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# Impact of Multi-Hospital System Organizational Structure on Financial Performance and Quality of Care in Rural Hospitals

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IMPACT OF MULTI-HOSPITAL SYSTEM ORGANIZATIONAL STRUCTURE ON  
FINANCIAL PERFORMANCE AND QUALITY OF CARE IN RURAL HOSPITALS

by

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Submitted in Partial Fulfillment of the Requirements

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## DEDICATION

I dedicate this work to my aunt, Dr. Victoria A. Quinn, who always reminded me to, “Invest in your community. The key to wealth is a healthy and stable middle class.” She was a great dentist, professor, and, above all, a Christian.

## ACKNOWLEDGEMENTS

I want to thank my committee members, friends and family, for without their support I would not have been able to finish my dissertation.

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Lastly I thank my beloved, Lauren, for always believing in me and helping me complete my education, even when unreasonable obstacles presented themselves.

## ABSTRACT

Considering the increasing challenge to providing access to affordable healthcare in the United States and its effect on the economy, it is critical for patients, healthcare organizations, financial institutions, and federal and state agencies to understand the impact of different organizational structures within affiliated hospitals. The objective of this study was to investigate the impact of different organizational structures within rural multi-hospital systems (MHS) on the hospitals' financial performance and the quality of patient care.

The data for this study were drawn by linking two national datasets: the 2011 American Hospital Association (AHA) Annual Survey and the 2012 American Hospital Directory (AHD). The two databases were linked via the Medicare ID Number. The AHA survey provided information on rural hospitals' organizational structure and financial information. The AHD data, extracted from the 2012 CMS Medicare Compare National Dataset based on researchers' specifications, provided the quality of care and financial measures for the study. The three financial measures used were 1) operating margin, 2) return on equity (ROE), and 3) days cash on hand. Furthermore, the quality-of-care indicators studied were the 30-day readmission rate and the 30-day mortality rate associated with acute myocardial infarction, heart failure, and pneumonia. Multivariate pairwise regression analysis was used to examine the relationship between the outcome

variables, financial and quality indicators, and hospitals' organizational structure (centralized, decentralized, and moderately centralized).

This study explored both the financial and quality indicators of rural MHS. There were 757 hospitals in the financial indicators pool. The financial indicators showed that there are significant variations related to days cash on hand and the types of MHS organizational structures. It was concluded that both centralized and decentralized structures had a significant relationship to days cash on hand, with decentralized MHS having the lowest days cash on hand (32.63 days). This indicates negative financial performance as more days cash on hand would suggest greater organizational stability. With respect to quality of care data, there was a total hospital pool of 233 units. The main quality indicators explored were 30-day readmission and mortality rates. These main indicators were subcategorized based on the Inpatient Quality Indicators (IQI) recommended by the Agency for Healthcare Research and Quality (AHRQ). The selected IQIs included acute myocardial infarction (AMI), congestive heart failure (CHF), and pneumonia. These IQIs were selected to gauge the quality of care of patients within hospital settings. This study found that centralized MHS had the lowest 30-Day readmission rate for CHF (23.65%). In comparison, the CHF rates were 24.75% for moderately centralized and 24.65% for decentralized MHS. Therefore, it can be concluded that when comparing decentralized, moderately-centralized, and centralized hospitals centralized MHS provides the highest level of care for patients based on 30-day readmission rates for heart failure.

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## LIST OF ABBREVIATIONS

ACA	Affordability Care Act
ACOs	Accountability Care Organizations
AHA	American Hospital Association
AHD	American Hospital Directory
AHRQ	Agency for Healthcare Research and Quality
AMI	Acute Myocardial Infarction
CAH	Community Access Hospitals
CDS	Clinical Decision Support
CFAT	Cash Flow After Taxes
CHF	Congestive Heart Failure
CMS	Centers for Medicare and Medicaid Services
COC	Continuity of Care
DRGs	Diagnosis Related Group
ERR	Early Readmission Rates
FHA	Federal Housing Authority
HCA	Healthcare Corporation of America
HUD	Housing and Urban Development
IOM	Institute of Medicine
IQIs	Inpatient Quality Indicators
IRS	Internal Revenue Service

JAMA.....	Journal of American Medical Association
MedPAR .....	Medicare Provider Analysis And Review
MHS.....	Multi-Hospital System
MMA .....	Managed Medical Association
OPPS.....	Outpatient Prospective Payment System
PPS.....	Perspective Payment System
RHC .....	Rural Health Clinic
ROE.....	Return on Equity
SNH .....	Safety Net Hospitals
USDA.....	United States Department of Agriculture

# CHAPTER 1

## INTRODUCTION

### 1.1 PURPOSE OF THE STUDY

Over the years, hospitals have undergone a significant transition with respect to organizational structure. In 2010, there were 5,724 registered hospitals in the United States, 4,972 (86%) of which were community hospitals. Of all community hospitals, 3007 (60%) belonged to a system and 1,535 (30%) were part of a network (Association, 2012c). Considering the increasing challenge to providing access to affordable healthcare in the US and its effect on the economy, it is critical for patients, healthcare organizations, financial institutions, and federal and state agencies to understand the impact of different organizational structures within affiliated hospitals. This study explores the impact of multi-hospital organizational structures on quality of care to patients and the hospitals' financial performance (Madison, 2004). By exploring whether and how hospital organizational structure impacts financial performance and selected quality care measures on a national level, this research seeks to help major stakeholders—government, investors, suppliers, administrators, and patients—to make informed management and care-delivery decisions.

Many studies have highlighted the importance of rural hospitals in US healthcare delivery (Dranove, White, & Wu, 1993; Ermann & Gabel, 1984; Hiatt, 1999). Studies have also highlighted the fact that these hospitals—and the communities they serve—are



facing severe challenges with respect to the availability and quality of care (Harrison, Ogniewski, & Hoelscher, 2009; Hing & Burt, 2007; Joynt, Harris, Orav, & Jha, 2011; Kottke & Isham, 2010) Rural hospitals are closing at a faster rate than their urban counterparts and in a recent controversial study found that the quality of care provided to rural populations is generally lower than in urban areas with counties classified as remote rural as experiencing 19.8%, the highest percentage of individuals reporting fair or poor health (Monnat & Beeler Pickett, 2011). Rural populations also suffer from higher uninsured rates than their urban counterparts—18.7% uninsured rate versus 16.3% (Arcury et al., 2005; DeNavas-Walt, Proctor, & Smith, 2012; Monnat & Beeler Pickett, 2011). Considering these challenges, it is therefore imperative that we examine the impact of the organizational structure on financial performance and quality of care in rural hospitals.

## **1.2 CONTEXT OF THE STUDY**

Healthcare represents nearly 18% of the entire U.S. economy and currently is one of the few bright spots in terms of job growth. Hospitals are an integral part of our healthcare system. In 2010, 1,987 hospitals in the United States (34.5% of total) were classified as rural hospitals, serving primarily rural populations (Association, 2012c). The Office of Management and Budget, classifies counties into two categories: “metropolitan,” populations of 50,000 or greater and “non-metropolitan,” populations less than 50,000. Economic Research Service (ERS) researchers refer to non-metropolitan areas as “rural areas” (USDA, 2012). In this research, we follow this definition of rural hospitals.

In recent years, the social structure in this country has shifted from people mostly living in rural communities to one where most people live in urban areas. This has resulted in the current trend where roughly 20% (or 60 million) residents live in rural areas (Lipsky & Glasser, 2011). However, only 11 percent of US physicians practice in rural areas (Arcury, et al., 2005). The rural community in general is unique with respect to their decreased access to healthcare, which is believed to result in decreases in the utilization of health services (Merwin, Snyder, & Katz, 2006; Simmons, Huddleston-Casas, Morgan, & Feldman, 2012). Further, rural populations are forecasted to incur more difficulty within their communities, most importantly related to sustainability of their healthcare system in the near future. Rural populations tend to be more vulnerable; the residents tend to be older, of a lower socio-economic status, and have lesser access to healthcare providers than urban populations (Bennett, Powell, & Probst, 2010). Further, residents of rural areas spend more, as a ratio of their entire income, on their healthcare than those in urban areas. While lower in dollar amount, the ratios are 50% higher based on the cost-of-care-to-income ratio than for their urban counterparts (Bennett, et al., 2010).

The growth of rural hospitals in the US can be traced to the passage of the Hill-Burton Act of 1945, which helped provide financial means for the construction of rural community hospitals. The Hill-Burton Act provided more than \$6.1 billion in loans and grants that helped construct or update 6,800 healthcare facilities, serving 4,000 communities. When the Act was originally passed, the focus was to assist healthcare facilities that served rural populations (Ricketts & Heaphy, 2000; Simmons, et al., 2012). The Act was seen as a success at the time, allowing rural populations access to good-

quality healthcare. While the Act assisted with the construction of rural hospitals, the introduction of Medicare and Medicaid in mid-1960s ensured that these newly built hospitals were successful, at least until the mid-1970s (Hsia & Shen, 2011; Ricketts & Heaphy, 2000).

As with many federal programs, the funding through the Hill-Burton Act was the catalyst that initiated the building of many hospitals in rural areas, but as time went on, its effectiveness diminished (Bazzoli, Gerland, & May, 2006). The rapid hospital expansion, especially in rural areas, ended, and with it came a high number of hospital closures in the 1980s and 1990s. During the 1980s, the number of rural hospital closures grew each year. While management issues were seen as the crucial point for rural hospitals in the 1980's, 1983 also contained an exogenous shock: the passage of prospective payment (DRGs). This resulted in rural hospitals receiving 25% less per discharge and had a direct effect on the viability of many rural hospitals (Probst, Samuels, Hussey, Berry, & Ricketts, 1999). Twenty-eight rural hospitals closed between 1994 and 1997, about seven each year (Ricketts & Heaphy, 2000). In an effort to assist hospitals to remain solvent, legislation was passed that created medical assistance facilities, rural primary care hospitals, and critical access hospitals (Ricketts & Heaphy, 2000). Some healthcare observers believed that rural hospitals were perhaps an anachronism and that only those institutions that were large and integrated with other larger hospitals would survive. Unsurprisingly, some rural hospitals began to merge with others in order to remain financially solvent and to continue their mission of providing health delivery to local communities. It must be noted here that mergers occur when separate hospitals unite under one shared license. Mergers are thus different from acquisitions, where both

entities keep their unique hospital license numbers but share a common corporate governing body (Cuellar & Gertler, 2003).

Overall, the number of community hospitals in rural areas decreased by 11.8% between 1980 and 1998, largely due to hospital closures, mergers, and conversions (Cuellar & Gertler, 2003; Ricketts & Heaphy, 2000). As mergers within hospitals grew in the 1990s, an increasing number of hospitals joined multihospital systems (Luke, 2006). According to the American Hospital Association, a multi-hospital system consists of two or more hospitals owned, leased, contract-managed, or sponsored by a separate administrative entity (Madison, 2004). They can be both non-federal and non-state hospitals; they are legally incorporated; and they operate under the direction of a board of directors. Accordingly, a rural multi-hospital system can be reasonably defined as any non-federal and non-state hospitals that is leased, under contract management, legally incorporated, and/or under the direction of a board of directors that administers the operations of two or more hospitals that meets the rural criteria (Ermann & Gabel, 1984).

Such hospital affiliations can help hospitals spread to costs associated with the expansion of more advanced and at times costlier services to the communities that they serve. These affiliations can have an effect on aspects of the organization other than just what can be monitored on balance sheets and financial reports (Madison, 2004). However, despite the growing local presence of hospital systems, few studies have examined the effects these changing organizational structures have on the quality of healthcare, the financial stability of the resulting organization, and the overall healthcare market (Cuellar & Gertler, 2003).

Organizational theory suggests that the relationship between organizational characteristics and profitability could vary greatly based on the organizational level and structure under consideration (Hearld, Alexander, Fraser, & Jiang, 2008). Current literature does not focus on organizational structures within multi-hospital affiliations in the rural setting. Even if rural hospitals were included in different studies, it was mainly because they were grouped with all hospitals at a regional or national level. While the utilization of multi-hospital organizations has been studied to some extent, the effect of multi-hospital organizations on financial performance and quality of care have been relatively ignored (Bazzoli, Chan, Shortell, & D'Aunno, 2000; Cleverley, 2001; Cuellar & Gertler, 2005). To address this gap in literature, this study examines the effects of not only multi-hospital organizations but also the different types of administrative structures (based on level of centralization) on the financial performance and quality of care in rural hospitals.

There are both theoretical and empirical justifications to establish the relationship between an organization's characteristics and the quality of care that a patient receives in different hospital settings. Quality of care is defined as "whether individuals can access the health structures and processes of care they need and if the care received is effective" (Moscovice, Wholey, Klingner, & Knott, 2004). The 2001 report from the Institute of Medicine titled "Crossing the Quality Chasm" prioritized the topic of quality of care that patients receive in a hospital environment for medical and healthcare researchers. The implications of structure, process, and outcome provide important measurements and perspectives on how quality should be measured (Moscovice, et al., 2004). Any attempt to summarize this relationship across different settings could easily be confounded due to

conflicting relationships (Hearld, et al., 2008). In a 1997 article, Mitchell and Shortell concluded that future health services research should focus on lower- or unit-level relationships to accurately understand overall quality of care, while Alexander et al. (1985) concluded that the quality of care offered by a hospital should be constantly examined using an organizational approach (Hearld, et al., 2008).

Although many studies have considered hospitals as the unit of analysis, these studies have examined the outcome of quality based on a hospital's internal organization and structure. The main areas of exploration within this subset of quality of care have been the relationship between staff and ownership with respect to 30-day mortality rate. While these studies have been helpful in providing some guidance, they have not examined rural hospital's centralization within multi-hospital organizations and the quality of care that these particular organizations provide for their patients and the communities they serve. Thus, rurality-along with the impact of centralization of management on financial performance and quality of care—is an important area of exploration within the healthcare literature.

### **1.3 RESEARCH QUESTIONS AND HYPOTHESES**

The proposed study therefore seeks to examine issues that may have a direct impact on the overall organization of rural hospitals, and the health delivery outcomes that these hospitals provide to the local population. In doing so, the study seeks to bridge an important gap in the current healthcare management literature. The studies' first research question is to examine the effect of rural hospitals' organizational structure—as measured by level of centralization, i.e., centralized, decentralized, and moderately centralized—on their financial performance. The study will identify how organizational

structure of rural hospitals affect; return on equity (ROE), operating margin and (number of) days cash on hand.

The second research question is to examine the effect of rural hospitals' organizational structure—as measured by level of centralization, i.e., centralized, decentralized and moderately centralized—on patients' quality of care. The specific research questions examined are: how does the organizational structure of rural hospitals affect 30-day readmission and mortality rate for patients previously treated for or heart attack (acute myocardial infarction, AMI), congestive heart failure (CHF), and pneumonia.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 RURAL HEALTH SYSTEMS

The term “rural,” though seemingly straightforward, is not easy to explain. The U.S. Office of Management and Budget classifies counties into two categories: “metropolitan,” populations of 50,000 or greater and “non-metropolitan,” populations less than 50,000. The U.S. Department of Agriculture’s (USDA) Economic Research Service refers to non-metropolitan areas as “rural areas” (USDA, 2012). The University of Washington, in collaboration with the Economic Research Service, has further detailed rural areas based on rural-urban commuting areas. Accordingly, there are three main subgroups: large rural towns, small rural towns, and isolated rural towns. Large rural towns have micro population cores and commuting trends and patterns that are similar to urban areas. Small rural towns have populations of between 2,500 and 9,999 residents with no main form of transportation to urbanized or urban clusters. Isolated rural towns, the least populated rural areas, do not have any main commute or transportation flow patterns to urbanized areas or urban clusters (West et al., 2010). While this definition of rural is more detailed and helpful for administrative and planning purposes, we follow the broader definition specified above (that is, non-metropolitan areas with population below 50,000). Figure 2.1 indicates the geographic rural disparity between urban, large rural and small or isolated rural areas within the United States (HRSA, 2007).



Rural communities tend to have weaker economies, higher poverty, and higher unemployment than their urban counterparts (Trinh & O'Connor, 2000b). Further, the rural population in the U.S. has historically been older, poorer, and more dependent on local resources for their medical care. According to a recent study, 15.1% of rural citizens live in poverty, compared to 12.9% of urban residents, with 88% of counties experiencing persistent poverty being those of rural counties (Simmons, et al., 2012). Rural residents visit their medical home less frequently and often do so later in their illness. These same rural residents suffer from decreased access to care, lack of insurance, and travel restrictions associated with obtaining their needed medical care (Harrison, et al., 2009). Rural hospitals have historically had a harder time attracting clinical and professional staff. This has led to a noticeable difference between urban and rural hospitals. Based on risk pooling, urban hospital have a larger paying population that pay for a hospitals fixed costs compared to rural hospitals. Urban hospitals are able to afford the latest technology. Rural hospitals are often plagued by low occupancy rates, higher labor costs, and older facilities compared to their urban counterparts (Trinh & O'Connor, 2000a, 2002).

A 2008 study found that 31.8% of residents in rural communities bypass their local community for primary care when asked, “Where do you usually go for primary medical care and is this place located in your community?” (Liu, Bellamy, Barnet, & Weng, 2008). Patients who said they would bypass their local hospital were often younger, better educated, and of higher incomes than patients who utilized their local rural hospital facilities. In addition, patients from areas with low primary care physician (PCP) density were more likely to bypass their local critical access hospital (Liu, et al., 2008). Prior research has found that patients that are both in rural areas and also suffering

from more chronic illnesses were more likely to travel longer distances for their care (Gregory et al., 2000). This can be attributed to patients with more acute and life threatening conditions to be willing to travel longer distances in order to receive the specialized care that they might require. Also, patients that traveled longer distances were seen to have incurred hospital bills that were higher than similar patients that used the same hospital, but were seen as local patients (Basu & Mobley, 2007). Patients noted that one of the largest determining factors for their willingness to travel longer distances for health services was; to gain access to a larger scope and access to advanced teaching activities (Tai, Porell, & Adams, 2004).

While hospitals are important to the overall wellbeing of the communities that they serve from a healthcare standpoint, they are viewed as an important staple from an economic standpoint. In many rural areas, the community hospital is one of the largest employers and is an integral part of the financial stability and social capital of the community. Many of the community's healthcare professionals work either directly or indirectly with the community hospital. Other businesses within the community are also economically supported by local hospitals (Probst, et al., 1999). A 2011 study found that rural communities with a Critical Access Hospital (CAH) benefitted economically when compared to similar communities that did not have a CAH (Ona & Davis, 2011). Thus, the literature indicates that rural hospitals contribute significantly to the local economies and that these rural hospitals are a major source of employment and financial stability to the community infrastructure.

Recent studies have examined the effect of hospital closures on rural communities. In 2007, Escarce, et al., found that safety net hospitals and public health

clinics usage greatly increases when an emergency department closes. This is especially true within the rural communities where the population is already disadvantaged compared to their urban counterparts (Bazzoli, Lee, Hsieh, & Mobley, 2012).

## **2.2 HISTORICAL TRANSFORMATION OF RURAL HEALTH SYSTEMS**

Many scholars point to the Flexner Report of 1910 as one of the major transitions within the delivery of healthcare in the United States. The Flexner Report was commissioned by the American Medical Association to assist in the transformation and practices within medical education in the United States. On June 11, 1910, the *Journal of the American Medical Association (JAMA)* announced that The Carnegie Foundation for the Advancement of Teaching (CFAT) would issue its report on the status of medical education in the United States (Barr, 2011). The reasoning for the imminent need for this report was to gauge the variances in medical school education. Medical schools within the United States varied greatly and frequently provided inadequate education to their students (Beck, 2004).

### *Unintended Consequences of the Flexner Report on Rural Hospitals*

Abraham Flexner conducted the report as part of a broader medical transition that had been evolving over the previous decades (Duffy, 2011). Within 18 months, Flexner traveled across the United States evaluating all 155 medical schools to highlight the deficiencies and variability in medical education from the viewpoint of a medical educator (Beck, 2004; Gallagher, 2010). He painstakingly detailed the deficiencies and variability of the education that medical students received in the United States (Duffy, 2011). After concluding his research, Flexner recommended improvements to ensure a uniform standard of education throughout all medical schools in the United States. These

recommendations included, but were not limited to; of heightened admission standards with stricter curriculum requirements, increased medical research and education in both a laboratory and hospital setting, and allowing states the ability to license medical doctors to practice in a state (Beck, 2004). The Association of American Medical Colleges viewed the Report as a success for its ability to increase the uniformity and quality of education that medical schools provided. Notwithstanding, the elitist image of the medical profession, salaries and need for medical doctors all increased while the number of available practitioners decreased (Drake, 2013).

However, the implementation of the Flexner Report had unintended consequences. It is estimated that 7-12% of all medical schools within the United States closed immediately following the releasing of the Report because they did not meet the recommended standards. Over the next few years, as many as 22-38% of medical schools closed or merged because they were not able to adhere to the higher standards set forth by the report. This affected medical schools and students that represented vulnerable populations, including rural, small, and minority focused medical schools (Hiatt, 1999). This resulted in a shortage of physicians across US, and particularly in rural areas. As a result, health care delivery and access to care greatly diminished in many rural hospitals.

Prior to the Flexner Report, many rural hospitals were small non-affiliated hospitals located in a physician's home, where he/she provided skilled medical care. In many cases, the quality of care differed greatly depending on the training of the physicians. Moreover, many physicians at the time had received a majority of their training through an apprenticeship. One of the inherent flaws with such an unregulated form of training is that the new physician could, in many cases; carry on the inferior

practices taught by his predecessor. Those who received a college-based education also had a wide range of quality education available. In many cases physicians who practiced in rural areas attended colleges that might have provided an inferior education. This, however, was sometimes the only avenue of education available to people wanting to go into the medical field (Duffy, 2011). African-American medical students and those of lesser financial means were often taught at medical schools that ultimately closed down or merged with another institution after the publication of the Flexner Report.

### *Subsequent Legislative Changes Impacting Rural Hospitals*

In the years after the Flexner Report, the healthcare industry in the United States evolved significantly. Major contributory factors affecting this evolution have been the various legislations over the years. The introduction of the Hospital Survey and Construction Act of 1946, widely known as the Hill-Burton Act or PL 79-725, was signed by President Harry Truman on August 13, 1946 and was largely viewed as a construction program for healthcare facilities (Clark, Field, Koontz, & Koontz, 1980). It was introduced as a vehicle to improve the quantity and quality of hospitals within the United States. The Hill-Burton Act focused on building hospitals in rural areas, but many different types of facilities, including skilled-nursing, outpatient facilities, and public health centers, were beneficiaries of its provisions. Prior to 1946, there was stratification of hospitals and physicians with communities of lower socioeconomic standing and/or rural areas suffering from diminished access to care (Mantone, 2005).

Interestingly, the Hill-Burton Act originally had further-reaching ambitions to shape the healthcare industry. There were initially provisions within the law that provided universal healthcare coverage for all Americans. President Truman, an advocate of this

plan, ultimately had to drop this component because opponents felt that would be too costly for the times (McLaughlin, 2005). Researchers, politicians, and the medical community as a whole are torn as to the relative success of the program. A 1980 article noted, “The Hill-Burton Act was unsuccessful in effecting changes in the distribution of physicians through bed distribution” (Clark, et al., 1980). Many scholars view the disproportionate distribution of physicians as a direct result of the lack of hospitals and other medical facilities. Building hospitals was viewed as the most straightforward and effective course to provide needed healthcare to many American communities. Funding for medical facilities, mainly hospitals, was available to all states, but was designed for the poorer states, with the federal contribution being a derivative of a state’s per capita income (Clark, et al., 1980). The federal government helped share the cost of building and updating medical facilities.

In response to the Hill-Burton Act, over a six-decade period, the federal government disbursed over \$4.6 billion in grants and \$1.5 billion in loans (Clark, et al., 1980). According to the Federal Health Resources and Services Administration, these funds were utilized for the construction of about 6,800 healthcare facilities and more than 4000 communities (Mantone, 2005). The federal government attached provisions to any funds that states received. For example, facilities or a soon-to-be-updated portion of a facility must be available to all persons residing within the territorial areas of the application, and a portion of facilities being built or modernized were made available to members of the community who cannot pay for medical treatment (Mantone, 2005; Strunk & Ginsburg, 2004).

Medicare, signed into law on July 30, 1965 by President Lynden B Johnson, provided guaranteed health benefits to seniors. In 2003, President George W. Bush signed the Medicare Modernization Act (MMA). This Act carried exceptions of historical significance because the MMA included outpatient drug coverage for Medicare recipients. Medicaid was created through the addition of Title XIX to the Social Security Act of 1965. Medicaid is an entitlement program designed to assist states to provide health coverage for low-income families and/or other individuals who meet certain eligibility requirements. These eligibility requirements include benefits for the blind, aged, disabled, and pregnant women. Each state administers its own Medicaid program, establishes unique eligibility requirements, determines the scope of services provided, and establishes a reimbursement rate. CMS monitors the state-run programs and establishes criteria to ensure that states practice within federal guidelines.

After the 1983 implementation of PPS, researchers began to notice increasing rates of closure of rural hospitals due to reduced Medicare payments. The CAH designation was introduced as a possible resolution to mitigate the effects of hospital closures. This was closely linked to the introduction of reimbursement mechanisms aimed to encourage efficiency and quality improvement within all healthcare organizations, especially rural hospitals (Garcia-Lacalle & Martin, 2010). Legislation within the Balanced Budget Act of 1997 (BBA) assisted rural hospitals by allowing them to convert to CAHs. This allowed rural hospitals to change their Medicare payment scheme from a Prospective Payment System (PPS) to a cost-based system (Li, Schneider, & Ward, 2009). For a hospital to be classified as a CAH, the organization must meet certain requirements. These requirements include: must be not-for-profit; located in a

non-Metropolitan Statistical Area that is at minimum 35 miles away from another short-term hospital (this is reduced to 15 miles in areas classified as mountainous); have 25 or less total beds, of which 15 or fewer should be acute care, and a 24 hour emergency service facility; at least 1 physician and 1 registered nurse on-site at all times; each hospital must maintain at most, a 96 hour average length of stay for acute-care patients; and there must also be an agreement with an acute care hospital for patient referrals. This was later adjusted in the Budget Refining Act of 1999, with a change to the length of stay to an annual average of 4 days. In 2003, there was a further refinement associated with the Medicare Modernization Act that would allow CAHs to use up to 25 beds for acute care with all other elements of previous legislation to stay static (Li, et al., 2009; Ona & Davis, 2011).

CAHs received reimbursements at 101% of the Medicare authorized rate, but in turn, the hospital had to accept certain restrictions set forth by the federal government (Meit & Knudson, 2009). Literature has shown that rural hospitals before the conversion to CAH were facing financial hardship. A 2004 study found that over half of the converted CAHs were losing money prior to their affiliations and new payment structure allotted by being categorized as a CAH (Cameron, Zelman, & Stewart, 2001; Li, et al., 2009). A 2009 study found that rural hospitals that converted to CAH were able to increase their operating revenue, expenses, and margins significantly (Li, et al., 2009). After the conversion, these hospitals increased their profit margin by 2 to 4% (Stensland, Davidson, & Moscovice, 2004). In 2001, one in every nine hospitals was a CAH. A year later, one in every seven hospitals and one in every three non-metropolitan area hospitals were classified as CAH.



More recently, the Patient Protection and Affordable Care Act of 2010 (ACA), signed into law by President Obama on March 23, 2010, represented a major advancement in a long effort to achieve some form of universal health coverage for all Americans. This act is seen as a law that will dramatically alter the way in which healthcare is financed and delivered in the United States (Gorin & Moniz, 2012). If fully implemented, the Affordable Care Act has the potential to improve population health in three avenues: increasing the number of citizens with meaningful insurance coverage; increasing the value of insurance coverage for addressing preventative health needs; and improving access to healthcare professionals and hospitals. Along with the Recovery Act, it involves some of the most sweeping legislation affecting our nation's healthcare systems since Medicare was enacted in 1965 (Kocher & Sahni, 2010).

The Affordable Care Act's Title VII, Section 747, specifically helps extend the quality and availability of healthcare available to underserved populations (Bodenheimer, Grumbach, & Berenson, 2009). This will have a direct effect on rural citizens. Ultimately, many issues that rural hospitals face will be mitigated since healthcare coverage will not only be available through a person's employer, but also personally through an exchange. Individuals will have easier underwriting guidelines and, most importantly, will not be exempt based on their ability to pay for pre-existing conditions.

In summary, the current healthcare system has been a movement that can be traced back to 1910 and the Flexner Report and currently to the Affordable Care Act of 2010. Within the last century, important pieces of legislation have continued to make a direct and lasting effect on the landscape of our hospitals and hospital systems.

### **2.3 EMERGENCE OF MULTI-HOSPITALS SYSTEMS (MHS)**

Over the years, legislative changes have had significant implications on the organization and operation of hospitals, especially rural hospitals. One particular development has been the emergence of MHS. These newly formed multi-hospitals were creating larger, increasingly diverse hospital systems than had ever been seen in the United States. This growth also revealed how little was known about hospital systems (Bazzoli, Shortell, Ciliberto, Kralovec, & Dubbs, 2001; Luke, 2006). In 1994, the number of hospitals that were part of a health network or system was 56.2%, compared to 3091 or 63.2% in 1999, and 72.1% in 2000 (Association, 2007; Rosko & Proenca, 2005). The American Hospital Association did not survey hospital systems about their management models or business lines until 1981 (Ermann & Gabel, 1984). The number of solo hospitals that are not part of any MHS has been in decline since the merger boom of the mid-1990s. Since this time, many solo hospitals have decided to join established hospital systems (Cuellar & Gertler, 2003). The hospital merger and acquisition boom of the 1980s gave way to a wave of hospitals joining multihospital systems.

The AHA defines MHS as nonfederal and non-state hospitals that are leased, under contract management, legally incorporated, and/or under the direction of a board of directors, that determines the central direction of two or more hospitals. These hospitals are assigned system identifiers in a given year that retained the same identifier as another hospital (Ermann & Gabel, 1984; Madison, 2004). The AHA has been collecting data on MHSs from the mid-1970s until today (Bazzoli, et al., 2006). The current multi-unit hospital structures are the byproducts of the mergers and affiliations that started in the

late 1960s (Luke & Wholey, 1999). The three main elements that distinguish hospital organizations are differentiation, integration, and centralization (Bazzoli, et al., 2000).

One of the major trends noticed was the effect that the political environment has had on the corporate structure of hospitals. An example of hospitals reacting to political challenges is the move in the mid-1990s to merge delivery systems in response to President Clinton's Health Security Act of 1994 (Bazzoli, et al., 2000). Multi-market healthcare systems in general are increasing in their popularity. A 2003 study found that 75% of hospital systems belong to a local cluster where there is at minimum one other system partner within the same market (Bazzoli, et al., 2000; Bazzoli, et al., 2006). The utilization of different hospital structures has become a useful tool for all stakeholders, as it can be used as an indicator of performance. There is great value in understanding the overall implications that organizational structures have on our healthcare system. This information will become more valuable as more research is conducted on it, as it will help healthcare leaders, researchers, and policymakers ensure that optimal decisions are being made with respect to the overall health of a region's healthcare delivery (Dubbs, Bazzoli, Shortell, & Kralovec, 2004).

Multi-hospitals systems can differ on many different dimensions; one main difference is the type of hospital's organizational structure. Accordingly, different types of health systems (or networks) as shown in Table 2.1—centralized, moderately centralized, and decentralized—can exist (Madison, 2004).

System structural arrangements are associated with a wide range of factors. Regarding for-profit systems standardize management practices and centralize decision-making, historic autonomy is preserved in order to facilitate mergers and acquisitions,

and public systems have minimal levels of centralization for historic reasons (Bazzoli, et al., 2000). Centralization would be measured at the organizational level where decisions are made, and rely on the input of survey participants answering questions asked on hospital reporting survey (Bazzoli, et al., 2001). In 1967, researchers identified two key challenges faced by organizations. These challenges include the ability to differentiate themselves from other organizations while simultaneously integrating into the broader service market. Differentiation implies a number of different products and/or services that the organization offers to its consumers, including the development of specialized knowledge and organizational intellectual elements (Lawrence & Lorsch, 1967). The current trend within multi-unit hospital systems is favoring moderately centralized and/or decentralized system structures. These systems are able to provide more localized care for patients (Bazzoli, et al., 2001; Cuellar & Gertler, 2003).

#### *Benefits of Multi-Hospitals Systems*

The degree of centralization within a healthcare system might have both positive and negative effects on different aspects of the organizations properties (Dubbs, et al., 2004). Researchers explore and provide the appropriate type and amount of services through the continuum of care. Integration of services refers to the organization's ability to construct an organizational system that would provide optimal service value. Using owners of various services and programs of the continuum of care and contractual relationships with organizations can accomplish this integration. Within vested organizations, this integration and contractual-based integration can be utilized either horizontally or vertically (Goldsmith, 1994).

There might be operating incentives to more decentralized hospitals structures, but greater centralized healthcare systems might be optimal in certain financial or capital related environments (Dubbs, et al., 2004). There is a strong debate that focuses on the relative cost-effectiveness and financial viability of these different forms of integration. Hospitals have an increased need for capital investments in order to upgrade and maintain medical equipment and infrastructure. The utilization of integrative structures is an organizational element that may be built into contractual obligations. While these obligations can add costs to the organization(s), they strengthen the linkage across contractually invested organizations (Bazzoli, Shortell, Dubbs, Chan, & Kralovec, 1999). Hospital boards opt to join an MHS because the membership provides desirable benefits, including information exchange, access to capital, increased efficiency and economies of scale (Ermann & Gabel, 1984; Luke, 2006; Rosko & Proenca, 2005). We discuss these briefly here:

- Information Exchange-The utilization of clinical decision support (CDS) has increasingly become an important aspect for healthcare managers. These systems have been used in diagnosing patients' overall conditions along with recommendations for treatments, determining proper drug usage, and reminding administrators of preventative medical treatments. Clinical managers have increasingly increased their dependency on health technologies to provide health related information to make optimal decisions related to the quality of care provided to patients (Wong, Legnini, & Whitmore, 2000). When compared to hospitals that are not part of a multi hospital system, information transfer between participating hospitals in an MHS increases the ability to transfer data. The

partnership between hospitals within multi-hospital systems leads to greater interaction between healthcare professionals across hospitals, information about new medical procedures and treatments have the ability to be shared throughout the entire hospital system (Madison, 2004).

- Access to capital- The actual infrastructure of hospitals requires a great deal of capital to update, renovate, expand, and modernize. The capital requirement also includes the costs related to maintaining staff and other fixed costs associated with the day-to-day business of the organization. These requirements, along with a decrease in philanthropy and government grants, have made it necessary for hospitals to explore alternate avenues of capital (Ermann & Gabel, 1984). Hospitals that were part of a system tend to have more optimal financial performance than hospitals that are not part of a network (Rosko & Proenca, 2005). The financial underwriting community provides a more favorable borrowing and credit risk assessment to hospitals that are part of a hospital system rather than stand-alone hospitals. This stems from the technical advantage to debt underwriting with respect to spreading the risk of default over a number of hospitals rather than a single unit that is subject to community, environmental, and/or structural issues. Historically, hospitals that were members of multi-system organizations had higher credit ratings than those of stand-alone hospitals (Bazzoli, et al., 2000). While the spread of debt origination might only be a few hundred basis points, this difference can greatly affect the overall health of a hospital's income because of the massive amount of capital that is needed to adequately fund their short-term and long-term financial obligations. Multi-

hospital systems do appear to have a advantage over solo hospitals with respect to variable-term corporate, capital-market, debt-origination, and pricing (Ermann & Gabel, 1984).

- Increased efficiency- The utilization of consolidated human and financial operating expenses in multi-system hospitals allows increased efficiency by sending needed and available resources to their optimal location. It is through this combination of human and financial capital that MHSs are able to increase their efficiency through pooling of required resources (Levitz & Brooke, 1985). Many MHSs have increased efficiencies and scope by integrating physician practices, nursing homes, and outpatient rehabilitation centers (Stewart, 2012).
- Economies of scale - Hospitals that are part of an MHS in underserved areas appear to benefit more from being part of these systems. These units are able to transform their economic power into political powers, which can be used to influence both local and state agencies (Hearld, et al., 2008). The term, “countervailing power,” was used by the economist Galbraith to suggest that markets could increase efficiencies to offset higher levels of power by either buying or selling goods or services (Luke & Wholey, 1999). This would hold true with multi-unit hospitals because they would be able to use their served populations in a way to negotiate better contracts on insurance premiums and goods required to provide their services.

A 2007 study found that hospitals that were members of an MHS were able to increase the procedure compensation that they negotiated with insurers compared to their non-member counterparts. This is in response to many years of little to no growth by

hospitals on the prices that they charge for their services (Strunk & Ginsburg, 2004). Hospitals have been able to turn to mergers or joining multi-hospital systems within their local markets as a way to increase the prices that they are able to negotiate with insurers (Abraham, Gaynor, & Vogt, 2007). From a price negotiations or bargaining standpoint, there is more variance and strength given to larger multi-system hospitals because they are able to utilize their wide servicing market as a way to increase their demands for reimbursement from payers. This is in contrast to earlier studies that indicated that larger insurers were able to use their market power/strength to negotiate lower payments and minimize discounts given to non-networked hospitals (Cuellar & Gertler, 2003). In theory, hospitals have been utilizing the same tactics as insurers, or payers in a form of “meeting force with force.”

Within health services research, the debate over centralized-decentralized organizational structures has been researched from both individually and system-wide standpoint. The degree of organizational centralization affects both the time with which critical decisions are made and the ability to efficiently produce innovative products and services amid accountability to various stakeholders. Historically, hospital executives and administrators have been stakeholders in the development and implementation of ground-based organizational strategy. (Bazzoli, et al., 1999). While the current economic research associated with these business tactics are limited in number and scope, a 2000 study did analyze the association between hospitals within a system and prices of reimbursements. This study was focused solely on non-profit hospitals, but the study did find there was a significant positive relationship between non-profit hospitals part of a multi-hospitals system and the amount of reimbursements from their insurance carriers.



More recently, a 2005 study found that the formation of MHSs memberships had a positive effect on negotiated hospital charges similar to that of ownership of relationship price structures. The study looked at only four states, but found that within these states, multi-hospitals were reimbursed on average 4.1 to 7.7% higher than non-system hospitals within similar geographic regions (Cuellar & Gertler, 2005).

## **2.4 MULTI-HOSPITAL SYSTEMS IN RURAL AREAS**

Transaction costs theory indicates that centralizing organizational structures and services at a system level might lead to reduced costs within aspects of both variable and fixed expenses (Rosko & Proenca, 2005). The current environment includes increasing competitiveness, higher regulation, and politicized environments. Rural hospitals rely on organizational affiliation with an MHS as an avenue to increase financial performance and quality. Rural hospitals explore the possibility of becoming part of a multi-hospital system as a way to compete with larger urban competitors. In recent years, the growth of multi-hospital systems has been seen as a way to provide the necessary support and strength to survive as an independent entity. Rural hospitals also view joining an MHS as an optimal alternative to the necessary financial support and strength required for survival and can help avoid mergers from investor-owned systems. Joining multi-hospital systems can integrate access to technical resources from larger “hub” hospitals, which increases quality of care for patients. The utilization of multi-hospital structures allows rural hospitals an opportunity to develop relationships with previously competing organizations for patients and resources (Grim, 1986).

It is estimated that about 40% of multi-hospitals have multiple facility locations. The distance between hospitals within multi-hospitals systems tends to vary greatly, as

some multi-hospitals are formed in clusters within the same market, while others are freestanding of each other or servicing different markets (Luke, 2006). Multi-hospital systems might consist of large urban hospital(s) that offer a number of innovative procedures, but are also able to utilize their rural hospitals to attract patients that normally would not have access or knowledge of certain highly specialized procedures. System affiliated hospitals have a higher utilization compared to their stand-alone rural hospitals. These findings continued to strengthen the finding that indicated the system-affiliated hospitals have higher utilization of inter-organizational communication (Bazzoli, et al., 2000; Ermann & Gabel, 1984).

Multi-hospital affiliations can encourage the expansion of high tech and expensive techniques. The medical professionals that practice at multi-hospital units in rural areas could prefer highly selective procedures be conducted at larger, more advanced urban facilities, all the while having access to their patients and ability to provide post procedure care efficiently (Ermann & Gabel, 1984; Madison, 2004). Rural hospitals that offer a wide range of procedures and have comparable facilities to their urban counterparts might not need to transfer their patients to larger urban centers. This situation is unique since rural hospitals have historically serviced a narrower scope of patient conditions than their urban counterparts (Melnick & Keeler, 2007).

Historically, rural hospitals have found it hard to stay solvent while having to retain an optimal position with respect to staffing and other overhead expenditures. With the recent expansion of health information technology, many rural hospitals view new technology as a critical part of their overall ability to compete with hospitals in an urban setting (McSwain, Rotondo, Meade, & Duchesne, 2012). There is a critical need for large

sums of capital to sustain any hospital, regardless of size. This has led to a management shift toward multi-hospital systems. This is because multihospital systems have the ability, due to economies of scale, to negotiate better contracts compared to what might have been able to be obtained if these multi-hospital systems were organized independently. System wide, smaller hospitals, by virtue of their own business structure, constrain the ability for these hospitals to invest in larger or more expensive medical facilities. With independently run hospitals, the sole entity is the producer of revenue and the sole reinsurer of financial performance. This makes it very difficult for solo hospitals to invest in any large element without known risks (Levitz & Brooke, 1985).

Studies have been inconclusive in their findings with respect to multi-system hospital affiliation and profitability. A 1990 national study found that there was no significance between network or multi-system affiliation and debt structures in rural hospitals (Mick & Morlock, 1990). In 1992, Lillie et al. found that from 1985-1988, small hospitals (less than 50 beds) located in areas of high unemployment and low per capita incomes were at greater risk of closing (Lillie-Blanton et al., 1992). A later study in 1997 confirmed earlier studies that small rural hospitals can attribute their increased profitability, in terms of positive cash flow, to internal organization factors that hospital administration can control (Moscovice & Stensland, 2002). When comparing rural hospitals in Florida that are part of a multi-hospital system compared to standalone counterparts, MHS showed to have more critical services implemented. With respect to laboratory information systems, 83.3% of system-affiliated hospitals had clinical IT applications versus 38.5% of standalone hospitals, 86.7% of pharmacies in system-affiliated versus 36.2% in standalone hospitals, and with respect to chart tracking, 53.3%

of system affiliated hospitals versus 30.8% of standalone hospitals (Menachemi, Burke, Clawson, & Brooks, 2005).

## **2.5 IMPACT OF MHS ON FINANCIAL PERFORMANCE OF HOSPITALS**

The financial performance of rural and urban hospitals has increased to the point that policymakers have started to take notice of the disparity (Wang, Wan, Falk, & Goodwin, 2001). Studies have been inconclusive in their findings with respect to multi-system hospital affiliation and profitability. Shortell et al. (1996) reported that larger hospitals were less profitable and were less efficient, which resulted in longer lengths of stay for the patient (Shortell, Gillies, Anderson, Erickson, & Mitchell, 1996). A later study in 2003 found higher cash flow margins in for-profit hospitals compared to not-for-profit hospitals. This stems from better internal factors, most notably lower overhead staffing and benefit expenses (Byrd & McCue, 2003). A major issue relates to the definition of profitability. Some researchers use profitability by its strict account definition, while others address profitability with respect to cash flow (McCue & Nayar, 2009). Cash flow is seen as the optimal element within hospitals to indicate financial performance. Cash flow is less subjective to variations in accounting practices. In many cases, organizations can utilize different aspects of generally accepted accounting practices to manipulate financial elements of profitability. Also, cash is used by organizations to pay expenses and is one of the true benchmarks because it has very little variation between organizations. A 1995 study indicated that hospitals that were part of a multi-hospital system were more cash flow positive than hospitals that were not members of a multi-hospital system (42,286 vs. 37,794 [1995 USD]). Multi-hospital systems also had higher net revenue per adjusted discharge (4611 vs. 4493 [1995 USD]). It is also

noteworthy that multi-hospital systems also had higher operating expenses per adjusted discharge than non-multi-Hospital systems (4520 vs. 4486 [1995 USD]) (Clement et al., 1997).

A 1990 national study found that there was no significance between network or multi-system affiliation and debt structures in rural hospitals (Mick & Morlock, 1990). Research of hospital profitability in the State of Virginia in 1993 had an operating margin of 4.79 vs. 4.07 for urban hospitals compared to rural hospitals (a variance of 17.69%), and a corresponding return on assets of 11.77 vs. 11.52 (a variance of 2.12%). The gross revenue per admission in rural hospitals was \$6,037 vs. \$7,787 for urban hospitals, a variance of -23.36% (Wang, et al., 2001). This research is both outdated and representative of hospitals in Virginia only, but it helps provide a guide to possible trends with respect to the profitability variance of urban and rural hospitals.

In an effort to incentivize a decrease in the number of patient visits to hospitals for the same medical ailment, CMS initiated the prospective payment system (PPS). This new payment scheme pays hospitals a fixed amount per 60-day timeline of care. A resulting trend is an increase in the amount of market penetration in historically lower overhead, high margin avenues of care, for example, home health care (Stensland, et al., 2004).

Several studies have addressed the issue of organizational structure and its effect on financial performance. For instance, Müller and colleagues took a look at the closures of 161 CAHs from 1980 to 1987. These hospitals were then match-controlled with 482 rural hospitals that had remained open during this same period of time. This study determined that system affiliation significantly decreased the risk of rural hospitals

closing (Mullner, Rydman, Whiteis, & Rich, 1989). Cleverly (1992) conducted a larger study that explored 5,722 hospitals with complete Medicare Cost Report data for the three-year time period of 1986 through 1989. This study utilized a matching function with a comparison linkage to independent hospitals and/or independent hospital systems. This research concluded that system hospitals had a higher return on equity and a higher costs per care mix-adjusted discharge, higher profits through more aggressive pricing strategies, and greater capital investments when compared to independent hospitals (Cleverly, 1990).

In 1992, Sears researched profitability within several for-profit hospitals. He found that for-profit hospitals were more profitable than nonprofit hospitals (Sears, 1992). In 2003, Young et al. expanded on Sears's earlier 1992 study by including elements of return on investments, studying both for-profit and nonprofit hospitals in Florida from 1982 to 1988. This research concluded that elements such as hospital profit status conversions, occupancy rate, and teaching affiliations were important factors in determining a hospital's overall profitability. Young later used data from 1991 to conclude that rural hospitals were less profitable than their urban counterparts (Young, 2003). National research by Walker et al. in 1993 found that financial variables such as return on equity, used without the integration of other financial variables and profit structure elements, failed to distinguish differences between for-profit and nonprofit hospitals (Walker, 1993).

Halpern and colleagues' findings reiterated earlier findings and examined 2,705 rural hospitals from 1983 to 1988 in a longitudinal study. (Halpern, Alexander, & Fennell, 1992). This study also expanded on prior research with respect to system

affiliation with IO systems significantly reducing the survival of rural hospitals while larger rural hospitals had higher survival rates (Halpern, Alexander, & Fennell, 1992). Succi and colleagues explored all rural hospitals from 1984 through 1991 utilizing a pooled cross-sectional design controlling for: size, ownership, performance, market conditions, and time trends. The findings contradicted earlier studies that showed a hospital's affiliation with a hospital system not directly affecting its closure rate, but it did significantly increase the likelihood of these hospitals to convert to a non-hospital facility. Succi (1996) also explored all CAHs in research through cross-sectional time series. In this research, it was concluded that hospitals benefited moderately from affiliating with a system (Succi, Lee, & Alexander, 1997).

Menke explored 2,200 hospitals with complete organizational and financial data in cross-sectional research with a two-stage estimation model to minimize selection bias. It was within this research that systems and independent hospitals were found to have different cost functions. The research went on to conclude that the costs of system hospitals were lower than those of independent hospitals. However, there were no significant differences in costs by ownership among system hospitals and economies of scale or volume for system hospitals. Clement (1997), researched 2,500 short term, acute care, and nonfederal urban hospitals with complete financial data from October 1994 through September 1995. This study was conducted using a cross-sectional design. It was concluded that membership in alliances was positively associated with net patient revenue but had no significant relationship with cash flow or expenses (Menke, 1997). Chan Feldman and Manning (1999) conducted research on 335 rural hospitals from 1988 through 1992. This longitudinal study concluded that size of a consortia resulted in a

curvilinear relationship with member hospitals' cost revenues and profitability. Member hospitals benefited from the increase in consortium size, but the benefit decreased as the consortium became too large (B. Chan, Feldman, & Manning, 1999). Table 2.2 summarizes these key findings of the effect of organizational structure on financial performance.

### *Hospital Closures*

Unfortunately, hospital closures have been on the rise because of continued pressure to obtain positive return on investments and profitability. A quiet trend within the industry has been the closure of hospitals. The current change in the economic market inhibits mergers either by explicitly discouraging them or by limiting the size and scope of the transaction (Kole, 1997). Removal of the profitability "safety net" provided by regulations and stricter lending guidelines introduced a substantial downside risk for this sector of healthcare. As a result, hospitals that engage in unprofitable mergers will face the possibility of bankruptcy or having to exit the market completely.

Hospital closures further affect deteriorating conditions in many rural communities and their residents since hospitals are seen as the heart of community health systems (Horwitz & Nichols, 2011). About 15% of all acute care hospitals have closed nationwide in the last 25 years. These are normally second tier healthcare facilities used for the short-term treatment of a disease. Patients are treated for a brief period and then released or transferred to another hospital (Topping, 1997). Another 30% have been forced to merge their emergency departments with neighboring hospitals. With the implementation of perspective payment, many rural hospitals have been disproportionately



at a disadvantage because of their relative smaller size, older infrastructure, and limited alliances and/or ability to refer patients to an “in house” facility (Succi, et al., 1997).

Safety net hospitals (SNHs) are an integral part of the U.S. healthcare system in that they are legally obligated to accept all patients and provide care for a disproportionately high number of disadvantaged populations. These hospitals are traditionally located in areas with a high percentage of disadvantaged populations (Bazzoli, Kang, Hasnain-Wynia, & Lindrooth, 2005). The closure or for-profit conversions of SNHs in rural areas appears to negatively affect access to care for disadvantaged populations that reside near these hospitals. This originates from the change in the structure of services in that non-SNHs are not required to provide community-centered services (Bazzoli, et al., 2012).

Travel time is viewed as a barrier to care access for patients who are traditional serviced by an SNH. A 2012 study found no positive correlational throughout all patient demographic groups between SNH closure and increased travel time to receive care. Uninsured women on average traveled an extra 3.29 miles to receive care, while uninsured Hispanic women travel 5.87 miles. In contrast, uninsured black women were found to travel 6.19 fewer miles (Harrison, et al., 2009). Another recent study published in 2013 found that there is a lack of geographic access to healthcare facilities for patients who suffer from tuberculosis. Patients with tuberculosis noted the lack of access to healthcare facilities, financial constraints, and the utilization of traditional (non-medical) avenues of care as the main reasons for not receiving or fully complying with their timely medical care (Tadesse, Demissie, Berhane, Kebede, & Abebe, 2013). There is need for future research using population-based data on groups of people over a long period of

time. This longitudinal information would help provide additional insight into the access that SNH contractions have on access to care (Bazzoli, et al., 2012).

### *Hospital Mergers*

Since 1990, over 45% of hospitals have been involved in either one or more of the following: mergers, acquisitions, and/or joint ventures (Jaspen, 1998). At the end of 2010, more than 25% of all U.S. hospitals were operating at a loss. Another 11% of hospitals were operating on earnings before interest and taxes (EBIT) margin of less than 2%. Among these changes have been the extensive consolidation of hospitals through mergers and the formation of hospital networks (Lesser & Ginsburg, 2000). However, recent financial market capital constraints inhibit mergers either by explicitly discouraging them or by limiting the size and scope of the transaction (Kole, 1997). With hospital mergers accounting for \$72.25 billion in 2002, there is a great need for both the business and healthcare industries to take note of this emerging trend. There were a total of 319 mergers worth \$75.25 billion, the largest of any sector within the U.S. economy in 2002 ((Joshi, 2006). According to the AHA's Trend Watch, hospital mergers peaked in 1998 with 287 mergers and have steadily decreased in number since then (Seymour, 2009). At the end of 2010, more than 25% of all U.S. hospitals were operating at a loss. Another 11% of hospitals were operating on an EBIT margin of under 2%. It is very unlikely that hospitals will enjoy any substantial increase from insurance companies or the federal government to offset this situation (Cuellar & Gertler, 2003). Even though the rate of mergers has been slowing in recent years stemming from capital constraints with capital markets, hospitals that merge do not always increase financial sustainability.

A number of hospitals have opted for a rather non-traditional merger in that, instead of merging between markets, hospitals have been opting for local within-market mergers (Krishnan, 2001). Consolidations resulting from hospital systems have outnumbered hospital mergers in recent years (Cuellar & Gertler, 2003). The AHA has distinctively different definitions for mergers and acquisitions. Mergers are defined as full integration under a single license, while acquisitions occur when separate hospitals retain their separate licenses but the ownership of different hospitals is transferred to a spate governing body (Cuellar & Gertler, 2005). Hospitals in many areas are merging to form local multi-hospital systems with the effect that these local systems will have on the overall access to care for patients (Dubbs, et al., 2004).

Medical reimbursement rates are also a major contributor to mergers within the hospital industry. Past studies have found the mergers and acquisitions do not have a measurable effect on in-patient 30-day Mortality Rates. Researchers either focus on the effects of mergers, thereby omitting the effects of hospital ownership and conversion, or focused on the expansion of certain elements within the merger (Thorpe, Florence, & Seiber, 2000). A 1999 study found that merged hospitals increased their prices for services and raised market shares. It has also been noted that hospital mergers raise price-cost margins in concentrated markets (Krishnan, 2001). Hospitals with strong ties to their local community might offset higher profits for other goals such as quantity of citizens served or quality maximization (Ho & Hamilton, 2000).

Mergers that result in vertical integration are utilized to increase interdependence on a buyer or seller's interaction. Horizontal integrations help to mitigate threats based on competitiveness or threats between competing organizations (Luke & Wholey, 1999).

Larger hospitals have been able to negotiate better reimbursement rates for their services and are allotted by the federal government a larger allowance for services provided.

Large hospitals, facilities with more the 200 beds, have been in a more favorable position than smaller hospitals, defined as facilities with less than 200 beds. Bed vacancy is a major liability of many hospitals, where it creates unused resources and operational loss. Within larger hospitals, the number of free beds at any given time is 15% lower than those of smaller hospitals (Association, 2012c).

There are a number of classifications that rural hospitals must determine. One of the large scope elements that a hospital board must decide is whether an organization will be classified as a for-profit or not-for-profit hospital. There are a number of studies that explore different aspects to these ownership platforms (Rotarius, Trujillo, Liberman, & Ramirez, 2005). From an investment perspective, for-profit hospitals have stockholders and an underlying main goal to maximize stockholders wealth. These entities are in the business to make money by maximizing the cash flow of the organization. For-profit hospitals have access to the equity markets and report to their stockholders. Non-profits do not have stockholders, but these organizations do have stakeholders that invest in their organizations. Non-profits are prohibited from issuing stock to the public and therefore rely heavily on the tax-exempt debt structures for capital (McCue & Nayar, 2009; Robinson, 2002).

For-profit and not-for-profit hospitals differ from an accounting and investment standpoint. Because not-for-profit hospitals rely heavily on capital debt structures to finance their organization, they tend to have larger amounts of cash reserves. Not-for-profit hospitals must keep cash-on-hand to debt ratios within certain favorable ratios for

their bondholders. These bondholders view cash-on-hand as an indication of credit risk and therefore, not-for-profit hospitals will have higher cash reserves to cover their structured debt obligations (Cleverley, 2001). Bondholders view this positively as it mitigates the risk of default associated with issuing current and future bonds to these hospitals. Since hospitals that are viewed as lower risk are more favorable, they will be assessed lower interest obligations. However, these hospitals will have less capital available for expansion. For-profit hospitals report primarily to their shareholders and therefore are able to utilize their cash to buy back stock, pay investor dividends, or invest in expansion (McCue & Nayar, 2009; Rotarius, et al., 2005).

Hospitals that are classified as non-profit are not guided to maximize positive cash flow. This stems from their not-for-profit tax status that enables the organization to focus on a charitable mission. Publically held hospitals are attracted to rural hospitals because of the lack of competition that many rural hospitals enjoy. This element is not available to most hospitals located in urban areas. In turn, this allows rural hospitals the ability to use their sole provider power to negotiate better reimbursement rates from insurers (Wang, et al., 2001). The Healthcare Finance Management Association reported in 2004 that from the late 1990s to the early 2000s, for-profit hospitals increased investments to update and expand their facilities, but not-for-profit hospitals delayed investing their capital and are expected to increase their capital spending in the near future (Report, 2004).

#### *Outlook of Hospital Mergers*

Several studies have looked into the effect that mergers have on hospitals and healthcare organization(s) in general. Most of these studies evaluated 3 years pre-merger

and 2 years post-merger. During the year that the merger took place, there was a decrease in overall quality, high turnover of workforce, and lower than average morale. Two years after the merger, the merged hospital had increased admissions per bed, increased markups, and an overall increase in quality of care, compared to a pre-merger benchmark (Lesser & Ginsburg, 2000). The type of merger has implications on clinical or administrative staff. Hospital staffs have argued that merging with a for-profit hospital system leads to reductions in nursing staff, a shift towards employment of lower-paid employees and reductions in expenditures on related supplies (Orszag & Emanuel, 2010).

Mergers allow organizations to consolidate smaller departments into a single larger unit, which can ultimately mitigate variation in the care patients receive. A larger single clinical environment has the ability to minimize sunk costs associated with the day-to-day functions of healthcare. This is associated with the traditional view of mergers where management and administrative elements of an organization are integrated into a single organizational structure. This view is somewhat outdated as there are a number of multi-hospital systems that are the end result of hospital mergers and not administered under the centralized system structure (Lynk, 1995). Employees argue that these all lower the quality of care that a patient receives. While employees might see that the quality of care that they provide is lower, the question within this study deals with the impact mergers have on a patient's overall view of quality of care. Ultimately, hospitals that underwent mergers were financially more stable and provided better care for their patients. The Federal Trade Commission has been accepting elements of these claims provided that mergers within hospitals are able to continue to provide care to their respected service populations more efficiently (Lynk, 1995).

Federal agencies, most notably the Department of Justice and the Federal Trade Commission, have been very skeptical to the claim of hospital merger underwriters that mergers of hospitals allow these hospitals to increase efficiency and compete under the business model of economies of scale (Lynk, 1995). An earlier study in 1997 found no significant effects in their model, to indicate that hospitals are motivated to merge for reasons of: increasing market power or to increase efficiency. In a more recent study, in 2003 found that hospitals with lower than prior profit margins or in a market with a low Herfindahl–Hirschman Index (HHI) were more likely to merge (Sloan, Ostermann, & Conover, 2003). The federal government has an economic and public health investment in making ensure that mergers within the hospital industry do not affect the communities served and that price fixing does not occur. The Federal Trade Commission and the Department of Justice, through Federal Trust legislation monitor mergers within the healthcare field and determine if any wrongdoing is occurring. Before a merger of any hospital organization can occur, the appropriate federal agency must assess the implications that the merger has on economic competition (Goldsmith, 1994).

Since 1991, the Department of Justice and the Federal Trade Commission have brought 7 hospital merger cases to trial, but have not received a favorable ruling in any of these cases (Vogt, Town, & Williams, 2006). The HHI has been regarded as a benchmark for the Federal Trade Commission to either review or challenge a hospital merger based on possible price increases. A post-merger that established a HHI of 1000 to 1800 is seen as moderately competitive, while a hospital merger with over 1800 is considered highly concentrated, warranting the investigation of the Federal Trade Commission (Vogt, et al., 2006). These agencies have been put on notice to look into the organizational formation

of local health networks and systems, not just the overall market share expansion that any single merger might entail (Dubbs, et al., 2004). The ongoing question, other than the financial impact that mergers have on the population served is the effect that mergers have on the quality of care that patients receive. If faced with a very limited selection of hospitals, or a number of hospitals that provide the same type and amount of services, patients become “captive” since their choice will have no overall effect on the quality or type of care they receive. In essence, there is no need for selection as the outcome will be similar regardless of the selection (Sills, Chiriac, Vaughan, Jones, & Salem, 2013).

The healthcare industry was not immune to the financial crisis that the rest of this nation experienced. Many traditional avenues of capital funding for short-term debt, such as investment banks and traditional retail banks, were unwilling to take on the risk associated with new loan originations that were not backed by some form of federal agency. As a result, many hospitals had to turn to the FHA and HUD for funding. These are funds in the form of bonds that are backed by the federal government under the Federal Housing Administration Section 242 and often carry very stringent capital spending requirements (Richman, 2011).

## **2.6 IMPACT OF MHS ON QUALITY OF CARE OF HOSPITALS**

Healthcare researchers face challenges in identifying effective ways to improve the quality of care that patients receive with the financial constraints that many rural hospitals face. The 2001 report from the Institute of Medicine titled “Crossing the Quality Chasm” prioritized the topic of quality of care that patients receive in a hospital environment for medical and healthcare researchers. The implications of structure, process, and outcome provide important measurements and perspectives on how quality



should be measured (Moscovice, et al., 2004). Quality of care is defined as “whether individuals can access the health structures and processes of care they need and if the care received is effective (Moscovice, et al., 2004). Rural residents often suffer from decreased access to care, lack of insurance, and travel restrictions associated with obtaining their needed medical care (Harrison, et al., 2009).

There are both theoretical and empirical justifications to establish the relationship between an organization’s characteristics and the quality of care that a patient receives in different hospital settings. Any attempt to summarize this relationship across different settings could easily be confounded due to conflicting relationships (Hearld, et al., 2008). In a 1997 article, Mitchell and Shortell concluded that future health services research should focus on lower- or unit-level relationships to accurately understand overall quality of care, while Alexander et al. in 1985 concluded that the quality care offered by a hospital should be constantly examined using an organizational approach (Hearld, et al., 2008).

Research has been conducted on the hospital level, but these studies mostly looked at the outcome of quality based on hospital structure. The main areas of exploration within this subset of quality of care have been the relationship between staff and ownership with respect to 30-day Mortality Rates. While these studies have been helpful in providing some guidance, they have done little to help in the area of rural hospital administration centralization within multi-hospital organizations and the quality of care that these particular organizations have been able to provide for their patients and the communities they serve. Rural hospitals are also greatly influenced by other issues that are addressed both through public policy and the actions of the hospital’s governing

body. A rural hospital's ability to act as a healthcare organization, especially with scarce resources, is another important indicator in the overall quality of care that the organization provides to its patients (Moscovice, et al., 2004). While there might be many underlying reasons for health disparities within the rural population of this country, structural factors, that include shrinking capital and increased demand for expensive technology, are seen as major contributors to the decreased quality of care that citizens receive (Alexander, Anderson, & Lewis, 1985). Rural hospitals that exhibit high quality of care are those where patients that otherwise cannot be treated efficiently at the originating hospital are quickly and accurately identified and transferred to another location where proper care can be administered (Moscovice, Wholey, Klingner, & Knott, 2004). A 2000 study found that only market power, ownership, and size have a significant impact on hospital serving rural areas (Mueller & Mackinney, 2006). Furthermore, citizens of large remote nonmetropolitan rural, rural adjacent to metropolitan, and remote rural counties, respectively report 34, 39, and 43% higher rates of having fair/poor health than residents that reside in urban areas (Monnat & Beeler Pickett, 2011). CAHs that operated a rural health clinic (RHC) had overall lower cash flow margins when compared to critical access hospitals that did not operate a rural health clinic. This could address one of the main underlying financial performance indicators that negatively affect the ability to attract and retain healthcare professionals (Pink, Holmes, Thompson, & Slifkin, 2007).

Historically, hospitals that serve rural areas struggle to remain financially solvent while providing the quality of care that their community demands. Recent advancements in health information technology could become a viable option for rural hospitals to

increase their quality of care and financial performance. One of the largest barriers seen with health information technology is the belief by some that rural hospitals lack to the resources, both financial and human, needed to properly implement and maintain a competitive health information technology system (Menachemi, et al., 2005).

Multi-system hospital arrangements are seen to help hospitals gain financial stability by allowing them access to larger capital markets and financing elements that would help them compete with larger urban hospitals. It was also found in a 1995 study that hospitals that participate in multi-hospital structures gain similar benefits with respect to marketing, staff recruitment, equipment purchasing, clinic expansion and development, and/or sharing of staff (Moscovice, Christianson, Johnson, Kralewski, & Manning, 1995). Hospitals that have lower margins were associated with overall worse quality of care based on processes of care, readmission rates, and changes in operating status. Medicare now covers 93% of all medical costs, and with increased financial pressures, many low margin hospitals are at a crossroads between providing higher quality of care with lower financial profitability while competing with more profitable hospitals (Ly, Jha, & Epstein, 2011). The Institute of Medicine (IOM) suggests applications to monitor healthcare development to include care that is continuous, customizable, patient controlled, information sharing, anticipatory, and coordinated (Mueller & Mackinney, 2006).

As illustrated in Table 2.2, several studies have addressed the issue of organizational structure and its effect on quality of care. In the article entitled “Efficacy of System Management or Ownership as Options for Distressed Small Rural Hospitals,” Berry and colleagues conducted research on small rural hospitals. This study used a

cross-sectional design with the object of exploring which element, if any, of an organization's arrangement could be used to predict the occupancy and quality of care. There were no known controls within this study. The study results indicated that the Joint Commission on Accreditation of Hospital Organizations were more likely to be system hospitals (Berry, Tucker, & Seavey, 1987). Shortell and colleagues researched the interaction of MHSs' organizational structures through hospitals in the United States. The hospitals were then subcategorized by cluster type, which were then compared using a cross-sectional design based on AHA Annual Survey Data. This study did control for elements of differentiation, centralization, and integration. It was concluded that moderately centralized and centralized systems utilize review and profiling within their protocols, pathways, and perhaps physician incentive compensation and that centralized health systems and networks may have comprehensive case/care management and EMR. Ultimately, these elements, embedded within these hospitals, may affect their organization as a whole. (Shortell, Bazzoli, Dubbs, & Kralovec, 2000)

A 2001 report by the Institute of Medicine emphasized that Health Information Technology will play a major role in; improving care, safety, effectiveness, effectiveness, timeliness and equity with respect to the care that hospitals provide to their patients (Medicare and Medicaid Programs, 2012). Capital limitations within rural hospitals are seen as a major constraint within the implementation of health information technology. Health information technology is designed to assist with the mitigation of medical error and improve overall patient quality of care. There has been substantial variation with the adoption of electronic medical record, which resulted in differences in HIT implementation. The mean EMR adoption has varied greatly between solo hospitals and

multi-system hospitals. Small hospitals owned by multi-hospital systems had a significantly higher EMR level compared to their independent counterparts (Li, et al., 2009).

As the name implies, the Medicare Hospital Readmission Reduction Program and the Affordable Care Act have implemented incentives to hospitals in the form of payment reductions to discourage readmissions within short periods. There has been an increase in the dependence on high-technology tools, especially for conditions like AMIs. However, even for conditions less dependent on advanced technologies for quality results, such as pneumonia or CHF, the 30-day Mortality Rate within CAHs has continued to decrease. Research published in 2011 indicated that CAHs had worse outcomes than non-CAHs, notwithstanding that this study did not take into account whether quality was increasing or decreasing longitudinally over time (Joynt, et al., 2011). Clinical indications and the use of IQIs can change in a much more rapid manor, thus enabling a quicker response from health care organizations through immediate feedback and effective intervention programs. The Robert Wood Johnson Foundation Leadership for Healthy Communities is a prime example of a health care program that allows integration from interconnected and outside health care sector stakeholders to address issues pertaining to elements and resources that may affect the overall quality of care and health of the communities that these stakeholders service (Joynt, et al., 2011).

In 2011, the AHA Annual Survey Database which encompassed a total of 6,317 hospitals throughout the United States, there were 3,734 or 59%, system-affiliated hospitals (Association., 2013). Since most of the studies on this topic focused primarily on financial performance, the topic of quality of care has been left unexplored with

respect to health care system formation and mergers (Cuellar & Gertler, 2005; Ho & Hamilton, 2000). In 2000, HO and Hamilton researched the affects that mergers of California hospitals had on inpatient mortality rates between 1992 and 1995. This research, while limited to the State of California, concluded that hospital mergers had no meaningful change in the inpatient mortality rates. In 2003 and 2005, published research found that system affiliation has no positive affect on patient mortality or safety (Cuellar & Gertler, 2005). AHRQ, along with CMS, established benchmark Inpatient Quality Indicators (IQIs) based on leading causes of death in the US.

Certain clinical procedures and timely and efficient treatments have led to decreased readmissions rates for AMI, CHF, and pneumonia. The 30-day Early Readmission Rate (ERR) is risk-adjusted for patients' age, sex, and other pertinent patient-level hospital data. In a 2009 study of 11 states, it found the central hospital systems are associated with lower AMI, CHF, and pneumonia rates when compared to other hospital systems on a national level. Notwithstanding, independent hospitals have better AMI ratings compared to centralized hospitals and moderately centralized health systems. Inpatient hospital care allows these hospitals to adjust accordingly to local market conditions (Chukmaitov et al., 2009).

Quality of care has been widely accepted as health care that increases the probability of obtaining desired health outcomes within the constraints of current health knowledge. Donabedian's model of quality indicates that the organizational structure of hospitals and the process of care may have a measurable impact on the overall quality of care and outcome of the patient (Donabedian, 1966). The Agency of Healthcare Research and Quality's (AHRQ) IQIs for AMI, CHF, stroke, and pneumonia 30-day Mortality

Rates have widely been validated and used as an indicator of overall hospital quality of care (Association, 2012b). IQIs were developed in order to better gauge the quality of care of patients within hospital settings. This is due, in part, because they can reflect deficiencies in hospital structures and provisions of care within the realm of these conditions (Chukmaitov, Tang, Carretta, Menachemi, & Brooks, 2012).

Research published in 2013 that studied hospitals within the State of Florida found that there were variances in not only the magnitude, but also importance of organizational IQIs in 30-day Mortality Rates. Hospitals with a centralized organizational structure had a 20% lower 30-day Mortality Rate than non-system hospitals. This might be attributable to the belief by some researchers that hospitals that are members of a system are able to have lower 30-day Mortality and Readmission Rates because of a standardization and centralization of care.

Little has been published about the 30-day ERR of patients. The Institute of Medicine and CMS continue to explore the topic of readmission after hospital discharge (Ross et al., 2008). Early readmission rates (ERRs) are seen as quality indicators, and they are used to publicize outcome differences and adjust payments based on hospital performance. The Health Care Financing Administration and many consumer groups are afraid of the unintended negative effects that a focus on ERRs might have on rates of premature discharge for hospital stays (Hofer & Hayward, 1995).

There are concerns that some patients may be obtaining discharges from hospitals more quickly even though they are sicker than their counterparts at hospitals with higher ERRs. While ERRs have received a great deal of criticism as well, this possibility has led some researchers to question ERRs as a valid patient quality indicator (Hofer &

Hayward, 1995). One class of ERR that has received a great deal of attention is the one that pertains to heart failure, as some studies have estimated that ERRs pertaining to heart failure are nearly 45% within a 6-month period. Other studies have indicated, however, that the high rates of readmission for heart failure might be due not only to the quality of care that the hospital provides but also to the patient's individual characteristics and the care that he or she receives at home (Hofer & Hayward, 1995; Ross, et al., 2008).

Some areas within the overall topic of ERR require further analysis. The first of these involves an assessment of patient risk models and laboratory test results, which are needed for the comparison of national administrative data. Secondly, there needs to be a greater focus on patient characteristics and the association between patients and ERR. This examination would look at not only the characteristics of the hospital structure but also at those of the patients themselves to indicate which characteristics, if any, yield the highest quality of care. It is clear that ERR from heart-failure patients must be monitored, especially because these statistics also serve as indicators of the overall quality of care that a patient receives (Ross, et al., 2008).

## **2.7 RESEARCH OPPORTUNITY**

Studies that have focused on the differences within membership structures and the effect that this relates to the hospital as a whole. Heart attacks are important indicators of overall quality of care, more extensive research needs to be conducted to fully evaluate the overall effects that system types has on patients (Madison, 2004). Future research should distinguish differences between system types.

The majority of research currently available focuses on hospital performance, competition, strategic alliances and managed care. These studies do not explore the actual



multi-unit structure exists or if there is even a multi-unit structure. Articles that do explore the topic of multi-hospital systems either look at solely a select urban setting, entire urban setting or national setting. There is yet to be a study that was conducted exploring the national utilization of multi-hospital system structures in solely a rural area. (Madison, 2004)(Bazzoli, et al., 2001)

There is a need to continue to research the effects that organizational structure has on the US Healthcare system. As the overall healthcare system in the US transforms, there will be changes to the structure of multi-hospital systems. There is a need to further define and refine the implications and new measures need to be made in order to address resulting changes. However, critical change are expected to occur in our current healthcare delivery system(s) within the next decade, making our current structure more efficient and thereby saving healthcare payers money while providing higher quality healthcare (Kocher & Sahni, 2010). Moreover, under the Affordable Care Act of 2010, healthcare providers will receive heavily reduced payments for readmission of patients within a certain period of time and with the same primary diagnosis. This statute is intended to motivate hospitals to engage with other healthcare providers to ensure that care is efficiently coordinated for patients (Kocher & Sahni, 2010). This goal will require the integration of many different elements of patient delivery organizations and the expansion of quality medical coverage and accountability to all healthcare practitioners and organizations (Gorin & Moniz, 2012).

Patient-centered accountable care organizations (ACOs) and medical homes will be at the center of medical care for healthcare organizations. Hospitals have been hiring physicians at a higher-than-normal rate in an effort to hedge any shortage that might

occur after full implementation of the Affordable Care Act (Boninger, Gans, & Chan, 2012). This alignment of care will entail a major shift in the current structure of physician and clinic characteristics, as ACOs will likely be comprised of multiple hospitals or clinics that contract with larger organizations to provide certain elements of care in the most cost-effective manner possible. Nearly 95% of all physicians' practices have less than five physicians (Hing & Burt, 2007). ACOs have decreased the financial viability of solo and small physician practices; as such practices are not able to compete with larger clinics and hospital-affiliated practices (Gorin & Moniz, 2012).

Hospitals will also experience changes to their current business models if they are to hold control of ACOs. It is essential that hospitals trade near-term revenue in order to gain long-term financial savings. This will include streamlining many of their operations, providing elements of care that are seen as unprofitable, and integrating their healthcare systems into larger healthcare organizations in order to ensure the optimal combination of quality and revenue. As with any major development in our country's history, parts of this legislation were met with opposition from special interest groups and politicians that felt it was unconstitutional.

One element of the Affordable Care Act (ACA) that sparked great debate was the individual mandate. Beginning in 2014, the ACA will require most citizens to have some form of minimal essential healthcare coverage or pay an annual fee to the Internal Revenue Service (Boninger, et al., 2012). In the landmark case *NFIB v. Sebelius*, Chief Justice John Roberts concluded that the federal government was within its constitutional rights in requiring citizens to buy health insurance or pay a fine, because the commerce clause gives Congress the right to regulate interstate commerce as well as to levy and

collect taxes. Although Congress cannot require citizens to purchase health insurance, it can tax citizens who fail to do so (Gorin & Moniz, 2012). There is an important area for future research that should explore mixed methods approaches to better understand what happened to communities after safety net hospitals closed or converted to other types of hospitals. This would include how and also why safety net hospital configurations were changed and how these changes would affect access to care among the more vulnerable populations; the elder, uninsured, underinsured and Medicaid (Bazzoli, et al., 2012).

This study provides empirical information pertaining to the organizational structure of MHS in rural areas and their impact on profitability and quality of care. The first research question is as follows: How does the structure of rural hospitals, as measured by level of centralization (i.e., centralized, decentralized and moderately centralized), affect operating margin, return on equity and days cash on hand? The researcher hypothesizes that rural hospitals that are affiliated with other multi-hospital systems and have a centralized organizational structure will have higher financial performance, based on operating margin, total return on equity, and days cash on hand, compared to, multi-hospital affiliated hospitals with decentralized organizational structures, and multi-hospital affiliated hospitals with moderately centralized organizational structures.

The second research question is as follows: How do 30-day readmission and mortality rates related to acute myocardial infarction (AMI), congestive heart failure (CHF), and pneumonia differ between multi-hospital systems that are centralized, decentralized, and moderately centralized rural hospitals? The researcher hypothesizes that affiliated rural hospitals that are part of a multi-hospital system will provide higher

quality care to patients, as evidenced by lower 30-day readmission and mortality rates for AMI, CHF, and pneumonia, compared to affiliated hospitals with decentralized organizational structures, and affiliated hospitals with semi-centralized organizational structures.

## **2.8 SIGNIFICANCE OF THE STUDY**

Bazzoli et al, 1999 helped lay the footprint for further empirical studies about organizational structure(s) and the effect, if any that this element of an organization might have on financial performance and quality of care (Bazzoli, et al., 1999). Perceived hospital quality, hospital reputation, and system membership are likely reasons for variation related to hospital concentration in certain area, but these are actually based on AHRQ quality indicators (Lesser & Ginsburg, 2000) Bazzoli at al, 2000 further explored the topic of financial performance with a study that concluded that moderately centralized healthcare systems enjoyed a higher degree of financial performance when compared to centralized hospital systems (Bazzoli, et al., 2000). A 2007 study by Rosko et al. further extended the scope of this theory by Stochastic Frontier Analysis (SFA) to study hospitals and found that the optimal relationship between physician and organizational structure for financial performance was obtained through the utilization of centralized physician and/or insurance services and decentralized health systems were more efficient than the other types of systems (Rosko & Proenca, 2005). In 2009, Chukmaitov et al, conducted a study that indicated that based on Bazzoli et al, 1999's utilizing the taxonomy provided the highest quality of care, was provided by hospitals that were part of a centralized healthcare system (Chukmaitov, et al., 2009).

An initial literature review has indicated that there is little agreement among researchers on what type of hospital organizational structure would provide the highest financial performance and quality of care. With respect to quality of care, there are over 30 indicators, of which any researcher might choose from, therefore there is no one single “simple” indicator that researchers use. It is also important to note that these studies were done based on a national dataset that included both urban and rural hospitals. It was also evident within this study through a simple analysis that the taxonomy may simply be a measure of the geographic dispersion of the hospitals within a system, and advocates studying local system clusters, rather than relying on an over-arching taxonomy of systems. An example of this is the categorization of the Healthcare Corporation of America (HCA).

Most recent studies within the research area of hospital taxonomy have attempted to fill gaps within the literature through the examination of financial performance and quality of care of multi-hospitals organization, hospital clusters and/or member hospitals (Trinh & O'Connor, 2002). While this is very interesting, none of these studies focuses on rural hospitals. The proposed study will provide information to stakeholders as to what organizational structure within rural hospitals systems would provide desired financial performance and quality of care benchmarks. Further, the chosen subcategories will help provide more detailed information with respect to the benchmark’s variable interactions. Thus, the study will not only help bridge the gap in literature between urban and rural hospitals, it will also help provide much needed empirical evidence that stakeholders can use to make well-informed decisions with respect to the type of organizational structure that might be seen as optimal in rural MHS settings.

## **2.9 GAPS IN THE LITERATURE**

Studies are needed in order to better understand the organizational structures within rural environments that provide the highest amount of financial performance and quality of care to their patients. Also, there is a general shortcoming in the literature with respect to national research in the area of solely rural hospitals. Most literature looks at national data or statewide data. Few studies have reported on characteristics such as rural-only, region, bed size, organizational structure (Ricketts & Heaphy, 2000). In addition, there is a lack of information on which characteristics may actually help to predict a rural multi-hospital member hospital's operating margin, return on equity, day cash on hand, readmission/mortality rates on AMI, heart failure, and pneumonia. Furthermore, there is no nationally representative hospital-based study that explores organizational structure with respect to outlined financial and quality indicators (Wang, et al., 2001).

## **2.10 RESEARCH CONTRIBUTION**

Few studies have examined the implications of rural organizational structures on profitability and quality of care. While there have been studies that explore rural hospitals, most of these studies examined closure rates, quality of care, and sustainability of all rural hospitals. Studies that have researched system performance have looked at national studies that included both urban and rural hospitals, urban hospitals only, or case studies that involve specific systems (Moscovice & Stensland, 2002). With respect to quality of care, there have been studies that look at the quality of care in rural and urban areas and independent versus multi-hospital systems, but there has not been a study that looks at multi-hospital systems and quality of care strictly within rural areas.

Table 2.1 Chief Characteristics of Hospital's Organizational Structure

<b>Organizational Structure in MHS</b>	<b>Characteristics</b>
Centralized health system	Centralized hospital systems are highly centralized in their hospital, physician, and insurance affiliations. These hospitals tend to have a small number of affiliated hospitals that are medium-sized in terms of beds. They are largely found in not-for-profits and urban areas with many of their hospitals in close proximity to each other.
Decentralized health system	Hospitals within this type of system differ greatly on the services and products that they offer. They provide low, system-level centralization activity with respect to the products and services that are available to patients. Patient services, physician arrangements, and insurance products tend to demonstrate moderate degrees of differentiation. They are normally a small number of hospitals with a small number of beds located in close geographic proximity.
Moderately centralized health system	Moderately centralized hospital systems integrate their service/product mix together. These systems offer differentiation in services provided, physician arrangements, and insurance activities. These hospitals tend to be mid-level sized, non-for-profit hospitals found in a vast number of different geographic locations

Table 2.2 Key Studies and Findings

Author, Year	Sample	Design	Findings
Berry et al, 1987	Small rural hospitals; 194 system managed, 235 systems and 311 independent and self-managed circa 1983	Cross-sectional design; different organizational arrangements used to predict occupancy, quality of care, service range, and resource efficiency; no controls were used when comparing hospitals with different management structures	System hospitals were more likely to be accredited by JCAH
Muller, 1989	161 closed CAH from 1980-87; matched with a control group of 482 rural hospitals that remained open	Matched case control study design	System affiliation significantly decreased the risk of rural closure
Cleverly, 1992	5,722 hospitals with complete Medicare cost report data from 1986-1989	Compared with independent hospitals, independent IO system	Compared with independent hospitals, system hospitals, especially IO ones, had higher returns on equity, higher costs per case mix-adjusted discharge, higher profits through more aggressive pricing strategies, greater capital investments
Halpern, 1992	2705 rural hospitals from 1983-1988	Longitudinal design	System affiliation with IO systems significantly reduced survival of rural hospitals; larger hospitals had higher survival rates
Succi, Lee and Alexander, 1996	All rural community hospitals (1984-1991)	Cross Sectional (pooled) Controlled for: size, ownership, performance, market conditions, and time trend	Affiliation with a system had no impact on rural hospital closures



Table 2.2 Continued

<b>Author, Year</b>	<b>Sample</b>	<b>Design</b>	<b>Findings</b>
Menke, 1997	2200 hospitals with complete organizational and financial data	Cross-sectional design, with two-stage estimation model to minimize selection bias. Controlled for labor costs, case mix, hospital mortality rate, payer mix service range, medical school affiliation, ownership, physician supply, hospital competition, urban location, and geographic region	System and independent hospitals had different cost functions, suggesting hospitals having been selected to join systems; costs of system hospitals were lower than those of independent hospitals, but there were no statistically significant differences in costs by ownership among system hospitals; economies of scale and scope occurred at all volumes and those of system hospitals were lower than those of independent hospitals.
Chan, Feldman, and Manning, 1999	335 rural hospitals 1988 to 1992	Longitudinal design; controlled for degree of formalization, resource disparity, bed size, ownership, MHS, Medicare payment status, patient mix, local economy, census region, and time condition	Size of the consortium showed a curvilinear relationship with member hospitals' cost revenues and profitability; member hospitals benefited from the increase in consortium and size, but the benefit decreased as the consortium became too large.

Table 2.2 Continued

<b>Author, Year</b>	<b>Sample</b>	<b>Design</b>	<b>Findings</b>
Shortell, et al., 2000	Multihospital Systems, subcategorized by cluster type	Cross-sectional design; AHA Data, Utilization of System Clusters. Controlled for differentiation, centralization, and integration	Moderately centralized and centralized systems may utilize review and profiling with protocols, pathways, and perhaps physician incentive compensation. Centralized health systems and networks may have comprehensive case/care management and EMR.

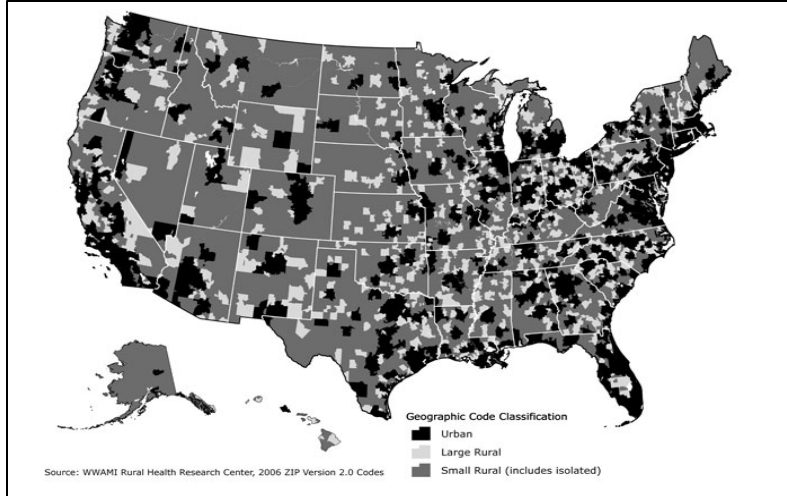


Figure 2.1 Rural areas within United States

CHAPTER 3  
METHODOLOGY

**3.1 A CONTINGENCY THEORY APPROACH**

This research uses a Contingency Theory approach, which suggests that there is no “best” strategy related to performance. Early researchers of contingency approaches focused on strategies that purportedly led to improve performance. Supporters of these approaches maintain that an organization should utilize specific strategies and resources to obtain optimal results. Also known as the structural contingency theory, this approach encompasses the basic paradigm that an organization’s overall performance depends on that organization’s ability to appropriate its organization to environmental changes (Donaldson, 1995). Past research has used a contingency approach to investigate the performance impacts or benign environmental differences in organizations through different organizational environments (Fried, 1986). The contingency theory attempts to explain the inter-relationship both within and among sub-systems and the interaction between an organization and the environment with which it interacts. This theory is often referred to as the “it all depends” theory because the answer generally given when asked an organizational theory question on contingency theory is, “it all depends” (Battilana & Casciaro, 2012).

Contingency theory is based on the following three assumptions: There is no one “best” way to organize for every situation, different organizational structures are not

always equally effective for a given situation, and dominant environmental characteristics are the largest factors in finding the “best” structural solution for an organization (Thompson, 1967). Contingency theory is a very unique theory in that its fundamentals are based on how organizations with similar and derived structures operate with respect to each other under different internal and external conditions (Shepard & Hougland Jr, 1978). The diversity within contingency theory can be classified as individual or organizational diversity. Individual and organizational characteristics interact strongly within the overall organization, which in turn directly affects organizational outcomes (Vroom, 1959).

### **3.2 MULTIPLE PERSPECTIVE OF CONTINGENCY THEORY**

Contingency theory perspectives have provided many important additions to organizational theory, however, these additions consider individual, organizational, and environmental variables, many of which have not been thoroughly integrated into different organizational environments (Shepard & Hougland Jr, 1978). The “complex man” addresses individual differences within an organization. These differences include the effects of attitude, values, and needs (Vroom, 1959). At this level, the main concern is addressed by focusing on motivating participants to embrace the organizational structure on the basis of technological or environmental elements (Hunt, 1970). The underlying basis within contingency theory is further rooted within five major contingency subgroups which are; Environmental uncertainty, task interdependence, technology, diversification strategy and size. Table 3 provides a summary of key articles pertaining to contingency theory Source (Qui, 2012).

Organizational structure, also addressed elements of the “complex organization”, has an attempted measure of individual differences throughout the utilization of organizational characteristic variables. These characteristics include the following variables: age, education, income, unionization, occupational history, and length of present job (Shepard & Hougland Jr, 1978). The complex organizational approach with respect to contingency theory relates to either the technological or environmental conditions within the organization (Hunt, 1970; Negandhi & Reimann, 1973). In 1966, Katz and Khan indicated that organizations are affected by both their relationship with the larger society and by their “throughput” process. This effect encompasses the utilization of technology processes that enable the organization to transform raw materials into completed product(s) (Kast & Rosenzweig, 1973; Shepard & Hougland Jr, 1978).

The political nature of an organization is reportedly attributed largely to the trends within an organization (Bazzoli, et al., 2000). This political environment has caused organizations and their members, in many cases, to have pre-mature acceptance or non-compliance to changes within an organization that can affect the overall organizational structure or function of a company. Any type of change, in many instances, can alter stakeholders’ perceptions of the company’s overall wellbeing. Organizations that have a long history or establish a pattern or business model, find it harder to change their overall business model since, in many cases, it is embedded throughout an organization (Battilana & Casciaro, 2012).

### *Z-Factor Elements*

Environmental factors can influence how an organization aligns within and adapts to the surrounding business environment. These factors include, but are not limited to, economic uncertainty, change in competition structure, and shifts within consumer patterns (Shepard & Hougland Jr, 1978). In 1971, Hickenson established a theory that incorporates the structural conditions that organizations use to cope with uncertainty, centrality, and substitutability prevalently proposed in the literature as the main source of power. The varieties of the proposed sources are large and include elements that control tasks and resource distribution, including network or workforce relations, information distribution, knowledge, and mitigation of environmental uncertainties. According to Hinnings et al., coping with uncertainty includes both the level of uncertainty within subunits and the ability of those subunits to cope with events of uncertainty (Hickson, Hinings, Lee, Schneck, & Pennings, 1971).

The degree of centralization within an organizational network has a direct correlation to the amount and type of research organizations conduct and their expansion into non-traditional or novelty plans. As outline in a 2005 study, a high degree of structural closures leads to what is known as “structural holes” within an organization. Structural closures have a direct effect on an organization’s ability to initiate and implement innovative ideas that would help expand and competitively increase an organization’s standing within its peers (Fleming, 2007 ). Within the development and implementation of contingency, a relationship was established between network closure and that of an organization’s willingness to innovate or generate new ideas. Research has for some time drawn a theoretical line between lower-level, individual changes within an

organization's network and/or system and that of the organization's ability to change and be an innovative leader within its respective field (Battilana & Casciaro, 2012).

Contingency theory holds that while organizational structure is important, it is not the only factor that affects the overall makeup an optimal organization environment. What might work and be seen as an optimal solution for one organization, may or may not hold true if other environmental changes occur (Balabanis, 2007).

### **3.3 PRIOR RESEARCH**

Prior research indicates that when utilizing a contingency approach with respect to performance, a variety of strategies would yield optimal based on the environment, for example, organic, mechanistic, entrepreneurial, or adaptive. Moreover, within these different environments, there also yield deviations based on geographic locations (Styles, 2003). One of the truths that holds relatively constant throughout all industries is that high behavioral uncertainty, or uncertainty in general, leads to higher operating costs. These operating costs can include monitoring, supervision, and enforcement. Higher distributor opportunism and higher transactional costs are directly affected by higher behavioral uncertainty. This uncertainty leads to investors and other stakeholders to become unwilling to commit future resources because of their inability to predict changes within the business environment (Li, et al., 2009).

The organizational structure a company chooses is often based on the organization's overall size. Companies that are smaller compared to their relative competition are better suited for a centralized management system. This is an organizational structure that encompasses decisions originated by a select few predetermined organizational employees. Larger organizations require more diversified



management structures to allow executives to stay current on the roles and tasks within the organization. Unfortunately, many organizations, regardless of size, wait too long to implement change. This normally occurs when an organization's outlook and performance deeply worsens and a contingency plan is desperately required for the organization to stay solvent (Robles, 2011).

Intra-organizational power with contingency theory suggests that an organization's power is a function of its centrality, substitutability, and ability to cope with uncertainty (Fried, 1986). Organizational subunits are required to adapt to organizational and market uncertainties that are ultimately refined to perceived actions that reduce the probability of variations in inputs, information probability variables in inputs, and activities that absorb the effects of variations in market or organizational inputs (Reagans & McEvily, 2003). Organizational subunits that obtain power will normally implement policies that allow the subunit to maintain or grow its overall organizational power or control over the other sources of power (Salancik & Pfeffer, 1977). Organizational structural features of the company may also alter the power distribution. Within the interconnection of organizational subunits, units that have higher control of tasks, social interaction, and communication networks are seen to be more powerful. With the formation of organizational interdependence among subunits as a source of variation in power, when work is reciprocal, immediacy, non-sustainability, and percussiveness appears to relate to power and immediacy significantly affects the power in the organizational setting more than where the work process is also not sequential (Lachman, 1989).

Centrality is addressed as the division of organizational work throughout organizational subunits and the interdependence within the system to which subunits are more controlled than others. Two dimensions of centrality have been suggested—pervasiveness and immediacy (Hickson, et al., 1971). Pervasiveness is the extent to which a subunit is either directly or indirectly linked to other subunits throughout the organization. Immediacy is the speed and severity to which the activities of a subunit affect the activities and output of the other subunits in the organization (Hickson, et al., 1971).

### **3.4 RELEVANCE OF CONTINGENCY THEORY TO THIS RESEARCH**

Contingency theory assumes that there is no single optimal solution an organization can employ to yield the most favorable results in all market conditions. As such, there is great emphasis on external constraints that can ultimately affect the overall viability of a single organizational structure (Shepard & Hougland Jr, 1978). The theory is explicitly concerned with the issue of organizational performance. Followers of this theory argue that a healthcare organization can choose strategies and structures that optimize its market-driven environment, thus enhancing an organization's performance (Kast & Rosenzweig, 1973).

A recent study by Chen et al. 2012 demonstrates how contingency theory has been utilized in the healthcare context. This study examined the overall quality of care that chronic disease patients received while obtaining their care from a multi-hospital system. Although there were many positive aspects to the quality of care received with respect to integration of services and continuity of care (COC), Chen et al. found an inverse relationship between multi-unit hospitals and patients having access to the same

physician throughout their treatment. Ultimately, this study found that while multihospital systems were able to integrate many of the services that their patients needed and were able to provide a higher degree of COC, these patients did not have access to the same medical staff throughout their medical procedure. This is ultimately seen as a negative aspect to multihospital organizations (C. L. Chan, You, Huang, & Ting, 2012). When seen through the lens of contingency theory, which assumes that there is no single optimal organizational structure that would yield the most favorable results throughout, all market conditions. Incorporating this information into this research would yield to the conclusion that, under different business environments, the optimal organizational structure might not be static throughout all elements of financial performance and/or quality of care. Another study within the context of a hospital's IT implementation used contingency theory to explain why there is no uniform system implementation across all hospitals. McGinnis et al., 2004 demonstrated that although to outsiders the hospitals might look similar, there are elements that managers are aware of that might have an effect on not only the implementation, but on how encompassing the system might actually become.

Bazzoli and her associates researched 1047 health network hospitals and 112 health systems hospitals to explore the relationship between organizational structure and financial performance. They concluded that hospitals in health systems with a single owner had higher financial performance than their contractually based counterparts. Drawing on similar logic, in the proposed research, we seek to relate MHS organizational structure to the quality of healthcare services that rural hospitals provide and their overall financial performance. Contingency theory suggests that the optimal organizational

structure of a rural hospital is not easily known. As prior research has indicated, there are a number of environmental and patient factors that influence what might be considered optimal (Wan & Wang, 2003). Factors that affect the overall financial performance and quality of care include: economic, political and socio-demographic elements. It is the belief of healthcare providers that integrated healthcare systems provides the optimal mix of quality of care to patients and financial performance (Strandberg-Larsen & Krasnik, 2009). Using similar logic, Devers et al (2004) suggested three main areas to address: 1) structural and cultural integration of the organization; 2) measures of intermediate outcomes or internal process variables, including the overall integration of system-wide activities; and 3) measurement of the overall success of a unit in terms of its overall goal is within the organization. This can be based on financial indicators, quality indicators, or any other pre-determined benchmark or indicator (Devers et al., 1994). However, it can be assured that organizations that continually performance well (as determined by financial and quality of care indicators) would be seen as superior to their peers (Strandberg-Larsen & Krasnik, 2009).

Furthermore, contingency theory has been the basis for a number of empirical studies within healthcare and is commonly seen by researchers as the optimal business theory in association with healthcare organizations (Shortell & Kaluzny, 2000). In research published in 1992, Young, Beekun, and Ginn utilized elements of contingency theory to understand the inter-relationship between a hospital's board of directors and the overall hospital performance (Young, Beekun, & Ginn, 1992).

Traditionally, the business theory associated with organizational structure was one of straight uniformity; there was one best way for an organization to be established and

all organizations within the same industry should have identical structures. However at the beginning of the 1960's, this way of conducting business began being transformed into more of a contingency theory wherein organizational structures would be required to alter their structures to achieve the best organizational structure. Burns and Stalker originated the elements of contingency theory when they conducted research on internal management practices and environmental factors (Burns & Stalker, 1961). Ultimately their research concluded that there were two main structural vestments: mechanical and organic. The type of structure that an organization initiates should be heavily based on the environment in which they conduct business. In more rigid, stable, and/or predictable environments, a company would choose a more mechanical organizational structure, but in a more fluidic, changing, or unreliable environment, a company should choose an organic organizational configuration (Burns & Stalker, 1961). This theory was further eliminated in a 1962 study by Chadler, which concluded that environmental changes in population, income, and technology and major organizational drivers of change and can cause new methods of conducting business for an organization (Chadler 1962). One of these finding was that in more stable environments an organization would benefit from a more centralized organizational model. However, in an environment that is constantly changing, a more decentralized business model would be seen as optimal (Chadler, 1962)

Thompson's contingency theory is a foremost theoretical model for the analysis of healthcare systems' organizational models. This theory claimed that an organization can be one of two types: open and closed. Open organizations were able to harness the uncertainties within their environments and efficiently adapt to these changes, while closed systems were only able to control a few items, but these items were critical to the

success of the organization (Thompson, 1967). The term, “contingency theory” was first used by Lawrence and Lorsch to provide empirical evidence that even subsidiaries of an organization will have different organizational structures because of the unique environmental conditions and subsidiaries interact (Lawrence and Lorsch, 1967). More recently, Donaldson concluded that organizations that want to prosper are required to avoid having unaligned organizational structures based on the environment that they are interacting with. This ultimately leads organizations that are able to adapt to their changing environments and conditions to control a larger market share because they are able to notice changes and react appropriately (Donaldson, 2001).

Contingency Theory is the optimal management theory to use within the context of this study (Figure 3.1) because the results from the hypothesis may strengthen the basis of this theory. Reflecting on the main research questions and the hypothesis associated with each one, it is possible to notice that no single organizational structure may produce an optimal solution. This is because different organizational structures can be viewed as optimal depending on either individual or environmental conditions. Nevertheless, elements of contingency theory may help identify and explain some of the variables that influence the decisions that top managers within a hospital organization might make.

Hospitals located in rural settings have unique challenges and these challenges can in-turn affect the way these organizations conduct business. Taking into account elements of contingency theory, it becomes evident that there might be rationale for reason why rural hospitals might behave differently than their urban counterparts (Shortell, et al., 1996). A related issue that contingency theory might help to explain is

why more than 75% of hospitals are no longer independent, but part of a network or system (Bazzoli, et al., 1999).

### **3.5 STUDY DESIGN**

The study involves multi-variable regression analysis of survey data (conducted by AHA) of administrators of rural hospitals that are members of a multi-hospital system. The study will utilize a cross level study design incorporating 2012 American Hospital Association (AHA) data along with 2012 American Hospital Directory Data. Data will be analyzed using a multivariate linear regression analysis to adjust for hospital level characteristic differences.

### **3.6 DATA SOURCES**

The data for this study were obtained directly from the 2011 American Hospital Association (AHA) Annual Survey and the American Hospital Directory (AHD) 2012 dataset. Both datasets were secondary data; the researcher had no direct interaction with any hospital. All information within this paper was based solely on the data directly obtained from these secondary data-sources. Within all datasets, the most recent available annual survey was used. The AHA 2011 Annual Survey dataset was obtained via download. Throughout the year, the data is updated because information may be missing, changed, or incorrect. The dataset obtained from the AHD utilized 2012 data. This dataset is the most recent annual dataset available and was based on data obtained from the 2012 CMS Medicare Compare National Dataset. The dataset utilized was constructed based on this researcher's specifications. Figure 3.2 presents the hospital inclusion flowchart. The gray-shaded structures represent the areas of interest in this study.

### *American Hospital Association Annual Survey of Hospitals (AHA) Dataset*

The AHA Annual Survey of Hospitals has gathered individual hospital level data since 1946 and response rates have historically been above 70% each year. This dataset is the single source for American Hospital Association data that are associated with other state and industry organizations. The survey is administered during the fourth quarter of each year to all AHA registered and nonregistered facilities, which currently includes about 6,500 hospitals in the United States and associated areas. The survey includes hospital-level questions related to facilities, finances, staffing, and administration and is sent to prior designated employee(s) at each AHA member hospital. In the event of an apparent inconsistency, the hospital is contacted in order to provide clarification until the problem is resolved (Association., 2013).

The AHA Annual Survey of Hospitals is a single dataset that includes the most reliable information about hospitals within the United States and associated areas. The survey generates estimates from the previous year's responses and from comparisons to hospitals of similar size and orientation. If there are any unusual variations in reported characteristics from one year to the next, the data administrators will inquire with the hospital for clarification. The data are a primary source of hospital-level data for government agencies, including the Center for Disease Control and Prevention, Centers for Medicare and Medicaid Services and a number of industry-related companies. This data are viewed as the industry benchmark as they contain valuable insights into our nation's current hospitals (Association, 2012c).

Currently, the AHA dataset tracks hospital demographics and characteristics. This includes information pertaining to hospital leadership, strategic planning, service-line



offering, beds, utilization, finance human resource management, information management, process management, patient-centered focus satisfaction, and staffing. An added level of analysis is implemented to ensure the highest data quality. Hospital data are compared to information obtained in previous years with regard to hospital type, size, and geographic location. The data is updated monthly from information obtained directly from Medicare. The preliminary data on hospitals are updated monthly from April to September, with finalized data available in October (Association, 2012b).

A total of 1984 member hospitals within the AHA annual survey met the selection criteria. These hospitals were classified as located in a rural area; there were no hospitals located in an urban area. Rural standalone hospitals and those that are part of a multi-hospital system were selected. Within multi-hospitals, hospitals were further classified by their organizational structure, which were centralized, decentralized, or semi-centralized. Solo hospitals were not sub classified based on organizational structure. The final pool of hospitals contained standalone hospitals of those that are part of a multi-hospital system, and all were located in a rural setting (Association, 2012b).

#### *American Hospital Directory (AHD) Dataset*

The American Hospital Directory provides online data for over 6,000 hospitals and is a privately owned Subchapter S Corporation incorporated in the State of Kentucky under the Federal Employer Number of 61-1298744. The company has no third-party relationships that could influence the services provided. The main sources of revenue are subscriptions to the company's website, ahd.com, and the sale of custom data services. Most of the data used on the website or in their custom data services is obtained from Medicare claims data (MedPAR and OPSS), hospital cost reports, and other files

obtained from the Centers for Medicare and Medicaid Services (CMS). It is important to note that the AHD is not affiliated with the American Hospital Association (AHA) and is not a direct source for AHA Data.

Based on a preliminary check of the data provided within the AHA dataset, there appears to be some concern as to the validity of some of the respondent's multi-hospital structure. Hospitals that are part of the Department of the Army Health System, the Veterans Affairs Health System, and the Indian Health Service, were respectively categorized as; moderately centralized and decentralized respectively, but are actually part of highly centralized healthcare system with fairly rigid command, control structures, financial management, and clinician staffing. Even though this is seen as a threat to the overall validity of the study, it is important to note that throughout the literature review, the taxonomy that Bazzoli et al, 1999 created and the AHA annual survey dataset are seen as the benchmark of characterization and information within their respected fields of study.

A total of 12 variables were obtained from the 2012 American Hospital Association. Out of the 12 variables, only six were needed for this study (Table 3.2). These six variables are highlighted (\*) in Table 3.2, and are discussed below:

- i. System membership was not provided although it was used to generate the dataset. It was labeled as the variable "MHSMEMB". This is a dichotomous variable where 0 is no system membership and 1 indicates that the hospital is a member of a larger system. This variable was used for data cleaning and completion purposes when any variables were missing from the required variable list. If a hospital does not equal a blank, then "MHSMEMB" equals 1.

- ii. AHA region code was coded as the variable “REGION” within the dataset. This variable was generated using hospitals’ state locations and coded as “STATE.” There are a total of nine regions within the United States (Figure 3.3). The range of states within each region ranges from three states in region 2 to seven states in regions 3, 4, 6, 8, and 9. 1 = Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. 2 = New Jersey, New York, and Pennsylvania; 3 = Delaware, Kentucky, Maryland, North Carolina, Virginia, West Virginia, and District of Columbia; 4 = Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee, and Puerto Rico; 5 = Illinois, Michigan, Indiana, Ohio, and Wisconsin; 6 = Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota 7 = Arkansas, Louisiana, Oklahoma, and Texas 8=Arizona, Colorado, Idaho, Montana, New Mexico, Utah, and Wyoming; 9 = Alaska, California, Hawaii, Nevada, Oregon, and Washington (Association, 2012a).
- iii. The Medicare provider identification number is coded as the variable MCRNUM within the dataset. Data from this variable were obtained through internal proprietary organizational structure characteristics. This variable is continuous, with every hospital within the dataset having its own unique Medicare provider identification number. This variable is the same as the CMS ID number, which is found within the AHD dataset and serves as the primary linking variable between the Annual American Hospital Association Survey of Hospitals and the American Hospital Directory.
- iv. The healthcare system ID is coded as the variable CLUSTERCODE within the dataset. The variable explores the actual type of organizational structure within a

- multihospital system. Data for this variable are obtained through respondent indication. There are six possible answers: 1—centralized, 2—centralized physician/insurance health system, 3—moderately centralized health system, 4—decentralized health system, 5—-independent hospital system, or 6—blank or unassigned code. For the purpose of this study, hospitals with independent, missing, or unassigned system structures were excluded from the data analysis. In addition, hospitals and physician/insurance systems with centralized structures were combined, since the focus of this study is on the organizational structure.
- v. The number of medically staffed hospital beds is labeled as “beds set up and staffed” and is coded as the continuous variable “BDH” within the dataset. This variable explores the number of non-nursing home beds in a hospital. Data for this variable can be found within question D.1.b. Within this survey, the respondent will indicate the number of beds, and this number is inserted directly into the dataset.
  - vi. Critical access hospitals, or CAHs, have been labeled in the survey as “variable CAHs”. This variable explores whether or not a hospital is classified as a critical access hospital. Data for this variable can be found within question B.11.15. Within this survey, the respondent will indicate if the hospital is indeed a registered critical access hospital with 0=no or 1=yes.

### **3.7 SELECTED INDICATORS FOR FINANCIAL PERFORMANCE**

Financial information for each hospital used in this study was obtained through the Online Medicare cost report worksheets and datasets from the Cost Report data through the AHD. This data, taken directly from The Healthcare Cost Report Information

System (HCRIS) dataset, contains the most recent information from each cost report filed with CMS. It is the goal of the CMS to provide data that is accurate, complete, and up-to-date. Cost reports are filed annually by hospitals in accordance to their specified year-end reporting schedule. Data obtained for these relative financial variables is updated quarterly by the CMS. Medicare-certified institutional providers are required to submit an annual cost report to a Medicare Administrative Contractor (MAC) by submitting a CMS-2552-10 form.

Financial indicators are an integral part of a business's overall decision-making and benchmarking. One of the main indicators financial organizations and stakeholders use to gauge a business model's viability is the business's return on equity (ROE). ROE allows firms to increase profitability from alternatives to their normal method of business. A company can become a market leader if it provides higher return on equity than its counterparts in the same sector or industry (Younis & Forgione, 2005). This ultimately gives it competitive advantage. ROE increases with a given market share, firm size, barriers to entry, and conservative accounting factors (Bellandi, 2000). ROE is ultimately part of internal and external evaluations and should correspond to the organization's price-to-book ratio (Bellandi, 2000)

### **3.8 SELECTED INDICATORS FOR QUALITY OF CARE**

Quality data on hospitals through the AHD was obtained directly from Hospital Compare, a dataset originated by the CMS with an affiliation with the Hospital Quality Alliance (HQA), collaboration between both public and private health researchers designed to increase public awareness of hospital quality of care. Data within this dataset is obtained quarterly or whenever website updates are provided.

The statistical model used to calculate 30-day Mortality and 30-day Readmission rates for each hospital is based on “interval estimates,” which are the upper- and lower-variable bounds for each hospital’s risk-adjusted 30-day Mortality and Readmission Rates. These bounds help describe the amount of uncertainty in the mortality and readmission rates provided for each hospital (Bernheim et al., 2010; Ross, et al., 2008). Due to internal threats to validity, larger hospitals normally have more accurate estimates and smaller interval estimates, because there is a larger pool of patient data available from which to calculate 30-day Mortality and Readmission rates. This information can be obtained via administrative data without having to examine each eligible patient’s medical chart individually (2002).

These 30-day Mortality Rates are all risk-adjusted for patients’ age, sex, and other pertinent patient-level hospital data. In a 2009 study of 11 states, it found the Central Hospital Systems are associated with lower AMI, CHR, and pneumonia rates when compared to other hospital systems on a national level. Notwithstanding, some hospitals have better AMI ratings compared to centralized hospitals and moderately centralized health systems. Inpatient hospital care allows these hospitals to adjust accordingly to local market conditions (Chukmaitov, et al., 2009).

The 30-day Readmissions and Mortality Rates indicator (Figure 3.5) encompasses Medicare-eligible patients over the age of 65 or patients who have been enrolled in traditional fee-for-service Medicare for a full year prior to their hospital admission. A research team that included both clinical and statistical experts from Yale and Harvard universities derived these measures. This team of researchers utilized the statistical methodologies that have been used in the peer-reviewed literature pertaining to

healthcare quality (QualityNet, 2013). This measure also complies with the standards for publically reported outcome statistical models implemented by the American Heart Association and the American College of Cardiology. It is important to note that this data does not include patients that are enrolled in any type of Medicare-managed care plan (Bernheim, et al., 2010; QualityNet, 2013).

### *30-day Readmission Rate*

According to the CMS, the 30-day Readmission Rate measures a large set of healthcare variables and ultimately helps to describe the quality of care that a patient receives during their hospital stay. There appears to be a direct correlation between the quality of care that a patient receives and the likelihood that they will experience improved outcomes like survival, increased functional ability, and improved quality of life. This quality indicator, the 30-day Readmission Rate, is consistent with the Department of Health and Human Services' National Quality Strategy. The goals of this program are threefold: 1) to improve the healthcare quality of patients, 2) to improve the health of the entire population of the United States, and 3) to reduce healthcare costs within the nation (QualityNet, 2013).

### *30-day Mortality Rate*

The 30-day Mortality Rate measures are estimates of deaths from any cause within 30 days of a hospital admission among patients hospitalized with one of several primary diagnoses (heart attack, heart failure, and pneumonia). This measure is a way to assess the overall wellbeing and quality of care that a patient receives. It is actuated regardless of whether the patient dies while still admitted to the hospital or after discharge. CMS utilizes this measure instead of inpatient deaths in an effort to use a more

consistent measurement time-window. The average length of a patient's hospital stay will vary across different populations and hospitals. Measuring longer time periods, such as 90-180 days, could skew the data with factors that are less relevant to patient quality of care and more indicative of complications, illnesses, patient behavior, or after-discharge patient care (Bernheim, et al., 2010; QualityNet, 2013).

The CMS 30-day Mortality Rate measure helps to assess the quality of care for patients in a way that is consistent with the goals of the Department of Health and Human Services' National Quality Strategy. The goals of this program are threefold: 1) to improve the healthcare quality of patients, 2) to improve the health of the entire population of the United States, and 3) to reduce healthcare costs within the nation. In 2008, the CMS began to publically report the 30-day Mortality Rate through Hospital Compare (QualityNet, 2013). The CMS mortality measure adjusts for a hospital's caseload, so that hospitals are able to be benchmarked on a "level playing field" with one another (Bernheim, et al., 2010).

### **3.9 DATA EXCLUSION AND INCLUSION CRITERIA**

Data from the AHA Annual Survey contained a total sample size of 2,220 rural hospitals. 1,398 hospitals with missing organizational structure information and independent or unassigned organizational structure were omitted from the analysis. The remaining 822 rural hospitals were used in the data linking process and analysis. Three datasets from the American Hospital Director were used, the first contained the financial indicators, the second the mortality rate for the quality indicators and the third the readmission for the quality indicators. The total sample size from the AHD financial dataset was 6,185. Again all observations with missing financial indicator values were



omitted (n=514). The total sample size for the AHD mortality and readmission rate quality indicators were 4,174 and 14, 873, respectively and once the missing values were omitted the remaining sample size for the mortality and readmission rate quality indicators were 1,101 and 10,750, respectively.

### **3.10 DATA LINKING STRATEGY**

Data from both the AHA Annual Survey and the American Hospital Directory will be linked using the Medicare Provider Identification number. Within both datasets, this variable and the number associated with it represent the same hospital, thereby making this a standard linkable variable (Figure 3.6). Ultimately, the provider identification number is similar to that of an IRS tax identification number in that the number will stay with the organization as long as that organization is still functioning as it did when the number was originally assigned. Unless a company is dissolved, merged, or no longer conducts business for tax reasons in the United States, the IRS tax identification number does not change. This static number is also useful because it will help track of future changes within certain segments of the hospitals.

A hospital can change its name, but seldom will it actually change its Medicare identification number. Although a company might update or modify its name, the Medicare identification number will not change (CMS, 2012). Each hospital will have its own Medicare identification number. This element of the variable makes it much more direct in that while a group of hospitals might conduct business under a single IRS tax identification number, each individual hospital has its own Medicare identification number.

The linked AHA and financial AHD dataset contained a total of 784, whereby 38 rural hospitals from the AHA were not matched. In addition, upon outlier analysis an additional 27 hospitals were excluded from the analysis reducing the sample size to 757.

### 3.11 ANALYTICAL APPROACH

Overall research objective was to examine the effect of rural hospitals' organizational structures—as measured by level of centralization, i.e. centralized, decentralized, and moderately centralized—on their financial performance.

The specific research equations are:

$$(1) \text{ FINANCIAL PERFORMANCE} = \beta_0 + \beta_1 \text{Organizational Structure} + \beta_2 \text{Agency Characteristics} + \beta_3 \text{Region} + \varepsilon_i$$

$$(2) \text{ QUALITY OF CARE} = \beta_0 + \beta_1 \text{Organizational Structure} + \beta_2 \text{Agency Characteristics} + \beta_3 \text{Region} + \varepsilon_i$$

Data analyses of the study's proposed research questions were conducted using SAS 9.3. First, descriptive statistics were generated using frequencies, means, percentages, and selected measures for bivariate analysis of categorical variables. To determine the effect of selected hospital organizational structures on the quality of patient care and financial performance, a multivariate linear regression analysis was executed using Least Square Means and Adjusted Tukey Analysis. To adjust for organizations' characteristic differences, selected organizational characteristic variables were included in the analysis.

Table 3.1 Key Components of Contingency Theory

Major Contingencies	Major Structural Variable	Key Articles
Uncertainty: Environmental	Organic, mechanistic structures	Burns & Stalker (1961)
	Organizational differentiation and integration	Hage (1965), Hage & Aiken (1969), Perrow (1967)
Task Interdependence	Coordination mechanism	Thompson (1967)
Technology	Related topic, hierarchical levels	Woodward (1965)
Diversification Strategy	Divisionalization	Chandler (1962), Donaldson (1987)
Size	Formalization, specialization and centralization	

Table 3.2 Selected Variables from 2012 AHD Dataset

Organizational Variables	Description	RQ1 & RQ2
MHSMEMB*	System membership	Data cleaning
AHA ID	AHA ID	N/A
NAME	Name of hospital	N/A
ADDRESS	Hospital Street Address	N/A
STATE*	Hospital state location	Create "REGION"
CITY	Hospital city location	N/A
CRITICAL*	Designated critical access hospital	Control
ZIPCODE	Hospital zip code	N/A
MCRNUM*	Medicare ID	Link
CLUSTERCODE*	Organizational structure type	Independent
BDH*	Total number of staffed hospital beds	Control

Table 3.3 Variables from the AHD Dataset

Variables	Root Data	RQ1	RQ2
Operating Margin		D1	-
Return on Equity		D2	-
Day's Cash on Hand		D3	-
<u>30-day readmission rate</u>	Acute Myocardial Infarction	-	D1
	Heart Failure	-	D2
	Pneumonia	-	D3
<u>30-day mortality rate</u>	Acute Myocardial Infarction	-	D4
	Heart Failure	-	D5
	Pneumonia	-	D6

Table 3.4 Selected Financial Performance Indicators from AHD Dataset

Variable	Variable/Format	Calculated as:	Source
Total Operating Margin	Continuous / Percentage	$[(\text{Total operating Revenue} - \text{Total operating expenses}) / (\text{Total operating Revenue})] * 100$	AHD
Return on Equity	Continuous / Percentage	$\text{Net income} / (\text{total assets} - \text{total liabilities}) * 100$	AHD
Day's Cash on Hand	Continuous / Percentage	$(\text{Cash on hand} + \text{market securities}) / [\text{Total operating expenses} - \text{depreciation}] / 365$	AHD

Table 3.5 Definition of Financial Performance Indicators

Financial Variable	Generic Definition
Total Operating Margin	The operating margin is the most commonly used ratio to measure a hospital's financial performance. If total operating revenue is less than total operating expenses, the organization is operating at a loss and will have a negative operating margin.
Return on Equity	Profitability ratio of a company is sometimes gauged using Return on Equity. This is a tool investors can use to measure how effectually the company is utilizing their money. Source: (Commerce, 2012)
Day's Cash on Hand	A commonly used liquidity measurement that indicates the amount of cash that is readily available for an organization's day-to-day monetary requirements (Bazzoli, et al., 1999; Ricketts & Heaphy, 2000)

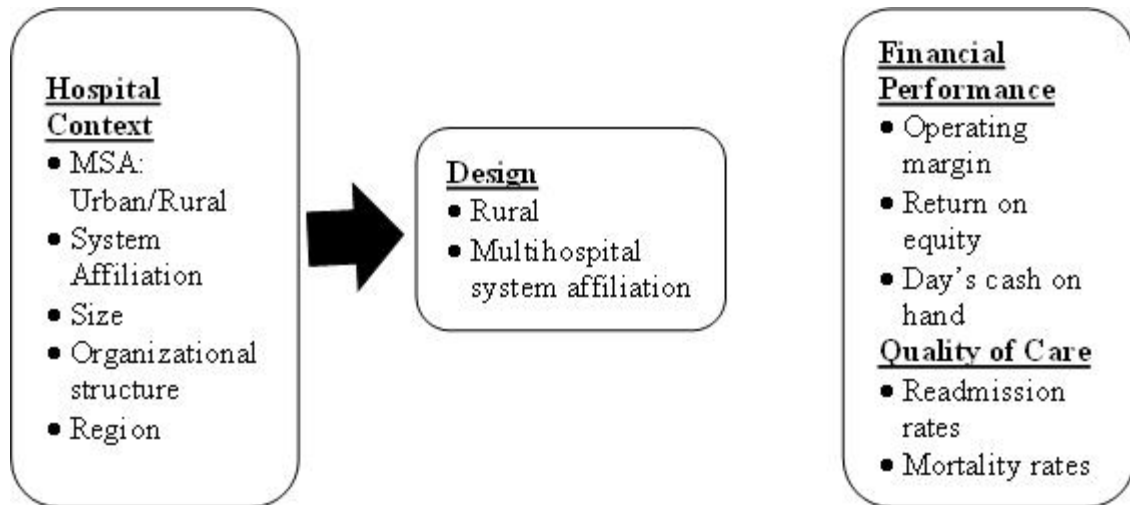


Figure 3.1 Rural areas within United States

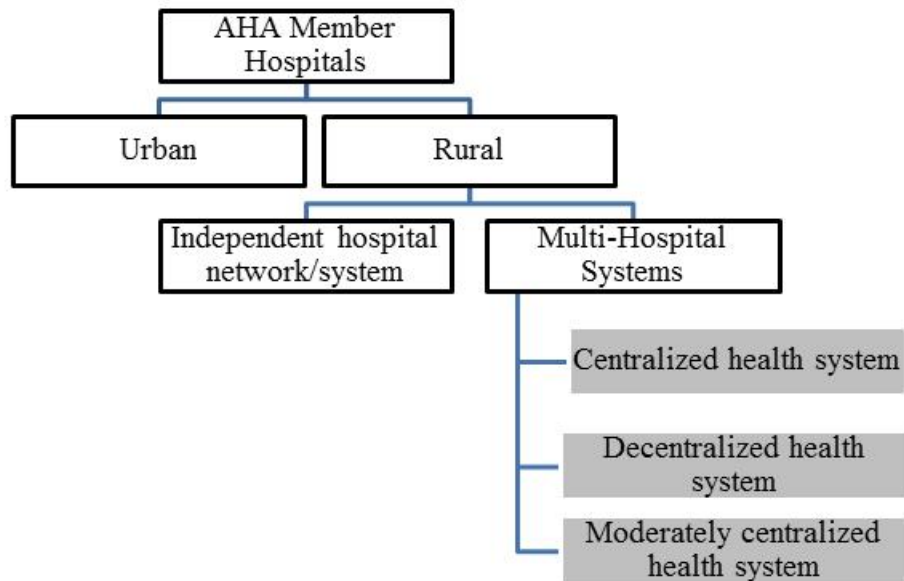


Figure 3.2 Hospital inclusion flow-chart



Figure 3.3 American hospital association regions

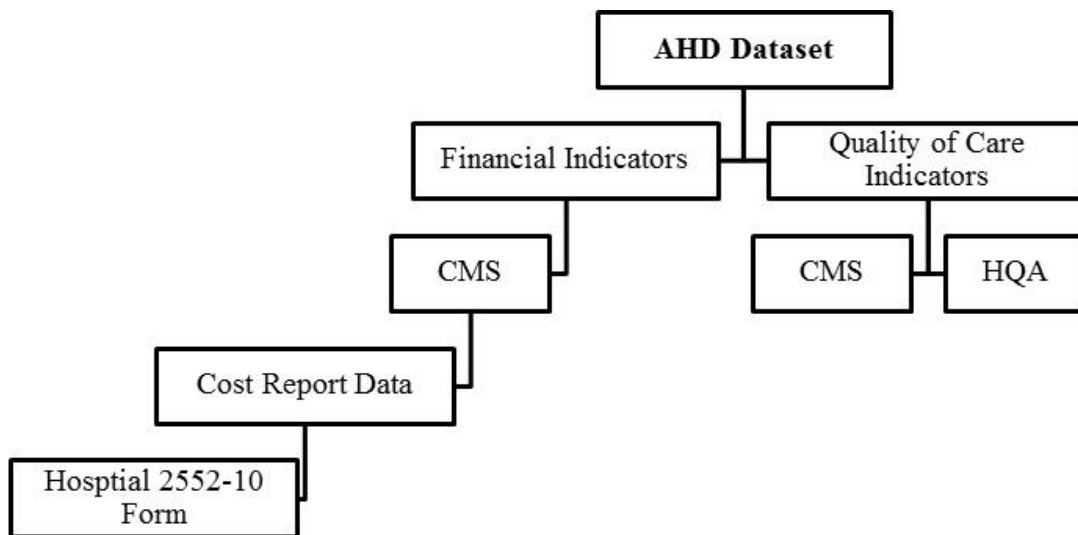


Figure 3.4 The American hospital directory (AHD) data origination flowchart

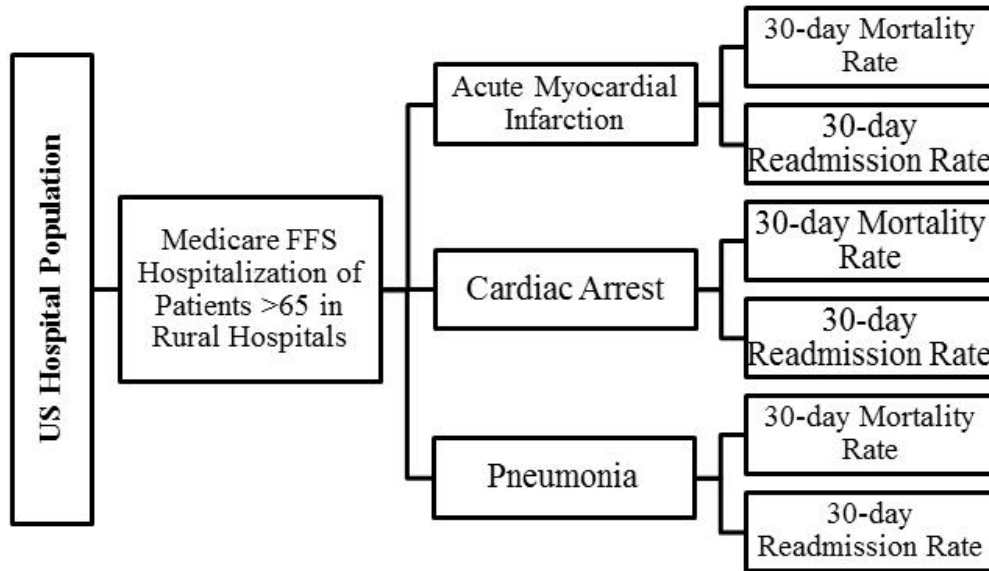


Figure 3.5 Quality of care indicator scheme



Figure 3.6 AHA and AHD data linkage

## CHAPTER 4

### RESULTS

#### 4.1 DESCRIPTIVE STATISTICS

The first important task is to understand the demographics of the hospitals within this study. This will be accomplished through the following series of tables. Table 4.1 reports the characteristics of rural multisystem hospitals in the United States. Out of the 822 rural hospitals included in the study, 17 rural hospitals were located in region I, 23 in region II, 110 in region III, 115 in region IV, 121 in region V, 203 in region VI, 101 in region VII, 89 in region VII, and 43 in region IX. Region VI has the highest rural hospital representation and region I has the lowest. Among all rural hospitals, 54.26% identified themselves as critical access hospital, while 45.74% did not. The average number of total facility beds was 71.50 with a minimum of two and maximum of 757 beds.

Approximately 56% of rural hospitals have a decentralized organizational structure, 29% have a moderately centralized structure, and 15% have a centralized organizational structure (Table 4.1).

Table 4.2 shows the distribution of rural hospitals' organizational structures across the nine national regions. The number of hospitals per region ranges from two to 154. A total of 462 rural hospitals identified a decentralized organizational structure. 236 identified a moderately centralized structure, and only 124 hospitals identified a centralized organization structure. Hospitals with centralized structures and moderately decentralized



hospitals were mostly located in regions IV and V, with 71 and 154 hospitals in each region respectively.

Table 4.3 reports the characteristics of the linked AHA and AHD financial indicators. After plotting all the data points to each of the respective three financial indicators, it became apparent that some information within the data was erroneous. In consultation with a senior researcher, it was determined that any hospital that contained either incomplete or apparently incorrect information should not be considered for financial analysis. This decision resulted in a decrease in the overall sample size from the original 822 hospitals to 757. It shows both hospital organizational structures and financial performance characteristics. Overall, the MHS rural hospitals' percentages are consistent with the data provided by the American Hospital Association. The average MHS rural hospital operating margin was between -15 and 12 with returns on equity ranging from -27 to 48.92 and days cash on hand ranging from -21 to 101 days. The widest variation is in days cash on hand among MHS rural hospitals.

Table 4.4 reports the distribution of rural hospitals after outlier elimination and linking of rural hospitals with financial indicators. The distribution of hospitals is similar to that of the unlinked AHA dataset. The largest elimination was in moderately centralized hospitals whereby 40 rural hospitals were eliminated due to the linking process. Overall, more than half (n=440) of MHS rural hospitals had decentralized organizational structures, 121 reported having a centralized organizational structure, and 196 reported having a moderately centralized structure.

The American Hospital Association's data was linked with the ADA data to obtain three financial elements: operating margin, return on equity (ROE), and days cash

on hand. A total of 784 hospitals were matched. Further examination of the data revealed the presence of outlier observations within the three financial indicators, which resulted in 27 rural hospitals being omitted from the analysis. Table 4.5 reports the mean and standard error of the financial indicators across all three organizational structures. The mean operating margins were -0.22, -1.63, and -1.94 for centralized, moderately centralized, and decentralized rural hospitals, respectively. The mean returns on equity were 15.76, 9.51, and 9.83 for centralized, moderately centralized, and decentralized rural hospital, respectively. The mean days cash on hand was 52.67, 40.43, and 36.26 days for centralized, moderately centralized, and decentralized rural hospital, respectively.

Table 4.6 reports the characteristics of the linked AHA and AHD quality indicators. An internal issue with incomplete data for all the six quality indicators was seen as a threat to the validity of this study. Again, in consultation with a senior researcher, it was decided that if a hospital had any of the six quality indicators missing (or erroneous), that hospital would be omitted from the quality of care analysis. This decision resulted in a decrease in the total number of individual hospitals within the data pool from 822 to 233. Overall the percentages of MHS rural hospitals are consistent with the data provided by the American Hospital Association. The average MHS rural hospital 30-day mortality rates for heart attack, heart failure, and pneumonia were 15.80, 12.80 and 12.60 with a total of 116, 234, and 263 patients, respectively. On the other hand, the average 30-day readmission rates were 19.58, 24.91, and 18.57 for heart attack, heart failure, and pneumonia, respectively. It is evident that overall 30-day readmission rates were higher than the mortality rates.

The American Hospital Association's data was linked with the ADA data resulting in a total of 233 matched MHS rural hospitals on two quality of care indicators, 30-day readmission and mortality rates, for three medical conditions: 1) acute myocardial infraction (AMI), 2) congestive heart failure (CHF), and 3) pneumonia. Table 4.7 illustrates the mean 30-day readmission rate for AMI, CHF, and pneumonia across all three organizational structures. The mean 30-day readmission rates for AMI were 19.40, 24.07, and 18.20 with an average standard error of 1.59 for centralized, moderately centralized, and decentralized rural hospitals, respectively. The mean 30-day readmission rate for CHF was 19.45, 25.20, and 18.61 with an average standard error of 1.69 for centralized, moderately centralized, and decentralized rural hospitals, respectively. The mean 30-day readmission rates for pneumonia were 19.71, 25.95, and 18.64 with an average standard error of 1.79 for centralized, moderately centralized, and decentralized rural hospitals, respectively. Across all three types of organizational structures, the 30-day readmission rate for CHF was consistently higher—although not significantly so—than those of AMI and pneumonia. The means of all three 30-day readmission rate conditions are similar to the national rate averages.

Table 4.8 illustrates the mean 30-day mortality rate for myocardial infraction (i.e. heart attack), CHF and pneumonia across all three organizational structures. The mean 30-day mortality rates for AMI were 15.62, 11.69, and 11.89 with standard errors ranging from 1.60 to 1.79 for centralized, moderately centralized, and decentralized rural hospital, respectively. The mean 30-day mortality rates for CHF were 15.92, 12.39, and 12.75 for centralized, moderately centralized, and decentralized rural hospital, respectively. The mean 30-day mortality rates for pneumonia were  $15.78 \pm 1.38$ ,  $11.99 \pm 1.71$ , and

12.71±2.15 for centralized, moderately centralized, and decentralized rural hospitals, respectively. Across all three conditions, the 30-day mortality rate was approximately equal to that of the national averages. This supports the assertion that even with the omission of unmatched MHS rural hospitals, the sample remains a representative sample.

#### **4.2 MULTIVARIATE ANALYSIS: EFFECT ON FINANCIAL PERFORMANCE**

The following section will highlight the results of research objective 1, to examine the effect of rural hospitals' organizational structure—as measured by level of centralization—on their financial performance. The specific hypotheses were:

- H1: Rural hospitals affiliated with other multi-hospital systems and with a centralized organizational structure will have higher operating margins than multi-hospital-affiliated hospitals with decentralized organizational structures, and multi-hospital-affiliated hospitals with moderately centralized organizational structures.
- H2: Rural hospitals affiliated with other multi-hospital systems and with a centralized organizational structure will have higher returns on equity than multi-hospital-affiliated hospitals with decentralized organizational structures, and multi-hospital-affiliated hospitals with moderately centralized organizational structures.
- H3: Rural hospitals affiliated with other multi-hospital systems and with a centralized organizational structure will have more days cash on hand than multi-hospital-affiliated hospitals with decentralized organizational structures, and multi-hospital-affiliated hospitals with moderately centralized organizational structures.

The financial performance of rural hospitals has increased to the point that policymakers have started to take notice of the disparity (Wang, et al., 2001). Multi-system hospital arrangements are seen to help hospitals gain financial stability by allowing them access to larger capital markets and financing elements that would help them compete with larger urban hospitals (Moscovice, et al., 1995). Analysis testing of hypotheses 1-3 was guided by assumptions outlined by contingency theory and findings from prior studies. This dissertation aims to explore the impact of MHS rural hospitals' organizational structure on financial performance. A series of models were generated to analyze these associations. The models analyzed (Table 4.9) included context and performance variables; including metropolitan statistical area (study included only rural hospital), system affiliation, hospital size, and region location.

Hypothesis 1 explores whether centralized rural MHS hospitals will have larger operating margins than moderately centralized and decentralized rural MHS hospitals. This hypothesis was not supported: mean operating margins were not significantly different. Other significant factors associated with a rural MHS hospital's operating margin were size ( $p\text{-value} < 0.0001$ ) and location ( $p\text{-value} < 0.0001$ ).

Hypothesis 2 similarly compares return on equity between the three groups. This hypothesis was not supported: mean return on equity did not significantly differ between centralized, moderately centralized, and decentralized organizational structures.

Hypothesis 3 examines whether hospital affiliation and organizational structure has an effect in determining hospital financial performance based on days compares days cash on hand between the three groups. The multivariate analysis revealed a significant association between organizational structure and days cash on hand ( $p\text{-value} = 0.0139$ ).

Results of further analysis reject the null hypothesis and support a portion of hypothesis 3. Centralized hospitals had significantly more days cash on hand than decentralized ones, (p-value = 0.0130) although not significantly more than moderately centralized ones.

Due to the unequal distribution within the different clustering of the MHS organizations, utilization of the Least Square Means (Table 4.10) was implemented throughout all financial elements to insure that any significant findings took into unequal distributions between the three types of organizational structures within the dataset.

#### **4.3 MULTIVARIATE ANALYSIS: EFFECT ON QUALITY OF CARE**

Healthcare researchers face challenges in identifying effective ways to improve the quality of care that patients receive with the financial constraints that many rural hospitals face. Quality of care is defined as “whether individuals can access the health structures and processes of care they need and if the care received is effective (Moscovice, et al., 2004). This section will highlight the results of research objective 2, to examine the effect of rural hospitals’ organizational structure—as measured by level of centralization—on patients’ quality of care. The specific hypotheses are:

- H4: Affiliated rural hospitals that are part of a multi-hospital system will have lower 30-day mortality rates for acute myocardial infarction when centralized than when decentralized or moderately centralized.
- H5: Affiliated rural hospitals that are part of a multi-hospital system will have lower 30-day mortality rates for CHF when centralized than when decentralized or moderately centralized.

- H6: Affiliated rural hospitals that are part of a multi-hospital system will have lower 30-day mortality rates for pneumonia when centralized than when decentralized or moderately centralized.
- H7: Affiliated rural hospitals that are part of a multi-hospital system will have lower 30-day readmission rates for acute myocardial infarction when centralized than when decentralized or moderately centralized.
- H8: Affiliated rural hospitals that are part of a multi-hospital system will have lower 30-day readmission rates for CHF when centralized than when decentralized or moderately centralized.
- H9: Affiliated rural hospitals that are part of a multi-hospital system will have lower 30-day readmission rates for pneumonia, when centralized than when decentralized or moderately centralized.

The statistical model used to calculate 30-Day Mortality and 30-day Readmission rates for each hospital sector is based on “interval estimates,” which are the upper- and lower-variable bounds for each hospital’s risk-adjusted mortality and readmission rates. These bounds help describe the amount of uncertainty in the mortality and readmission rates provided for each hospital (Bernheim, et al., 2010; Ross, et al., 2008). There are both theoretical and empirical justifications to establish the relationship between an organization’s characteristics and the quality of care that a patient receives in different hospital settings. Any attempt to summarize this relationship across different settings could easily be confounded due to conflicting relationships (Hearld, et al., 2008).

Quality of care has been widely accepted as health care that increases the probability of obtaining desired health outcomes within the constraints of current health

knowledge. According to the contingency theory model, organizational structure of hospitals may have a measurable impact on the overall quality of care and outcome of the patient (Donaldson, 1995). The Agency of Healthcare Research and Quality's (AHRQ) IQIs for AMI, CHF, and pneumonia 30-day Mortality Rates have widely been validated and used as an indicator of overall hospital quality of care (Association, 2012c). IQIs were developed to better gauge the quality of care of patients within hospital settings.

Therefore, analysis testing of hypotheses 4-9 was guided by contingency theory and findings from prior studies. This dissertation aims to explore the impact of MHS rural hospitals' organizational structure on quality of care, based on 30-day readmission and mortality rates. A series of models were generated to analyze these associations. The models analyzed (Table 4.11 and Table 4.12) included context and these performance variables: metropolitan statistical area (study included only rural hospital), system affiliation, hospital size, and region location.

Hypotheses 4-6 compare centralized, moderately centralized, and decentralized rural MHS hospitals' 30-day mortality rates for AMI, CHF, and pneumonia. Multivariate analysis did not support any of the three hypotheses were not supported by the multivariate analysis. Results indicated that rural MHS organizational structures' are not significant in predicting 30-day mortality rate for all three illnesses. Furthermore, the mean risk adjusted 30-day mortality rate did not significantly differ between hospitals with different organizational structures. There was only one significant variable—region—that varied with respect to the 30-day mortality rate for AMI ( $p$ -value = 0.0027) and pneumonia ( $p$ -value = 0.0007). For CHF, no variables were significant.



Hypotheses 7-9 examine whether organizational structure determines quality of case status based on 30-day readmission rate for AMI, heart failure, and pneumonia. Multivariate analysis revealed a significant association between organizational structure and CHF (p-value = 0.0316). Results of further analysis reject the null hypothesis and support hypothesis 8: centralized hospitals had significantly lower 30-day readmission rates for CHF than moderately centralized (p-value = 0.0326) and decentralized hospitals (p-value = 0.0478). However, no evidence suggests that centralized hospitals have lower 30-day readmission rates for AMI or pneumonia than moderately centralized or decentralized hospitals. Only one significant variable, region, varied the 30-day readmission rate for CHF (p-value < 0.01) and pneumonia (p-value = 0.0005). For AMI, no variables were significant.

Due to unequal distribution of organizational types within the quality of care dataset, a Least Squared Means approach was utilized. This was conducted to assist in mitigating any issues that could result from the unequal distribution of data that was present in the raw dataset. The results are shown in Table 4.13.

Table 4.1 Descriptive Statistics of Study Population in AHA Dataset (n=822)

Characteristics	Frequency	Unweighted Percent (%)		
<b>Region</b>				
Region I	17	2.07		
Region II	23	2.80		
Region III	110	13.38		
Region IV	115	13.99		
Region V	121	14.72		
Region VI	203	24.70		
Region VII	101	12.29		
Region VIII	89	10.83		
Region IX	43	5.23		
<b>Cluster Code</b>				
Centralized	124	15.09		
Moderately Centralized	236	28.71		
Decentralized	462	56.20		
<b>Critical Access Hospital</b>				
Yes	446	54.26		
No	376	45.74		
	<b>Mean</b>	<b>SE</b>	<b>Min</b>	<b>Max</b>
Total Facility Beds	71.50	69.56	2	757
Total Hospital Beds	60.71	62.10	2	650

Table 4.2 Bivariate Analysis of Organizational Structures across Regions (n=822)

Regions	Centralized	Moderately Centralized	Decentralized
Region I	7	8	2
Region II	7	6	10
Region III	16	45	49
Region IV	18	26	71
Region V	33	29	59
Region VI	12	37	154
Region VII	20	35	46
Region VIII	5	35	49
Region IX	6	15	22
<b>Total</b>	<b>124</b>	<b>236</b>	<b>462</b>

Table 4.3 Descriptive Statistics of AHA + AHD Financial Data (n=757)

Characteristics	Frequency	Unweighted Percent (%)		
<b>Region</b>				
Region I	16	2.11		
Region II	23	3.04		
Region III	103	13.61		
Region IV	105	13.87		
Region V	114	15.06		
Region VI	194	25.63		
Region VII	90	11.89		
Region VIII	72	9.51		
Region IX	40	5.23		
<b>Cluster Code</b>				
Centralized	121	15.98		
Moderately Centralized	196	25.89		
Decentralized	440	58.12		
<b>Critical Access Hospital</b>				
Yes	358	47.29		
No	399	52.71		
	<b>Mean</b>	<b>SE</b>	<b>Min</b>	<b>Max</b>
Total Facility Beds	73.32	71.08	2	757
Operating Margin	-1.58	13.80	-73.21	51.19
Return on Equity	10.70	38.22	-182.79	329.52
Days Cash on Hand	39.96	61.21	-63.03	370.41

Table 4.4 Bivariate Analysis of Structure & Region in AHA + AHD Financial Data (n=757)

Regions	Centralized	Moderately Centralized	Decentralized
Region I	7	8	1
Region II	7	6	10
Region III	14	41	48
Region IV	18	22	65
Region V	33	28	53
Region VI	12	29	153
Region VII	19	29	42
Region VIII	5	19	48
Region IX	6	14	20
<b>Total</b>	<b>121</b>	<b>196</b>	<b>440</b>

Table 4.5 MHS Hospitals' Organizational Structures and Financial Strengths

Organizational Structure (n=757)	Operating Margin		Return on Equity		Day's Cash on Hand	
	Mean	SE	Mean	SE	Mean	SE
Centralized	-0.22	10.38	15.76	52.23	52.67	69.03
Moderately Centralized	-1.63	12.89	9.51	30.67	40.43	59.54
Decentralized	-1.94	14.97	9.83	36.66	36.26	59.31

Table 4.6 Descriptive Statistics of AHA + AHD Quality Data (n=233)

Characteristics	Frequency	Unweighted Percent (%)			
<b>Region</b>					
Region I	9	3.86			
Region II	12	5.15			
Region III	53	22.75			
Region IV	39	16.74			
Region V	34	14.59			
Region VI	29	12.45			
Region VII	36	15.45			
Region VIII	8	3.43			
Region IX	13	5.58			
<b>Cluster Code</b>					
Centralized	33	14.16			
Moderately Centralized	75	32.19			
Decentralized	125	53.65			
<b>Critical Access Hospital</b>					
Yes	12	5.15			
No	221	94.85			
	<b>Mean</b>	<b>SE</b>	<b>Min</b>	<b>Max</b>	
Total Facility Beds	133.68	90.43	17	757	
<b>AMI Mortality</b>					
Total Patients	116.27	112.03	28.00	900.00	
Rate	15.80	1.39	11.80	21.90	
<b>CHF Mortality</b>					
Total Patients	234.77	143.74	46	1051	
Rate	12.08	1.69	8.10	16.60	
<b>Pneumonia Mortality</b>					
Total Patients	263.09	132.28	72.00	836.00	
Rate	12.61	2.10	8.40	19.30	
<b>AMI Readmission</b>					
Total Patients	100.43	127.97	25.00	1063.00	
Rate	19.58	1.21	15.70	24.30	
<b>CHF Readmission</b>					
Total Patients	282.24	180.22	51.00	1357.00	
Rate	24.91	2.13	19.80	33.60	

Table 4.6 Continued

Characteristics	Frequency	Unweighted Percent (%)		
<b>Pneumonia Readmission</b>				
Total Patients	274.23	137.65	77.00	863.00
Rate	18.57	1.88	14.30	24.20

Table 4.7 Hospitals' Organizational Structures and 30-Day Readmission Rates

30- Day Readmission Rate	Centralized		Decentralized		Moderately Centralized	
	Mean	SE	Mean	SE	Mean	SE
Heart Attack	19.40	1.13	19.45	1.30	19.71	1.17
Heart Failure	24.07	1.72	25.20	2.09	25.95	2.21
Pneumonia	18.20	1.92	18.61	1.68	18.64	2.00

Table 4.8 Hospitals' Organizational Structures and 30-Day Mortality Rates

30- Day Mortality Rate	Centralized		Decentralized		Moderately Centralized	
	Mean	SE	Mean	SE	Mean	SE
AMI	15.62	1.60	15.92	1.30	15.78	1.38
CHF	11.69	1.71	12.39	1.61	11.99	1.71
Pneumonia	11.89	1.79	12.75	2.10	12.71	2.15

Table 4.9 Multivariable Linear Regression of Financial Performance Indicators on Hospital Characteristics

Hospital Characteristics (n=757)	Model 1: Operating Margin	Model 2: Return on Equity	Model 3: Day's Cash on Hand
Intercept	-1.73 (2.21)	11.26 (6.34)	53.47 *(9.95)
<b>Organizational Structure</b>			
Decentralized	Ref	Ref	Ref
Centralized	1.27 (1.43)	5.29 (4.1)	18.28*(6.44)
Moderately Centralized	-0.57 (1.19)	-0.77 (3.41)	8.29 (5.36)
<b>Facility total number of beds</b>	0.03*(0.008)	0.001 (0.02)	0.0009 (0.036)
<b>Critical Access Hospital</b>			
Yes	Ref	Ref	Ref
No	3.61*(1.24)	3.63 (3.57)	-13.52*(5.61)

Table 4.9 Continued

<b>Hospital Characteristics (n=757)</b>	<b>Model 1: Operating Margin</b>	<b>Model 2: Return on Equity</b>	<b>Model 3: Day's Cash on Hand</b>
<b>Region</b>			
Region IX	Ref	Ref	Ref
Region I	-5.14 (3.97)	-13.58 (11.39)	-31.49 (17.91)
Region II	-6.2*(3.57)	2.8 (10.24)	-20.3 (16.09)
Region III	-6.89*(2.52)	-8.64 (7.23)	-23.2*(11.36)
Region IV	-7.89*(2.54)	-2.13 (7.29)	-22.59*(11.46)
Region V	0.45 (2.46)	-3.48 (7.05)	-2.95 (11.08)
Region VI	-4.06 (2.34)	-4.74 (6.71)	-5.6 (10.55)
Region VII	-6.82*(2.56)	4.22 (7.36)	-2.36 (11.57)
Region VIII	0.87 (2.63)	-1.51 (7.55)	-18.75 (11.87)

Table 4.10 Least Square Means of Days Cash on Hand versus MHS Hospital's Organizational Structure

<b>Organizational Structure</b>	<b>Days Cash on Hand LSMEAN</b>	<b>P-value</b>	
		<b>Centralized</b>	<b>Moderately Centralized</b>
Centralized	40.92		
Moderately Centralized	50.91	0.3341	
Decentralized	32.63	0.0130*	0.2697

Table 4.11 Multivariable Linear Regression of Mortality Rate Quality Indicators and Hospital Characteristics (n=233)

<b>Hospital Characteristics</b>	<b>Model 1: AMI</b>	<b>Model 2: CHF</b>	<b>Model 3: Pneumonia</b>
Intercept	16.75*(0.51)	12.65*(0.64)	12.45*(0.77)
<b>Organizational Structure</b>			
Decentralized	Ref	Ref	Ref
Centralized	-0.07 (0.28)	-0.21 (0.35)	-0.57 (0.42)
Moderately Centralized	-0.0045 (0.21)	0.51(0.26)	0.17 (0.31)
<b>Facility total number of beds</b>	-0.0005 (0.0011)	0.0015 (0.0013)	0.0017 (0.0016)
<b>Critical Access Hospital</b>			
Yes	Ref	Ref	Ref
No	0.26 (0.43)	-0.24 (0.53)	-0.86 (0.64)

Table 4.11 Continued

<b>Hospital Characteristics</b>	<b>Model 1: AMI</b>	<b>Model 2: CHF</b>	<b>Model 3: Pneumonia</b>
<b>Region</b>	*		*
Region IX	Ref	Ref	Ref
Region I	-1.13*(0.59)	-0.78 (0.74)	-0.63 (0.88)
Region II	-1.41*(0.55)	-0.69 (0.7)	-0.43 (0.83)
Region III	-1.13*(0.42)	-1.14*(0.53)	0.77 (0.63)
Region IV	-1.23*(0.44)	-0.71 (0.55)	1.76*(0.66)
Region V	-1.48*(0.44)	-0.56 (0.55)	0.63 (0.66)
Region VI	-1.63*(0.46)	-0.46 (0.57)	0.39 (0.68)
Region VII	-0.47 (0.44)	-0.43 (0.55)	1.47*(0.66)
Region VIII	-1.46*(0.61)	-0.91 (0.76)	-0.68 (0.9)

\*Significant p-value &lt;0.05

Table 4.12 Multivariable Linear Regression of Readmission Rate Quality Indicators and Hospital Characteristics

<b>Hospital Characteristics (n=233)</b>	<b>Model 1: AMI</b>	<b>Model 2: CHF</b>	<b>Model 3: Pneumonia</b>
Intercept	19.08*(0.46)	23.76*(0.77)	17.47*(0.66)
<b>Organizational Structure</b>		*	
Decentralized	Ref	Ref	Ref
Centralized	-0.31 (0.25)	-1*(0.42)	-0.76*(0.36)
Moderately Centralized	-0.26 (0.19)	0.1 (0.32)	-0.18 (0.27)
<b>Facility total number of beds</b>	-0.0009 (0.0009)	-0.0004 (0.0016)	0.0022 (0.0014)
<b>Critical Access Hospital</b>			
Yes	Ref	Ref	Ref
No	-0.08 (0.38)	-0.04 (0.64)	-1.06*(0.55)
<b>Region</b>		*	*
Region IX	Ref	Ref	Ref
Region I	0.28 (0.52)	0.51 (0.88)	1.32 (0.76)
Region II	1.02*(0.49)	1.6*(0.84)	2.46*(0.72)
Region III	1*(0.38)	2.15*(0.64)	2.88*(0.54)
Region IV	1.14*(0.39)	1.89*(0.67)	2.56*(0.57)
Region V	0.89*(0.39)	0.66 (0.66)	1.72*(0.57)
Region VI	0.39 (0.41)	1.07 (0.69)	1.29*(0.59)
Region VII	0.88*(0.39)	1.46*(0.66)	1.77*(0.57)
Region VIII	0.88 (0.54)	-0.69 (0.91)	0.56 (0.78)

Table 4.13 Least Square Means of 30-Day Readmission Rate for CHF versus MHS Hospital's Organizational Structure

Organizational Structure (n=233)	Readmission CHF LSMEAN	P-value	
		Centralized	Moderately Centralized
Centralized	23.65		
Moderately Centralized	24.75	0.0326*	
Decentralized	24.65	0.0478*	0.9485



## CHAPTER 5

### DISCUSSION

#### 5.1 BACKGROUND

Healthcare represents nearly 18% of the entire U.S. economy and currently is one of the few bright spots in terms of job growth. Hospitals are an integral part of our healthcare system. In 2010, there were 5,724 registered hospitals in the United States, 4,972 (86%) of which were community hospitals, 3007 (60%) belonged to a system and 1,535 (30%) were part of a network (Association, 2012c). In 2010, 1,987 hospitals in the United States (34.5% of total) were classified as rural hospitals, serving primarily rural populations (Association, 2012c).

Rural populations tend to be; older, of a lower socio-economic status, and have lesser access to healthcare providers than urban populations (Bennett, et al., 2010). Rural communities tend to have weaker economies, higher poverty, and higher unemployment than their urban counterparts (Trinh & O'Connor, 2000b). Residents in these areas visit their medical home less frequently and suffer from decreased access to care, lack of insurance, and travel restrictions associated with obtaining their needed medical care (Harrison, et al., 2009). This has led to a noticeable difference between urban and rural hospitals. Rural hospitals are often plagued by low occupancy rates, higher labor costs, and older facilities compared to their urban counterparts (Trinh & O'Connor, 2000a, 2002). Hospital closures further affect deteriorating conditions in many rural communities and their residents since hospitals are seen as the heart of community health

systems (Horwitz & Nichols, 2011).

Over the years, legislative changes have had significant implications on the organization and operation of hospitals, especially rural hospitals. One particular development has been the emergence of multi-hospital systems (MHS). These newly formed multi-hospitals were creating larger, increasingly diverse hospital systems than ever seen in the United States. This growth also revealed how little we know about hospital systems (Bazzoli, et al., 2001; Luke, 2006).

Rural hospitals also view joining a MHS as an optimal alternative to the necessary financial support and strength required for survival and can help avoid mergers from investor-owned systems. The utilization of multi-hospital structures allows rural hospitals an opportunity to develop relationships with previously competing organizations for patients and resources (Grim, 1986). A 2003 study found that 75% of hospital systems belong to a local cluster where there is at minimum one other system partner within the same market (Bazzoli, et al., 2000; Bazzoli, et al., 2006)

Historically, rural hospitals have found it hard to stay solvent while having to retain an optimal position with respect to staffing and other overhead expenditures (McSwain, et al., 2012). The financial performance of rural and urban hospitals has increased to the point that policymakers have started to take notice of the disparity (Wang, et al., 2001). Differences in hospital systems can greatly affect the number of organizations involved in providing patient care (Luke & Wholey, 1999).

Quality of care has been widely accepted as health care that increases the probability of obtaining desired health outcomes within the constraints of current health knowledge. The Agency of Healthcare Research and Quality's (AHRQ) IQIs for AMI,

CHF, stroke, and pneumonia 30-day Mortality Rates have widely been validated and used as an indicator of overall hospital quality of care (Association, 2012b).

## 5.2 SUMMARY OF FINDINGS

There were two significant findings within the data obtained. The first significant finding was in connection with days cash on hand. There was a significant relationship between centralized and decentralized days cash on hand. Decentralized MHS was found to have the lowest days cash on hand of 32.63 days. This was significant as the p-value was .0130. This indicates that out of the three types of hospital structures (centralized, moderately centralize, and decentralized), the decentralized hospitals had the lowest days cash on hand. This can be seen as a sign that these MHS are less liquid and have lower available funds to cover upcoming expenses. It is very important to note that in many cases the number of days cash on hand is seen as a direct link to an organizations' abilities to pay their short- and long-term debt obligations.

The second significant find within this study was associated with the quality indicator "30-day readmission rate for heart failure." Within this study, centralized MHS was found to have the lowest 30-Day readmission rate for heart failure, a rate of 23.65%. This is compared to 24.75% for moderately centralized and 24.65% for decentralized MHS. Ultimately, based on the framework associated with this study, when comparing decentralized, moderately centralized, and decentralized hospitals, centralized MHS provided the highest level of care as indicated by patients' 30-day readmission rate for heart failure.

### 5.3 DISCUSSION OF CONCLUSION

Overall, the conclusions that were obtained explained the trends within current MHS. These findings do indicate that there are differences within certain types of financial indicators and different organizational structures. While this research only found one financial indicator that showed significant differences, there could be differences within other types of financial indicators, which could be address in future, research and/or within a larger study that incorporates more MHS variables.

The days cash on hand financial indicator, while only a single financial indicator, does provide a window into many aspects of a hospital's overall financial health. This is ultimately very important for ensuring that hospitals are able to provide financial stability in today's environment and for the long-term viability of the organization. Proper financial strength is an integral element in both long-term and short-term viability of an organization. One reason that days cash on hand was chosen as a financial indicator was that it can help provide this window into both short- and long-term financial stability and viability.

The readmission rate for CHF proved to be significant, which ultimately helped to support the claim that there are differences in quality of care within different MHS organizational structures. This started to explain the differences in the quality of care that patients with different ailments receive after and/or during during different medical procedures. Also, knowing which hospitals' organizational structures provide a higher quality of care will ultimately help the public and will help the organizations to increase their viability and quality. This also can help hospitals, some of which might provide

lower quality care, to emulate certain aspects of other hospitals' organizational structures to ultimately increase the quality of the care that they provide.

Future research on this topic should include more years of data as to help track other changes that might happen within a MHS. While Days Cash on Hand is a very important indicator, utilizing it with other sophisticated financial modeling tools would be very helpful in providing a more clearer view of other aspects that are occurring within an organization. Another area of future research that would be very interesting to explore is the utilization of this research and linking each MHS with its applicable Area Resource File. This too would assist in understanding larger aspects of the region and would allow the researcher to explore elements not only within an organization, but also that of an organization's environment to assist in both financial and quality of care indicators. Another area for future research could encompass both financial and quality indicators, but include both rural and urban MHS. Researchers could also examine the impact of for-profit and not-for-profit organizational structures on financial performance and quality of care. Finally, future researchers could compare independent hospitals with MHS systems in terms of their impact on financial performance and quality of care.

#### **5.4 STUDY LIMITATIONS**

There were three main limitations within this study. The first limitation is the inherited risk associated with using secondary data. Some of the observations reported within the data contained reporting errors. These errors included but were not limited to data-entry errors, whereby some values for variables, most notably financial variables, were too abnormal to be included in the study. In order to mitigate the threat of internal

validity, outlier analysis was completed and values that were identified as outliers were ultimately deleted from the dataset. This was done to ensure the integrity of the data.

The second limitation is that the study did not address the impact of hospital clustering. Hospitals within the same MHS will typically have more in common than hospitals from other systems. Adjusting for clustering effect would improve the finding of this study. Lastly, this was a cross-sectional study of one year of data. This does not allow for a longitudinal perspective of the data. Examining multiple years of data would allow the study to control unobserved biases that might be influenced by external factors such as policy changes and the 2007 economic recession. Also having more historical data would assist in ensuring that if changes within different hospital organizations did occur, there would be an underlying reason and/or explanation for why it occurred.

Lastly, this study did not consider external elements such as unemployment and/or uninsured populations. However, the focus of this research was to examine the impact of organizational structure.

## **5.5 IMPLICATIONS**

Combining data related to organizational structure and quality of care at rural multihospital systems, we expect to find that multihospital systems with a centralized configuration have had the highest financial performance and quality of care. This study has been able to provide a glimpse of information that healthcare stakeholders including patients, patient advocates, healthcare organizations, financial institutions, and federal and state agencies might be able to use to help them in selecting hospitals that provide excellent care and have strong financial performance.

Patients and patient advocates can use this information to better understand the differences in the quality of care that not only different hospitals but also different hospital systems can provide. Patients in rural settings are already at a disadvantage; this research can help them understand what options are available to them and where optimal care may be found. This study of patients' quality of care will also provide them with the material they need to ask their providers more informed questions. This in turn will allow them to use their healthcare dollars to choose organizations that can provide them with better support.

Healthcare organizations would greatly benefit from this research, as it would help them make better-informed decisions with respect to mergers or any other type of corporate association that may be on the horizon. With this paper's information, healthcare organizations' leaders would be able to ensure that they make more informed decisions that increase the viability and progress of their organizations. This is true not only from a financial standpoint but also from a quality-of-care standpoint. This would not only increase the overall quality of care an organization provides to its patients, but, with the help of new legislation, might help mitigate the losses that can result from increased readmission and/or mortality rates. In the current economic environment, it is imperative that healthcare organizations' leaders have all current information available to assist them in making business decisions to help their organization grow.

Financial institutions will be able to utilize this information to assist them in providing the financing that hospitals require in order to grow and stay competitive in the current healthcare market. This study will also help financial institutions to mitigate their exposure to certain organizations that might be seen as carrying too high of a beta risk.

Also, financial institutions will be able to use this up-to-date information to benchmark other hospitals and include needed addendums to upcoming debt obligations to ensure that debt-contract obligations are written in manners that optimize the financial viability of the hospital.

Federal and state agencies will be able to use this information to better understand organizational implications and their effects on both financial performance and quality of care. This study will assist these organizations to make more informed decisions when necessary. Also, this study will assist in providing financially viable and high quality hospital services in rural areas.



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