CALIFORNIA NURSING HOMES:
DOES OWNERSHIP TYPE PREDICT DIFFERENCES IN CARE?

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CALIFORNIA NURSING HOMES:
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A Thesis

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Abstract

of

CALIFORNIA NURSING HOMES:
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Given California's growing senior population (those aged 65 and over) and rising healthcare costs, California will continue to depend on and fund a large portion of nursing homes services within the state. Since nursing homes can form as either nonprofit or for-profit facilities, some question whether they diverge with respect to quality of care. I examined whether ownership type (nonprofit versus for-profit) explains differences in the level of care these facilities provide. Using 2007 state and federal nursing home datasets, I compared deficient citations, staffing levels and resident based measures by ownership type. While there are notable differences across measures of quality, my findings generally suggest that in California, nonprofit facilities provide better care than for-profit facilities. Since these services are heavily dependent on publicly funded programs, state policymakers should explore the reasons for quality of care differences and hold nursing homes accountable to their residents, consumers, and taxpayers.

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Date

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Chapter 1

INTRODUCTION

Similar to healthcare costs across the United States, nursing home expenses continue

to increase; for 2008, total U.S. costs are projected to approximate $137 billion. Of this

estimate, on average, slightly less than two-thirds will be paid with public funds (federal,

state and local), about one-fourth with out-of pocket payments, and the remaining portion

through health insurance and other private funding (Center for Medicaid and Medicare

[CMS]-Projections 2007). In addition to increasing costs, another contributing factor to

rising nursing home expenses is the projected sharp rise in the elderly population. Over a

twenty-year period, from 2010 to 2030, when the U.S. population is projected to increase

by approximately 17%, the elderly population, those aged 65+ years old, is projected to

increase by almost 80% (Census 2004). Figure 1.1 reflects population projections

through 2025, with California's elderly population growing faster than the U.S. average

(CA Healthcare Foundation [CHF], 2005). As the elderly population continues to

increase, the demand for nursing home services is sure to follow.

In this thesis, I examine whether nursing home ownership type influences quality of

care. The methodology I used is similar to that of prior studies, which relied on multiple

regression analysis to examine the relationship between ownership type and staffing

levels, facility deficiencies as well as other resident level quality indicators. I used

federal and state survey data to compare California nursing homes by ownership type. In

comparing ownership type and quality indicators, I included neighborhood income levels

for each nursing home by zip code, facility size, and costs as control variables. In the

sections to follow I will provide an overview of social changes that could contribute to an increased need for nursing home care, a brief historical overview of how the nursing home industry has transformed into what it is today and explore the market forces behind the unique for-profit and nonprofit market mix.

<div align="center">Social Changes</div>

In addition to population growth, social trends also contribute to an increased need for nursing home services. One trend is the presence of smaller families. In general, the number of families with children is projected to decrease, thus resulting in less adult children to care for their elder parents (U.S. Census, 1996). Furthermore, because it is easier to relocate, families are less likely to live close to one another. Such mobility limits an elderly person's ability to rely on relatives (Weinstein, 1996). Lastly, a common challenge is that when elderly parents need their children; often times they too have families of their own.

Figure 1.1 U.S. and California Population Projections For Residents 65+ Years Old

	2000	2005	2015	2025
CA	3.387	3.454	4.465	6.424
U.S.	35.835	36.370	45.959	62.641
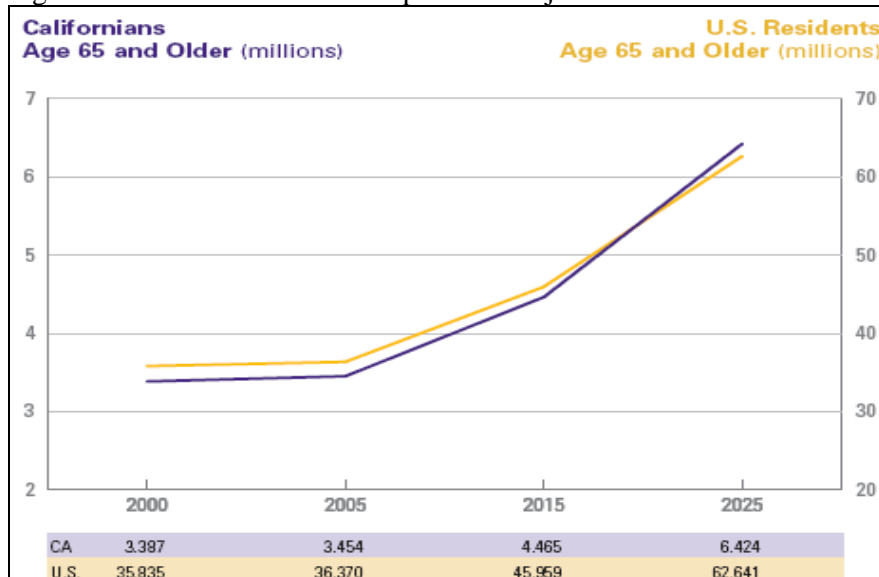
For some individuals, the need for assistance takes place over time. This begins with the desire for elderly individuals to keep their life as normal as possible; they stubbornly live at home and try to live independently. Although some are able to provide basic care for themselves, over time they may face day-to-day challenges and eventually need assistance to address medical conditions (Wilson, 2006). Over the years, nursing homes will continue to provide much needed care for our growing elderly population.

Given the anticipated growth of the elderly population over the next twenty years, an examination of nursing home facilities and the quality of care they provide is an essential topic to examine. In 2004, California nursing home expenditures totaled $8.4 billion, and an estimated 75%, ($6.3 billion) in expenses were funded through federal and state programs (CMS 2007-Actuals; CHF 2005, 2007). Given the amount of public funds used to provide nursing home services, the level of care provided by nursing homes is a relevant government responsibility.

Since nursing homes currently operate as either nonprofit or for-profit facilities, ownership type is one way to compare quality of care. Because the overall objective of a for-profit business is to generate a profit, these facility types have the motive to reduce operating costs at the risk of affecting the level of care they provide. In contrast, since nonprofit entities are less likely to be influenced by profit motives, they are commonly perceived to provide better care but focus less on operating efficiencies (Santerre &Vernon, 2005).

Studies suggest there is a link between ownership type and quality of care (Harrington, Woolhandler, Mullan, Carrillo, & Himmelstein, 2001; McGregor et al.,

2005). However, the nursing home market is complex, for example, there are unique federal and state nursing home regulations, some facilities offer both post acute care (short-term) and long-term care services, and in addition to nonprofit or for-profit status, facilities can organize as a freestanding or hospital-based nursing home. Due to the complexity of the nursing home market, analyzing and deciding upon which factors most influence quality of care is an undertaking that continues to stir debates. As researchers attempt to understand the determinants of quality care, they simultaneously call for better ways to define and measure quality related indicators.

<div align="center">History of Nursing Home Industry</div>

In Kaffenberger's (2000) historical account of the nursing home industry, care for the elderly began with neighbors helping one another where family members were nonexistent. As the elderly population increased, cities began to reimburse those that cared for the elderly. Eventually cities provided homes to care for the elderly. During the early 1800's public institutions were created. These institutions developed most notably in Boston, and were coined almshouses.

During the early 1900's a rapid increase in the elderly population attracted the attention of lawmakers and the public. Voters began to realize the number of elderly individuals in almshouses and the substandard care provided by the government. The public demanded that the government's oversight of almshouses be revoked. Support for nonprofit facilities took center stage and the public called on these organizations to provide social services where the government failed. Subsidies offset the cost of nursing home care and soon after for-profit entities entered the market (Kaffenberger, 2000).

Market Mix

Although the government's financial incentives were designed to assist nonprofit organizations enter the nursing home market, they also attracted for-profit businesses. The nursing home industry was popular; companies that knew nothing about the industry joined the frenzy and entered the market (Kaffenberger 2000). This co-existence of nonprofit and for-profit entities within the nursing home industry raises questions. How do the nonprofit and profit businesses respond to one another, and how does this market mix affect quality of care?

Marwell and McInerney (2005) explore the dynamics between nonprofit and for-profit entities and provide an overview of how these entities respond to one another. They identify five stages that explain the relationship. Nonprofits enter the market to satisfy a social need, referred to as *market identification*. The second and third stages address how nonprofits react to market forces when service needs begin to increase and how these organizations pass on increased prices. The final stages discuss that as nonprofits continue to be successful they relay a sign of legitimacy, signaling to for-profit organizations that sufficient demand is present for the creation of a market.

Lastly, the authors explain three possible outcomes that result from the tension between for-profit and nonprofit businesses. One is a *stratified market*; this is when organizations focus on a specific group of consumers. Nonprofit organizations will usually serve poor consumers and for-profit organizations will likely serve the wealthy. Another outcome is a *displaced market*, which is when for-profit organizations push nonprofits out of the market. The last outcome is referred to as a *defended-market*; this is

when nonprofit organizations find ways to avoid the pressure of for-profit organizations.

Some nonprofits will conduct additional fundraising and even seek help from government

programs (Marwell & McInerney, 2005). Although this analysis of market forces and

competition explains the co-existence of for-profit and nonprofit nursing homes, the

authors note that the dynamics of mixed markets continuously change.

An appropriate inquiry to follow the discussion of market forces is that led by Santerre

and Vernon (2005), who examine the optimal mix of nonprofit and for-profit nursing

homes by comparing the ownership mix of a geographic area to utilization rates. Their

measure of quality is the level of utilization of nursing home services within a county.

The authors base their model on the premise that nonprofit nursing homes provide a

signal to customers of high quality levels, in terms of patient care, because they are

motivated, presumably, by a desire to fulfill a social need and not by profits. They also

contend that nonprofit facilities will tend to operate less efficiently than for-profit

facilities due to the very lack of profit motives. Thus, in a market where for-profits

dominate, their hypothesis predicts that, due to being associated with higher quality levels,

increasing the number of nonprofit facilities will lead to higher social benefits.

Alternatively, when nonprofits dominate, due to inefficient operations, increasing the

number of nonprofit facilities will lead to lower social benefits. Thus, the authors

anticipate that an optimal mix of nonprofit and for-profit facilities would increase

competition, result in higher quality levels and lower costs. Their empirical study relied

on multiple regression analysis to examine 2,939 nursing home markets within the U.S.

during 1996. Their model predicted that the optimal market share of nonprofit

organizations should account for approximately double their actual market share. Their study was conducted using 1996 figures, at which time nonprofit facilities represented, on average, 23% of the nursing home market in the U.S. Similarly, at the present, California nonprofit nursing homes account for approximately 20% of the market (CMS-Database 2008). Figure 1.2 highlights that for-profit facilities clearly dominate California's nursing home industry.

Santerre and Vernon (2005) question why the market fails to correct itself and automatically increase nonprofit nursing homes. The study concludes by noting that competition within this industry is healthy and that nonprofit organizations keep quality up, while for-profit facilities keep costs reasonable. Lastly, they call for additional studies to explore the efficiency of nonprofit and for-profit businesses by ownership type for the healthcare industry and other markets.

In summary, this chapter provided an overview of the demographic and social changes, as well as a summary of the market forces that affect the nursing home industry. In the chapters to follow, I will first introduce studies that have analyzed quality of care indicators by ownership type and discuss the challenges in measuring quality. Next, I will introduce the multiple regression models analyzed. The results of my analysis include interesting cross tabulations and regression results, in which, ownership type explains some variance within the variables that measure quality of care. This thesis concludes with a discussion of how my findings could influence California's nursing home policies.

Figure 1.2-California Nursing Homes by Ownership Type 2007

*This figure only includes nonprofit and for-profit facilities. Government owned facilities, not shown in this chart, account for about 4% of all California nursing homes.
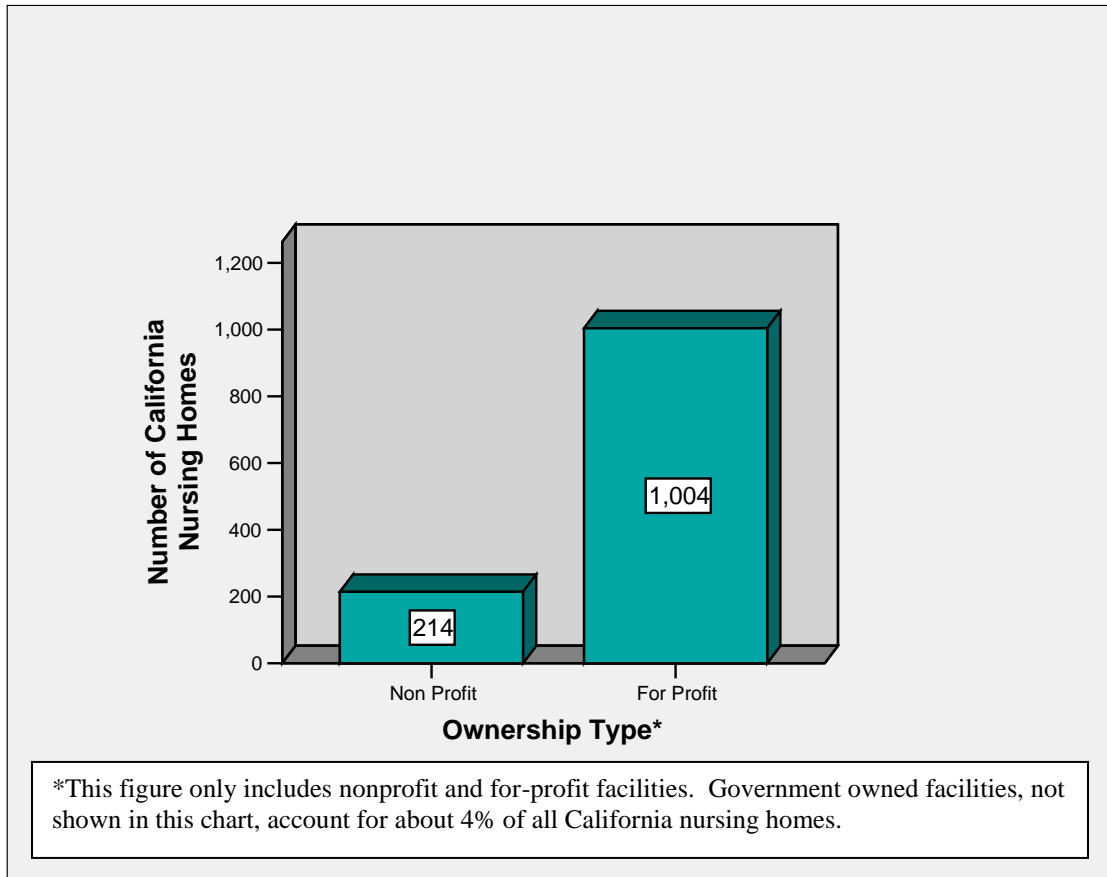
Chapter 2

LITERATURE REVIEW

Measuring the level of care nursing homes provide is a challenging, yet important objective. Many researchers have analyzed various aspects of quality within nursing homes, by comparing quality indicators to nurse staffing, Medicaid payment rates and care techniques (Bostick, 2004; Grabowski, Angelelli & Vincent, 2004; Jensdottir et al, 2003). Researchers have also compared quality indicators by nursing home ownership type and have identified differences in the quality of care provided by for nonprofit and for-profit facilities (Harrington, 2001; McGregor et al., 2005).

Studying the relationship between quality and nursing home ownership type is worthwhile given the attention the industry has received in the recent years. In 2004, California passed legislation to alter CA's nursing home funding mechanism in an effort to address quality of care issues (Nursing, 2007). Additionally, federally sponsored quality initiative programs introduced in 2002 are an ongoing effort to enhance quality within nursing homes. Late last year, the Federal Subcommittee on Health held an informational hearing on trends within the nursing home industry to explore the relationship between nursing home ownership type and quality of care (U.S. Health, 2007).

Backed by various quality related studies within the industry and fueled by continued publicity, exploring the relationship between ownership type and quality of care is most relevant. In this chapter, I will first introduce studies that have examined quality of care by nursing home ownership type. To understand the challenges of measuring quality, I

will introduce studies that have examined nursing home quality indicators and will review the relatively recent federally sponsored efforts that aim to refine quality indicators. I will conclude this chapter by summarizing the quality of care indicators I incorporate into my study.

Nursing Homes and Ownership Type

Aimed at determining whether ownership type can predict which facility provides superior care, the following studies examine nursing homes in the United States and British Columbia. Harrington, Woolhandler, Mullan, Carrillo, and Himmelstein (2001) relied on state inspection data to calculate quality of care indicators; the authors examined data for 13,693 nursing homes across the U.S. for 1998. The analysis was based on a multivariate model, including univariate means test, one-way analysis of variance, and ordinary least squares regression methods. In the second study, McGregor et al. (2005) explore the same question but use staffing levels as an indicator of quality. The authors of this study examined data for 167 long-term care facilities in British Columbia and relied on various research methods, including one-way and two-way analysis of variance, univariate linear regression, and analysis of covariance. Both studies found that nonprofit nursing homes provide a higher level of care; defined in the first study as lower state deficiencies and in the second study as higher staffing levels. Table 2.1 summarizes the quality indicators used for the two studies.

Harrington et al. (2001) explain that because the main goal of for-profit organizations is to generate profits, such nursing homes have a reason to reduce spending, which increases the chance of failing an inspection. Harrington et al. (2001)

and McGregor et al. (2005) both call for additional studies to examine quality of care and

recommend that future studies incorporate the medical needs of residents. Harrington et

al. (2001) conclude by questioning whether for-profit nursing homes should have the duel

responsibility of caring for the elderly and earning profits.

Table 2.1 Nursing Home Ownership Studies

Study #1 Harrington et al. (2001)	Research Question	Does Ownership Compromise the Quality of Care in the U.S.?
	Quality Indicators	(1) State issued deficiencies: quality of care, quality of life, and other deficiency types, (2) Nursing staff ratios, and (3) Diagnoses
	Data Source	On-Line Survey Certification and Reporting database
Study #2 McGregor et al. (2005)	Research Question	Does ownership type influence staffing levels in British Columbia?
	Quality Indicators	Staffing levels
	Data Source	The British Columbia Labour Relations Board

Measuring Quality of Care

The previous authors end their research on quality of care on a thoughtful and

important note, how should we measure quality? Table 2.2 summarizes how two studies

examined quality of care within nursing homes. Jensdottir et al, (2003) and Bostick,

(2004) explain that the United States' federal government mandated the use of resident

assessment standards during 1990 for Medicaid and Medicare certified facilities. Bostick

(2004) explored the relationship between staffing levels and quality of care and used

resident assessment data because prior studies have resulted in inconsistent conclusions.

Jensdottir et al, (2003) argue that although the resident assessment data is not an inclusive

list of quality indicators, it is an appropriate tool to find ways to improve care. In the

second study, Jensdottir et al, (2003) examined how different care techniques affected

quality. Jensdottir et al (2003) explain that many researchers have developed ways to use federal data and have conducted studies over the last decade refining these measurements. Although researchers have developed ways to use the federal data, it is not the final authority on measuring quality.

Table 2.2 Examples of Quality of Care Studies

Study #		Study Topic & Quality Indicators (QIs)
1 Jensdottir et al, 2003	Question	Does the quality of long-term care outcomes differ when using varied care techniques?
	QI	Number of Medications, Weight loss, Dehydration, Behavioral symptoms, Infections, Bedridden, Daily physical restraints, Depression, Tube Feeding, Little or no activity, and Falls
2 Bostick, 2004	Question	Is there a relationship between quality indicators and staffing levels?
	QI	Physical restraints, weight loss, incontinence, activities of daily living decline, stages 1 to 4 pressure ulcers, and problem behaviors toward others.

Over the last several years, the federal government has created committees to examine the need for nursing home quality standards. These federal efforts to improve quality of care have spurred discussions of how to best develop measurement indicators. The outcome of these public and private collaborative efforts to define quality indicators will ultimately influence how the government holds nursing homes accountable and how consumers make decisions. The following section will provide a glimpse into the challenges that researchers and the industry face in establishing quality indicators that satisfy the needs of government authorities, information seeking consumers and nursing home facilities.

In order for nursing homes to receive funding from government-sponsored programs, it is required that they submit to regular inspections. The inspection data and reporting requirements are relied on to fulfill a variety of needs. Although the primary goal in collecting this data is to ensure accountability of public funds and to protect residents, consumers need this data to make informed decisions when selecting a nursing home.

The federal agency responsible for evaluating and collecting nursing home data are the Center for Medicare and Medicaid Services (CMS). Although the primary use of this data is to ensure compliance, it is continuously used to make conclusions about the quality of care facilities provide. CMS maintains two datasets, the Minimum Data Set (MDS) and the Online Survey, Certification and Reporting database (OSCAR). The MDS database includes resident level quality of care information and is collected through surveys that are routinely required. OSCAR data reports nursing home characteristics such as deficiencies, and other facility level indicators. The federal government usually contracts with states to conduct inspections and track deficiencies. Over time, the type of data collected and the methods used to assess resident level care is a process that continues to evolve.

During 2002, the federal government introduced the Nursing Home Quality Initiative. The initiative's primary goals are to improve the quality of nursing homes and to establish relationships with enforcement authorities and consumers, and to create public-private partnerships (Hilliard, 2005). Researchers contend that purposefully designing quality indicators will continue to fuel research debates. In developing agreed upon quality of care indicators, it is important that acknowledge that the indicators must be

able to 1) assist government authorities enforce regulations, 2) help consumers make informed decisions for loved ones, and 3) help facilities improve patient care.

Fueled by the information age, consumers are likely to rely on the Internet to conduct research on nursing homes. Rahman (2007) argues that data mandated by governments to ensure accountability of public funds and data collected for consumer use should be different since they serve different purposes. Hilliard (2005), focusing on public information, argues that any data released to the public will be used as quality indicators and should be uniquely developed. Based on this need, Hilliard (2005) introduces the concepts of quality of care and quality of life. The first concept is similar to facility-based ratings and the latter concept would require an inquiry at the resident level to measure their well-being. Rahman (2007) supports the development of resident-level quality of life indicators. This article calls for researchers to explore how to measure resident level quality indicators and points to the complexity of this effort by identifying the need to examine both, preferred and perceived care.

<div align="center">Selected Quality of Care Indicators</div>

Based on the above literature, over the years nursing homes have received constant attention. To explore the relationship of ownership type and quality of care I used MDS and OSCAR data collected during 2007 to compare California nonprofit and for-profit nursing homes. This dataset includes staffing ratios, deficiency data and resident level quality of care measures. In an attempt to account for any spurious conclusions of the relationship between ownership type and quality indicators, I control for cost, facility size and neighborhood income.

Literature Review Summary

This chapter reviewed studies that examined my research question and briefly explored the debate of how to measure quality of care. The debate that surrounds the development of quality indicators is driven by the need to fulfill numerous goals; to ensure public/facility accountability and to provide consumers information to make informed decisions. To address these separate goals, researchers and industry professionals call for agreed upon measurement techniques to quantify both, facility-based quality indicators and resident level quality of life indicators. I have emphasized how sensitive the topic of nursing home care is and highlighted its complexities. Relying on these findings, the next chapter details the methodology of my study.

Chapter 3

METHODOLOGY

In comparing the quality of care nonprofit and for-profit nursing homes provide, there

are limited sources that provide state level data. As discussed in the prior chapter, data

resulting from federal surveying and state inspections are not perfect quality

measurements, yet these measurements continue to evolve and are useful in comparing

quality by facility type. In this chapter, I will introduce the regression model and explain

data elements employed in this study. The following equation is the basic model used to

determine if ownership type is a predictive indicator of quality care:

$$\text{Quality of Care} = f(\text{ownership, income, cost, occupancy})$$

In this section, I will expand this model by substituting different types of quality of

care indicators. Control variables were included to help minimize any spurious

conclusions about the relationship between ownership type and quality of care. Serving

as dependent variables, the following three quality of care categories were incorporated

into the model: staffing ratios, facility deficiency score (based on annual inspection

results), and resident level quality of care measures. The control variables include a

measure of neighborhood income, the cost per resident per day and the number of

residents within each facility. The addition of these dependent and control variables

result in the following expanded models:

$$\text{Staffing levels} = f(\text{ownership, income, cost, occupancy})$$

$$\text{Facility deficiency score} = f(\text{ownership, income, cost, occupancy})$$

Resident level quality assessments = f (ownership, income, cost, occupancy)

Dependent Variables

The dependent variables represent various quality of care measures. The three categories (staffing, inspection results, and resident level assessments) are commonly referenced quality indicators. Each quality indicator captures either inputs or outputs (outcomes) of care, both of which relate to the level of care provided. For example, staffing levels are inputs that influence resident level care. Alternatively, examining inspection results allows a comparison of quality based on outcomes.

Data for each quality category, for California nursing homes, were extracted from several databases maintained by the Center for Medicare and Medicaid Services (CMS). Both staffing ratios and resident-level quality measurement data was gathered from the CMS's databases. From CMS' inspection data, I calculated a deficiency score for each facility. In general, data items relate to surveys collected and inspections conducted during 2007.

Next, I will provide a brief overview of how all dependent variables were calculated. See table 3.1 for a complete list of dependent variables by category and measurement type.

Staffing levels

As explored in the literature review, staffing levels have been found to have a direct link to better care. Using staffing levels as an indicator of quality, I pulled all licensed

and certified staffing data from CMS' website. Staffing ratios represent a two-week

snapshot of the number of staffing hours per resident per day (CMS-Database 2008).

Table 3.1 Dependent Variables and Measurement Type

Dependent Variables			Measurement
Staffing			
	1	Certified Nursing Assistants	Ratio Calculated by CMS = Average total number of hours worked each day by all staff during the two-week period prior to the annual inspection
	2	Licensed Practical or Vocational Nurses	
	3	Registered Nurses	_____
	4	Total Licensed Staff	The number of residents
Inspection deficiencies*			
	5	Calculated Deficiency Score	*Self calculated score: Based on 2007 annual inspection results including both, the total number of deficiencies issued and their severity type and category.
Resident Based Quality Indicators			
	6	High-Risk Long-Stay Residents Who Have Pressure Sores	CMS calculates a percentage for each indicator by examining resident assessment data collected over a three-month or six-month period.
	7	Long-Stay Residents Given Influenza Vaccination During the Flu Season	
	8	Long-Stay Residents Who are More Depressed or Anxious	
	9	Long-Stay Residents Who Were Physically Restrained	

*Self-calculated using data reported by CMS, all other data items are directly from CMS datasets.

Inspection Deficiencies

The primary use of annual inspection data are to determine whether facilities comply

with federal and state regulations. Annual inspections are required, on average, every 15

months. Using the annual inspection results, I calculated a deficiency score for each

facility and compared these scores by ownership type. There are a few important

distinctions to draw regarding the data. The first distinction to identify is that there are

two types of deficiencies: health and fire safety. The ability to isolate the deficiency

type, health versus fire safety, is a relatively new addition to the database. Using CMS'

dataset, I examined health citations issued against California nursing homes during 2007.

In addition to deficiency type, for each citation the inspection results indicate the

severity of the deficiency, which combines the scope (how many residents are impacted)

and the level of harm (for example potential versus actual harm). The severity codes

follow a lettering scheme, denoted with letters A through L, with L representing the most

egregious violation. Additionally, citations are classified into one of eight deficiency

categories, generally linked to resident, environment or administrative related errors.

Deficiencies in these categories appear to represent both direct and indirect violations that

influence the quality of care provided to residents. By combining these attributes and

using federal compliance standards as a general guideline, I assigned each citation a value

that ranged from zero to four, representing no citations through substandard care. See

table 3.2 for a complete list of federal categories of compliance and for a legend of values

assigned to each group of deficiency types (CMS-Manual 2008, CDPH, 2008,

Harrington, 2003). After I translated each citation, that resulted from their annual

inspection, into a numeric value, by summing these values, each facility had one

deficiency score.

Resident Quality of Care Measures

Starting with about eight resident level quality measurements, over the years CMS has

modified its list of quality indicators and measuring methods. Today about seventeen

different resident level measurements are relied upon to critique nursing home care. I

included four of the seventeen resident level measurements into my model as quality

indicators.

Table 3.2 Deficiency Score Chart

In Compliance Value Assigned: 0
Substantial Compliance Scope and severity level of A, B, or C Value Assigned: 1
Non-Compliance (Serious) Scope and severity level of D or E Value Assigned: 2
Non-Compliance (Very Serious) Scope and severity F through L for any deficiency related to Resident Assessment, Environment, Nutrition, Pharmacy, or Administration and Socpe and severity level G for a deficiency related to Mistreatment, Resident Rights or Quality Care Value Assigned: 3
Substandard Care Scope and severity level F, H, I, J, K or L for any deficiency issued for Resident Rights, Mistreatment, or Quality Care Value Assigned: 4

As an organization, CMS incorporates nursing home quality assurance into its long-

term objectives. Over the last few years, CMS has continuously strived to reduce the use

of physical restraints, decrease the prevalence of pressure sores and increase influenza

vaccinations (Performance 2008). Since CMS continues to identify these measures as important goals, I used these three measures as quality of care indicators. Additionally, to examine a resident level condition, I also included a variable that measures the percentage of residents that suffer from depression. These quality indicators are measured by looking at changes over time and have specific look back timeframes that range from days to years.

<div align="center">Control Variables</div>

To anticipate the possibility that any relationship identified between ownership type and quality of care is explained by other factors, I included three control variables: the number of residents within each facility, the average income of the neighborhood that includes each nursing home and the average cost per resident per day. See Table 3.3 for a list of control variables, measurement description and their source. In this section, I will briefly define each variable and explain why they are important control variables.

Table 3.3 Independent Variables and Measurement Type

	Control Variables	Measurement	Data Source
1	Facility Size	Number of Residents	CMS
2	Neighborhood Income	The average adjusted gross income by zip code	CA Franchise Tax Board
3	Cost	Cost Per Resident Per Day	CA Office of Statewide Health Planning and Development

Since the primary focus of this analysis is whether ownership type predicts the level of care provided, nursing home ownership status is the independent variable. In order to compare nonprofit and for profit nursing homes, facility related characteristics were taken into consideration. Since a larger facility, one with more residents, is likely to influence

the number of citation incurred, I controlled for the size of the facility. This enables a comparison of the level of care provided, regardless of the facility's size. Occupancy data was taken from CMS' data files.

In addition to size, cost related variables were added to the model. Since I anticipate that a facility's costs and the quality of care they provide to have a positive relationship, I control for the cost charged per resident per day. I pulled this data from California's Office of Statewide Health Planning and Development datasets, using the average cost per facility (OSHPD, 2007).

Lastly, I consider whether the socio-economic status of a neighborhood that includes a nursing home is related to the level of care provided. Put another way, if nursing home residents are pulled from their surrounding neighborhood, will a relationship link income levels to quality of care? Although this income variable does not capture information about the facility's residents, the variable serves as a proxy for socio-economic status. Income related data was obtained from California's Franchise Tax Board dataset, which reports income by zip code (FTB, 2007). Using these income tax files, I matched average adjusted gross income data to each nursing home facility's zip code.

<div align="center">Methodology Summary</div>

The hypothesis is that ownership type predicts the level of care provided. Specifically, nonprofit facilities have been shown to provide better care than for-profit nursing homes. Using regression analysis, I rely on three different indicators of quality of care; staffing levels, citations issued during annual inspections, and resident level quality measurements. I also control for other factors that I anticipate could influence the

relationship between quality of care and ownership type. I control for the number of

residents within a facility, the income level of a neighborhood that surrounds a facility,

and average costs charged by each facility. In table 3.4, descriptive statistics can be

found for both dependent and control variables. In the next chapter, I will outline the

results of my regression analysis. The final chapter summarizes my findings and

provides policy implications.

Table 3.4 Descriptive Statistics for all Variables

| Descriptive Statistics				
	Mean	Std. Dev.	Min.	Max.
Ownership Type	0.82	0.38	0	1
Control Variables				
	Mean	Std. Dev.	Min.	Max.
Number of Residents	82	46	3	416
Cost Per Resident Per Day	$180	$49	$107	$503
Neighborhood Income by Facility Zip Code	$59,454	$46,441	$1,511	$543,346
Dependent Variables				
	Mean	Std. Dev.	Min.	Max.
Ratio of Staffing Hours Worked by:				
Certified Nursing Assistants	2.60	0.62	0.00	5.13
Licensed Practical or Vocational Nurses	0.84	0.59	0.00	5.17
Registered Nurses	0.68	0.76	0.06	7.77
Total Licensed Staff	1.52	1.08	0.21	8.87
Facility Level Quality Indicator (Annual Inspection)				
Calculated Deficiency Score	22	15	0	105
Resident Level Quality Indicators				
Residents Given Influenza Vaccination	82%	19%	0%	95%
Residents Who Were Physically Restrained	11%	10%	0%	89%
Residents Who Have Pressure Sores	13%	8%	0%	54%
Residents Who Were More Depressed or Anxious	10%	7%	0%	39%

Chapter 4

RESULTS

My research goal was to determine whether ownership type is a predictive indicator of

the level of care nursing homes provide. I will present my results in three stages. First, I

will present cross-tabulations for interesting observations about California nursing

homes, in particular, the average number of residents and neighborhood income levels.

Next, to explain directional relationships and determine that no two independent variables

display a strong relationship, I will briefly evaluate the correlation matrix. Lastly, I will

consider results from multivariate regression analysis and introduce significant

relationships. Based on numerous regression equations (which rely on various quality of

care measures), the results suggest that in some cases ownership type and quality of care

are related. Of the three quality of care categories analyzed (staffing levels, number of

deficiencies, and resident level measures) a significant relationship was identified within

each group. Lastly, I will call attention to unique yet, inconsistent findings.

Cross Tabulations

The following bar charts display cross-tabulations for California nursing homes by

ownership type for two independent variables: 1) the average number of individuals that

reside in nursing homes; and 2) the average income of neighborhoods that include

nursing homes. In researching whether ownership type is a predictive variable for quality

of care measures, making general comparisons by ownership type is always a good start.

Figure 4.1 shows that, on average, for-profit nursing homes serve more residents per

facility. Such findings are not surprising since profit-maximizing goals influence the

behavior and business practices of for-profit facilities. In this case, serving more

residents may result in the potential for greater profits. The next cross-tabulation figure

4.2, shows that the average income of neighborhoods, where nursing homes are located,

is higher for nonprofit facilities. Put another way, nonprofit facilities are located in

neighborhoods that on average, have higher incomes. Without a general feeling for the

directional relationship, I can only speculate that neighborhood income may be a proxy

Figure 4.1 – Resident Levels by Nursing Home Ownership Type 2007
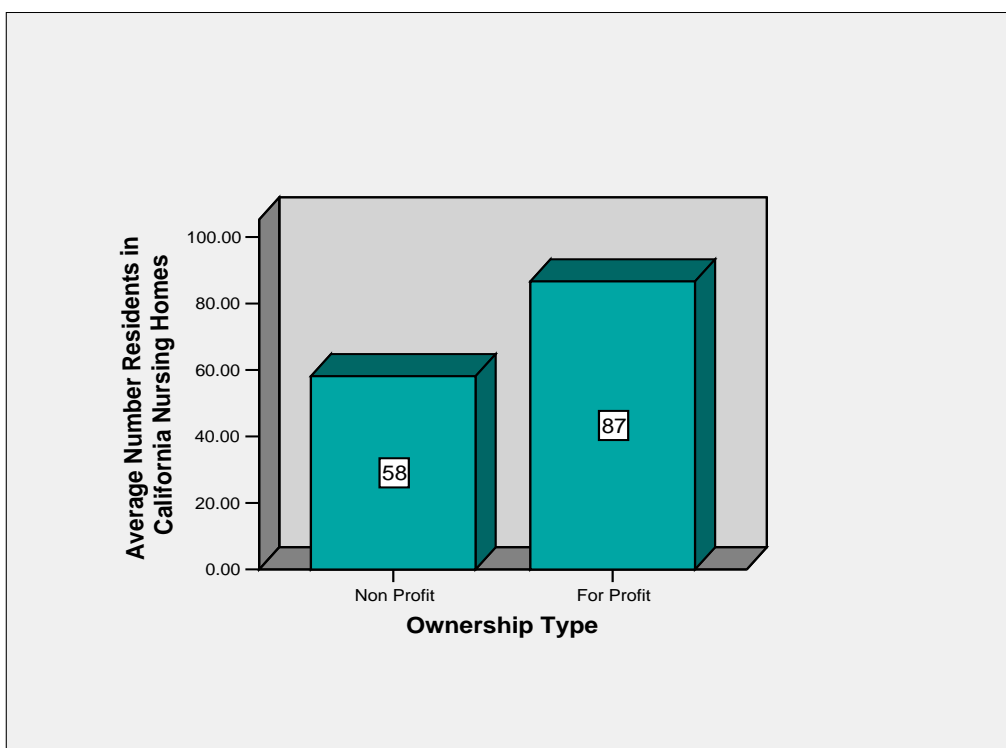
for rental prices. Therefore, this relationship may also be linked to profit oriented

motives; for-profit facility types may be more likely to locate in low-income

neighborhoods, where rent is cheaper. Additionally, rent expenses may be less of a

concern for nonprofit facilities.

In summary, the cross-tabulations show that nonprofit facilities care for fewer residents and are located in higher-income neighborhoods. These findings advance the discussion of which factors explain differences in the quality of care provided by nonprofit and for-profit nursing home facilities.

Figure 4.2 – Neighborhood Income by Nursing Home Ownership Type 2007
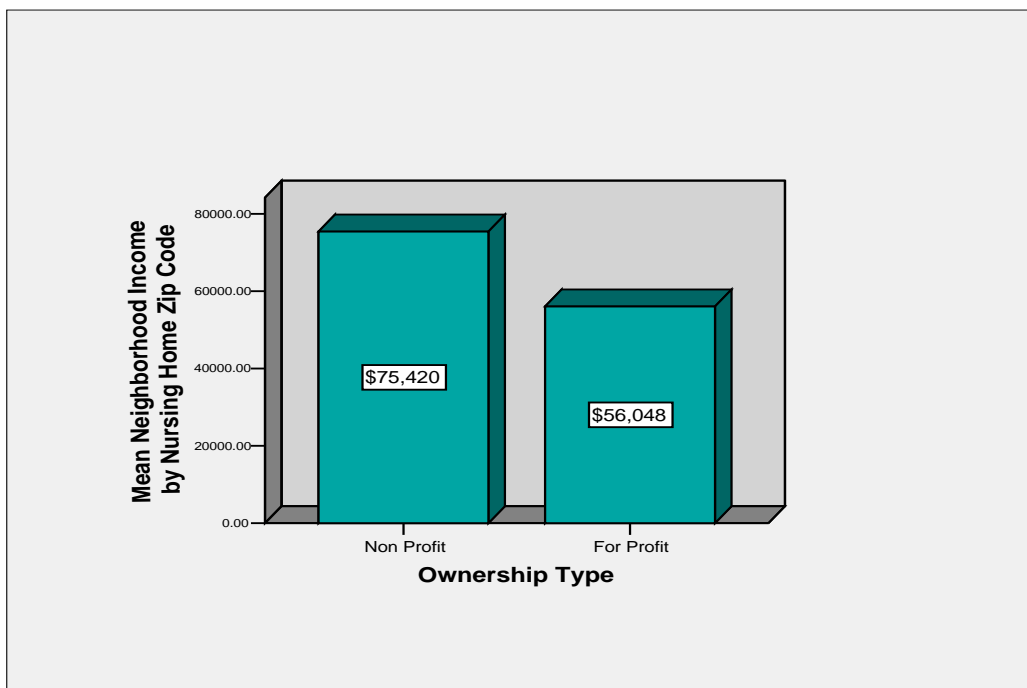
Correlation Results

I reviewed the correlation matrix to gain a general feel for the strength and direction of any relationships between variables. I also examined the matrix to determine if there was likely to be a concern about variables being collinear (See Tables 4.1). Based on standard thresholds for making such a determination, this did not appear to be a problem. None of the independent variables had a correlation as high as .8; the highest correlation was a weak .24, representing the relationship between ownership type and the number of

residents. Next, I examined directional relationships. In looking at ownership type, the directional relationships are consistent with significant relationships found in prior studies, which supported that nonprofit facilities provide better care. For example, keeping in mind that ownership is coded 0-nonprofit and 1-for-profit, examination of the correlation matrix indicates that when ownership switches from a nonprofit to for-profit nursing facility, the deficiency score increases, while the score for all staffing level related variables falls. This suggests that for-profit facilities either receive more citations (or receive citations for more egregious violations) and have lower staffing levels. However, are these relationships maintained when control variables are taken into consideration? To answer that question I turn to the results from multiple regression analysis.

<div align="center">Regression Results</div>

To determine if a relationship exists between nursing home ownership type and quality of care, I analyzed nine regression equations. The regression models examined the impact of ownership type on various measures of quality, controlling for facility size, costs and neighborhood income. The critical question is whether ownership type partially explains the variance in the level of care (defined multiple ways) nursing homes provide.

Of the nine equations tested, Table 4.2A and 4.2B outline the coefficients and standard errors of the seven models for which the independent variables as a group have a significant effect on the dependent variable. This conclusion relies on the F-test and applies an acceptable significance value at the 5 percent level. Another measure critiqued

is the R-square, which explains the model's predictive power; for the seven models, these

values ranged from 2% to 10%.

Table 4.1 Correlation Matrix

		(AGI) Neighbor-hood Income	Certified Nursing Assistant Hours	Cost Per Resident Per Day	LPN/LVN Hours	Flu Vacc.	More Depressed / Anxious
Neighborhood Income	PC	1.00	0.02	0.19	-0.07	0.00	0.05
	Sig. (2-tailed)		0.49	0.00	0.02	0.93	0.12
	N	1217	1119	927	1119	1069	1005
Certified Nursing Assistant Hours	PC	0.02	1.00	0.02	-0.01	0.11	0.01
	Sig. (2-tailed)	0.49		0.47	0.72	0.00	0.68
	N	1119	1120	872	1120	1002	940
Cost Per Resident Per Day	PC	0.19	0.02	1.00	0.04	-0.04	0.01
	Sig. (2-tailed)	0.00	0.47		0.19	0.19	0.67
	N	927	872	928	872	883	843
LPN/LVN Hours	PC	-0.07	-0.01	0.04	1.00	-0.04	-0.04
	Sig. (2-tailed)	0.02	0.72	0.19		0.22	0.20
	N	1119	1120	872	1120	1002	940
Influenza Vaccination	PC	0.00	0.11	-0.04	-0.04	1.00	-0.03
	Sig. (2-tailed)	0.93	0.00	0.19	0.22		0.42
	N	1069	1002	883	1002	1070	995
More Depressed / Anxious	PC	0.05	0.01	0.01	-0.04	-0.03	1.00
	Sig. (2-tailed)	0.12	0.68	0.67	0.20	0.42	
	N	1005	940	843	940	995	1006
Number of Residents	PC	-0.09	-0.12	0.00	-0.14	-0.18	0.01
	Sig. (2-tailed)	0.00	0.00	0.93	0.00	0.00	0.82
	N	1216	1120	928	1120	1070	1006
For Profit Ownership	PC	-0.16	-0.14	-0.14	-0.11	-0.14	-0.04
	Sig. (2-tailed)	0.00	0.00	0.00	0.00	0.00	0.22
	N	1217	1120	928	1120	1070	1006
Physically Restrained	PC	0.00	0.09	-0.18	0.11	0.01	-0.08
	Sig. (2-tailed)	1.00	0.01	0.00	0.00	0.76	0.01
	N	1016	950	842	950	1003	994
Pressure Sores	PC	-0.03	-0.03	0.04	0.15	-0.24	-0.03
	Sig. (2-tailed)	0.42	0.50	0.29	0.00	0.00	0.37
	N	765	721	651	721	759	759
Facility Deficiency Score	PC	-0.01	-0.09	-0.04	-0.08	-0.16	0.02
	Sig. (2-tailed)	0.67	0.01	0.26	0.01	0.00	0.65
	N	1012	928	781	928	891	841
Registered Nurse Hours	PC	0.12	0.15	0.27	0.26	-0.08	-0.03
	Sig. (2-tailed)	0.00	0.00	0.00	0.00	0.01	0.39
	N	1119	1120	872	1120	1002	940
Total Licensed Staff Hours	PC	0.04	0.10	0.20	0.73	-0.07	-0.05
	Sig. (2-tailed)	0.15	0.00	0.00	0.00	0.02	0.15
	N	1119	1120	872	1120	1002	940
**		Correlation is significant at the 0.01 level (2-tailed).					
*		Correlation is significant at the 0.05 level (2-tailed).					

Table 4.1 Correlation Matrix – Continued

	Number of Residents	For Profit Ownership	Physically Restrained	Pressure Sores	Facility Deficiency Score	RN Hours	Total Licensed Staff Hours
Neighborhood Income	-0.09	-0.16	0.00	-0.03	-0.01	0.12	0.04
	0.00	0.00	1.00	0.42	0.67	0.00	0.15
	1216	1217	1016	765	1012	1119	1119
Certified Nursing Assistant Hours	-0.12	-0.14	0.09	-0.03	-0.09	0.15	0.10
	0.00	0.00	0.01	0.50	0.01	0.00	0.00
	1120	1120	950	721	928	1120	1120
Cost Per Resident Per Day	0.00	-0.14	-0.18	0.04	-0.04	0.27	0.20
	0.93	0.00	0.00	0.29	0.26	0.00	0.00
	928	928	842	651	781	872	872
LPN/LVN Hours	-0.14	-0.11	0.11	0.15	-0.08	0.26	0.73
	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	1120	1120	950	721	928	1120	1120
Influenza Vaccination	-0.18	-0.14	0.01	-0.24	-0.16	-0.08	-0.07
	0.00	0.00	0.76	0.00	0.00	0.01	0.02
	1070	1070	1003	759	891	1002	1002
More Depressed / Anxious	0.01	-0.04	-0.08	-0.03	0.02	-0.03	-0.05
	0.82	0.22	0.01	0.37	0.65	0.39	0.15
	1006	1006	994	759	841	940	940
Number of Residents	1.00	0.24	0.00	0.06	0.33	-0.32	-0.30
		0.00	0.95	0.10	0.00	0.00	0.00
	1217	1217	1017	766	1011	1120	1120
Ownership	0.24	1.00	0.09	0.09	0.20	-0.40	-0.35
	0.00		0.00	0.01	0.00	0.00	0.00
	1217	1218	1017	766	1012	1120	1120
Physically Restrained	0.00	0.09	1.00	-0.03	0.12	-0.05	0.07
	0.95	0.00		0.41	0.00	0.16	0.04
	1017	1017	1017	766	851	950	950
Pressure Sores	0.06	0.09	-0.03	1.00	0.09	0.27	0.23
	0.10	0.01	0.41		0.02	0.00	0.00
	766	766	766	766	644	721	721
Facility Deficiency Score	0.33	0.20	0.12	0.09	1.00	-0.17	-0.17
	0.00	0.00	0.00	0.02		0.00	0.00
	1011	1012	851	644	1012	928	928
Registered Nurse Hours	-0.32	-0.40	-0.05	0.27	-0.17	1.00	0.85
	0.00	0.00	0.16	0.00	0.00		0.00
	1120	1120	950	721	928	1120	1120
Total Licensed Staff Hours	-0.30	-0.35	0.07	0.23	-0.17	0.85	1.00
	0.00	0.00	0.04	0.00	0.00	0.00	
	1120	1120	950	721	928	1120	1120
**	Correlation is significant at the 0.01 level (2-tailed).						
*	Correlation is significant at the 0.05 level (2-tailed).						

Although my main goal is assessing the impact of ownership rather than building a model that thoroughly explains variance in quality measures, it is worth noting that much remains unexplained. The low r-square value immediately points out that a large portion of the variance is unexplained, in this case as much as 98%. When looking over the regression results, it is interesting that the model with the highest predictive power, 14%, (which analyzes registered nurse staffing levels) fails to identify ownership type as a significant predictive variable; however, all control variables do meet the significance threshold.

Table 4.2A Regression Results For Models Using Staffing and
Deficiency Scores as Measures of Quality Care

Quality of Care Measure	Certified Nursing Assistants	Registered Nurses	Total Licensed Staff	Deficiency Score
For Profit Ownership	-.123*	-.011	-.075	5.181**
	(.054)	(.024)	(.043)	(1.543)
F-tests (Sig)	.001	.000	.000	.000
Control Variables				
Number of Residents	-.001**	-.001**	-.001*	.100**
	(.000)	(.000)	(.000)	(.012)
Cost Per Day	.000	.001**	.001**	-.011
	(.000)	(.000)	(.000)	(.011)
Neighborhood Income	-.0970	.013**	.087**	.096
	(.000)	(.000)	(.000)	(.000)
R-squared	0.022	0.149	0.061	0.104

*Significant at the 95% level (two tailed tests)
**Significant at the 99% level (two-tailed test)

Table 4.2B Regression Results for Models Using Patient Treatment Measures as
Indicators of Quality

Quality of Care Measure	High-Risk Long-Stay Residents Who Have Pressure Sores	Long-Stay Residents Given Influenza Vaccination During the Flu Season	Long-Stay Residents Who Were Physically Restrained
For Profit Ownership	3.268**	-7.351**	2.179*
	(.895)	(2.007)	(1.013)
F-tests (Sig)	.001	.000	.000
Control Variables			
Number of Residents	.010	-.087**	.003
	(.007)	(.016)	(.008)
Cost Per Day	.007	-.019	-.033**
	(.005)	(.013)	(.000)
Neighborhood Income	.029	-.018	.036
	(.000)	(.000)	(.000)
R-squared	0.027	0.056	0.037

 *Significant at the 95% level (two tailed tests)

 **Significant at the 99% level (two-tailed test)

Coefficients for Ownership and Control Variables

I turn now to the central question: is there a relationship between ownership type and

quality of care, when controlling for other variables? To derive such meanings, we must

turn to the coefficients for the ownership type variable for each equation. On the whole,

the models support the conclusion that nonprofit facilities provide better care in the form

of higher staffing levels, less inspection deficiencies, reduced levels of physical restraints,

less frequent incidents of patients with pressure sores and more frequently provide

residents influenza vaccinations. To place the significance of these directional

relationships into context, I will interpret the most intriguing results.

The first model that shows ownership having a significant effect on quality focuses on the ratio of certified nursing assistant staffing hours. Based on the results, the associated coefficient shows that when switching from a nonprofit to a for-profit facility, the nursing assistant staff ratio decreases by 12%, other variables held constant. This relationship is statistically significant at the .05 level. The results mean that during the two-week period tested by state inspectors, for a given level of residents, for-profit nursing homes had fewer nursing assistant hours than nonprofit nursing homes. The dependent variable is calculated by CMS using the following formula:

Average, total number of hours worked each day
during the two-week period prior to the annual inspection

_____

The number of residents

To interpret these results, I assumed the following fact pattern:
Nursing Home X
Mean C.N.A. ratio: 2.60
Mean number of residents: 86
Derived Average Hours: 224 hours (2.6 x 86)

For this example, a nursing home with the mean number of residents (86) and the mean C.N.A. ratio (2.60), a change in ownership type from nonprofit to for-profit would be expected to result in 12% fewer nursing assistant hours, a reduction from 224 to 197 hours.

The next relationship to analyze is the impact of ownership on quality when using the deficiency score variable. The coefficient of a positive 5.181 for ownership means that when switching from a nonprofit to a for-profit facility, the deficiency score increases by 5.181 points. This relationship is statistically significant at the .01 level. Based on the point system I used to calculate a facility's deficiency score, 5 points could translate into

as many as five substantial compliant violations (the least egregious violation), or two citations, one for substantial compliance and one citation for substandard care (the most egregious violation). Examined another way, the mean value of all deficiency scores is 22 points, thus a five point increase would result in a 23% difference when comparing ownership type.

The last category of variables to examine includes the resident level quality of care measures. Using this group of dependent variables, multiple regression analysis indicates that when switching from nonprofit to for-profit facilities, a larger percentage of residents have pressure sores and were physically restrained. Additionally, a smaller percentage of residents in for-profit facilities were given influenza vaccinations. The coefficient for the percentage of residents who have pressure sores is 3 percentage points, for use of physical restraints is 2 percentage points and for influenza vaccinations is 7 percentage points. Since the mean values for these measures, for all nursing homes, were 13%, 11%, and 82% respectively, the coefficient values represent about a 10% difference when comparing nursing homes by ownership type. The relationships that related to pressure sores and influenza vaccinations are statistically significant at the .01 level.

Results Summary

In this chapter, I provided a general overview of selected cross-tabulation results, general directional relationships based on bivariate correlations, and results from multiple regression analysis. Overall, these methods of analysis indicated that in most cases ownership type and quality of care are correlated. In summary, various tests lean toward

the same conclusion, that nonprofit facilities provide better care, when comparing

violations, certified nursing assistant staffing levels, use of physical restraints, pressure

sores occurrences and influenza vaccinations.

More specifically, the null hypothesis I examined holds that ownership type does not

impact quality of care. The regression results indicate that for seven of the nine models

the null hypothesis can be rejected with at least a .05 confidence level.

In the next chapter, I will explain how these findings could influence California's

nursing home policies and recommend what future studies should examine.

Chapter 5

CONCLUSIONS & POLICY RECOMMENDATIONS

In examining California nursing homes, my research suggest that ownership type explains differences in the level of care provided, when examining inspection citations, certain staffing levels and specific resident level quality measures. When relying on these quality of care measures and knowing the ownership type of a nursing home, a consumer can conclude that a nonprofit facility will provide better care than a for-profit facility and that this difference will not occur by random chance. Spurred by these findings, current nursing home residents, consumers, government authorities and taxpayers should ask why these differences exist among facilities. Does the government hold facilities accountable to their residents and to taxpayers? This is a relevant question given that public programs fund about 75% of California's nursing home services. Throughout this chapter, I will explain how my findings can influence California nursing home policies, discuss the reoccurring issue of measuring quality care, and suggest additional research endeavors that could help determine whether facilities are adequately caring for the state's elderly population.

California Nursing Home Policies

The quality of care that nursing homes provide is a sensitive issue and is a concern of many: consumers, businesses, taxpayers and policymakers. Each of these groups has an interest in ensuring that the elderly population receives adequate care. As discussed in chapter two, defining the term "quality of care" is a challenge. For purposes of this study, I define quality of care various ways, based on staffing levels, issued deficiencies,

and resident-level measures (pressure sores, vaccination, and use of physical restraints). It is important to note that my conclusions regarding differences in care provided are limited to the unique quality of care measures employed within this study.

Efficient Use of Public Funds

A common government objective is to fund public programs that provide the largest public benefit. Based on my findings, residents that reside in nonprofit facilities receive better care, based on several specific quality measures. Since for-profit facilities account for almost 80% of California's nursing homes, shifting residents into nonprofit facilities is not a feasible solution. Additionally, the market may respond differently in a purely nonprofit setting. Reducing competition may reduce market driven incentives to provide quality care. On the other hand, creating programs to assist nonprofit facilities enter and remain in the market is an option.

Furthermore, while my findings suggest that on average, nonprofit facilities provide better care than for-profit facilities, when analyzing specific quality measures, they do not indicate that nonprofit facilities provide *optimal* care. As mentioned earlier, optimal or adequate care is a relevant issue and would require a comparison of all nursing home performance results to established quality measures, or benchmarks. Although researchers and health professions continue to debate the most appropriate way to measure quality of care, nursing home facilities should be held accountable regardless of measurement challenges.

Outreach/Publicity

Since my findings suggest that nonprofit nursing homes provide better care, policymakers should ask why these differences exist and seek answers. In seeking answers, areas to examine should include how nursing homes operate, from care procedures and administrative/management practices to their business culture (commonly known as corporate culture). In conducting this research, findings may identify certain attributes or care methods that nonprofits are implementing more effectively. Additionally, public officials should also explore and understand why for-profit facilities provide inferior quality care, yet simultaneously earn profits.

To examine care differences, I recommend that California create outreach programs to: 1) examine and endorse care practices and management techniques/administrative policies, 2) increase awareness and accountability by publicizing state nursing home performance results, and 3) educate consumers about what they should expect from nursing homes facilities. The outreach program could also establish preferred lists – rewarding facilities that either continuously maintain exceptional levels of care, or continuously improve their performance. Acknowledging nursing homes through preferred lists and publicizing this information could increase competition between nonprofit and for-profit nursing homes.

Nursing homes are in charge of caring for California's elderly population. Since nursing homes are heavily dependent on state funding, California must hold these facilities accountable and make certain that they provide satisfactory care. Creating outreach programs sets a tone; it signifies that the government is aware of differences in

care that facilities provide and are motivated to learn why. The attention will place pressure on nursing homes to become more transparent and will help facilitate a public dialogue, resulting in informed consumers.

Future Research

While my research supports the notion that ownership type affects quality of care, further research is necessary to prove (or disprove) this claim. There remain many unknowns about what causes varied levels of care within nursing homes. As with many research endeavors there are always ways to alter a research approach or methodology. In examining quality of care and ownership type, there are numerous ways to expand future nursing home studies. In particular, I would compare facility care techniques, resident level attributes, such as the length of resident stay, medical conditions and quality of life measures; for example, resident and family interaction. I anticipate that residents with active family members, meaning family members that visit regularly and follow up on care issues result in better care outcomes. Additionally, it would be helpful if future research could include more control variables, to attempt to ensure that conclusions about ownership are not subject to omitted variable bias. My study was limited with respect to the number and types of control measures that could feasibly be included; a more extensive, better funded research project presumably would include others (e.g., resident and neighborhood demographic characteristics, other than income).

Recommendation Summary

My research findings confirm what others have found, that at least with respect to certain quality of care measures, nonprofit facilities out-perform for-profit nursing

homes. Since for-profit facilities account for about 80% of California's nursing home industry, my findings should raise concerns. Since these facilities primarily depend on publicly funded programs and care for a vulnerable population, policymakers must ask why levels of care differ. I recommend that policymakers seek out answers to the question of why differences in care exist, by placing pressure on facilities through outreach programs. These state sponsored efforts will examine care techniques, release findings to the public, result in preferred facility lists, and encourage competition. These combined efforts will increase facility accountability and consumer transparency.

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