountability Act (HIPAA), such as the residents' personal information and the individuals' health outcomes, are excluded. According to ResDAC (2013b) public data neither require a data use agreement (DUA)

nor a Privacy Board review, and any person can access the data without prior approval (ResDAC, 2013b). Because Lee et al. (2014) used secondary data at the facility level, the authors were exempt from human subjects requirements. Nevertheless, Walden University's institutional review board (IRB) reviewed and approved the dissertation proposal (No. 11-05-15-0289599) before I started to acquire the data from the CMS Nursing Home Compare datasets.

Summary

In the study, I used a quantitative, correlational design to study the relationship between nurse staffing levels and quality of care in Louisiana nursing homes as measured by process and outcome measures. The independent variable was the nurse staffing level as measured by RN HPRD and CNA HPRD. The dependent variables were the following: quality of care deficiencies, physical restraints, pressure ulcers, and UTIs. The covariates were ownership (i.e., nonprofit or for-profit), chain membership (i.e., chain or nonchain), and facility size (i.e., number of certified beds).

I used public use files from the Nursing Home Compare datasets that present aggregate data. I planned to perform separate multiple regression analysis to evaluate how staffing levels and each dependent variable were related. Separate multiple regression analyses were going to be employed for each dependent variable by using the following equation: $\check{Y} = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5$.

Details of the alternative data analysis path appear in Chapter 4, along with a further discussion of how the data were gathered and the results.

Chapter 4: Statistical Analysis

Introduction

The purpose of the quantitative, correlational research was to determine the relationship between nurse staffing levels and quality of care in Louisiana nursing homes. The two research questions addressed the relationship between staffing levels and process measures (i.e., deficiencies and physical restraint use), and between staffing levels and outcome measures (i.e., pressure ulcers and urinary tract infections). In Chapter 3, I examined the appropriateness of the research method and design, the study population, the inclusion criteria, the procedures for data acquirement, the data source and operationalization of constructs, the analysis plan, and the limitation of datasets.

In Chapter 4, I present the research questions, the descriptive statistics on the nurse staffing hours per resident day (HPRD) and the quality measures in Louisiana nursing homes, and the statistical analyses for each research question.

Research Questions

Two research questions guided the statistical analyses:

RQ1: What is the relationship, if any, between nurse staffing levels and process measures (i.e., deficiency citations and physical restraint use)?

RQ2: What is the relationship, if any, between nurse staffing levels and outcome measures (i.e., pressure ulcers and urinary tract infections)?

Data Analysis

I had planned to use ordinary (least squares) linear regression analysis to measure the relationship, if any, between nurse staffing HPRD and quality of care as measured by

quality of care deficiencies and CMS quality measures. Instead, I used GLM, a class of models that includes ordinary least squares linear regression. GLMs are frequently used when the standard assumptions of ordinary linear regression are violated (Unruh, 2003; Konetzka et al., 2004), as was the case here. For example, they are used in cases where the dependent variable is binary (representing the occurrence—or not—of a certain event), or can be assumed to represent "counts of events" and, in general, in situations with deviations from the assumptions of ordinary linear regression. In the study, the data did not meet the normality and constant variance assumptions, even after transformations. To highlight possible differences in quality measures due to staffing levels, I conducted simpler analyses. I compared the quality measures between nursing homes in the lower quartile with regard to staffing levels and nursing homes in the upper quartile (see Rafferty et al., 2007).

For the first research question (relationship between nurse staffing levels and process measures), I used the deficiency citations as the dependent variable and the staffing levels variables as independent, while controlling for various facility characteristics (i.e., ownership, chain membership, and number of certified beds). To this end, I conducted a negative binomial regression analysis. This analysis generalizes Poisson regression, which is widely used for the modelling of counts of relatively rare adverse events (e.g., Unruh, 2003; Konetzka et al., 2004; Castle & Engberg, 2005). I also carried out a common comparison in the literature, namely, a comparison of the deficiency citations at the staffing levels defined by the lower and upper quartiles of staffing (e.g., Rafferty et al., 2007).

Still in the first research question, I then used the physical restraint index as the dependent variable and the staffing levels variables as independent, while again controlling for the facility characteristics mentioned. I conducted a similar regression analysis, only this time assuming a different distribution for the residuals more appropriate for skewed continuous data, the gamma distribution (Hyer et al., 2011; Chew, Hassan & Sherina, 2015). I also carried out the comparison of the physical restraint index at the staffing levels defined by the lower and upper quartiles of staffing.

For the second research question (relationship between nurse staffing levels and outcome measures) I used the pressure ulcers as the dependent variable and the adjusted total HPRD staffing variable as independent, while controlling for the same facility characteristics mentioned (ownership, chain membership, and number of certified beds). The reason I did not use the individual staffing variables were the large residuals observed when regressing pressure ulcers on them. I then conducted a similar regression analysis as with the physical restraint index, (i.e. assuming a gamma distribution for the residuals for similar reasons) and also carried out a simple comparison of the mean staffing levels between the two groups defined by a binary split of the sample around the median.

Finally, in the second part of the second research question, I used the urinary tract infections index as the dependent variable and the adjusted total HPRD staffing variable as independent, while controlling for the facility characteristics. The analyses were the same as in the first part of the second research question.

Results of the Study

The following discussion presents the descriptive statistics on the variables I used. The variable information is summarized in Table 3. The descriptive statistics for the continuous variables are shown in Table 4, and for the categorical variables are shown in Table 6.

The descriptive statistics indicate that some variables are far from normality; the deficiency citations and the physical restraint use index are notably non-normal as indicated by their low median values compared to the means. This is indeed verified by the Kolmogorov-Smirnov test, as shown in Table 5. In the majority of the tests the null hypothesis of normality is rejected. It only fails to be rejected for the adjusted LPN staffing HPRD, the outcome measures (pressure ulcers index, urinary tract infections index) and the number of certified beds.

Most of the staffing level variables cannot be considered normal, and these take part in all analyses. Most importantly, however, it is not possible to make transformations in the variables (i.e., taking logarithms or square roots) in order to use ordinary linear regression, because the assumptions regarding the normality of the distribution of the errors and the constant variance of the errors are still largely violated. This particular data set could be modeled only if I allowed more flexibility in the distribution of the errors, which is discussed below.

Table 3

Summary of Variables

Category of variable	Description	Variable name	Type of variable
Staffing levels	Adjusted CNA staffing HPRD	CNA HPRD	Continuous
	Adjusted RN staffing HPRD	RN HPRD	Continuous
	Adjusted LPN staffing HPRD	LPN HPRD	Continuous
	Adjusted Total staffing HPRD	TOTAL HPRD	Continuous
Process measures	Deficiency citations (sum of scores)	Deficiencies	Continuous
	Physical restraint use index	Restraints	Continuous
Outcome measures	Pressure ulcers index	Pressure ulcers	Continuous
	Urinary tract infections index	UTIs	Continuous
Facility characteristics	Ownership flag	Ownership	Categorical (1 = for profit, 2 = not for profit)
	Chain membership flag	Chain membership	Categorical (1 = chain member, 2 = not chain member)
	Number of certified beds	Number of certified beds	Continuous

Table 4

Descriptive Statistics of the Continuous Variables

	Mean	Median	Std. Deviation
Staffing:			
RN HPRD	.32	.30	.114
CNA HPRD	2.37	2.30	.53
LPN HPRD	1.23	1.18	.298
Total HPRD	3.67	3.61	.689
Process measures:			
Deficiencies	14.98	4.00	35.51
Physical restraints	.03	.01	.04
Outcome measures:			
Pressure ulcers	.07	.07	.05
UTIs	.06	.06	.04
Facility characteristic:			
Number of beds	131	124	36

Note. $N = 161$.

The distributions of the two grouping variables are shown in Table 6. There is an imbalance in the sample, especially in the ownership variable since the for-profit nursing homes are 6.7 times more than the nonprofit ones. However, the GLM methods are robust to such imbalances in the design.

Table 5

Normality Test for the Continuous Variables

	Kolmogorov-Smirnov Z	Asymp. Sig. (2-tailed)
Staffing:		
RN HPRD	1.44	.03 Not normal
CNA HPRD	1.25	.09
LPN HPRD	1.15	.14
Total HPRD	1.30	.07
Process measures:		
Deficiencies	4.31	.00
Physical restraints	.03	.00
Outcome measures:		
Pressure ulcers	1.16	.13
UTIs	1.21	.11
Facility characteristic:		
Number of beds	1.22	.10

Note. One-sample Kolmogorov-Smirnov test.

Table 6

Frequency Distributions of the Grouping Variables

	Frequency	Percent (%)
Ownership:		
For-profit	139	86.9
Nonprofit	21	13.1
Chain Membership:		
Chain	123	76.4
Nonchain	38	23.6

Relationship between Nurse Staffing Levels and Process Measures

This section includes a discussion of the effects of nurse adjusted staffing levels on process measures (i.e., deficiency citations and physical restraint use). I controlled for facility characteristics, namely chain membership, ownership, and number of certified beds. The regression models I used are GLMs, and the exact variant was decided based on the distribution of the dependent variable (deficiencies or physical restraint use).

Effects on Deficiencies

The dependent variable was the sum of the deficiencies scores registered in the second half of 2013 and the first quarter of 2014. It must be emphasized that, although I refer to this variable as a score, from a statistical point of view, this number is closer to a count (of events), only weighted by scope and severity. Deficiency citations are indeed repeatable events that occur in evenly-divided time intervals, which is the common definition of counts. Furthermore, the deficiency scores do not take any possible values but integer ones, and the majority of the scores are multiples of 4. This means that it is much more reasonable to consider the scores as "almost counts" (i.e., if I divided the scores by 4) rather than continuous in the sense that a calculated index is.

The proper statistical model was, therefore, the negative binomial regression (e.g. Konetzka et al., 2004). Poisson regression, frequently applied in similar studies in the literature (e.g., Unruh, 2003; Castle & Engberg, 2005), is a special case that is used when the variance is about the same order as the mean. In this case, the mean was 14.98 and the variance was $(SD)^2 = (35.52)^2 = 1261.3$ (see Table 4). Therefore, I applied the more general model that allows for this over-dispersion.

I used the deficiencies as the dependent variable, the facility variables (ownership and chain membership) as factors, and both staffing level variables and number of certified beds as covariates. Formally, the expected deficiencies $\hat{y}$ were linked to a linear function of the independent variables through a link function g(.), and this link function was taken as the natural logarithm:

$$g(\hat{y}) = \ln(\hat{y}) = b_0 + b_1x_1 + b_2x_2 + \cdots + b_px_p$$

Furthermore, the expected variance of the deficiencies was considered in this model to be much larger than the expected mean, exactly what was observed in the data. In the above, $x_1, x_2, \ldots, x_p$ are either continuous variables (covariates) or categorical indicator (dummy) variables corresponding to the levels of a factor (ownership, chain membership). I assumed that the second level of a factor (not for profit, not a chain member) was the reference level for that factor. The coefficient for the reference level is set to zero and the nonzero coefficients represented the change when a factor was set at the first level relative to the second.

$$\ln(\hat{y}) = \cdots + b_k(ownership = 1) + b_{k+1}(chain\ membership = 1)$$

For example in the above, Level 2 of ownership (nonprofit) was the reference level and did not contribute to the regression equation. In the reference level, the dummy variable (ownership=1) took a zero value. Therefore, the coefficient b_k showed that, compared to Level 2 of ownership, the expected log deficiencies at Level 1 (i.e., for ownership = 1) increase by b_k. Note that in this model and in subsequent analyses, I refer to the "log" of a dependent variable, by convention, meaning the natural logarithm. The same equation was written as follows after exponentiating both sides:

$$\hat{y} = e^{\cdots + b_k(ownership=1)} e^{b_{k+1}(chain\ membership=1)}$$

This allowed a better interpretation for dummy variables, in terms of the exponentiated coefficients (e^{b_k}). Again, using the ownership variable as an example, the ratio of the conditional (on the two levels) expected values of deficiencies is simply the exponentiated coefficient:

$$\frac{\hat{y}|ownership = 1}{\hat{y}|ownership = 2} = e^{b_k}$$

The exponentiated coefficient for a dummy variable gives a score ratio. This would be an incidence ratio in the case of actual counts.

The null hypothesis, H_0, was that there was no association between the deficiency scores and the staffing levels, after controlling for facility characteristics. H_0 would be rejected if the model were overall significant and at least one of the coefficients of the staffing levels variables differed significantly from zero.

The results of the analysis appear in Table 7. The model has a very good fit, namely small deviance and omnibus test *p*-value practically zero. Note that the deviance is a measure of distance from the maximum achievable fit.

The model shows a significant (at 0.05 alpha level) effect of adjusted RN staffing HPRD on deficiencies. In the case of continuous predictors, such as the adjusted RN staffing HPRD here, the coefficients B give the average increase in the log score per unit increase in the continuous predictor. Therefore, the coefficient for the adjusted RN staffing HPRD was interpreted as an average 2.8 decrease in the log score per unit increase in the RN staffing HPRD. In this analysis and the following, I refer to such coefficients only to give an indication of the direction and the order of the strengths of the

effects. One should be cautious and also look at the 95% confidence levels. For example, the 95% confidence interval for this decrease was mean ±1.96 x (standard error) = -2.82 ±1.96 x 1.38, where 1.96 is the approximate value of the 97.5% percentile of the normal distribution.

Table 7

Effects on Deficiencies: Negative Binomial Regression

Parameter	*B*	e^B	Sig.
(Intercept)	1.06	2.89	0.46
[Chain Membership = 1.0]	-0.90	0.41	0.01
[Chain Membership = 2.0]	0	.	.
CNA HPRD	0.40	1.50	0.35
RN HPRD	-2.82	0.06	0.04
LPN HPRD	0.28	1.33	0.64
Number of Certified Beds	0.01	1.01	0.19
[Ownership = 1]	1.05	2.85	0.04
[Ownership = 2]	0	.	.

Note. B = coefficient. e^B = exponentiated coefficient.
Sig. = Significance of Wald X^2 statistic.

The effects of adjusted CNA staffing HPRD and adjusted LPN adjusted staffing HPRD on deficiencies were not significant. As for the facility factors, the ownership and chain membership were both significant at the 0.05 significance level. Following the interpretation of the coefficients of categorical dummy variables which was mentioned, the expected scores ratio of the chain members compared to nonchain members was about 0.4 (expected log ratio -0.9). In other words, nonchain members had an expected deficiencies score 2.5 times the one of chain members (see Figure 1). The observed ratio

underestimates the expected one (23.11/12.47 = 1.85). The for-profit nursing homes had almost 3 times expected deficiencies compared to nonprofit ones (expected log ratio 1.05; see Figure 2). The number of certified beds was not significant.

The relationships with the ownership and chain membership variables are shown in Figures 5 and 6. The ratios observed are not the same as the expected ratios by the model.

Figure 1. Mean of deficiencies between chain membership groups.

Figure 2. Mean of deficiencies between ownership groups.

With regard to the null hypothesis H_0, that there would be no association of the deficiency scores with the staffing levels, and after controlling for facility characteristics I rejected this in favor of the alternative hypothesis, that is, there was such an association at the 0.05 significance level. The *p*-value for the adjusted RN staffing HPRD was $0.04 < 0.05$; therefore, the probability of wrongly rejecting the null hypothesis (a type I error) was less than 5%.

The effect of the adjusted RN staffing HPRD variable could also be clearly seen after recoding this variable as categorical using its quartiles. I compared the mean deficiencies in the first and fourth groups shown in Figure 3 in order to highlight differences (see, e.g., Rafferty et al., 2007). The trend for the deficiencies is clearly decreasing with more RN staff. The increase from the 25% adjusted RN HPRD quartile to the median (50% quartile) was small and may be due to chance (see Figure 3).

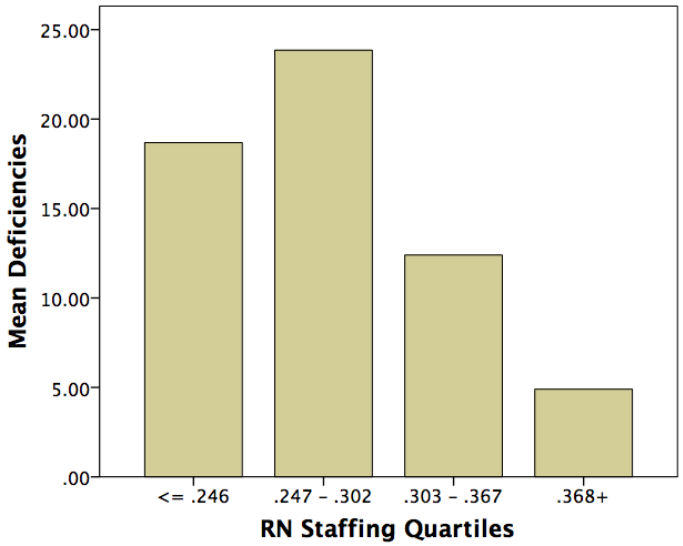

Figure 3. Comparison of mean deficiencies in the quartiles of RN adjusted RN staffing HPRD.

The *t* test comparing the deficiencies in the first and fourth groups results to a difference of 18.68 - 4.90 = 3.78 (see Table 8) significant at the 0.10 level ($t(42) = 1.91$, $p = .06$), confirming the importance of the adjusted RN staffing HPRD.

Table 8

Comparison of Deficiencies in the 1st and 4th Quartiles of Adjusted RN Staffing HPRD

Deficiencies	RN Quartile 1	RN Quartile 4
	≤ .25	≥ 4.37
n	41	40
M	18.7	4.90
SD	45.41	7.92
SEM	7.09	1.25

When I compared the deficiencies between the two groups defined by the median of adjusted RN Staffing HPRD, I noted a difference significant at the 0.05 level. On the contrary, the same procedure applied to the other staffing levels variables did not give any meaningful result.

Effects on Physical Restraint Use

As aforementioned, the physical restraint variable was highly non-normal (in particular very much positively skewed) and could not be modeled with ordinary linear regression because the relevant assumptions were violated. I carried out a similar GLM analysis with the index of physical restraint use, only this time using a gamma distribution with a log link, the common choice for skewed continuous data under such circumstances (Hyer et al., 2011; Chew, Hassan & Sherina, 2015). The reason this approach works well is because this distribution can take various shapes contrary to the normal and can frequently fit the data when ordinary linear regression fails (Harrell, 2015). To avoid missing values, I added a small constant to the index.

The regression equation was the same as in the regression of the deficiency scores because the link function was the same (the natural logarithm). The null hypothesis H_0 here was analogous: there was no association of the physical restraints index with the staffing levels, after controlling for facility characteristics. Again, I rejected H_0 because the model was overall significant and at least one of the coefficients of the staffing levels variables differed significantly from zero. This model did not however have a good fit, but it revealed a possible effect of the RN staffing HPRD on the physical restraint use.

Table 9

Effects on Physical Restraints Use: GLM with Gamma Distribution and Log Link

Parameter	*B*	e^B	Sig.
(Intercept)	-2.45	0.09	0.04
[Ownership = 1]	-0.41	0.66	0.28
[Ownership = 2]	0	.	.
[Chain membership = 1.0]	-0.08	0.93	0.78
[Chain membership = 2.0]	0	.	.
CNA HPRD	0.34	1.40	0.22
RN HPRD	-2.24	0.11	0.08
LPN HPRD	-0.61	0.54	0.32
Number of Certified Beds	0.00	1.00	0.69

Note. B = coefficient. e^B = exponentiated coefficient.
Sig. = Significance of Wald X^2 statistic.

The log of the physical restraints index decreased by more than 2 with a one unit increase in the RN staffing HPRD, but this estimate was unreliable because the model was not a good fit. Incidentally, the ownership and chain membership variables did not show any effect at all, as also evident from their close means in Figures 4 and 5.

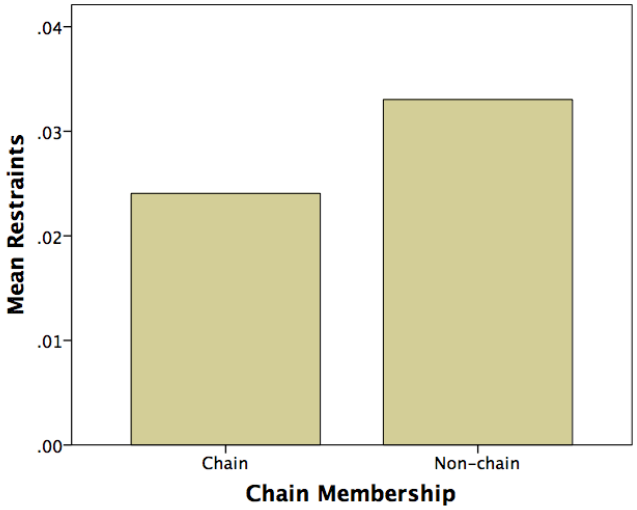

Figure 4. Mean of physical restraint use index between chain membership groups.

Figure 5. Mean of physical restraint use index between ownership groups.

In conclusion, because the model did not exhibit a good fit and the resulting coefficients were not reliable, I could not reject the null hypothesis H_0. There was no association of the physical restraints index with the staffing levels, after controlling for facility characteristics. Although the results showed a negative association with the RN staffing HPRD, I had insufficient evidence to reject the null hypothesis.

I also conducted *t* tests with the 1st and 4th quartiles of all staffing level variables, expecting to observe some differences in the RN staffing HPRD quartiles. This was not the case, however, as the differences were too small and the last category showed an unexpected increase (see Figure 6).

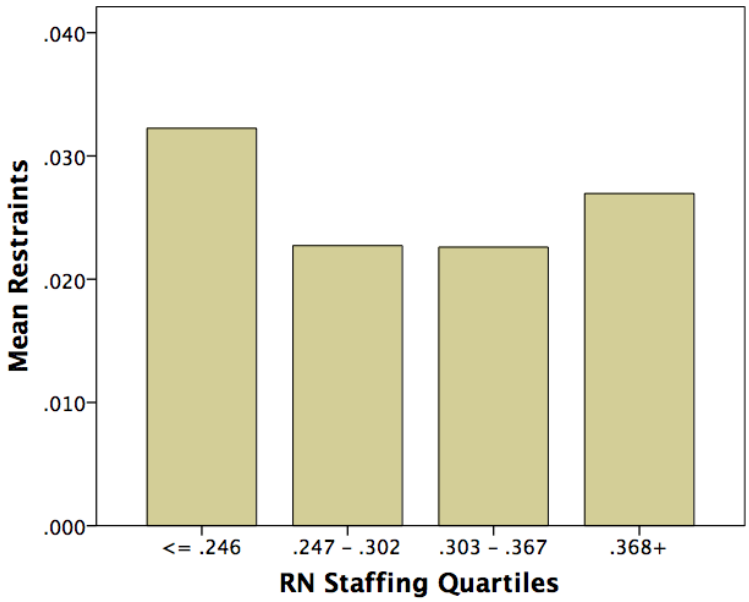

Figure 6. Comparison of mean physical restraint use index in the quartiles of adjusted RN staffing HPRD.

This inconsistency was corrected when I used a binary split around the median (the mean physical restraint use index was higher in the first group), but still the

difference was not large. It was evident that the possible effect of the RN staffing HPRD could not be shown in this simple bivariate analysis.

Relationship between Nurse Staffing Levels and Outcome Measures

The following section presents the effects of nurse staffing levels (i.e., adjusted RN staffing HPRD, adjusted CNA staffing HPRD, and adjusted LPN staffing HPRD) on outcome measures (i.e., pressure ulcers and urinary tract infections). I controlled for facility characteristics, that is, chain membership, ownership, and number of certified beds. The regression model I used was the GLM. I also conducted the complementary analyses comparing the dependent variable in the first and fourth quartiles of the staffing level variables.

Effects on Pressure Ulcers

In this analysis, I used the pressure ulcers index as the dependent variable, the ownership and chain membership variables as factors and the continuous staffing level variables together with the number of certified beds as covariates. I used a gamma distribution with a log link as with the physical restraints index, for analogous reasons of skewness in the dependent variable and added a small constant to the pressure ulcers index to avoid missing values. Although I had noted that this variable can be reasonably be considered to follow the normal distribution, the other assumptions of ordinary linear regression (notably the constant variance) still did not hold, therefore this variable is best modeled with a GLM.

The null hypothesis H_0 was that there would be no association of the pressure ulcers index with the staffing levels, after controlling for facility characteristics. In this

model, I could not use the individual staffing variables to investigate their relationships with the dependent variable. The scatterplots of these variables with the pressure ulcers index showed too much spread, which did not allow a good fit. Using instead the adjusted total HPRD staffing variable, I obtained a good fit (small deviance, omnibus test *p*-value 0.06). The coefficient for the total HPRD staffing indicated a negative relationship between total HPRD staffing and pressure ulcers index (see Table 10), but this was not significant to be considered reliable.

Table 10

Effects on Pressure Ulcers: GLM with Gamma Distribution and Log Link

Parameter	*B*	e^B	Sig.
(Intercept)	-3.02	0.05	0.00
[Ownership = 1]	-0.17	0.84	0.32
[Ownership = 2]	0	.	.
[Chain membership = 1]	-0.11	0.90	0.49
[Chain membership = 2]	0	.	.
Number of Certified Beds	0.1	1.01	0.00
Total HPRD	-0.19	0.83	0.17

Note: *B* = coefficient. e^B = exponentiated coefficient.
Sig. = Significance of Wald X^2 statistic.

The *p*-value was too large (0.17) for the effect to be considered significant. Therefore, I can only observe a negative relationship between total staffing and pressure ulcers in the sample, but I cannot draw any conclusions about it. As with the physical

restraints index, the 95% confidence interval of the total staffing coefficient includes also positive values.

I did obtain, however, a significant result with a simpler analysis, starting from the recoding of the staffing levels variables based on their quartiles. The comparisons between the 1st and 4th quartiles did not show clearly the differences, but continuing with dichotomous variables (the split being around the median), I compared the means of the pressure ulcers index in the two categories of the recoded adjusted RN staffing HPRD variable around its median (see Table 11). The mean of the pressure ulcers index was smaller in the category of larger RN staffing HPRD, and the difference was significant at the 0.05 level.

Table 11

Comparison of the Pressure Ulcers Index in the Two Categories of the Adjusted RN Staffing HPRD Variable

Pressure ulcers	RN Group 1 ≤ .3	RN Group 2 > .3
n	75	86
M	.08	.06
SD	.05	.04
SEM	.01	.00

Presumably, staffing has an effect on pressure ulcers. However, because of the large spread mentioned, the effect can be seen only with this recoding. Figure 7 shows the plot corresponding to this analysis.

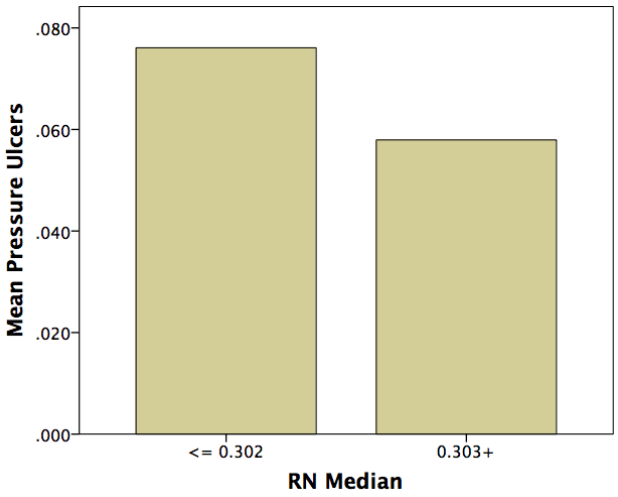

Figure 7. Means of pressure ulcers index in the two levels of adjusted RN HPRD defined by the median.

A similar analysis with the adjusted CNA staffing HPRD showed a difference (mean index 0.069 in the first group vs. 0.065 in the second group) but this was too small to show up in the *t* test.

Incidentally, in all tests with variants of the GLM model where one or all staffing levels were recoded as dichotomous variables, a persistent finding indicated the importance of the number of certified beds (see Table 10). Of note, this was the only model wherein the number of certified beds showed an effect. The effect of the number of certified beds on pressure ulcers was small but significant. As found by a linear regression with only these two variables, for each additional bed, the pressure ulcers index increased by 0.1%. This relationship can also be shown in Figure 8, which shows a trend in spite of the noise.

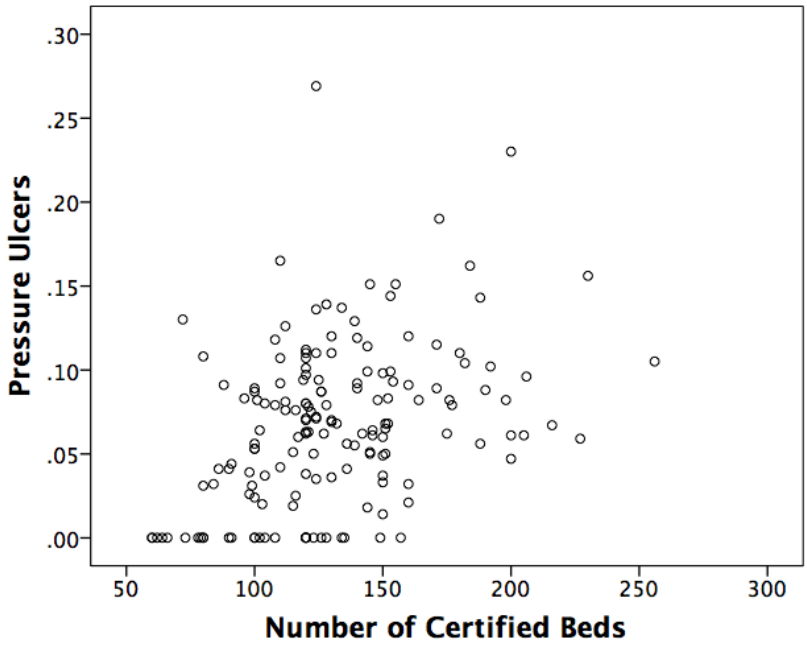

Figure 8. Pressure ulcers and number of certified beds.

The null hypothesis was that there would be no association between staffing levels and pressure ulcers, controlling for facility characteristics. I could not formally reject the null hypothesis because I did not have sufficient evidence for this. However, I could demonstrate a weaker result. I used a dichotomous variable from the adjusted RN HPRD staffing (with values ≤ 3 and > 3) and found a significant association between this RN HPRD and the pressure ulcers index.

Effects on Urinary Tract Infections

Next, I used the urinary tract infections index as the dependent variable, with the same independent variables as before. The reasoning for the choice of the same model as with the pressure ulcers index was the same (i.e., many deviations from the assumptions of ordinary linear regression).

The null hypothesis H_0 was that there would be no association between the urinary tract infections index and the staffing levels, after controlling for facility characteristics. This time, the model fit was poor, and no associations were found, either the specific or the adjusted total HPRD staffing variables. Tests with recoding of the dependent variable into dichotomous and application of logistic regression also did not produce any useful results. The smaller *p*-values were found in the comparison between the two groups around the medians of adjusted total HPRD (.189) and of adjusted CNA HPRD (0.281).

Therefore, the null hypothesis was not rejected. The noise in the data, as with the pressure ulcers, was evident in scatterplots of the staffing levels variables with the dependent variable. Any effects were spread out and could not be identified with any predictor.

Summary

The purpose of the quantitative, correlational research was to determine the relationship between nurse staffing levels and quality of care in Louisiana nursing homes. In this chapter I presented the results of the statistical analysis conducted, to test the relationships between staffing levels and quality measures. I used Generalized Linear Modeling and discussed why this approach was the indicated one. Complementarily, I compared the means of the quality measures between the 1st and 4th quartiles of the staffing levels variables, or between the two categories defined by the median. I also described the findings to each research question and whether I rejected or not each null hypothesis.

With regard to the relationship between staffing levels and process measures, the results showed a significant relationship between RN HPRD and quality of care deficiencies. A one unit increase in the RN HPRD decreased the deficiency score by 2.8 in average. However, there was no association between CNA and LPN staffing and the deficiency score. For-profit facilities and nonchain facilities were significantly associated with an increase in deficiency scores.

I tested the relationships between nurse staffing levels and outcome measures. In the regression models, I noted no significant negative relationship between the total HPRD and the pressure ulcers. However, complementary analyses showed a significant relationship between these two variables when the means of the pressure ulcers index were compared in the two categories of RN HPRD defined by the median. The number of certified beds had a small but significant effect on pressure ulcers. Facilities with more beds were associated with a higher prevalence of pressure ulcers. In addition, and as aforementioned, I found no association between staffing levels and UTI.

In Chapter 5, I will discuss, analyze, and interpret the findings based on the Donabedian (1988) framework and the findings in the peer-reviewed literature. I will also describe the limitations of the study, the recommendations for future research, and the potential impact on positive social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this qualitative, correlational research was to determine the relationship between nurse staffing levels and quality of care in Louisiana nursing homes. The study was designed to analyze if there was a statistically significant relationship between (a) nurse staffing levels (i.e., RNs, LPNs, and NAs) and two process measures (i.e., quality of care deficiencies and physical restraints), and between (b) nurse staffing levels and two outcome measures (i.e., pressure ulcers and UTIs). It is imperative to understand the relationship between staffing levels and quality of care in order to guide policy interventions such as the Medicaid MLTSS programs.

This study was important to conduct for several reasons. First, it addressed the quality of care of Louisiana nursing homes from multiple aspects (i.e., quality measures and deficiency citations). Second, Louisiana ranked 43rd in quality measures among states, and its legislature is planning to develop Medicaid MLTSS programs (Purpera et al., 2014). This study increases the understanding of the relationship between nurse staffing levels and quality of care, particularly in Louisiana's nursing facilities. This study may enhance quality care and cost effectiveness in these facilities and thus create a positive social change for a vulnerable population.

The results showed that a higher RN HPRD was significantly related to lower deficiency scores (better quality) and fewer pressure ulcers (when recoded), but not significantly related to fewer physical restraints. However, there was no association between CNA and LPN staffing and any of the process and outcome measures.

Moreover, there was an indicative relationship between total staffing and lower prevalence of pressure ulcers. On the other hand, for-profit facilities and nonchain facilities had a significant relationship with an increase in deficiency scores. In Chapter 5, I discuss the findings presented in Chapter 4, the conclusions, the limitations of the study, and the recommendations for policy makers and future research.

Interpretation of the Findings

In the following section, I offer an interpretation of the findings based on each research question.

Staffing Levels and Process Measures

As shown in the literature review, findings in past studies on the relationship between staffing levels and process measures have been inconsistent. This study aimed to clarify the association between these variables in Louisiana. Based on the Donabedian (1988) model, higher nurse staffing levels should have been associated with better quality of care processes and outcomes at a statistically significant level. However, controlling for facility characteristics (i.e., ownership, chain affiliation, facility size), the only significant relationship among staffing levels occurred between RN HPRD and deficiency citations. Higher RN HPRD was significantly associated with a lower deficiency score, meaning better quality of care. CNAs and LPNs HPRD were not associated with any process measure.

These findings may be the result of RNs' level of education. According to Castle and Anderson (2011), RNs, because of their training, possess more critical thinking skills than LPNs and NAs. RNs are educated to evaluate the residents and develop their care

plans based on their health status, prognosis, and goals. They also supervise other nurses and NAs. It could be that nursing homes that had a higher number of RNs offered more supervision of residents' care and their health status.

RNs are also trained for administrative positions. If there were more RNs, the nurses' paperwork may have been up-to-date and in compliance with federal regulations (i.e., none or lower deficiency score). In places where the number of RNs was lower, RNs may not have had the time to comply with paperwork or supervise the care that other nurses were providing.

On the other hand, I found an indicative relationship between higher RN staffing and a lower prevalence of physical restraints. However, none of the staffing levels were significantly associated with the prevalence of physical restraints in Louisiana. This finding supports the results in two studies (Arling et al., 2007; Bostick, 2004). This association may contradict the Donabedian (1988) framework since he stated that the structure of care (e.g., staffing) might have an effect on the processes of care (e.g., physical restraint use). However, these results contradict two others studies (Bowblis, 2011; Castle & Anderson, 2011).

With respect to ownership and chain membership, I found that these were related to deficiency citations. Nonprofits and chain-affiliated nursing homes had lower deficiency scores, indicative of a better quality of care, affirming the findings in other studies (Castle et al., 2011; Wagner et al., 2013). Wagner et al. (2013) asserted that chain-affiliated facilities have the advantage of the economies of scale, which leads to reduced costs when administrators purchase equipment and supplies. These savings may

increase resources, such as additional RNs (Wagner et al., 2013). On the other hand, nonprofit nursing facilities also had lower deficiency scores (better quality of care). Grabowski and Hirth (2003) found that the quality of care was better in places that had a higher competition between for-profits and nonprofits. Louisiana, however, has a disproportionate percentage of for-profits in the market. This finding could have implications for policy makers. Incentivizing nonprofit nursing homes to compete with their for-profit counterparts may increase the quality of care in these facilities.

Staffing Levels and Outcome Measures

As shown in the literature review, researchers have found inconsistent findings regarding the relationship between staffing levels and some outcome measures. The results of this study were consistent with the findings of Lee et al. (2014) and Rantz et al. (2004) regarding the lack of association between nurse staffing levels and UTIs. The finding that the staffing level (i.e., RN, LPN, NA) was not associated with the prevalence of UTIs may disconfirm to a certain point the Donabedian (1988) model. However, Donabedian (1988) suggested that outcomes may be affected by many factors. Apparently, staffing levels does not have a large impact on UTIs.

Only RNs had a significant relationship with a lower prevalence of pressure ulcers when RN staffing was recoded around its median. As with the deficiency citations, these findings might be the result of the higher education that RNs receive compared to NAs and LPNs (Castle & Anderson, 2011). Their skills are more comprehensive, and their supervisory roles may help in preventing pressure ulcers or keeping the prevalence low.

Furthermore, the total staffing HPRD had an indicative negative relationship with the pressure ulcers.

Larger facilities had significantly higher rates of pressure ulcers, even though it was a small effect. This was consistent with the findings from other studies (Lee et al., 2014; Rantz et al., 2004). Rantz et al. (2004) found that smaller nursing homes (median of 80 beds) in Missouri had better outcomes than larger facilities (median of 120 beds), perhaps because nurses must divide their time between more residents and therefore are unable to offer the same amount of direct care as in places with fewer residents.

Limitations of the Study

There were several limitations in the research. The use of a cross-sectional design delimited the findings of this research to one point in time rather than over a longer period. It is impossible to know if the results were going to be the same if I would have chosen a different period of time. Therefore, future research should focus in a longitudinal analysis and see if the relationships between nurse staffing levels and process and outcome measures are consistent or whether they differ. Moreover, due to the cross-sectional design, the findings of the study should be interpreted with care. They may not be generalized to the whole population of nursing homes in the United States.

On the other hand, sample selection is a threat of cross-sectional studies. I tried to overcome this issue by studying the whole population of Louisiana nursing homes. Another limitation was the use of a correlational analysis. This study shows indications of the relationships between nurse staffing levels and quality, but not explanations of the causal mechanisms. A retrospective design may also contain incomplete or missing data

due to transfers, discharge, or death. However, Smith et al. (2012) stated that the missing data from various quality measures endorsed by the NQF are not significantly associated with the missing rate.

Extraneous factors (i.e., confounding variables) may have had an effect on the results. I did not include in the study nurse training, years or kinds of experience, consistent assignment, turnover rates, workforce morale, and retention issues, among others, may also have had an effect on the findings (Arling & Mueller, 2014). These factors, which I did not include in the study, have important implications for future research.

The secondary data could have had some measurement errors or a systematic reporting bias (Castle, 2008). The findings could have been different had I collected primary data directly from the nursing homes, such as internal reports, and interviews from nurses, patients, and family members. Furthermore, because of the unavailability of the data on the Nursing Home Compare website, I could not incorporate the location of the nursing homes (i.e., urban or rural) in the statistical analyses. It might be that the location of the nursing home has an effect on the process or outcome measures. Lutfiyya et al. (2013) found that rural nursing facilities had statistically significant better results than their urban counterparts, such as higher overall ratings and better health inspections. As Donabedian (1988) stated, multitudes of factors influence outcomes; hence, it is not possible to know conclusively "the extent to which an observed outcome is attributable to an antecedent process of care" (p. 1746).

Recommendations

Quality of care in nursing homes has been controversial in the literature since researchers have obtained mixed results. The findings of this study suggest that higher RNs, non-profit nursing facilities, and chain members are associated with better quality of care in Louisiana nursing homes as measured by deficiencies (i.e., lower deficiency citations). These findings support the findings in a few studies (e.g., Castle et al., 2011), while contradicts the findings in others studies (e.g., Wagner et al., 2013). It is possible that researchers are having inconclusive results due to different confounding factors (e.g., rural/urban, staff experience). In the following section I offer the recommendations for future research and for practice based on the strengths and limitation of the current study.

Recommendations for Future Research

The current study suggests that higher RNs, non-profit nursing facilities, and chain members are associated with better quality of care in Louisiana nursing homes as measured by deficiencies (i.e., lower deficiency citations). However, as previously discussed, the data used was secondary and at the facility level. Using data at the individual level can be more accurate and may help assess better the quality of care in Louisiana nursing homes. It may also be necessary to compare Louisiana quality of care with that of other states and consider other covariates, such as the location of the facility (i.e., rural/urban zone). Moreover, future research should focus in a longitudinal analysis and see if the relationships between nurse staffing levels and process and outcome measures are consistent or whether they differ with the pass of time.

Researchers should use data at the individual level, from either the Minimum Data Set 3.0, or nursing homes' internal reports, to examine other relationships that may have an effect on quality of care. Researcher could measure other factors, such as staff morale, teamwork, management practices, and technology, any of which might interfere between the time that nurses or NAs invested in direct care (HPRD) and processes and outcome measures (Arling et al., 2007). Moreover, using a longitudinal design may identify relationships that cannot be identified with the use of a cross-sectional design.

A quantitative approach was well suited for the research because of its past use for assessing quality of care. However, a mixed approach can be useful to assess the quality of care in Louisiana nursing homes. Researchers could compare Louisiana nursing homes with nursing facilities in states that are performing better and assess what is the difference between nursing homes based on interviews with RNs, patients, and family members. Moreover, to observe the daily interaction between nurses and residents and families may help gather additional data. Burgio et al. (2004) did an observational research to study if there was a difference between the morning and evening shifts in regards to residents' hygiene and grooming, residents' disruptive behaviors, and CNAs burnout and absenteeism. It may be necessary to shift from data that is easy to gather such as with the MDS 3.0 or Nursing Home Compare website (e.g., number of pressure ulcers) to other aspects that may be more important for residents and families.

Recommendations for Practice

As mentioned above, higher RNs were significantly associated with lower deficiency citations. They also were significantly related to fewer pressure ulcers when

they were recoded in the statistical analysis. Even though I cannot recommend a specific RN HPRD, according to these findings, the quality of care will improve in Louisiana nursing homes if the legislature increases the RN requirements. It would be ideal to study the financial impact that this could bring to nursing home facilities.

Implications

The findings have important implications for staffing practices in Louisiana nursing homes. According to Lee et al. (2014), nursing home organizations in the United States generally try to control costs by trying to reduce RNs and total nurse staffing. However, this study demonstrates that RNs are important assets for offering better quality of care, according to federal regulations as measured by deficiency citations. RNs may also be important in preventing pressure ulcers. In the study, this association was significant with dichotomous splits defined by the median. These findings could be useful to nursing home administrators seeking to reduce quality of care deficiencies and pressure ulcers, which could reduce expenses.

Louisiana has performed low regarding pressure ulcers among nursing home residents. Introducing additional RNs might bring a positive social change since pressure ulcers have a negative effect on residents physically, psychologically, emotionally, socially, and financially (Repić & Ivanović, 2014). Higher RN HPRD could reduce pressure ulcers and prevent new ones, even though this is only indicative in this study.

The Louisiana legislature is developing Medicaid MLTSS programs to reduce health care costs and improve coordination of services (Purpera et al., 2014). Even though I cannot recommend implementing higher staffing standards as part of the

Medicaid MLTSS programs, Louisiana legislators should understand the importance of RNs on deficiency citations and pressure ulcers. This could help them make informed decisions regarding staffing and quality of care.

Additionally, for-profit nursing homes were associated with higher deficiency citations than nonprofit homes. This has an important implication in Louisiana: Almost 87% of the state's nursing homes are for-profits. Given that there are better outcomes where there is a higher competition between for-profits and nonprofits, Louisiana legislators should consider incentivizing nonprofits to enter the market. Such changes may have another positive impact on nursing home residents.

Conclusions

Louisiana has experienced significant issues with quality of care in nursing homes. From 2011 to 2013, the state had the lowest nurse staffing level among all states, and 7,666 deficiencies for immediate jeopardy violations. Notwithstanding plenty of research on nurse staffing levels and quality, there is no agreement on how higher nurse staffing relates to quality. Because different researchers have found inconsistent results with most of the quality indicators, I intended to increase the understanding of the relationship between nurse staffing levels and quality of care in Louisiana nursing homes. Therefore, the purpose of this quantitative, correlational research was to study the relationship between nurse staffing levels and quality of care specifically in Louisiana nursing homes. The research questions were developed using the Donabedian (1988) conceptual framework of structure, process, and outcome (SPO) since researchers has commonly used it (Gardner et al., 2013).

The data included the quality of care deficiency score and the quality measures found in the CMS datasets. The process measures were the deficiencies and the use of physical restraints, while the outcome measures were the prevalence of nursing home residents with pressure ulcers and urinary tract infections. Generalized linear models were used to analyze the relationship between nurse staffing levels and the quality measures. I also did a complementary analysis to compare the means of the quality measures between the 1st and 4th quartiles of the staffing levels, or between the two categories defined by the median.

The findings of the study confirm many of the research that found that RN HPRD was significantly associated with a lower prevalence of pressure ulcers (Bostick, 2004; Bowblis, 2011; Horn et al., 2005; Konetzka et al., 2008; Lee et al., 2014; Lin, 2014). The results suggest that RNs, nonprofits, and chain-affiliated nursing homes are important to reducing or preventing quality of care deficiencies in Louisiana nursing homes. RNs may also be important in reducing or preventing pressure ulcers. Smaller nursing facilities may also be necessary to reduce the prevalence of pressure ulcers. However, the results offer little evidence that a higher HPRD is associated with lower prevalence of physical restraints and UTIs. Experience, dedication of staff, and care allocated effectively across residents (Arling et al. (2007), among other factors, may have intervened with the study findings. Therefore, I cannot make conclusions regarding the establishment of a new minimum staffing mandate in Louisiana facilities. However, Louisiana legislators can use these results and make better informed decisions when developing and implementing the Medicaid MLTSS programs.

The study findings have implications for social change in Louisiana nursing homes. This information may help inform and direct policy makers in the development and implementation of Medicaid managed long-term services and supports programs in order to improve the quality of care of a vulnerable population: the elderly and disabled. Louisiana policy makers could incentivize nonprofit nursing homes, smaller facilities, and those facilities that increase the RN HPRD. This approach could increase the quality of care of nursing home residents in Louisiana.

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Appendix A: CMS Data Codebook

Variable Name (column headers on ACCESS tables and CSV Downloadable files)	Description	Format / Values
Quarter	Quarter in which data were originally posted	text
PROVNUM	Federal Provider Number	6 alphanumeric characters
PROVNAME	Provider Name	text
ADDRESS	Provider Address	text
CITY	Provider City	text
STATE	Provider State	2-character postal abbreviation
ZIP	Provider Zip Code	5-digit zip code
PHONE	Provider Phone Number	10 numeric characters
COUNTY_SSA	SSA county code	3-digit SSA code
COUNTY_NAME	Provider County Name	text
OWNERSHIP	Nature of organization that operates a provider of services	text
BEDCERT	Number of Federally Certified Beds	integer
RESTOT	Number of Residents in Federally Certified Beds	integer
CERTIFICATION	Category which is most indicative of provider	text
INHOSP	Facility Resides in Hospital Inidcator	Y/N
LBN	Legal Business Name	text
PARTICIPATION_DATE	Date First Approved to Provide Medicare/Medicaid Services	YYYY-MM-DD
CCRC_FACIL	Continuing Care Retirement Community Indicator	Y/N
SFF	Special Focus Facility Indicator	Y/N
CHOW_LAST_12MOS	Facility Changed Ownership in Last 12 Months Indicator	Y/N
resfamcouncil	With a Resident and Family Council	Resident, Family, Both, None
sprinkler_status	Automatic Sprinkler Systems in All Required Areas	Yes, Partial, No, Data Not Available
rn_staffing_rating_fn	RN Staffing Rating Footnote	text
STAFFING_FLAG	Reported Staffing Footnote	text
PT_STAFFING_FLAG	Physical Therapy Staffing Footnote	text

AIDHRD	Reported CNA Staffing - Hours per Resident per Day	real number, up to 5 decimal places
VOCHRD	Reported LPN Staffing - Hours per Resident per Day	real number, up to 5 decimal places
RNHRD	Reported RN Staffing - Hours per Resident per Day	real number, up to 5 decimal places
TOTLICHRD	Reported Licensed Staffing - Hours per Resident per Day (RN + LPN)	real number, up to 5 decimal places
TOTHRD	Reported Total Nurse Staffing - Hours per Resident per Day (CNA+LPN+RN)	real number, up to 5 decimal places
PTHRD	Reported Physical Therapy Staffing - Hours per Resident Per Day	real number, up to 5 decimal places
exp_aide	Expected CNA Staffing - Hours per Resident per Day	real number, up to 5 decimal places
exp_lpn	Expected LPN Staffing - Hours per Resident per Day	real number, up to 5 decimal places
exp_rn	Expected RN Staffing - Hours per Resident per Day	real number, up to 5 decimal places
exp_total	Expected Total Nurse Staffing - Hours per Resident per Day (CNA+LPN+RN)	real number, up to 5 decimal places
adj_aide	Adjusted CNA Staffing - Hours per Resident per Day	real number, up to 5 decimal places
adj_lpn	Adjusted RN Staffing - Hours per Resident per Day	real number, up to 5 decimal places
adj_rn	Adjusted LPN Staffing - Hours per Resident per Day	real number, up to 5 decimal places
adj_total	Adjusted Total Nurse Staffing - Hours per Resident per Day (CNA+LPN+RN)	real number, up to 5 decimal places
cycle_1_defs	Total Number of Health Deficiencies in Cycle 1 - See CMS 5-Star Techinical Users' Guide for description of Cycles	integer
cycle_1_nfromdefs	Number of Health Deficiencies from the Standard Survey During Cycle 1	integer
cycle_1_nfromcomp	Number of Health Deficiencies from Complaint Surveys during Cycle 1	integer
cycle_1_defs_score	Cycle 1 - Health Deficiency Score	integer
CYCLE_1_SURVEY_DATE	Date of Cycle 1 Standard Health Survey Date	YYYY-MM-DD
CYCLE_1_NUMREVIS	Number of Health Survey Repeat-Revisits for Cycle 1	integer
CYCLE_1_REVISIT_SCORE	Points Associated with Health Survey Repeat Revisits for Cycle 1	integer
CYCLE_1_TOTAL_SCORE	Cycle 1 - Total Health Inspection Score	integer

incident_cnt	Number of Facility-Reported Incidents	integer
cmplnt_cnt	Number of Substantiated Complaints	integer
FINE_CNT	Number of Fines	integer
FINE_TOT	Total Amount of Fines in Dollars	integer
PAYDEN_CNT	Number of Payment Denials	integer
TOT_PENLTY_CNT	Total Number of Penalties	integer

Note. From the Centers for Medicare & Medicaid Services (2015).

Appendix B: Minimum Data Set 3.0

Resident _____ Identifier _____ Date _____

MINIMUM DATA SET (MDS) - Version 3.0
RESIDENT ASSESSMENT AND CARE SCREENING
Nursing Home Comprehensive (NC) Item Set

Section A	**Identification Information**

A0050. Type of Record

Enter Code

1. **Add new record** → Continue to A0100, Facility Provider Numbers
2. **Modify existing record** → Continue to A0100, Facility Provider Numbers
3. **Inactivate existing record** → Skip to X0150, Type of Provider

A0100. Facility Provider Numbers

A. National Provider Identifier (NPI):

B. CMS Certification Number (CCN):

C. State Provider Number:

A0200. Type of Provider

Enter Code

Type of provider
1. **Nursing home (SNF/NF)**
2. **Swing Bed**

A0310. Type of Assessment

Enter Code

A. Federal OBRA Reason for Assessment
01. **Admission** assessment (required by day 14)
02. **Quarterly** review assessment
03. **Annual** assessment
04. **Significant change in status** assessment
05. **Significant correction** to **prior comprehensive** assessment
06. **Significant correction** to **prior quarterly** assessment
99. **None of the above**

Enter Code

B. PPS Assessment
PPS Scheduled Assessments for a Medicare Part A Stay
01. **5-day** scheduled assessment
02. **14-day** scheduled assessment
03. **30-day** scheduled assessment
04. **60-day** scheduled assessment
05. **90-day** scheduled assessment
PPS Unscheduled Assessments for a Medicare Part A Stay
07. **Unscheduled assessment used for PPS** (OMRA, significant or clinical change, or significant correction assessment)
Not PPS Assessment
99. **None of the above**

Enter Code

C. PPS Other Medicare Required Assessment - OMRA
0. **No**
1. **Start of therapy** assessment
2. **End of therapy** assessment
3. **Both Start and End of therapy** assessment
4. **Change of therapy** assessment

Enter Code

D. Is this a Swing Bed clinical change assessment? Complete only if A0200 = 2
0. **No**
1. **Yes**

Enter Code

E. Is this assessment the first assessment (OBRA, Scheduled PPS, or Discharge) **since the most recent admission/entry or reentry?**
0. **No**
1. **Yes**

Resident _____ Identifier _____ Date _____

Section A Identification Information

A0310. Type of Assessment - Continued

Enter Code

F. Entry/discharge reporting
01. **Entry** tracking record
10. **Discharge** assessment-**return not anticipated**
11. **Discharge** assessment-**return anticipated**
12. **Death in facility** tracking record
99. **None of the above**

Enter Code

G. Type of discharge - Complete only if A0310F = 10 or 11
1. **Planned**
2. **Unplanned**

Enter Code

H. Is this a SNF PPS Part A Discharge (End of Stay) Assessment?
0. **No**
1. **Yes**

A0410. Unit Certification or Licensure Designation

Enter Code

1. **Unit is neither Medicare nor Medicaid certified and MDS data is not required by the State**
2. **Unit is neither Medicare nor Medicaid certified but MDS data is required by the State**
3. **Unit is Medicare and/or Medicaid certified**

A0500. Legal Name of Resident

A. First name: **B. Middle initial:**

C. Last name: **D. Suffix:**

A0600. Social Security and Medicare Numbers

A. Social Security Number:

– –

B. Medicare number (or comparable railroad insurance number)**:**

A0700. Medicaid Number - Enter "+" if pending, "N" if not a Medicaid recipient

A0800. Gender

Enter Code

1. **Male**
2. **Female**

A0900. Birth Date

– –

Month Day Year

A1000. Race/Ethnicity

↓ **Check all that apply**

- ☐ **A. American Indian or Alaska Native**
- ☐ **B. Asian**
- ☐ **C. Black or African American**
- ☐ **D. Hispanic or Latino**
- ☐ **E. Native Hawaiian or Other Pacific Islander**
- ☐ **F. White**

Resident _____ Identifier _____ Date _____

Section A Identification Information

A1100. Language

Enter Code

A. Does the resident need or want an interpreter to communicate with a doctor or health care staff?

0. **No** → Skip to A1200, Marital Status
1. **Yes** → Specify in A1100B, Preferred language
9. **Unable to determine** → Skip to A1200, Marital Status

B. Preferred language:

A1200. Marital Status

Enter Code

1. **Never married**
2. **Married**
3. **Widowed**
4. **Separated**
5. **Divorced**

A1300. Optional Resident Items

A. Medical record number:

B. Room number:

C. Name by which resident prefers to be addressed:

D. Lifetime occupation(s) - put "/" between two occupations**:**

A1500. Preadmission Screening and Resident Review (PASRR)

Complete only if A0310A = 01, 03, 04, or 05

Enter Code

Is the resident currently considered by the state level II PASRR process to have serious mental illness and/or intellectual disability ("mental retardation" in federal regulation) or a related condition?

0. **No** → Skip to A1550, Conditions Related to ID/DD Status
1. **Yes** → Continue to A1510, Level II Preadmission Screening and Resident Review (PASRR) Conditions
9. **Not a Medicaid-certified unit** → Skip to A1550, Conditions Related to ID/DD Status

A1510. Level II Preadmission Screening and Resident Review (PASRR) Conditions

Complete only if A0310A = 01, 03, 04, or 05

Check all that apply

- ☐ **A. Serious mental illness**
- ☐ **B. Intellectual Disability ("mental retardation" in federal regulation)**
- ☐ **C. Other related conditions**

Resident _____ Identifier _____ Date _____

Section A Identification Information

A1550. Conditions Related to ID/DD Status

If the resident is 22 years of age or older, complete only if A0310A = 01

If the resident is 21 years of age or younger, complete only if A0310A = 01, 03, 04, or 05

↓ **Check all conditions that are related to ID/DD status** that were manifested before age 22, and are likely to continue indefinitely

	ID/DD With Organic Condition
☐	**A. Down syndrome**
☐	**B. Autism**
☐	**C. Epilepsy**
☐	**D. Other organic condition related to ID/DD**
	ID/DD Without Organic Condition
☐	**E. ID/DD with no organic condition**
	No ID/DD
☐	**Z. None of the above**

Most Recent Admission/Entry or Reentry into this Facility

A1600. Entry Date

_ _

Month Day Year

A1700. Type of Entry

Enter Code

1. **Admission**
2. **Reentry**

A1800. Entered From

Enter Code

01. **Community** (private home/apt., board/care, assisted living, group home)
02. **Another nursing home or swing bed**
03. **Acute hospital**
04. **Psychiatric hospital**
05. **Inpatient rehabilitation facility**
06. **ID/DD facility**
07. **Hospice**
09. **Long Term Care Hospital** (LTCH)
99. **Other**

A1900. Admission Date (Date this episode of care in this facility began)

_ _

Month Day Year

A2000. Discharge Date

Complete only if A0310F = 10, 11, or 12

_ _

Month Day Year

Resident _____ Identifier _____ Date _____

Section A Identification Information

A2100. Discharge Status

Complete only if A0310F = 10, 11, or 12

Enter Code

01. **Community** (private home/apt., board/care, assisted living, group home)
02. **Another nursing home or swing bed**
03. **Acute hospital**
04. **Psychiatric hospital**
05. **Inpatient rehabilitation facility**
06. **ID/DD facility**
07. **Hospice**
08. **Deceased**
09. **Long Term Care Hospital** (LTCH)
99. **Other**

A2200. Previous Assessment Reference Date for Significant Correction

Complete only if A0310A = 05 or 06

_ _

Month Day Year

A2300. Assessment Reference Date

Observation end date:

_ _

Month Day Year

A2400. Medicare Stay

Enter Code

A. Has the resident had a Medicare-covered stay since the most recent entry?

0. **No** → Skip to B0100, Comatose
1. **Yes** → Continue to A2400B, Start date of most recent Medicare stay

B. Start date of most recent Medicare stay:

_ _

Month Day Year

C. End date of most recent Medicare stay - Enter dashes if stay is ongoing:

_ _

Month Day Year

Resident _____ Identifier _____ Date _____

Look back period for all items is 7 days unless another time frame is indicated

Section B Hearing, Speech, and Vision

B0100. Comatose

Enter Code

Persistent vegetative state/no discernible consciousness
0. **No** → Continue to B0200, Hearing
1. **Yes** → Skip to G0110, Activities of Daily Living (ADL) Assistance

B0200. Hearing

Enter Code

Ability to hear (with hearing aid or hearing appliances if normally used)
0. **Adequate** - no difficulty in normal conversation, social interaction, listening to TV
1. **Minimal difficulty** - difficulty in some environments (e.g., when person speaks softly or setting is noisy)
2. **Moderate difficulty** - speaker has to increase volume and speak distinctly
3. **Highly impaired** - absence of useful hearing

B0300. Hearing Aid

Enter Code

Hearing aid or other hearing appliance used in completing B0200, Hearing
0. **No**
1. **Yes**

B0600. Speech Clarity

Enter Code

Select best description of speech pattern
0. **Clear speech** - distinct intelligible words
1. **Unclear speech** - slurred or mumbled words
2. **No speech** - absence of spoken words

B0700. Makes Self Understood

Enter Code

Ability to express ideas and wants, consider both verbal and non-verbal expression
0. **Understood**
1. **Usually understood** - difficulty communicating some words or finishing thoughts **but** is able if prompted or given time
2. **Sometimes understood** - ability is limited to making concrete requests
3. **Rarely/never understood**

B0800. Ability To Understand Others

Enter Code

Understanding verbal content, however able (with hearing aid or device if used)
0. **Understands** - clear comprehension
1. **Usually understands** - misses some part/intent of message **but** comprehends most conversation
2. **Sometimes understands** - responds adequately to simple, direct communication only
3. **Rarely/never understands**

B1000. Vision

Enter Code

Ability to see in adequate light (with glasses or other visual appliances)
0. **Adequate** - sees fine detail, such as regular print in newspapers/books
1. **Impaired** - sees large print, but not regular print in newspapers/books
2. **Moderately impaired** - limited vision; not able to see newspaper headlines but can identify objects
3. **Highly impaired** - object identification in question, but eyes appear to follow objects
4. **Severely impaired** - no vision or sees only light, colors or shapes; eyes do not appear to follow objects

B1200. Corrective Lenses

Enter Code

Corrective lenses (contacts, glasses, or magnifying glass) used in completing B1000, Vision
0. **No**
1. **Yes**

Resident _____ Identifier _____ Date _____

Section C Cognitive Patterns

C0100. Should Brief Interview for Mental Status (C0200-C0500) be Conducted?
Attempt to conduct interview with all residents

Enter Code

0. **No** (resident is rarely/never understood) → Skip to and complete C0700-C1000, Staff Assessment for Mental Status
1. **Yes** → Continue to C0200, Repetition of Three Words

Brief Interview for Mental Status (BIMS)

C0200. Repetition of Three Words

Enter Code

Ask resident: *"I am going to say three words for you to remember. Please repeat the words after I have said all three. The words are:* ***sock, blue, and bed.*** *Now tell me the three words."*

Number of words repeated after first attempt

0. **None**
1. **One**
2. **Two**
3. **Three**

After the resident's first attempt, repeat the words using cues ("s*ock, something to wear; blue, a color; bed, a piece of furniture*"). You may repeat the words up to two more times.

C0300. Temporal Orientation (orientation to year, month, and day)

Enter Code

Ask resident: "*Please tell me what year it is right now*."

A. Able to report correct year

0. **Missed by > 5 years** or no answer
1. **Missed by 2-5 years**
2. **Missed by 1 year**
3. **Correct**

Enter Code

Ask resident: "*What month are we in right now?*"

B. Able to report correct month

0. **Missed by > 1 month** or no answer
1. **Missed by 6 days to 1 month**
2. **Accurate within 5 days**

Enter Code

Ask resident: "*What day of the week is today?*"

C. Able to report correct day of the week

0. **Incorrect** or no answer
1. **Correct**

C0400. Recall

Enter Code

Ask resident: "*Let's go back to an earlier question. What were those three words that I asked you to repeat?*"
If unable to remember a word, give cue (something to wear; a color; a piece of furniture) for that word.

A. Able to recall "sock"

0. **No** - could not recall
1. **Yes, after cueing** ("something to wear")
2. **Yes, no cue required**

Enter Code

B. Able to recall "blue"

0. **No** - could not recall
1. **Yes, after cueing** ("a color")
2. **Yes, no cue required**

Enter Code

C. Able to recall "bed"

0. **No** - could not recall
1. **Yes, after cueing** ("a piece of furniture")
2. **Yes, no cue required**

C0500. BIMS Summary Score

Enter Score

Add scores for questions C0200-C0400 and fill in total score (00-15)
Enter 99 if the resident was unable to complete the interview

Resident _____ Identifier _____ Date _____

Section C Cognitive Patterns

C0600. Should the Staff Assessment for Mental Status (C0700 - C1000) be Conducted?

Enter Code

0. **No** (resident was able to complete Brief Interview for Mental Status) → Skip to C1310, Signs and Symptoms of Delirium
1. **Yes** (resident was unable to complete Brief Interview for Mental Status) → Continue to C0700, Short-term Memory OK

Staff Assessment for Mental Status

Do not conduct if Brief Interview for Mental Status (C0200-C0500) was completed

C0700. Short-term Memory OK

Enter Code

Seems or appears to recall after 5 minutes
0. **Memory OK**
1. **Memory problem**

C0800. Long-term Memory OK

Enter Code

Seems or appears to recall long past
0. **Memory OK**
1. **Memory problem**

C0900. Memory/Recall Ability

↓ **Check all that the resident was normally able to recall**

- ☐ **A. Current season**
- ☐ **B. Location of own room**
- ☐ **C. Staff names and faces**
- ☐ **D. That he or she is in a nursing home/hospital swing bed**
- ☐ **Z. None of the above** were recalled

C1000. Cognitive Skills for Daily Decision Making

Enter Code

Made decisions regarding tasks of daily life
0. **Independent** - decisions consistent/reasonable
1. **Modified independence** - some difficulty in new situations only
2. **Moderately impaired** - decisions poor; cues/supervision required
3. **Severely impaired** - never/rarely made decisions

Delirium

C1310. Signs and Symptoms of Delirium (from CAM©)

Code **after completing** Brief Interview for Mental Status or Staff Assessment, and reviewing medical record

A. Acute Onset Mental Status Change

Enter Code

Is there evidence of an acute change in mental status from the resident's baseline?
0. **No**
1. **Yes**

Coding:
0. **Behavior not present**
1. **Behavior continuously present, does not fluctuate**
2. **Behavior present, fluctuates** (comes and goes, changes in severity)

↓ **Enter Codes in Boxes**

- **B. Inattention** - Did the resident have difficulty focusing attention, for example being easily distractible, or having difficulty keeping track of what was being said?
- **C. Disorganized thinking** - Was the resident's thinking disorganized or incoherent (rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject)?
- **D. Altered level of consciousness** - Did the resident have altered level of consciousness as indicated by any of the following criteria?
  - **vigilant** - startled easily to any sound or touch
  - **lethargic** - repeatedly dozed off when being asked questions, but responded to voice or touch
  - **stuporous** - very difficult to arouse and keep aroused for the interview
  - **comatose** - could not be aroused

Resident _____ Identifier _____ Date _____

Section D Mood

D0100. Should Resident Mood Interview be Conducted? - Attempt to conduct interview with all residents

Enter Code

0. **No** (resident is rarely/never understood) → Skip to and complete D0500-D0600, Staff Assessment of Resident Mood (PHQ-9-OV)
1. **Yes** → Continue to D0200, Resident Mood Interview (PHQ-9©)

D0200. Resident Mood Interview (PHQ-9©)

Say to resident: "*Over the last 2 weeks, have you been bothered by any of the following problems?*"

If symptom is present, enter 1 (yes) in column 1, Symptom Presence.
If yes in column 1, then ask the resident: "*About **how often** have you been bothered by this?*"
Read and show the resident a card with the symptom frequency choices. Indicate response in column 2, Symptom Frequency.

1. Symptom Presence
0. **No** (enter 0 in column 2)
1. **Yes** (enter 0-3 in column 2)
9. **No response** (leave column 2 blank)

2. Symptom Frequency
0. **Never or 1 day**
1. **2-6 days** (several days)
2. **7-11 days** (half or more of the days)
3. **12-14 days** (nearly every day)

	1. Symptom Presence	2. Symptom Frequency
	↓ Enter Scores in Boxes ↓	
A. ***Little interest or pleasure in doing things***		
B. ***Feeling down, depressed, or hopeless***		
C. ***Trouble falling or staying asleep, or sleeping too much***		
D. ***Feeling tired or having little energy***		
E. ***Poor appetite or overeating***		
F. ***Feeling bad about yourself - or that you are a failure or have let yourself or your family down***		
G. ***Trouble concentrating on things, such as reading the newspaper or watching television***		
H. ***Moving or speaking so slowly that other people could have noticed. Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual***		
I. ***Thoughts that you would be better off dead, or of hurting yourself in some way***		

D0300. Total Severity Score

Enter Score

Add scores for all frequency responses in Column 2, Symptom Frequency. Total score must be between 00 and 27. Enter 99 if unable to complete interview (i.e., Symptom Frequency is blank for 3 or more items).

D0350. Safety Notification - Complete only if D0200I1 = 1 indicating possibility of resident self harm

Enter Code

Was responsible staff or provider informed that there is a potential for resident self harm?
0. **No**
1. **Yes**

Resident _____ Identifier _____ Date _____

Section D Mood

D0500. Staff Assessment of Resident Mood (PHQ-9-OV*)

Do not conduct if Resident Mood Interview (D0200-D0300) was completed

Over the last 2 weeks, did the resident have any of the following problems or behaviors?

If symptom is present, enter 1 (yes) in column 1, Symptom Presence.
Then move to column 2, Symptom Frequency, and indicate symptom frequency.

1. Symptom Presence
0. **No** (enter 0 in column 2)
1. **Yes** (enter 0-3 in column 2)

2. Symptom Frequency
0. **Never or 1 day**
1. **2-6 days** (several days)
2. **7-11 days** (half or more of the days)
3. **12-14 days** (nearly every day)

	1. Symptom Presence	2. Symptom Frequency
	↓ Enter Scores in Boxes ↓	
A. Little interest or pleasure in doing things		
B. Feeling or appearing down, depressed, or hopeless		
C. Trouble falling or staying asleep, or sleeping too much		
D. Feeling tired or having little energy		
E. Poor appetite or overeating		
F. Indicating that s/he feels bad about self, is a failure, or has let self or family down		
G. Trouble concentrating on things, such as reading the newspaper or watching television		
H. Moving or speaking so slowly that other people have noticed. Or the opposite - being so fidgety or restless that s/he has been moving around a lot more than usual		
I. States that life isn't worth living, wishes for death, or attempts to harm self		
J. Being short-tempered, easily annoyed		

D0600. Total Severity Score

Enter Score

Add scores for all frequency responses in Column 2, Symptom Frequency. Total score must be between 00 and 30.

D0650. Safety Notification - Complete only if D0500I1 = 1 indicating possibility of resident self harm

Enter Code

Was responsible staff or provider informed that there is a potential for resident self harm?
0. **No**
1. **Yes**

Resident _____ Identifier _____ Date _____

Section E Behavior

E0100. Potential Indicators of Psychosis

Check all that apply

- ☐ **A. Hallucinations** (perceptual experiences in the absence of real external sensory stimuli)
- ☐ **B. Delusions** (misconceptions or beliefs that are firmly held, contrary to reality)
- ☐ **Z. None of the above**

Behavioral Symptoms

E0200. Behavioral Symptom - Presence & Frequency

Note presence of symptoms and their frequency

Coding:
0. **Behavior not exhibited**
1. **Behavior of this type occurred 1 to 3 days**
2. **Behavior of this type occurred 4 to 6 days,** but less than daily
3. **Behavior of this type occurred daily**

Enter Codes in Boxes

- **A. Physical behavioral symptoms directed toward others** (e.g., hitting, kicking, pushing, scratching, grabbing, abusing others sexually)
- **B. Verbal behavioral symptoms directed toward others** (e.g., threatening others, screaming at others, cursing at others)
- **C. Other behavioral symptoms not directed toward others** (e.g., physical symptoms such as hitting or scratching self, pacing, rummaging, public sexual acts, disrobing in public, throwing or smearing food or bodily wastes, or verbal/vocal symptoms like screaming, disruptive sounds)

E0300. Overall Presence of Behavioral Symptoms

Enter Code

Were any behavioral symptoms in questions E0200 coded 1, 2, or 3?
0. **No** → Skip to E0800, Rejection of Care
1. **Yes** → Considering all of E0200, Behavioral Symptoms, answer E0500 and E0600 below

E0500. Impact on Resident

Did any of the identified symptom(s):

Enter Code
A. Put the resident at significant risk for physical illness or injury?
0. **No**
1. **Yes**

Enter Code
B. Significantly interfere with the resident's care?
0. **No**
1. **Yes**

Enter Code
C. Significantly interfere with the resident's participation in activities or social interactions?
0. **No**
1. **Yes**

E0600. Impact on Others

Did any of the identified symptom(s):

Enter Code
A. Put others at significant risk for physical injury?
0. **No**
1. **Yes**

Enter Code
B. Significantly intrude on the privacy or activity of others?
0. **No**
1. **Yes**

Enter Code
C. Significantly disrupt care or living environment?
0. **No**
1. **Yes**

E0800. Rejection of Care - Presence & Frequency

Enter Code

Did the resident reject evaluation or care (e.g., bloodwork, taking medications, ADL assistance) **that is necessary to achieve the resident's goals for health and well-being?** Do not include behaviors that have already been addressed (e.g., by discussion or care planning with the resident or family), and determined to be consistent with resident values, preferences, or goals.
0. **Behavior not exhibited**
1. **Behavior of this type occurred 1 to 3 days**
2. **Behavior of this type occurred 4 to 6 days,** but less than daily
3. **Behavior of this type occurred daily**

Resident _____ Identifier _____ Date _____

Section E Behavior

E0900. Wandering - Presence & Frequency

Enter Code

Has the resident wandered?

0. **Behavior not exhibited** → Skip to E1100, Change in Behavioral or Other Symptoms
1. **Behavior of this type occurred 1 to 3 days**
2. **Behavior of this type occurred 4 to 6 days**, but less than daily
3. **Behavior of this type occurred daily**

E1000. Wandering - Impact

Enter Code

A. Does the wandering place the resident at significant risk of getting to a potentially dangerous place (e.g., stairs, outside of the facility)?

0. **No**
1. **Yes**

Enter Code

B. Does the wandering significantly intrude on the privacy or activities of others?

0. **No**
1. **Yes**

E1100. Change in Behavior or Other Symptoms

Consider all of the symptoms assessed in items E0100 through E1000

Enter Code

How does resident's current behavior status, care rejection, or wandering **compare to prior assessment (OBRA or Scheduled PPS)?**

0. **Same**
1. **Improved**
2. **Worse**
3. **N/A** because no prior MDS assessment

Resident _____ Identifier _____ Date _____

Section F — Preferences for Customary Routine and Activities

F0300. Should Interview for Daily and Activity Preferences be Conducted? - Attempt to interview all residents able to communicate. If resident is unable to complete, attempt to complete interview with family member or significant other

Enter Code

0. **No** (resident is rarely/never understood and family/significant other not available) → Skip to and complete F0800, Staff Assessment of Daily and Activity Preferences
1. **Yes** → Continue to F0400, Interview for Daily Preferences

F0400. Interview for Daily Preferences

Show resident the response options and say: **"*While you are in this facility...*"**

Coding:
1. **Very important**
2. **Somewhat important**
3. **Not very important**
4. **Not important at all**
5. **Important, but can't do or no choice**
9. **No response or non-responsive**

↓ **Enter Codes in Boxes**

	A. *how important is it to you to* ***choose what clothes to wear?***
	B. *how important is it to you to* ***take care of your personal belongings or things?***
	C. *how important is it to you to* ***choose between a tub bath, shower, bed bath, or sponge bath?***
	D. *how important is it to you to* ***have snacks available between meals?***
	E. *how important is it to you to* ***choose your own bedtime?***
	F. *how important is it to you to* ***have your family or a close friend involved in discussions about your care?***
	G. *how important is it to you to* ***be able to use the phone in private?***
	H. *how important is it to you to* ***have a place to lock your things to keep them safe?***

F0500. Interview for Activity Preferences

Show resident the response options and say: **"*While you are in this facility...*"**

Coding:
1. **Very important**
2. **Somewhat important**
3. **Not very important**
4. **Not important at all**
5. **Important, but can't do or no choice**
9. **No response or non-responsive**

↓ **Enter Codes in Boxes**

	A. *how important is it to you to* ***have books, newspapers, and magazines to read?***
	B. *how important is it to you to* ***listen to music you like?***
	C. *how important is it to you to* ***be around animals such as pets?***
	D. *how important is it to you to* ***keep up with the news?***
	E. *how important is it to you to* ***do things with groups of people?***
	F. *how important is it to you to* ***do your favorite activities?***
	G. *how important is it to you to* ***go outside to get fresh air when the weather is good?***
	H. *how important is it to you to* ***participate in religious services or practices?***

F0600. Daily and Activity Preferences Primary Respondent

Enter Code

Indicate primary respondent for Daily and Activity Preferences (F0400 and F0500)
1. **Resident**
2. **Family or significant other** (close friend or other representative)
9. **Interview could not be completed** by resident or family/significant other ("No response" to 3 or more items")

Resident _____ Identifier _____ Date _____

Section F Preferences for Customary Routine and Activities

F0700. Should the Staff Assessment of Daily and Activity Preferences be Conducted?

Enter Code

0. **No** (because Interview for Daily and Activity Preferences (F0400 and F0500) was completed by resident or family/significant other) → Skip to and complete G0110, Activities of Daily Living (ADL) Assistance
1. **Yes** (because 3 or more items in Interview for Daily and Activity Preferences (F0400 and F0500) were not completed by resident or family/significant other) → Continue to F0800, Staff Assessment of Daily and Activity Preferences

F0800. Staff Assessment of Daily and Activity Preferences

Do not conduct if Interview for Daily and Activity Preferences (F0400-F0500) was completed

Resident Prefers:

Check all that apply

☐	**A. Choosing clothes to wear**
☐	**B. Caring for personal belongings**
☐	**C. Receiving tub bath**
☐	**D. Receiving shower**
☐	**E. Receiving bed bath**
☐	**F. Receiving sponge bath**
☐	**G. Snacks between meals**
☐	**H. Staying up past 8:00 p.m.**
☐	**I. Family or significant other involvement in care discussions**
☐	**J. Use of phone in private**
☐	**K. Place to lock personal belongings**
☐	**L. Reading books, newspapers, or magazines**
☐	**M. Listening to music**
☐	**N. Being around animals such as pets**
☐	**O. Keeping up with the news**
☐	**P. Doing things with groups of people**
☐	**Q. Participating in favorite activities**
☐	**R. Spending time away from the nursing home**
☐	**S. Spending time outdoors**
☐	**T. Participating in religious activities or practices**
☐	**Z. None of the above**

Resident _____ Identifier _____ Date _____

Section G Functional Status

G0110. Activities of Daily Living (ADL) Assistance
Refer to the ADL flow chart in the RAI manual to facilitate accurate coding

Instructions for Rule of 3
- When an activity occurs three times at any one given level, code that level.
- When an activity occurs three times at multiple levels, code the most dependent, exceptions are total dependence (4), activity must require full assist every time, and activity did not occur (8), activity must not have occurred at all. Example, three times extensive assistance (3) and three times limited assistance (2), code extensive assistance (3).
- When an activity occurs at various levels, but not three times at any given level, apply the following:
  - When there is a combination of full staff performance, and extensive assistance, code extensive assistance.
  - When there is a combination of full staff performance, weight bearing assistance and/or non-weight bearing assistance code limited assistance (2).

If none of the above are met, code supervision.

1. ADL Self-Performance
Code for **resident's performance** over all shifts - not including setup. If the ADL activity occurred 3 or more times at various levels of assistance, code the most dependent - except for total dependence, which requires full staff performance every time

Coding:

Activity Occurred 3 or More Times
0. **Independent** - no help or staff oversight at any time
1. **Supervision** - oversight, encouragement or cueing
2. **Limited assistance** - resident highly involved in activity; staff provide guided maneuvering of limbs or other non-weight-bearing assistance
3. **Extensive assistance** - resident involved in activity, staff provide weight-bearing support
4. **Total dependence** - full staff performance every time during entire 7-day period

Activity Occurred 2 or Fewer Times
7. **Activity occurred only once or twice** - activity did occur but only once or twice
8. **Activity did not occur** - activity did not occur or family and/or non-facility staff provided care 100% of the time for that activity over the entire 7-day period

2. ADL Support Provided
Code for **most support provided** over all shifts; code regardless of resident's self-performance classification

Coding:
0. **No** setup or physical help from staff
1. **Setup** help only
2. **One** person physical assist
3. **Two+** persons physical assist
8. ADL activity itself **did not occur** or family and/or non-facility staff provided care 100% of the time for that activity over the entire 7-day period

	1. Self-Performance	2. Support
	↓ Enter Codes in Boxes ↓	
A. Bed mobility - how resident moves to and from lying position, turns side to side, and positions body while in bed or alternate sleep furniture		
B. Transfer - how resident moves between surfaces including to or from: bed, chair, wheelchair, standing position (**excludes** to/from bath/toilet)		
C. Walk in room - how resident walks between locations in his/her room		
D. Walk in corridor - how resident walks in corridor on unit		
E. Locomotion on unit - how resident moves between locations in his/her room and adjacent corridor on same floor. If in wheelchair, self-sufficiency once in chair		
F. Locomotion off unit - how resident moves to and returns from off-unit locations (e.g., areas set aside for dining, activities or treatments). **If facility has only one floor**, how resident moves to and from distant areas on the floor. If in wheelchair, self-sufficiency once in chair		
G. Dressing - how resident puts on, fastens and takes off all items of clothing, including donning/removing a prosthesis or TED hose. Dressing includes putting on and changing pajamas and housedresses		
H. Eating - how resident eats and drinks, regardless of skill. Do not include eating/drinking during medication pass. Includes intake of nourishment by other means (e.g., tube feeding, total parenteral nutrition, IV fluids administered for nutrition or hydration)		
I. Toilet use - how resident uses the toilet room, commode, bedpan, or urinal; transfers on/off toilet; cleanses self after elimination; changes pad; manages ostomy or catheter; and adjusts clothes. Do not include emptying of bedpan, urinal, bedside commode, catheter bag or ostomy bag		
J. Personal hygiene - how resident maintains personal hygiene, including combing hair, brushing teeth, shaving, applying makeup, washing/drying face and hands (**excludes** baths and showers)		

Resident _____ Identifier _____ Date _____

Section G Functional Status

G0120. Bathing

How resident takes full-body bath/shower, sponge bath, and transfers in/out of tub/shower (**excludes** washing of back and hair). Code for **most dependent** in self-performance and support

Enter Code

A. Self-performance
0. **Independent** - no help provided
1. **Supervision** - oversight help only
2. **Physical help limited to transfer only**
3. **Physical help in part of bathing activity**
4. **Total dependence**
8. **Activity itself did not occur** or family and/or non-facility staff provided care 100% of the time for that activity over the entire 7-day period

Enter Code

B. Support provided
(Bathing support codes are as defined in item **G0110 column 2, ADL Support Provided**, above)

G0300. Balance During Transitions and Walking

After observing the resident, **code the following walking and transition items for most dependent**

Coding:
0. **Steady at all times**
1. **Not steady, but able to stabilize without staff assistance**
2. **Not steady, only able to stabilize with staff assistance**
8. **Activity did not occur**

↓ **Enter Codes in Boxes**

- **A. Moving from seated to standing position**
- **B. Walking** (with assistive device if used)
- **C. Turning around** and facing the opposite direction while walking
- **D. Moving on and off toilet**
- **E. Surface-to-surface transfer** (transfer between bed and chair or wheelchair)

G0400. Functional Limitation in Range of Motion

Code for limitation that interfered with daily functions or placed resident at risk of injury

Coding:
0. **No impairment**
1. **Impairment on one side**
2. **Impairment on both sides**

↓ **Enter Codes in Boxes**

- **A. Upper extremity** (shoulder, elbow, wrist, hand)
- **B. Lower extremity** (hip, knee, ankle, foot)

G0600. Mobility Devices

↓ **Check all that were normally used**

- ☐ **A. Cane/crutch**
- ☐ **B. Walker**
- ☐ **C. Wheelchair** (manual or electric)
- ☐ **D. Limb prosthesis**
- ☐ **Z. None of the above** were used

G0900. Functional Rehabilitation Potential

Complete only if A0310A = 01

Enter Code

A. Resident believes he or she is capable of increased independence in at least some ADLs
0. **No**
1. **Yes**
9. **Unable to determine**

Enter Code

B. Direct care staff believe resident is capable of increased independence in at least some ADLs
0. **No**
1. **Yes**

Resident _____ Identifier _____ Date _____

Section GG — Functional Abilities and Goals - Admission (Start of SNF PPS Stay)

GG0130. Self-Care (Assessment period is days 1 through 3 of the SNF PPS Stay starting with A2400B)
Complete only if A0310B = 01

Code the resident's usual performance at the start of the SNF PPS stay for each activity using the 6-point scale. If activity was not attempted at the start of the SNF PPS stay, code the reason. Code the patient's end of SNF PPS stay goal(s) using the 6-point scale.

Coding:

Safety and **Quality of Performance -** If helper assistance is required because resident's performance is unsafe or of poor quality, score according to amount of assistance provided.

Activities may be completed with or without assistive devices.

06. **Independent** - Resident completes the activity by him/herself with no assistance from a helper.
05. **Setup or clean-up assistance** - Helper SETS UP or CLEANS UP; resident completes activity. Helper assists only prior to or following the activity**.**
04. **Supervision or touching assistance** - Helper provides VERBAL CUES or TOUCHING/STEADYING assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
03. **Partial/moderate assistance** - Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
02. **Substantial/maximal assistance** - Helper does MORE THAN HALF the effort. Helper lifts or holds trunk or limbs and provides more than half the effort.
01. **Dependent** - Helper does ALL of the effort. Resident does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the resident to complete the activity.

If activity was not attempted, code reason:

07. **Resident refused.**
09. **Not applicable.**
88. Not attempted due to **medical condition or safety concerns.**

1. Admission Performance	2. Discharge Goal	
↓ Enter Codes in Boxes ↓		
		A. Eating: The ability to use suitable utensils to bring food to the mouth and swallow food once the meal is presented on a table/tray. Includes modified food consistency.
		B. Oral hygiene: The ability to use suitable items to clean teeth. [Dentures (if applicable): The ability to remove and replace dentures from and to the mouth, and manage equipment for soaking and rinsing them.]
		C. Toileting hygiene: The ability to maintain perineal hygiene, adjust clothes before and after using the toilet, commode, bedpan, or urinal. If managing an ostomy, include wiping the opening but not managing equipment.

Resident _____ Identifier _____ Date _____

Section GG — Functional Abilities and Goals - Admission (Start of SNF PPS Stay)

GG0170. Mobility (Assessment period is days 1 through 3 of the SNF PPS Stay starting with A2400B)
Complete only if A0310B = 01

Code the resident's usual performance at the start of the SNF PPS stay for each activity using the 6-point scale. If activity was not attempted at the start of the SNF PPS stay, code the reason. Code the patient's end of SNF PPS stay goal(s) using the 6-point scale.

Coding:

Safety and **Quality of Performance -** If helper assistance is required because resident's performance is unsafe or of poor quality, score according to amount of assistance provided.
Activities may be completed with or without assistive devices.

06. **Independent** - Resident completes the activity by him/herself with no assistance from a helper.
05. **Setup or clean-up assistance** - Helper SETS UP or CLEANS UP; resident completes activity. Helper assists only prior to or following the activity**.**
04. **Supervision or touching assistance** - Helper provides VERBAL CUES or TOUCHING/STEADYING assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
03. **Partial/moderate assistance** - Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
02. **Substantial/maximal assistance** - Helper does MORE THAN HALF the effort. Helper lifts or holds trunk or limbs and provides more than half the effort.
01. **Dependent** - Helper does ALL of the effort. Resident does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the resident to complete the activity.

If activity was not attempted, code reason:

07. **Resident refused.**
09. **Not applicable.**
88. Not attempted due to **medical condition or safety concerns.**

1. Admission Performance	2. Discharge Goal	
↓ Enter Codes in Boxes ↓		
		B. Sit to lying: The ability to move from sitting on side of bed to lying flat on the bed.
		C. Lying to sitting on side of bed: The ability to safely move from lying on the back to sitting on the side of the bed with feet flat on the floor, and with no back support.
		D. Sit to stand: The ability to safely come to a standing position from sitting in a chair or on the side of the bed.
		E. Chair/bed-to-chair transfer: The ability to safely transfer to and from a bed to a chair (or wheelchair).
		F. Toilet transfer: The ability to safely get on and off a toilet or commode.
		H1. Does the resident walk? 0. **No**, and walking goal is not clinically indicated → Skip to GG0170Q1, Does the resident use a wheelchair/scooter? 1. **No**, and walking goal is clinically indicated → Code the resident's discharge goal(s) for items GG0170J and GG0170K 2. **Yes** → Continue to GG0170J, Walk 50 feet with two turns
		J. Walk 50 feet with two turns: Once standing, the ability to walk at least 50 feet and make two turns.
		K. Walk 150 feet: Once standing, the ability to walk at least 150 feet in a corridor or similar space.
		Q1. Does the resident use a wheelchair/scooter? 0. **No** → Skip to GG0130, Self Care 1. **Yes** → Continue to GG0170R, Wheel 50 feet with two turns
		R. Wheel 50 feet with two turns: Once seated in wheelchair/scooter, can wheel at least 50 feet and make two turns.
		RR1. Indicate the type of wheelchair/scooter used. 1. **Manual** 2. **Motorized**
		S. Wheel 150 feet: Once seated in wheelchair/scooter, can wheel at least 150 feet in a corridor or similar space.
		SS1. Indicate the type of wheelchair/scooter used. 1. **Manual** 2. **Motorized**

Resident _____ Identifier _____ Date _____

Section GG	**Functional Abilities and Goals** - Discharge (End of SNF PPS Stay)

GG0130. Self-Care (Assessment period is the last 3 days of the SNF PPS Stay ending on A2400C)
Complete only if A0310G is not = 2 **and** A0310H = 1 **and** A2400C minus A2400B is greater than 2 **and** A2100 is not = 03

Code the resident's usual performance at the end of the SNF PPS stay for each activity using the 6-point scale. If an activity was not attempted at the end of the SNF PPS stay, code the reason.

Coding:

Safety and **Quality of Performance -** If helper assistance is required because resident's performance is unsafe or of poor quality, score according to amount of assistance provided.

Activities may be completed with or without assistive devices.

06. **Independent** - Resident completes the activity by him/herself with no assistance from a helper.
05. **Setup or clean-up assistance** - Helper SETS UP or CLEANS UP; resident completes activity. Helper assists only prior to or following the activity**.**
04. **Supervision or touching assistance** - Helper provides VERBAL CUES or TOUCHING/STEADYING assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
03. **Partial/moderate assistance** - Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
02. **Substantial/maximal assistance** - Helper does MORE THAN HALF the effort. Helper lifts or holds trunk or limbs and provides more than half the effort.
01. **Dependent** - Helper does ALL of the effort. Resident does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the resident to complete the activity.

If activity was not attempted, code reason:

07. **Resident refused.**
09. **Not applicable.**
88. Not attempted due to **medical condition or safety concerns.**

3. Discharge Performance	
Enter Code	**A. Eating:** The ability to use suitable utensils to bring food to the mouth and swallow food once the meal is presented on a table/ tray. Includes modified food consistency.
Enter Code	**B. Oral hygiene:** The ability to use suitable items to clean teeth. [Dentures (if applicable): The ability to remove and replace dentures from and to the mouth, and manage equipment for soaking and rinsing them.]
Enter Code	**C. Toileting hygiene:** The ability to maintain perineal hygiene, adjust clothes before and after using the toilet, commode, bedpan, or urinal. If managing an ostomy, include wiping the opening but not managing equipment.

Resident _____ Identifier _____ Date _____

Section GG — Functional Abilities and Goals - Discharge (End of SNF PPS Stay)

GG0170. Mobility (Assessment period is the last 3 days of the SNF PPS Stay ending on A2400C)
Complete only if A0310G is not = 2 **and** A0310H = 1 **and** A2400C minus A2400B is greater than 2 **and** A2100 is not = 03

Code the resident's usual performance at the end of the SNF PPS stay for each activity using the 6-point scale. If an activity was not attempted at the end of the SNF PPS stay, code the reason.

Coding:

Safety and **Quality of Performance -** If helper assistance is required because resident's performance is unsafe or of poor quality, score according to amount of assistance provided.
Activities may be completed with or without assistive devices.

06. **Independent** - Resident completes the activity by him/herself with no assistance from a helper.
05. **Setup or clean-up assistance** - Helper SETS UP or CLEANS UP; resident completes activity. Helper assists only prior to or following the activity**.**
04. **Supervision or touching assistance** - Helper provides VERBAL CUES or TOUCHING/STEADYING assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
03. **Partial/moderate assistance** - Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
02. **Substantial/maximal assistance** - Helper does MORE THAN HALF the effort. Helper lifts or holds trunk or limbs and provides more than half the effort.
01. **Dependent** - Helper does ALL of the effort. Resident does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the resident to complete the activity.

If activity was not attempted, code reason:

07. **Resident refused.**
09. **Not applicable.**
88. Not attempted due to **medical condition or safety concerns.**

3. Discharge Performance	
Enter Codes in Boxes	
	B. Sit to lying: The ability to move from sitting on side of bed to lying flat on the bed.
	C. Lying to sitting on side of bed: The ability to safely move from lying on the back to sitting on the side of the bed with feet flat on the floor, and with no back support.
	D. Sit to stand: The ability to safely come to a standing position from sitting in a chair or on the side of the bed.
	E. Chair/bed-to-chair transfer: The ability to safely transfer to and from a bed to a chair (or wheelchair).
	F. Toilet transfer: The ability to safely get on and off a toilet or commode.
	H3. Does the resident walk? 0. **No** → Skip to GG0170Q3, Does the resident use a wheelchair/scooter? 2. **Yes** → Continue to GG0170J, Walk 50 feet with two turns
	J. Walk 50 feet with two turns: Once standing, the ability to walk at least 50 feet and make two turns.
	K. Walk 150 feet: Once standing, the ability to walk at least 150 feet in a corridor or similar space.
	Q3. Does the resident use a wheelchair/scooter? 0. **No** → Skip to H0100, Appliances 1. **Yes** → Continue to GG0170R, Wheel 50 feet with two turns
	R. Wheel 50 feet with two turns: Once seated in wheelchair/scooter, can wheel at least 50 feet and make two turns.
	RR3. Indicate the type of wheelchair/scooter used. 1. **Manual** 2. **Motorized**
	S. Wheel 150 feet: Once seated in wheelchair/scooter, can wheel at least 150 feet in a corridor or similar space.
	SS3. Indicate the type of wheelchair/scooter used. 1. **Manual** 2. **Motorized**

Resident _____ Identifier _____ Date _____

Section H Bladder and Bowel

H0100. Appliances

Check all that apply

- ☐ **A. Indwelling catheter** (including suprapubic catheter and nephrostomy tube)
- ☐ **B. External catheter**
- ☐ **C. Ostomy** (including urostomy, ileostomy, and colostomy)
- ☐ **D. Intermittent catheterization**
- ☐ **Z. None of the above**

H0200. Urinary Toileting Program

Enter Code

A. Has a trial of a toileting program (e.g., scheduled toileting, prompted voiding, or bladder training) been attempted on admission/entry or reentry or since urinary incontinence was noted in this facility?

0. **No** → Skip to H0300, Urinary Continence
1. **Yes** → Continue to H0200B, Response
9. **Unable to determine** → Skip to H0200C, Current toileting program or trial

Enter Code

B. Response - What was the resident's response to the trial program?

0. **No improvement**
1. **Decreased wetness**
2. **Completely dry** (continent)
9. **Unable to determine** or trial in progress

Enter Code

C. Current toileting program or trial - Is a toileting program (e.g., scheduled toileting, prompted voiding, or bladder training) currently being used to manage the resident's urinary continence?

0. **No**
1. **Yes**

H0300. Urinary Continence

Enter Code

Urinary continence - Select the one category that best describes the resident

0. **Always continent**
1. **Occasionally incontinent** (less than 7 episodes of incontinence)
2. **Frequently incontinent** (7 or more episodes of urinary incontinence, but at least one episode of continent voiding)
3. **Always incontinent** (no episodes of continent voiding)
9. **Not rated,** resident had a catheter (indwelling, condom), urinary ostomy, or no urine output for the entire 7 days

H0400. Bowel Continence

Enter Code

Bowel continence - Select the one category that best describes the resident

0. **Always continent**
1. **Occasionally incontinent** (one episode of bowel incontinence)
2. **Frequently incontinent** (2 or more episodes of bowel incontinence, but at least one continent bowel movement)
3. **Always incontinent** (no episodes of continent bowel movements)
9. **Not rated,** resident had an ostomy or did not have a bowel movement for the entire 7 days

H0500. Bowel Toileting Program

Enter Code

Is a toileting program currently being used to manage the resident's bowel continence?

0. **No**
1. **Yes**

H0600. Bowel Patterns

Enter Code

Constipation present?

0. **No**
1. **Yes**

Resident _____ Identifier _____ Date _____

Section I Active Diagnoses

Active Diagnoses in the last 7 days - Check all that apply
Diagnoses listed in parentheses are provided as examples and should not be considered as all-inclusive lists

Cancer

- ☐ **I0100. Cancer** (with or without metastasis)

Heart/Circulation

- ☐ **I0200. Anemia** (e.g., aplastic, iron deficiency, pernicious, and sickle cell)
- ☐ **I0300. Atrial Fibrillation or Other Dysrhythmias** (e.g., bradycardias and tachycardias)
- ☐ **I0400. Coronary Artery Disease (CAD)** (e.g., angina, myocardial infarction, and atherosclerotic heart disease (ASHD))
- ☐ **I0500. Deep Venous Thrombosis (DVT), Pulmonary Embolus (PE), or Pulmonary Thrombo-Embolism (PTE)**
- ☐ **I0600. Heart Failure** (e.g., congestive heart failure (CHF) and pulmonary edema)
- ☐ **I0700. Hypertension**
- ☐ **I0800. Orthostatic Hypotension**
- ☐ **I0900. Peripheral Vascular Disease (PVD) or Peripheral Arterial Disease (PAD)**

Gastrointestinal

- ☐ **I1100. Cirrhosis**
- ☐ **I1200. Gastroesophageal Reflux Disease (GERD) or Ulcer** (e.g., esophageal, gastric, and peptic ulcers)
- ☐ **I1300. Ulcerative Colitis, Crohn's Disease, or Inflammatory Bowel Disease**

Genitourinary

- ☐ **I1400. Benign Prostatic Hyperplasia (BPH)**
- ☐ **I1500. Renal Insufficiency, Renal Failure, or End-Stage Renal Disease (ESRD)**
- ☐ **I1550. Neurogenic Bladder**
- ☐ **I1650. Obstructive Uropathy**

Infections

- ☐ **I1700. Multidrug-Resistant Organism (MDRO)**
- ☐ **I2000. Pneumonia**
- ☐ **I2100. Septicemia**
- ☐ **I2200. Tuberculosis**
- ☐ **I2300. Urinary Tract Infection (UTI) (LAST 30 DAYS)**
- ☐ **I2400. Viral Hepatitis** (e.g., Hepatitis A, B, C, D, and E)
- ☐ **I2500. Wound Infection** (other than foot)

Metabolic

- ☐ **I2900. Diabetes Mellitus (DM)** (e.g., diabetic retinopathy, nephropathy, and neuropathy)
- ☐ **I3100. Hyponatremia**
- ☐ **I3200. Hyperkalemia**
- ☐ **I3300. Hyperlipidemia** (e.g., hypercholesterolemia)
- ☐ **I3400. Thyroid Disorder** (e.g., hypothyroidism, hyperthyroidism, and Hashimoto's thyroiditis)

Musculoskeletal

- ☐ **I3700. Arthritis** (e.g., degenerative joint disease (DJD), osteoarthritis, and rheumatoid arthritis (RA))
- ☐ **I3800. Osteoporosis**
- ☐ **I3900. Hip Fracture** - any hip fracture that has a relationship to current status, treatments, monitoring (e.g., sub-capital fractures, and fractures of the trochanter and femoral neck)
- ☐ **I4000. Other Fracture**

Neurological

- ☐ **I4200. Alzheimer's Disease**
- ☐ **I4300. Aphasia**
- ☐ **I4400. Cerebral Palsy**
- ☐ **I4500. Cerebrovascular Accident (CVA), Transient Ischemic Attack (TIA), or Stroke**
- ☐ **I4800. Non-Alzheimer's Dementia** (e.g. Lewy body dementia, vascular or multi-infarct dementia; mixed dementia; frontotemporal dementia such as Pick's disease; and dementia related to stroke, Parkinson's or Creutzfeldt-Jakob diseases)

Resident _____ Identifier _____ Date _____

Section I Active Diagnoses

Active Diagnoses in the last 7 days - Check all that apply
Diagnoses listed in parentheses are provided as examples and should not be considered as all-inclusive lists

Neurological - Continued

- ☐ **I4900. Hemiplegia or Hemiparesis**
- ☐ **I5000. Paraplegia**
- ☐ **I5100. Quadriplegia**
- ☐ **I5200. Multiple Sclerosis (MS)**
- ☐ **I5250. Huntington's Disease**
- ☐ **I5300. Parkinson's Disease**
- ☐ **I5350. Tourette's Syndrome**
- ☐ **I5400. Seizure Disorder or Epilepsy**
- ☐ **I5500. Traumatic Brain Injury (TBI)**

Nutritional

- ☐ **I5600. Malnutrition** (protein or calorie) or at risk for malnutrition

Psychiatric/Mood Disorder

- ☐ **I5700. Anxiety Disorder**
- ☐ **I5800. Depression** (other than bipolar)
- ☐ **I5900. Manic Depression** (bipolar disease)
- ☐ **I5950. Psychotic Disorder** (other than schizophrenia)
- ☐ **I6000. Schizophrenia** (e.g., schizoaffective and schizophreniform disorders)
- ☐ **I6100. Post Traumatic Stress Disorder (PTSD)**

Pulmonary

- ☐ **I6200. Asthma, Chronic Obstructive Pulmonary Disease (COPD), or Chronic Lung Disease** (e.g., chronic bronchitis and restrictive lung diseases such as asbestosis)
- ☐ **I6300. Respiratory Failure**

Vision

- ☐ **I6500. Cataracts, Glaucoma, or Macular Degeneration**

None of Above

- ☐ **I7900. None of the above active diagnoses** within the last 7 days

Other

I8000. Additional active diagnoses
Enter diagnosis on line and ICD code in boxes. Include the decimal for the code in the appropriate box.

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

H. _____

I. _____

J. _____

Resident _____ Identifier _____ Date _____

Section J Health Conditions

J0100. Pain Management - Complete for all residents, regardless of current pain level

At any time in the last **5** days, has the resident:

Enter Code

A. Received scheduled pain medication regimen?
0. **No**
1. **Yes**

Enter Code

B. Received PRN pain medications OR was offered and declined?
0. **No**
1. **Yes**

Enter Code

C. Received non-medication intervention for pain?
0. **No**
1. **Yes**

J0200. Should Pain Assessment Interview be Conducted?

Attempt to conduct interview with all residents. If resident is comatose, skip to J1100, Shortness of Breath (dyspnea)

Enter Code

0. **No** (resident is rarely/never understood) → Skip to and complete J0800, Indicators of Pain or Possible Pain
1. **Yes** → Continue to J0300, Pain Presence

Pain Assessment Interview

J0300. Pain Presence

Enter Code

Ask resident: "***Have you had pain or hurting at any time*** *in the last 5 days?*"
0. **No** → Skip to J1100, Shortness of Breath
1. **Yes** → Continue to J0400, Pain Frequency
9. **Unable to answer** → Skip to J0800, Indicators of Pain or Possible Pain

J0400. Pain Frequency

Enter Code

Ask resident: "***How much of the time have you experienced pain or hurting*** *over the last 5 days?*"
1. **Almost constantly**
2. **Frequently**
3. **Occasionally**
4. **Rarely**
9. **Unable to answer**

J0500. Pain Effect on Function

Enter Code

A. Ask resident: "*Over the past 5 days,* ***has pain made it hard for you to sleep at night****?*"
0. **No**
1. **Yes**
9. **Unable to answer**

Enter Code

B. Ask resident: "*Over the past 5 days,* ***have you limited your day-to-day activities because of pain****?*"
0. **No**
1. **Yes**
9. **Unable to answer**

J0600. Pain Intensity - Administer **ONLY ONE** of the following pain intensity questions (A or B)

Enter Rating

A. Numeric Rating Scale (00-10)
Ask resident: "*Please rate your worst pain over the last 5 days on a zero to ten scale, with zero being no pain and ten as the worst pain you can imagine.*" (Show resident 00 -10 pain scale)
Enter two-digit response. Enter 99 if unable to answer.

Enter Code

B. Verbal Descriptor Scale
Ask resident: "*Please rate the intensity of your worst pain over the last 5 days.*" (Show resident verbal scale)
1. **Mild**
2. **Moderate**
3. **Severe**
4. **Very severe, horrible**
9. **Unable to answer**

Resident _____ Identifier _____ Date _____

Section J Health Conditions

J0700. Should the Staff Assessment for Pain be Conducted?

Enter Code

0. **No** (J0400 = 1 thru 4) → Skip to J1100, Shortness of Breath (dyspnea)
1. **Yes** (J0400 = 9) → Continue to J0800, Indicators of Pain or Possible Pain

Staff Assessment for Pain

J0800. Indicators of Pain or Possible Pain in the last 5 days

↓ **Check all that apply**

- ☐ **A. Non-verbal sounds** (e.g., crying, whining, gasping, moaning, or groaning)
- ☐ **B. Vocal complaints of pain** (e.g., that hurts, ouch, stop)
- ☐ **C. Facial expressions** (e.g., grimaces, winces, wrinkled forehead, furrowed brow, clenched teeth or jaw)
- ☐ **D. Protective body movements or postures** (e.g., bracing, guarding, rubbing or massaging a body part/area, clutching or holding a body part during movement)
- ☐ **Z. None of these signs observed or documented** → If checked, skip to J1100, Shortness of Breath (dyspnea)

J0850. Frequency of Indicator of Pain or Possible Pain in the last 5 days

Enter Code

Frequency with which resident complains or shows evidence of pain or possible pain
1. **Indicators of pain** or possible pain observed **1 to 2 days**
2. **Indicators of pain** or possible pain observed **3 to 4 days**
3. **Indicators of pain** or possible pain observed **daily**

Other Health Conditions

J1100. Shortness of Breath (dyspnea)

↓ **Check all that apply**

- ☐ **A. Shortness of breath** or trouble breathing **with exertion** (e.g., walking, bathing, transferring)
- ☐ **B. Shortness of breath** or trouble breathing **when sitting at rest**
- ☐ **C. Shortness of breath** or trouble breathing **when lying flat**
- ☐ **Z. None of the above**

J1300. Current Tobacco Use

Enter Code

Tobacco use
0. **No**
1. **Yes**

J1400. Prognosis

Enter Code

Does the resident have a condition or chronic disease that may result in a **life expectancy of less than 6 months?** (Requires physician documentation)
0. **No**
1. **Yes**

J1550. Problem Conditions

↓ **Check all that apply**

- ☐ **A. Fever**
- ☐ **B. Vomiting**
- ☐ **C. Dehydrated**
- ☐ **D. Internal bleeding**
- ☐ **Z. None of the above**

Resident _____ Identifier _____ Date _____

Section J Health Conditions

J1700. Fall History on Admission/Entry or Reentry
Complete only if A0310A = 01 or A0310E = 1

Enter Code

A. Did the resident have a fall any time in the **last month** prior to admission/entry or reentry?
0. **No**
1. **Yes**
9. **Unable to determine**

Enter Code

B. Did the resident have a fall any time in the **last 2-6 months** prior to admission/entry or reentry?
0. **No**
1. **Yes**
9. **Unable to determine**

Enter Code

C. Did the resident have any **fracture related to a fall in the 6 months** prior to admission/entry or reentry?
0. **No**
1. **Yes**
9. **Unable to determine**

J1800. Any Falls Since Admission/Entry or Reentry or Prior Assessment (OBRA or Scheduled PPS), whichever is more recent

Enter Code

Has the resident **had any falls since admission/entry or reentry or the prior assessment** (OBRA or Scheduled PPS), whichever is more recent?
0. **No** → Skip to K0100, Swallowing Disorder
1. **Yes** → Continue to J1900, Number of Falls Since Admission/Entry or Reentry or Prior Assessment (OBRA or Scheduled PPS)

J1900. Number of Falls Since Admission/Entry or Reentry or Prior Assessment (OBRA or Scheduled PPS), whichever is more recent

Coding:
0. **None**
1. **One**
2. **Two or more**

↓ **Enter Codes in Boxes**

A. No injury - no evidence of any injury is noted on physical assessment by the nurse or primary care clinician; no complaints of pain or injury by the resident; no change in the resident's behavior is noted after the fall

B. Injury (except major) - skin tears, abrasions, lacerations, superficial bruises, hematomas and sprains; or any fall-related injury that causes the resident to complain of pain

C. Major injury - bone fractures, joint dislocations, closed head injuries with altered consciousness, subdural hematoma

Resident _____ Identifier _____ Date _____

Section K Swallowing/Nutritional Status

K0100. Swallowing Disorder

Signs and symptoms of possible swallowing disorder

Check all that apply

- ☐ **A. Loss of liquids/solids from mouth when eating or drinking**
- ☐ **B. Holding food in mouth/cheeks or residual food in mouth after meals**
- ☐ **C. Coughing or choking during meals or when swallowing medications**
- ☐ **D. Complaints of difficulty or pain with swallowing**
- ☐ **Z. None of the above**

K0200. Height and Weight - While measuring, if the number is X.1 - X.4 round down; X.5 or greater round up

inches	**A. Height** (in inches). Record most recent height measure since the most recent admission/entry or reentry
pounds	**B. Weight** (in pounds). Base weight on most recent measure in last 30 days; measure weight consistently, according to standard facility practice (e.g., in a.m. after voiding, before meal, with shoes off, etc.)

K0300. Weight Loss

Enter Code

Loss of 5% or more in the last month or loss of 10% or more in last 6 months

0. **No** or unknown
1. **Yes, on** physician-prescribed weight-loss regimen
2. **Yes, not on** physician-prescribed weight-loss regimen

K0310. Weight Gain

Enter Code

Gain of 5% or more in the last month or gain of 10% or more in last 6 months

0. **No** or unknown
1. **Yes, on** physician-prescribed weight-gain regimen
2. **Yes, not on** physician-prescribed weight-gain regimen

K0510. Nutritional Approaches

Check all of the following nutritional approaches that were performed during the last **7 days**

1. **While NOT a Resident**
   Performed ***while NOT a resident*** of this facility and within the ***last 7 days***. Only check column 1 if resident entered (admission or reentry) IN THE LAST 7 DAYS. If resident last entered 7 or more days ago, leave column 1 blank
2. **While a Resident**
   Performed ***while a resident*** of this facility and within the ***last 7 days***

	1. While NOT a Resident	2. While a Resident
	Check all that apply	
A. Parenteral/IV feeding	☐	☐
B. Feeding tube - nasogastric or abdominal (PEG)	☐	☐
C. Mechanically altered diet - require change in texture of food or liquids (e.g., pureed food, thickened liquids)	☐	☐
D. Therapeutic diet (e.g., low salt, diabetic, low cholesterol)	☐	☐
Z. None of the above	☐	☐

Resident _____ Identifier _____ Date _____

Section K Swallowing/Nutritional Status

K0710. Percent Intake by Artificial Route - Complete K0710 only if Column 1 and/or Column 2 are checked for K0510A and/or K0510B

1. **While NOT a Resident**
   Performed ***while NOT a resident*** of this facility and within the ***last 7 days***. Only enter a code in column 1 if resident entered (admission or reentry) IN THE LAST 7 DAYS. If resident last entered 7 or more days ago, leave column 1 blank
2. **While a Resident**
   Performed ***while a resident*** of this facility and within the ***last 7 days***
3. **During Entire 7 Days**
   Performed during the entire ***last 7 days***

	1. While NOT a Resident	2. While a Resident	3. During Entire 7 Days
	↓ Enter Codes ↓		
A. Proportion of total calories the resident received through parenteral or tube feeding 1. **25% or less** 2. **26-50%** 3. **51% or more**			
B. Average fluid intake per day by IV or tube feeding 1. **500 cc/day or less** 2. **501 cc/day or more**			

Section L Oral/Dental Status

L0200. Dental

↓ **Check all that apply**

- ☐ **A. Broken or loosely fitting full or partial denture** (chipped, cracked, uncleanable, or loose)
- ☐ **B. No natural teeth or tooth fragment(s)** (edentulous)
- ☐ **C. Abnormal mouth tissue** (ulcers, masses, oral lesions, including under denture or partial if one is worn)
- ☐ **D. Obvious or likely cavity or broken natural teeth**
- ☐ **E. Inflamed or bleeding gums or loose natural teeth**
- ☐ **F. Mouth or facial pain, discomfort or difficulty with chewing**
- ☐ **G. Unable to examine**
- ☐ **Z. None of the above were present**

Resident _____ Identifier _____ Date _____

Section M Skin Conditions

Report based on highest stage of existing ulcer(s) at its worst; do not "reverse" stage

M0100. Determination of Pressure Ulcer Risk

Check all that apply

- ☐ **A. Resident has a stage 1 or greater, a scar over bony prominence, or a non-removable dressing/device**
- ☐ **B. Formal assessment instrument/tool** (e.g., Braden, Norton, or other)
- ☐ **C. Clinical assessment**
- ☐ **Z. None of the above**

M0150. Risk of Pressure Ulcers

Enter Code

Is this resident at risk of developing pressure ulcers?

0. **No**
1. **Yes**

M0210. Unhealed Pressure Ulcer(s)

Enter Code

Does this resident have one or more unhealed pressure ulcer(s) at Stage 1 or higher?

0. **No** → Skip to M0900, Healed Pressure Ulcers
1. **Yes** → Continue to M0300, Current Number of Unhealed Pressure Ulcers at Each Stage

M0300. Current Number of Unhealed Pressure Ulcers at Each Stage

Enter Number

A. Number of Stage 1 pressure ulcers

Stage 1: Intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have a visible blanching; in dark skin tones only it may appear with persistent blue or purple hues

Enter Number

B. Stage 2: Partial thickness loss of dermis presenting as a shallow open ulcer with a red or pink wound bed, without slough. May also present as an intact or open/ruptured blister

1. Number of Stage 2 pressure ulcers - If 0 → Skip to M0300C, Stage 3

Enter Number

2. Number of <u>these</u> Stage 2 pressure ulcers that were present upon admission/entry or reentry - enter how many were noted at the time of admission/entry or reentry

3. Date of oldest Stage 2 pressure ulcer - Enter dashes if date is unknown:

_ _

Month Day Year

Enter Number

C. Stage 3: Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle is not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling

1. Number of Stage 3 pressure ulcers - If 0 → Skip to M0300D, Stage 4

Enter Number

2. Number of <u>these</u> Stage 3 pressure ulcers that were present upon admission/entry or reentry - enter how many were noted at the time of admission/entry or reentry

Enter Number

D. Stage 4: Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often includes undermining and tunneling

1. Number of Stage 4 pressure ulcers - If 0 → Skip to M0300E, Unstageable: Non-removable dressing

Enter Number

2. Number of <u>these</u> Stage 4 pressure ulcers that were present upon admission/entry or reentry - enter how many were noted at the time of admission/entry or reentry

M0300 continued on next page

Resident _____ Identifier _____ Date _____

Section M Skin Conditions

M0300. Current Number of Unhealed Pressure Ulcers at Each Stage - Continued

E. Unstageable - Non-removable dressing: Known but not stageable due to non-removable dressing/device

Enter Number

1. **Number of unstageable pressure ulcers due to non-removable dressing/device** - If 0 → Skip to M0300F, Unstageable: Slough and/or eschar

Enter Number

2. **Number of <u>these</u> unstageable pressure ulcers that were present upon admission/entry or reentry** - enter how many were noted at the time of admission/entry or reentry

F. Unstageable - Slough and/or eschar: Known but not stageable due to coverage of wound bed by slough and/or eschar

Enter Number

1. **Number of unstageable pressure ulcers due to coverage of wound bed by slough and/or eschar** - If 0 → Skip to M0300G, Unstageable: Deep tissue

Enter Number

2. **Number of <u>these</u> unstageable pressure ulcers that were present upon admission/entry or reentry** - enter how many were noted at the time of admission/entry or reentry

G. Unstageable - Deep tissue: Suspected deep tissue injury in evolution

Enter Number

1. **Number of unstageable pressure ulcers with suspected deep tissue injury in evolution** - If 0 → Skip to M0610, Dimension of Unhealed Stage 3 or 4 Pressure Ulcers or Eschar

Enter Number

2. **Number of <u>these</u> unstageable pressure ulcers that were present upon admission/entry or reentry** - enter how many were noted at the time of admission/entry or reentry

M0610. Dimensions of Unhealed Stage 3 or 4 Pressure Ulcers or Eschar
Complete only if M0300C1, M0300D1 or M0300F1 is greater than 0

If the resident has one or more unhealed Stage 3 or 4 pressure ulcers or an unstageable pressure ulcer due to slough or eschar, identify the pressure ulcer with the largest surface area (length x width) and record in centimeters:

_____ . _____ cm **A. Pressure ulcer length:** Longest length from head to toe

_____ . _____ cm **B. Pressure ulcer width:** Widest width of the same pressure ulcer, side-to-side perpendicular (90-degree angle) to length

_____ . _____ cm **C. Pressure ulcer depth:** Depth of the same pressure ulcer from the visible surface to the deepest area (if depth is unknown, enter a dash in each box)

M0700. Most Severe Tissue Type for Any Pressure Ulcer

Enter Code

Select the best description of the most severe type of tissue present in any pressure ulcer bed

1. **Epithelial tissue** - new skin growing in superficial ulcer. It can be light pink and shiny, even in persons with darkly pigmented skin
2. **Granulation tissue** - pink or red tissue with shiny, moist, granular appearance
3. **Slough** - yellow or white tissue that adheres to the ulcer bed in strings or thick clumps, or is mucinous
4. **Eschar** - black, brown, or tan tissue that adheres firmly to the wound bed or ulcer edges, may be softer or harder than surrounding skin

9. **None of the Above**

M0800. Worsening in Pressure Ulcer Status Since Prior Assessment (OBRA or Scheduled PPS) or Last Admission/Entry or Reentry
Complete only if A0310E = 0

Indicate the number of current pressure ulcers that were **not present or were at a lesser stage** on prior assessment (OBRA or scheduled PPS) or last entry. If no current pressure ulcer at a given stage, enter 0.

Enter Number **A. Stage 2**

Enter Number **B. Stage 3**

Enter Number **C. Stage 4**

Resident _____ Identifier _____ Date _____

Section M Skin Conditions

M0900. Healed Pressure Ulcers

Complete only if A0310E = 0

Enter Code

A. Were pressure ulcers present on the prior assessment (OBRA or scheduled PPS)?

0. **No** → Skip to M1030, Number of Venous and Arterial Ulcers
1. **Yes** → Continue to M0900B, Stage 2

Indicate the number of pressure ulcers that were noted on the prior assessment (OBRA or scheduled PPS) that have completely closed (resurfaced with epithelium). If no healed pressure ulcer at a given stage since the prior assessment (OBRA or scheduled PPS), enter 0.

Enter Number	**B. Stage 2**
Enter Number	**C. Stage 3**
Enter Number	**D. Stage 4**

M1030. Number of Venous and Arterial Ulcers

Enter Number	**Enter the total number of venous and arterial ulcers present**

M1040. Other Ulcers, Wounds and Skin Problems

↓ **Check all that apply**

	Foot Problems
☐	**A. Infection of the foot** (e.g., cellulitis, purulent drainage)
☐	**B. Diabetic foot ulcer(s)**
☐	**C. Other open lesion(s) on the foot**
	Other Problems
☐	**D. Open lesion(s) other than ulcers, rashes, cuts** (e.g., cancer lesion)
☐	**E. Surgical wound(s)**
☐	**F. Burn(s)** (second or third degree)
☐	**G. Skin tear(s)**
☐	**H. Moisture Associated Skin Damage (MASD)** (e.g., incontinence-associated dermatitis [IAD], perspiration, drainage)
	None of the Above
☐	**Z. None of the above** were present

M1200. Skin and Ulcer Treatments

↓ **Check all that apply**

☐	**A. Pressure reducing device for chair**
☐	**B. Pressure reducing device for bed**
☐	**C. Turning/repositioning program**
☐	**D. Nutrition or hydration intervention** to manage skin problems
☐	**E. Pressure ulcer care**
☐	**F. Surgical wound care**
☐	**G. Application of nonsurgical dressings** (with or without topical medications) other than to feet
☐	**H. Applications of ointments/medications** other than to feet
☐	**I. Application of dressings to feet** (with or without topical medications)
☐	**Z. None of the above** were provided

Resident _____ Identifier _____ Date _____

Section N Medications

N0300. Injections

Enter Days	**Record the number of days that injections of any type** were received during the last 7 days or since admission/entry or reentry if less than 7 days. If 0 → Skip to N0410, Medications Received

N0350. Insulin

Enter Days	**A. Insulin injections - Record the number of days that insulin injections** were received during the last 7 days or since admission/entry or reentry if less than 7 days
Enter Days	**B. Orders for insulin - Record the number of days the physician (or authorized assistant or practitioner) changed the resident's insulin orders** during the last 7 days or since admission/entry or reentry if less than 7 days

N0410. Medications Received

Indicate the number of DAYS the resident received the following medications during the last 7 days or since admission/entry or reentry if less than 7 days. Enter "0" if medication was not received by the resident during the last 7 days

Enter Days	**A. Antipsychotic**
Enter Days	**B. Antianxiety**
Enter Days	**C. Antidepressant**
Enter Days	**D. Hypnotic**
Enter Days	**E. Anticoagulant** (e.g., warfarin, heparin, or low-molecular weight heparin)
Enter Days	**F. Antibiotic**
Enter Days	**G. Diuretic**

Resident _____ Identifier _____ Date _____

Section O Special Treatments, Procedures, and Programs

O0100. Special Treatments, Procedures, and Programs

Check all of the following treatments, procedures, and programs that were performed during the last **14 days**

1. While NOT a Resident
Performed ***while NOT a resident*** of this facility and within the ***last 14 days***. Only check column 1 if resident entered (admission or reentry) IN THE LAST 14 DAYS. If resident last entered 14 or more days ago, leave column 1 blank

2. While a Resident
Performed ***while a resident*** of this facility and within the ***last 14 days***

	1. While NOT a Resident	2. While a Resident
	↓ Check all that apply ↓	
Cancer Treatments		
A. Chemotherapy	☐	☐
B. Radiation	☐	☐
Respiratory Treatments		
C. Oxygen therapy	☐	☐
D. Suctioning	☐	☐
E. Tracheostomy care	☐	☐
F. Ventilator or respirator	☐	☐
G. BiPAP/CPAP	☐	☐
Other		
H. IV medications	☐	☐
I. Transfusions	☐	☐
J. Dialysis	☐	☐
K. Hospice care	☐	☐
L. Respite care		☐
M. Isolation or quarantine for active infectious disease (does not include standard body/fluid precautions)	☐	☐
None of the Above		
Z. None of the above	☐	☐

O0250. Influenza Vaccine - Refer to current version of RAI manual for current influenza vaccination season and reporting period

Enter Code

A. Did the **resident receive the influenza vaccine *in this facility*** for this year's influenza vaccination season?
0. **No** → Skip to O0250C, If influenza vaccine not received, state reason
1. **Yes** → Continue to O0250B, Date influenza vaccine received

B. Date influenza vaccine received → Complete date and skip to O0300A, Is the resident's Pneumococcal vaccination up to date?

_ _ _
Month Day Year

Enter Code

C. If influenza vaccine not received, state reason:
1. **Resident not in this facility** during this year's influenza vaccination season
2. **Received outside of this facility**
3. **Not eligible** - medical contraindication
4. **Offered and declined**
5. **Not offered**
6. **Inability to obtain influenza vaccine** due to a declared shortage
9. **None of the above**

O0300. Pneumococcal Vaccine

Enter Code

A. Is the resident's Pneumococcal vaccination up to date?
0. **No** → Continue to O0300B, If Pneumococcal vaccine not received, state reason
1. **Yes** → Skip to O0400, Therapies

Enter Code

B. If Pneumococcal vaccine not received, state reason:
1. **Not eligible** - medical contraindication
2. **Offered and declined**
3. **Not offered**

Resident _____ Identifier _____ Date _____

Section O — Special Treatments, Procedures, and Programs

O0400. Therapies

A. Speech-Language Pathology and Audiology Services

Enter Number of Minutes

1. **Individual minutes -** record the total number of minutes this therapy was administered to the resident **individually** in the last 7 days

Enter Number of Minutes

2. **Concurrent minutes -** record the total number of minutes this therapy was administered to the resident **concurrently with one other resident** in the last 7 days

Enter Number of Minutes

3. **Group minutes -** record the total number of minutes this therapy was administered to the resident as **part of a group of residents** in the last 7 days

If the sum of individual, concurrent, and group minutes is zero, → skip to O0400A5, Therapy start date

Enter Number of Minutes

3A. **Co-treatment minutes -** record the total number of minutes this therapy was administered to the resident in **co-treatment sessions** in the last 7 days

Enter Number of Days

4. **Days** - record the **number of days** this therapy was administered for **at least 15 minutes** a day in the last 7 days

5. **Therapy start date** - record the date the most recent therapy regimen (since the most recent entry) started

_ _ _
Month Day Year

6. **Therapy end date** - record the date the most recent therapy regimen (since the most recent entry) ended - enter dashes if therapy is ongoing

_ _ _
Month Day Year

B. Occupational Therapy

Enter Number of Minutes

1. **Individual minutes -** record the total number of minutes this therapy was administered to the resident **individually** in the last 7 days

Enter Number of Minutes

2. **Concurrent minutes -** record the total number of minutes this therapy was administered to the resident **concurrently with one other resident** in the last 7 days

Enter Number of Minutes

3. **Group minutes -** record the total number of minutes this therapy was administered to the resident as **part of a group of residents** in the last 7 days

If the sum of individual, concurrent, and group minutes is zero, → skip to O0400B5, Therapy start date

Enter Number of Minutes

3A. **Co-treatment minutes -** record the total number of minutes this therapy was administered to the resident in **co-treatment sessions** in the last 7 days

Enter Number of Days

4. **Days** - record the **number of days** this therapy was administered for **at least 15 minutes** a day in the last 7 days

5. **Therapy start date** - record the date the most recent therapy regimen (since the most recent entry) started

_ _ _
Month Day Year

6. **Therapy end date** - record the date the most recent therapy regimen (since the most recent entry) ended - enter dashes if therapy is ongoing

_ _ _
Month Day Year

O0400 continued on next page

Resident _____ Identifier _____ Date _____

Section O — Special Treatments, Procedures, and Programs

O0400. Therapies - Continued

C. Physical Therapy

Enter Number of Minutes

1. **Individual minutes -** record the total number of minutes this therapy was administered to the resident **individually** in the last 7 days

Enter Number of Minutes

2. **Concurrent minutes -** record the total number of minutes this therapy was administered to the resident **concurrently with one other resident** in the last 7 days

Enter Number of Minutes

3. **Group minutes -** record the total number of minutes this therapy was administered to the resident as **part of a group of residents** in the last 7 days

If the sum of individual, concurrent, and group minutes is zero, → skip to O0400C5, Therapy start date

Enter Number of Minutes

3A. **Co-treatment minutes -** record the total number of minutes this therapy was administered to the resident in **co-treatment sessions** in the last 7 days

Enter Number of Days

4. **Days** - record the **number of days** this therapy was administered for **at least 15 minutes** a day in the last 7 days

5. **Therapy start date** - record the date the most recent therapy regimen (since the most recent entry) started

_ _ _
Month Day Year

6. **Therapy end date** - record the date the most recent therapy regimen (since the most recent entry) ended - enter dashes if therapy is ongoing

_ _ _
Month Day Year

D. Respiratory Therapy

Enter Number of Minutes

1. **Total minutes -** record the total number of minutes this therapy was administered to the resident in the last 7 days
If zero, → skip to O0400E, Psychological Therapy

Enter Number of Days

2. **Days** - record the **number of days** this therapy was administered for **at least 15 minutes** a day in the last 7 days

E. Psychological Therapy (by any licensed mental health professional)

Enter Number of Minutes

1. **Total minutes -** record the total number of minutes this therapy was administered to the resident in the last 7 days
If zero, → skip to O0400F, Recreational Therapy

Enter Number of Days

2. **Days** - record the **number of days** this therapy was administered for **at least 15 minutes** a day in the last 7 days

F. Recreational Therapy (includes recreational and music therapy)

Enter Number of Minutes

1. **Total minutes -** record the total number of minutes this therapy was administered to the resident in the last 7 days
If zero, → skip to O0420, Distinct Calendar Days of Therapy

Enter Number of Days

2. **Days** - record the **number of days** this therapy was administered for **at least 15 minutes** a day in the last 7 days

O0420. Distinct Calendar Days of Therapy

Enter Number of Days

Record the number of calendar days that the resident received Speech-Language Pathology and Audiology Services, Occupational Therapy, or Physical Therapy for at least 15 minutes in the past 7 days.

O0450. Resumption of Therapy - Complete only if A0310C = 2 or 3 and A0310F = 99

Enter Code

A. Has a previous rehabilitation therapy regimen (speech, occupational, and/or physical therapy) ended, as reported on this End of Therapy OMRA, and has this regimen now resumed at exactly the same level for each discipline?

0. **No** → Skip to O0500, Restorative Nursing Programs
1. **Yes**

B. Date on which therapy regimen resumed:

_ _ _
Month Day Year

Resident _____ Identifier _____ Date _____

Section O Special Treatments, Procedures, and Programs

O0500. Restorative Nursing Programs

Record the **number of days** each of the following restorative programs was performed (for at least 15 minutes a day) in the last 7 calendar days (enter 0 if none or less than 15 minutes daily)

Number of Days	Technique
	A. Range of motion (passive)
	B. Range of motion (active)
	C. Splint or brace assistance
Number of Days	**Training and Skill Practice In:**
	D. Bed mobility
	E. Transfer
	F. Walking
	G. Dressing and/or grooming
	H. Eating and/or swallowing
	I. Amputation/prostheses care
	J. Communication

O0600. Physician Examinations

Enter Days	
	Over the last 14 days, **on how many days did the physician (or authorized assistant or practitioner) examine the resident?**

O0700. Physician Orders

Enter Days	
	Over the last 14 days, **on how many days did the physician (or authorized assistant or practitioner) change the resident's orders?**

Resident _____ Identifier _____ Date _____

Section P Restraints

P0100. Physical Restraints

Physical restraints are any manual method or physical or mechanical device, material or equipment attached or adjacent to the resident's body that the individual cannot remove easily which restricts freedom of movement or normal access to one's body

Coding:
0. **Not used**
1. **Used less than daily**
2. **Used daily**

↓ **Enter Codes in Boxes**

	Used in Bed
	A. Bed rail
	B. Trunk restraint
	C. Limb restraint
	D. Other
	Used in Chair or Out of Bed
	E. Trunk restraint
	F. Limb restraint
	G. Chair prevents rising
	H. Other

Section Q Participation in Assessment and Goal Setting

Q0100. Participation in Assessment

Enter Code
A. Resident participated in assessment
0. **No**
1. **Yes**

Enter Code
B. Family or significant other participated in assessment
0. **No**
1. **Yes**
9. **Resident has no family or significant other**

Enter Code
C. Guardian or legally authorized representative participated in assessment
0. **No**
1. **Yes**
9. **Resident has no guardian or legally authorized representative**

Q0300. Resident's Overall Expectation

Complete only if A0310E = 1

Enter Code
A. Select one for resident's overall goal established during assessment process
1. Expects to be **discharged to the community**
2. Expects to **remain in this facility**
3. Expects to be **discharged to another facility/institution**
9. **Unknown or uncertain**

Enter Code
B. Indicate information source for Q0300A
1. **Resident**
2. If not resident, then **family or significant other**
3. If not resident, family, or significant other, then **guardian or legally authorized representative**
9. **Unknown or uncertain**

Q0400. Discharge Plan

Enter Code
A. Is active discharge planning already occurring for the resident to return to the community?
0. **No**
1. **Yes** → Skip to Q0600, Referral

Resident _____ Identifier _____ Date _____

Section Q Participation in Assessment and Goal Setting

Q0490. Resident's Preference to Avoid Being Asked Question Q0500B

Complete only if A0310A = 02, 06, or 99

Enter Code

Does the resident's clinical record document a request that this question be asked only on comprehensive assessments?

0. **No**
1. **Yes** → Skip to Q0600, Referral

Q0500. Return to Community

Enter Code

B. Ask the resident (or family or significant other or guardian or legally authorized representative if resident is unable to understand or respond): **"Do you want to talk to someone about the possibility of leaving this facility and returning to live and receive services in the community?"**

0. **No**
1. **Yes**
9. **Unknown or uncertain**

Q0550. Resident's Preference to Avoid Being Asked Question Q0500B Again

Enter Code

A. Does the resident (or family or significant other or guardian or legally authorized representative if resident is unable to understand or respond) **want to be asked about returning to the community on <u>all</u> assessments?** (Rather than only on comprehensive assessments.)

0. **No** - then document in resident's clinical record and ask again only on the next comprehensive assessment
1. **Yes**
8. **Information not available**

Enter Code

B. Indicate information source for Q0550A

1. **Resident**
2. If not resident, then **family or significant other**
3. If not resident, family or significant other, then **guardian or legally authorized representative**
9. **None of the above**

Q0600. Referral

Enter Code

Has a referral been made to the Local Contact Agency? (Document reasons in resident's clinical record)

0. **No** - referral not needed
1. **No** - referral is or may be needed (For more information see Appendix C, Care Area Assessment Resources #20)
2. **Yes** - referral made

Resident _____ Identifier _____ Date _____

Section V Care Area Assessment (CAA) Summary

V0100. Items From the Most Recent Prior OBRA or Scheduled PPS Assessment
Complete only if A0310E = 0 and if the following is true for the **prior assessment**: A0310A = 01- 06 or A0310B = 01- 05

Enter Code

A. Prior Assessment Federal OBRA Reason for Assessment (A0310A value from prior assessment)
01. **Admission** assessment (required by day 14)
02. **Quarterly** review assessment
03. **Annual** assessment
04. **Significant change in status** assessment
05. **Significant correction** to **prior comprehensive** assessment
06. **Significant correction** to **prior quarterly** assessment
99. None of the above

Enter Code

B. Prior Assessment PPS Reason for Assessment (A0310B value from prior assessment)
01. **5-day** scheduled assessment
02. **14-day** scheduled assessment
03. **30-day** scheduled assessment
04. **60-day** scheduled assessment
05. **90-day** scheduled assessment
07. **Unscheduled assessment used for PPS** (OMRA, significant or clinical change, or significant correction assessment)
99. None of the above

C. Prior Assessment Reference Date (A2300 value from prior assessment)

__ __
Month Day Year

Enter Score

D. Prior Assessment Brief Interview for Mental Status (BIMS) Summary Score (C0500 value from prior assessment)

Enter Score

E. Prior Assessment Resident Mood Interview (PHQ-9©) Total Severity Score (D0300 value from prior assessment)

Enter Score

F. Prior Assessment Staff Assessment of Resident Mood (PHQ-9-OV) Total Severity Score (D0600 value from prior assessment)

Resident _____ Identifier _____ Date _____

Section V Care Area Assessment (CAA) Summary

V0200. CAAs and Care Planning

1. Check column A if Care Area is triggered.
2. For each triggered Care Area, indicate whether a new care plan, care plan revision, or continuation of current care plan is necessary to address the problem(s) identified in your assessment of the care area. The Care Planning Decision column must be completed within 7 days of completing the RAI (MDS and CAA(s)). Check column B if the triggered care area is addressed in the care plan.
3. Indicate in the Location and Date of CAA Documentation column where information related to the CAA can be found. CAA documentation should include information on the complicating factors, risks, and any referrals for this resident for this care area.

A. CAA Results

Care Area	A. Care Area Triggered	B. Care Planning Decision	Location and Date of CAA documentation
	↓ Check all that apply ↓		
01. Delirium	☐	☐	
02. Cognitive Loss/Dementia	☐	☐	
03. Visual Function	☐	☐	
04. Communication	☐	☐	
05. ADL Functional/Rehabilitation Potential	☐	☐	
06. Urinary Incontinence and Indwelling Catheter	☐	☐	
07. Psychosocial Well-Being	☐	☐	
08. Mood State	☐	☐	
09. Behavioral Symptoms	☐	☐	
10. Activities	☐	☐	
11. Falls	☐	☐	
12. Nutritional Status	☐	☐	
13. Feeding Tube	☐	☐	
14. Dehydration/Fluid Maintenance	☐	☐	
15. Dental Care	☐	☐	
16. Pressure Ulcer	☐	☐	
17. Psychotropic Drug Use	☐	☐	
18. Physical Restraints	☐	☐	
19. Pain	☐	☐	
20. Return to Community Referral	☐	☐	

B. Signature of RN Coordinator for CAA Process and Date Signed

1. Signature

2. Date

_ _ _
Month Day Year

C. Signature of Person Completing Care Plan Decision and Date Signed

1. Signature

2. Date

_ _ _
Month Day Year

Resident _____ Identifier _____ Date _____

Section X Correction Request

Complete Section X only if A0050 = 2 or 3

Identification of Record to be Modified/Inactivated - The following items identify the existing assessment record that is in error. In this section, reproduce the information EXACTLY as it appeared on the existing erroneous record, even if the information is incorrect. This information is necessary to locate the existing record in the National MDS Database.

X0150. Type of Provider (A0200 on existing record to be modified/inactivated)

Enter Code

Type of provider
1. **Nursing home (SNF/NF)**
2. **Swing Bed**

X0200. Name of Resident (A0500 on existing record to be modified/inactivated)

A. First name:

C. Last name:

X0300. Gender (A0800 on existing record to be modified/inactivated)

Enter Code

1. **Male**
2. **Female**

X0400. Birth Date (A0900 on existing record to be modified/inactivated)

_ _

Month Day Year

X0500. Social Security Number (A0600A on existing record to be modified/inactivated)

_ _

X0600. Type of Assessment (A0310 on existing record to be modified/inactivated)

Enter Code

A. Federal OBRA Reason for Assessment
01. **Admission** assessment (required by day 14)
02. **Quarterly** review assessment
03. **Annual** assessment
04. **Significant change in status** assessment
05. **Significant correction** to **prior comprehensive** assessment
06. **Significant correction** to **prior quarterly** assessment
99. **None of the above**

Enter Code

B. PPS Assessment
PPS Scheduled Assessments for a Medicare Part A Stay
01. **5-day** scheduled assessment
02. **14-day** scheduled assessment
03. **30-day** scheduled assessment
04. **60-day** scheduled assessment
05. **90-day** scheduled assessment
PPS Unscheduled Assessments for a Medicare Part A Stay
07. **Unscheduled assessment used for PPS** (OMRA, significant or clinical change, or significant correction assessment)
Not PPS Assessment
99. **None of the above**

Enter Code

C. PPS Other Medicare Required Assessment - OMRA
0. **No**
1. **Start of therapy** assessment
2. **End of therapy** assessment
3. **Both Start and End of therapy** assessment
4. **Change of therapy** assessment

X0600 continued on next page

Resident _____ Identifier _____ Date _____

Section X Correction Request

X0600. Type of Assessment - Continued

Enter Code

D. Is this a Swing Bed clinical change assessment? Complete only if X0150 = 2
0. **No**
1. **Yes**

Enter Code

F. Entry/discharge reporting
01. **Entry** tracking record
10. **Discharge** assessment-**return not anticipated**
11. **Discharge** assessment-**return anticipated**
12. **Death in facility** tracking record
99. **None of the above**

Enter Code

H. Is this a SNF PPS Part A Discharge (End of Stay) Assessment?
0. **No**
1. **Yes**

X0700. Date on existing record to be modified/inactivated - **Complete one only**

A. Assessment Reference Date (A2300 on existing record to be modified/inactivated) - Complete only if X0600F = 99

_ _
Month Day Year

B. Discharge Date (A2000 on existing record to be modified/inactivated) - Complete only if X0600F = 10, 11, or 12

_ _
Month Day Year

C. Entry Date (A1600 on existing record to be modified/inactivated) - Complete only if X0600F = 01

_ _
Month Day Year

Correction Attestation Section - Complete this section to explain and attest to the modification/inactivation request

X0800. Correction Number

Enter Number

Enter the number of correction requests to modify/inactivate the existing record, including the present one

X0900. Reasons for Modification - Complete only if Type of Record is to modify a record in error (A0050 = 2)

Check all that apply

- ☐ **A. Transcription error**
- ☐ **B. Data entry error**
- ☐ **C. Software product error**
- ☐ **D. Item coding error**
- ☐ **E. End of Therapy - Resumption (EOT-R) date**
- ☐ **Z. Other error requiring modification**
  If "Other" checked, please specify: _____

X1050. Reasons for Inactivation - Complete only if Type of Record is to inactivate a record in error (A0050 = 3)

Check all that apply

- ☐ **A. Event did not occur**
- ☐ **Z. Other error requiring inactivation**
  If "Other" checked, please specify: _____

Resident _____ Identifier _____ Date _____

Section X	Correction Request

X1100. RN Assessment Coordinator Attestation of Completion	
	A. Attesting individual's first name:
	B. Attesting individual's last name:
	C. Attesting individual's title:
	D. Signature
	E. Attestation date _ _ Month Day Year

Resident _____ Identifier _____ Date _____

Section Z	Assessment Administration

Z0100. Medicare Part A Billing

A. Medicare Part A HIPPS code (RUG group followed by assessment type indicator)**:**

B. RUG version code:

Enter Code

C. Is this a Medicare Short Stay assessment?
0. **No**
1. **Yes**

Z0150. Medicare Part A Non-Therapy Billing

A. Medicare Part A non-therapy HIPPS code (RUG group followed by assessment type indicator)**:**

B. RUG version code:

Z0200. State Medicaid Billing (if required by the state)

A. RUG Case Mix group:

B. RUG version code:

Z0250. Alternate State Medicaid Billing (if required by the state)

A. RUG Case Mix group:

B. RUG version code:

Z0300. Insurance Billing

A. RUG billing code:

B. RUG billing version:

Resident _____ Identifier _____ Date _____

Section Z Assessment Administration

Z0400. Signature of Persons Completing the Assessment or Entry/Death Reporting

I certify that the accompanying information accurately reflects resident assessment information for this resident and that I collected or coordinated collection of this information on the dates specified. To the best of my knowledge, this information was collected in accordance with applicable Medicare and Medicaid requirements. I understand that this information is used as a basis for ensuring that residents receive appropriate and quality care, and as a basis for payment from federal funds. I further understand that payment of such federal funds and continued participation in the government-funded health care programs is conditioned on the accuracy and truthfulness of this information, and that I may be personally subject to or may subject my organization to substantial criminal, civil, and/or administrative penalties for submitting false information. I also certify that I am authorized to submit this information by this facility on its behalf.

	Signature	Title	Sections	Date Section Completed
A.				
B.				
C.				
D.				
E.				
F.				
G.				
H.				
I.				
J.				
K.				
L.				

Z0500. Signature of RN Assessment Coordinator Verifying Assessment Completion

A. Signature:

B. Date RN Assessment Coordinator signed assessment as complete:

__ __

Month Day Year

Appendix C: Quality Measures' Specifications

MDS 3.0 Measure: Percent of Residents Who Were Physically Restrained (Long Stay)

MEASURE DESCRIPTION	MEASURE SPECIFICATIONS	COVARIATES
CMS: N027.01 **NQF: 0687** **This measure reports the percent of long-stay nursing facility residents who are physically restrained on a daily basis.**	***Numerator*** Long-stay residents with a selected target assessment that indicates daily physical restraints, where: trunk restraint used in bed (P0100B = [2]), OR limb restraint used in bed (P0100C = [2]), OR trunk restraint used in chair or out of bed (P0100E = [2]), OR limb restraint used in chair or out of bed (P0100F = [2]), OR chair prevents rising used in chair or out of bed (P0100G) = [2]). ***Denominator*** All long-stay residents with a target assessment, except those with exclusions. ***Exclusions*** Resident is not in numerator and any of the following is true: P0100B = [-], OR P0100C = [-], OR P0100E = [-], OR P0100F = [-], OR P0100G = [-].	Not applicable.

MDS 3.0 Measure: Percent of High-Risk Residents With Pressure Ulcers (Long Stay)

MEASURE DESCRIPTION	MEASURE SPECIFICATIONS	COVARIATES
CMS: N015.01 **NQF: 0679** **This measure captures the percentage of long-stay, high-risk residents with Stage II-IV pressure ulcers.**	***Numerator*** All long-stay residents with a selected target assessment that meets ***both*** of the following conditions: 1. Condition #1: There is a high risk for pressure ulcers, where "high-risk" is defined in the denominator definition below. 2. Condition #2: Stage II-IV pressure ulcers are present, as indicated by ***any*** of the following three conditions: 2.1 M0300B1 = [1, 2, 3, 4, 5, 6, 7, 8, 9] ***or*** 2.2. M0300C1 =[1, 2, 3, 4, 5, 6, 7, 8, 9] ***or*** 2.3. M0300D1 = [1, 2, 3, 4, 5, 6, 7, 8, 9]. ***Denominator*** All long-stay residents with a selected target assessment who meet the definition of high risk, except those with exclusions. Residents are defined as high-risk if they meet ***one or more*** of the following three criteria on the target assessment: 1. Impaired bed mobility or transfer indicated, by ***either or both*** of the following: 1.1. Bed mobility, self-performance (G0110A1) = [3, 4, 7, 8]. 1.2. Transfer, self-performance (G0110B1) = [3, 4, 7, 8]. 2. Comatose (B0100 = [1]) 3. Malnutrition or at risk of malnutrition (I5600 = [1]) (checked). ***Exclusions*** 1. Target assessment is an admission assessment (A0310A = [01]) or a PPS 5-day or readmission/return assessment (A0310B = [01, 06]). 2. If the resident is not included in the numerator (the resident did not meet the pressure ulcer conditions for the numerator) AND ***any*** of the following conditions are true: a. M0300B1 = [-] b. M0300C1 = [-] c. M0300D1 = [-].	Not applicable.

MDS 3.0 Measure: Percent of Residents With a Urinary Tract Infection (Long Stay)

MEASURE DESCRIPTION	MEASURE SPECIFICATIONS	COVARIATES
CMS: N024.01 **NQF: 0684** **The measure reports the percentage of long stay residents who have a urinary tract infection**	***Numerator*** Long-stay residents with a selected target assessment that indicates urinary tract infection within the last 30 days (I2300 = [1]). ***Denominator*** All long-stay residents with a selected target assessment, except those with exclusions. ***Exclusions*** 1. Target assessment is an admission assessment (A0310A = [01]) or a PPS 5-day or readmission/return assessment (A0310B = [01, 06]). 2. Urinary tract infection value is missing (I2300 = [-]).	Not applicable.

From RTI International (2013).

Appendix D: Deficiency Score Calculation

Table 1
Health Inspection Score: Weights for Different Types of Deficiencies

Severity	Scope		
	Isolated	**Pattern**	**Widespread**
Immediate jeopardy to resident health or safety	**J** 50 points* (75 points)	**K** 100 points* (125 points)	**L** 150 points* (175 points)
Actual harm that is not immediate jeopardy	**G** 20 points	**H** 35 points (40 points)	**I** 45 points (50 points)
No actual harm with potential for more than minimal harm that is not immediate jeopardy	**D** 4 points	**E** 8 points	**F** 16 points (20 points)
No actual harm with potential for minimal harm	**A** 0 point	**B** 0 points	**C** 0 points

Note: Figures in parentheses indicate points for deficiencies that are for substandard quality of care.

Shaded cells denote deficiency scope/severity levels that constitute substandard quality of care if the requirement which is not met is one that falls under the following federal regulations: 42 CFR 483.13 resident behavior and nursing home practices; 42 CFR 483.15 quality of life; 42 CFR 483.25 quality of care.

* If the status of the deficiency is "past non-compliance" and the severity is Immediate Jeopardy, then points associated with a 'G-level" deficiency (i.e. 20 points) are assigned.

Source: Centers for Medicare & Medicaid Services

Note. From *Design for nursing home compare five-star quality rating system: Technical users' guide*, p. 5, by the Centers for Medicare & Medicaid Services, 2012a.