**An Explanatory Study of Rural Hospital Closures and Their Links to the Economic Health of Local Communities.**

**by**

**David Pearson**

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Dr. Patricia M. Shields

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**ABSTRACT**

Numerous rural communities have experienced the loss of their local hospital since the early 1980s. Despite government intervention at the state and federal level, the perception that these closures have caused irreparable harm to the communities and counties where they were once located is ongoing. Much scholarship has been brought to bear on this issue, but little of it has focused on actual events. This paper fills the gaps in prior research, while focusing on the outcomes observed only in Texas.

This research builds on the comparative analysis approach used in another study regarding rural hospital closures between 1984 and 1988. Selected economic indicators from 24 rural Texas counties that lost their local hospital are compared with those from a group of counties that experienced no such closures. Comparison counties were selected based on a set of accepted demographic variables. Economic effects were then observed at one and ten years after closure. Quantitative analysis was used to determine the significance of the economic effects experienced by closure counties.

The research hypothesis states that hospital closures negatively impact the local economies of the counties where they were once located, in both the short-term and the long-term. Actual results, however, pointed to the contrary. There was no significant difference observed between the counties with hospitals and those without for any of the economic indicators that were tested. Also, the research revealed no significant difference between the two groups in either the short-term or the long-term. The outcomes observed here mimic the results obtained in the prior study, despite the differences between Texas county data and data aggregated at the national level. A smaller unit of analysis and a focus on effects other than the financial might make a more meaningful approach.

**CHAPTER ONE:**
**INTRODUCTION**


INTRODUCTION

Throughout the 1980s a tremendous number of rural hospitals closed their doors nationwide due to the impact of rural outmigration, shifting demographics and changes in Medicare payment methodologies. While hospitals were closing, many contend that communities were closing as well. The economic crater left when a hospital (often the community's number two employer) closes is in many cases simply too large to fill. The federal government has intervened a number of times to help reverse this trend, but for communities already affected, these programs were too little, too late.


No place was harder hit than Texas, which has the most rural counties of any state (196 out of 254). There are currently 63 rural Texas counties that no longer have a hospital located within their borders. There are another 103 that are down to just one such facility, while only one rural county has managed to add a hospital to the total over the past three years. This type of negative growth has communities running scared and government officials searching for ways to continue meeting the acute healthcare needs of rural beneficiaries.


RESEARCH PURPOSE

The purpose of this research, therefore, is to explain how rural hospital closures in Texas between 1987 and 1989 negatively influenced rural communities based on observed differences in local economic indicators. The study seeks to assess the ability of

communities to bounce back economically over the long-term. The findings should assist rural health policymakers at the state and federal level to target their efforts more appropriately and to make informed decisions regarding the ongoing need to protect remaining rural hospitals.

This research is compelling for three reasons, and they all have to do with the limitations of prior research on the subject. First, Probst et al. note, "most studies of economic effects have primarily relied on modeling techniques rather than observation of actual change" (1999:375). By attempting to model the potential impact of these providers, researchers[1] make room for inaccuracy. Like the Probst et al. study, this research focuses on counties that have already experienced such attrition and relies on the documented ramifications of the loss as recorded in historical economic data.

Furthermore, due to the fact that the focus of the study by Probst et al. (1999) was so broad, it ignored the differences that exist among rural areas in different regions and different states. Texas is unique because of its large rural population, approximately 3.1 million people (CRHI, 2001). The vast geographic area of rural Texas covers 80% of the state's total land mass and is roughly the same size as France (CRHI, 2001). Texas is also very diverse from an age and ethnicity standpoint. All of these factors should alter the outcome of any study based on national data.

Lastly, most studies give a snapshot of the immediate impact or at best the short-term effect of hospital closure. Probst et al. (1999) made their observations up to five

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[1] See for example Doeksen et al, 1997; Lichty et al, 1986; Christianson and Faulkner, 1981.

years beyond the base year, but this may not be long enough to see any recovery from the loss of a hospital. This research will extend the observation out ten years beyond the base year to see if counties are able to rebound after what must be considered a real economic setback.

CHAPTER SUMMARIES

Chapter two contains a review of the literature including an overview of rural demographics. It summarizes the operational environment and history of rural hospitals and other healthcare programs. It discusses the alternatives that rural hospitals have to choose from when faced with possible closure. Also, the chapter examines the reasons that so many hospitals have closed over the past few decades.

The third chapter narrows the research topic considerably to a focus on the links between the healthcare sector and the local economy. It concentrates on one particular study that used a comparative analysis approach to look at the differences between two groups of counties, those who lost their hospitals and those who did not. As noted previously, the study looked at closures across the country but was limited to the years between 1984 and 1988. The conceptual framework and research hypothesis are located within this chapter.

The fourth chapter operationalizes the hypothesis and describes the methodology developed to address the research question. The research method selected is an analysis of existing data. The process used to select both the treatment group and the comparison

group are explained therein. Statistical analysis is possible since the data being collected

are entirely quantitative in nature. The tests being used to measure the difference between

the treatment and comparison groups are described in this chapter.

Chapter five is the results chapter. The results of the statistical procedures used

will be explained in this part of the paper. The results are summarized in tabular form and

then interpreted in the text. This chapter concludes with a comparison to the study that

was used as a model to see if the outcomes were complimentary or not.

The sixth chapter summarizes the conclusions drawn from the results in chapter

five. The final chapter includes suggestions for future research and any necessary closing

remarks. This study provides an opportunity to fill gaps in the existing body of research .

The literature supports the efforts made to protect rural hospitals. This research is

intended to shed light on the efficacy of current programs and their ability to in turn

protect local economies.

**CHAPTER TWO:**
**RURAL HOSPITAL LITERATURE**

INTRODUCTION

The purpose of this chapter is to examine rural hospital closures and their links to the economic and social viability of local communities. As a way of introducing the subject, this section discusses perspectives among experts on the risks of hospital closure. The remainder of the chapter examines six general areas: 1) the barriers to providing hospital care in rural areas; 2) governmental involvement before the prospective payment system[2] (PPS); 3) governmental involvement after PPS; 4) current alternatives to closure for rural hospitals; and 5) the reasons rural hospital close.

**Overstating the Problem**

Many elected officials and policymakers contend that rural administrators are constantly 'crying wolf' over the possible closure of their hospitals. Opinions among regulatory agencies have lead to a wide range of predictions regarding the number of hospitals that would ultimately have to close. The Department of Health and Human Services (HHS) (1993:1) utilized information from the Government Research Corporation that estimated over 40 percent of all hospitals in the United States would close or be converted to other uses by the year 2000. Moscovice (1999:3) points to information from the Senate Special Committee on Aging that put the total number of rural closures at 600. It appears that both organizations overestimated the actual number of closures.

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[2] Under a prospective payment system, hospitals are reimbursed for services at a flat rate, rather than being reimbursed a fee for service, which was customary at the time.

Moscovice (1999:3) follows up by saying that between 1988 and 1997, only 243 hospitals actually had to close their doors. He attributes the shortfall to two things. First, the differentials between rural and urban payments from Medicare went away. Second, rural hospitals changed the way they did business. The latter is discussed in more detail in the alternatives to closure section. Rural hospitals are extremely susceptible to one-size-fits-all policies that fail to properly account for their unique needs. Most rural hospitals have become very flexible, taking on new forms and functions as the need arises. Unfortunately, hospitals can also be quite bureaucratic, and they aren't always nimble or resourceful enough to survive every change that comes their way.

**Underestimating the Impact**

While neither one of the aforementioned predictions turned out to be true, 243 is no small number either. Rural hospitals also must contend with statements from the General Accounting Office (GAO), that rural hospital closures have little effect (McGuire et al., 1993) and from HHS, which has implied that it is acceptable for a hospital that only served 9.2 patients per day to close (Department of Health and Human Services, 1993). If that were the case, then the over 500 hospitals across the country that serve six or less patients per day (Blanchfield et al., 2000:123) should surely be closed at once. Battling such misinformation is as important an effort as securing additional resources for most hospitals, and so it goes for many other rural issues that policymakers must contend with such as transportation and education.

In fact, the threat of hospital closure is both a historical reality and a call to action. Between 1987 and 1991, 193 hospitals across the country closed their doors. Thirty-seven of those hospitals were in Texas. Texas led the nation in hospital closures during the 80s (almost twenty percent of the national total), and most were rural (Department of Health and Human Services, 1993:4). Other states such as Louisiana, Mississippi, Minnesota and Alabama suffered double-digit losses over the same time period. During the last decade, the number of closures nationwide had leveled off, but recent changes made as a result of the Balanced Budget Act of 1997 threaten to reverse that trend once again (Rural Hospital Flexibility Program National Tracking Team, 2001; Moscovice, 1999). Many rural hospitals are still struggling despite some excellent programs intended to assist them.

BARRIERS TO PROVIDING HOSPITAL CARE IN RURAL AREAS

In order to understand why hospitals have closed, it is important to review the many realities that make providing care in rural areas uniquely difficult. Experts (Campion, 1995; Kansas Rural Health Options Project, 2000) frequently cite issues such as capital financing, new technology and recruitment/retention of qualified personnel. This section discusses four issues unique to rural hospitals. They are 1) rural classification, 2) demographic differences, 3) operational differences, and 4) financial differences. These areas frame the debate and provide a context and reasons for governmental involvement.

**Classifying Rural Areas[3]**

Rural areas are basically designated by default (Cordes, 2001; Medicare Payment Advisory Commission, 2001; Center for Rural Health Initiatives, 2001). It is easier for the government to identify urban areas, because they are easy to locate and have known minimum population thresholds. As a result, any county not classified as an MSA[4] is therefore considered rural. Another common rule of thumb is that rural counties are those with less than 50,000 residents. Either way, lumping all rural counties into one category fails to adequately take into account their variety. From the point of view of Cordes (1989:759), "when one disaggregates the nation's rural population or its nonmetropolitan counties, the striking characteristic is not the similarity that exists, but the dissimilarity or diversity that prevails within rural America."

The United States Department of Agriculture

In an attempt to classify this diversity, The United States Department of Agriculture (USDA) developed seven groups that accounted for 85 percent of the counties across the country in 1985 (Cordes, 1989:761-762). They are:

1. Farming-dependent counties.

2. Manufacturing-dependent counties.

3. Mining-dependent counties.

4. Specialized government counties.

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[3] As the specific demographic, operational and financial differences are discussed below, they will complement the categories in all of the studies described here.
[4] MSA stands for Metropolitan Statistical Area. MSAs are designated by the Federal Office of Management and Budget and based on population, commuting patterns and other factors. Rural areas are often referred to as non-MSA or nonmetropolitan. According to CRHI, there are over 47 different definitions of rural in use in the State of Texas, but this method is by far the most widely accepted.

5. Persistent poverty counties.

6. Federal land counties.

7. Destination retirement counties.

Another method developed by the USDA, goes by the name of Urban Influence Codes or UICs (Medicare Payment Advisory Commission, 2001). This method makes a determination of the level of 'rurality' for a given hospital based on population size and distance to the nearest MSA. The breakdown is as follows, with UIC9 being considered the most rural:

UIC1 – In large MSA

UIC2 – In small MSA

UIC3 – Adjacent to a large MSA, includes a town of at least 10,000

UIC4 – Adjacent to a large MSA, does not include a town of at least 10,000

UIC5 – Adjacent to a small MSA, includes a town of at least 10,000

UIC6 – Adjacent to a small MSA, does not include a town of at least 10,000

UIC7 – Not adjacent to an MSA, includes a town of at least 10,000

UIC8 – Not adjacent to an MSA, includes a town of between 2,500 & 10,000

UIC9 – Not adjacent to an MSA, does not include a town of at least 2,500

Texas A&M University

More recently, the Department of Rural Sociology at Texas A&M University used a statistical procedure called Disjoint Cluster Analysis to identify five types of rural counties, specific to Texas (Select Committee on Rural Development, 2000; Center for

Rural Health Initiatives, 2001). This process accounted for 100 percent of the rural

counties included in the study, but note the similarity to the USDA classifications

mentioned earlier:

1. Large Agriculture/Mining (41 counties)

2. Manufacturing/Minority (33 counties)

3. High Growth Commuting (43 counties)

4. Agriculture/Low Income/Minority (62 counties)

5. Mining/Very Low Income/Minority (17 counties)


**Demographic Differences**

The Medicare Payment Advisory Commission, in its recent report *Medicare in*

*Rural America* (2001:8), summarized the demographic differences between rural and

urban areas perfectly.

> Many rural communities face market conditions that may depress demand or supply and potentially decrease access to and use of health services among beneficiaries and other residents. Depending on the community, these factors include:

- a small population,

- a declining and disproportionately older population,

- low household incomes, relatively high unemployment rates, and high

  poverty rates,

- a high proportion of the population lacking health insurance or with

  limited coverage,

- physical isolation with long distances to urban centers for specialty care

Taken as a whole rural hospitals exhibit all of the above characteristics, but when each of these characteristics is examined individually, interesting patterns emerge. Table 2.1 illustrates these patterns by comparing the states that are east and west of the Mississippi River. Note the dramatic differences in characteristics such as declining population, isolated location and low volume. States to the West of the Mississippi River are generally far less populated and more isolated than states to the East. Despite these marked disparities, government programs are generally meant to treat everyone nearly the same. Often these differences are not adequately understood by elected officials (many of whom come from the east themselves).

Table 2.1 - Percentage of Rural Hospital Markets with Selected Characteristics by Region

| Market/hospital Characteristic | All markets | | | Markets with small population | | |
|---|---|---|---|---|---|---|
| | All | East | West | All | East | West |
| Declining population | 24.3 | 14.6 | 32.1 | 49.6 | 28.3 | 52.1 |
| Declining population and disproportionately aged | 10.3 | 1.7 | 17.3 | 32.4 | 8.3 | 35.3 |
| Low household income | 44.7 | 45.5 | 44.1 | 48.7 | 65.0 | 46.7 |
| High unemployment | 30.2 | 35.1 | 26.2 | 21.1 | 55.0 | 17.0 |
| Isolated location | 18.5 | 7.3 | 27.6 | 34.3 | 18.3 | 36.3 |
| Low volume | 21.7 | 8.1 | 33.2 | 65.6 | 54.5 | 67.0 |

Note: East and West regions are divided by the Mississippi River; East includes New England, Middle Atlantic, South Atlantic, East South Central and East North Central census divisions, while West includes West South Central, West North Central, Mountain and Pacific Divisions. Small population = fewer than 11,900 people; declining population = average annual population change from 1990 to 1999 of at least –0.1percent; disproportionately aged = at least 20 percent of the population in the market ZIP codes is age 65 or older; low household income = median household income of the market area is <$28,100; high unemployment = percent of workforce that is not employed is greater than 8.1 percent; isolated location = air-mile distance to nearest short-term acute care hospital is ≥ 25 miles; low volume = 500 or fewer acute inpatient discharges in 1997.

Source: Analysis of Claritas Corp. estimates based on 1990 census by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. (Medicare Payment Advisory Commission, 2001:11)

**Operational Differences**

Due to a lower volume of patients and the many demographic differences covered earlier, rural hospitals differ in size and scope from their urban counterparts. Rural hospitals are actually still quite numerous. About half of all hospitals in the country are located in rural areas (Moscovice, 1999). One quarter of all hospital beds are represented by these rural facilities. Since the population in rural areas is at most 20 percent of the total, many contend that rural areas have more beds than are actually needed (McGuire et al., 1993). These figures suggest to some that rural closures may actually be warranted.

Rural hospitals are also small-scale operations that have fewer than 100 beds and small medical staffs of two or fewer physicians (Moscovice, 1999:13). Furthermore, they are diminishing in size. The number of hospitals in the 6-49 bed category grew from 43 to 47 percent between 1987 and 1996 (Moscovice, 1999:10). In total, 65 percent of hospitals reduced their number of hospital beds, resulting in an overall decrease of 10 percent  (Moscovice, 1999:10). Only a scant 15 percent of rural hospitals increased their beds during the same period and that was before Medicare implemented an additional round of cuts in hospital reimbursement as a result of the Balanced Budget Act of 1997 (Moscovice, 1999:10).

Picard maintains (2000:20) "Accessibility and availability to adequate healthcare services are the biggest general health policy problems facing rural America." Rural hospitals are burdened by a lack of technology and trained specialists and are ill equipped to provide the sophisticated care that takes place at urban medical centers. Many don't

have the funding or resources needed to reverse this trend (Succi et al., 1997). Therefore, hospitals concentrate most of their efforts on outpatient and simple inpatient care services that best support the "stable volume of elderly patients" to whom they generally serve (Buczko , 2001:57). For that matter, outpatient services increased from 25 to 47 percent between 1987 and 1996 (Moscovice, 1999:29). Most other care that rural residents require has been made available through services resulting from managed care, multihospital systems or some other type of contract arrangement (Moscovice, 1999; Buczko, 2001).

**Financial Differences**

A hallmark of the financial differences between rural and urban hospitals is the level of dependence on Medicare, outpatient revenues and, to some extent, Medicaid (Dalton et al., 2000; Doeksen et al., 1997). According to Moscovice (1999:29), the number of inpatient days attributable to Medicare in rural hospitals went from 51 to 60 percent over a ten-year period ending in 1996. All indications are that this trend will continue. Small hospitals have less revenue and, therefore, less reserves to fall back on when major changes do occur (McGuire et al., 1993). Changes can include decreased reimbursement, faulty equipment, loss of a physician or a leaky roof. McGuire et al.[5] (1993) point out that small hospitals find it difficult to achieve any economies of scale on their own. This advantage allows larger, urban hospitals to absorb changes that put rural hospitals in such desperate need of outside assistance.

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[5] McGuire, CC, Walker, M, Cantieri, CH.

The cost of providing care doesn't start to approach the national average until a hospital has had 500 or more inpatients in a year. Eighty-five percent of the hospitals that have less than 500 discharges are found in rural areas. One example of financial performance that is easy to interpret is profit margin. The average Medicare profit margin for urban hospitals is a decent 6.9 percent, but rural hospitals had a negative margin (-2.9 percent in 1999). Total operating margins for rural hospitals decrease with size as well. For example, hospitals with less than 200 inpatients in 1999 were actually paid 1.6 percent less than the actual cost of the care provided (Medicare Payment Advisory Commission, 2001:66). The next two sections examine the history of this current dilemma.

GOVERNMENTAL INVOLVMENT BEFORE PROSPECTIVE PAYMENT

This section examines the early steps to support and sustain health and hospital care in rural America. The problem of hospital closures has in some ways been a direct result of the government's efforts to assist its own beneficiaries. The government must ensure that care is available in all areas, but at times attempts to saving money and force efficiency have had unintended consequences. As noted earlier, however, remedies have been piecemeal and used one-size-fits-all practices. This section explains many of the programs initiated and implemented through 1982, when Medicare introduced PPS for hospital reimbursement. PPS was a sentinel event for rural hospitals, and the next section explains how programs have subsequently changed.

**Access to Care**

  The United States began as a rural society, and as McGuire et al. (1993) point out, early programs before World War II were largely intended to expand healthcare services to a substantial rural population. Programs were not focused on hospitals at this point, because hospitals in rural areas didn't exist. In 1920, over 60 percent of the rural population lived on the farm (Cordes, 1989:758). Early federal programs were therefore intended to increase access to health services. In 1921, the Indian Health Service was created, making American Indians the first rural beneficiaries of government-sponsored healthcare. That same year, the government made grants to states for maternal and child health through the Sheppard-Towner Act. This legislation marks the beginning of a long list of similar public health programs. During the 1930s and 1940s, the Farm Security Administration helped to provide health insurance for over 400,000 rural residents in 1,100 counties (McGuire et al., 1993:34).

**Hospital Construction**

  In 1946, The Hill Burton Act was put into effect, and the majority of our nation's rural hospitals were built. These funds were available to hospitals in exchange for a commitment to provide a certain level and duration of charity care to the community. Of the 4,602 hospitals that received Hill Burton funding, 1,588 were rural (McGuire et al., 1993:34). This change meant that there was now a hospital in nearly every county that wanted one, which was necessary when over a third of the country's population lived in rural areas. The percentage of rural residents is now starting to fall below fifteen percent in Texas. Once busy hospitals are slowly but surely running out of patients. Many of the

hospitals in use today are original Hill Burton facilities built in the 1940s and early 1950s and are badly in need of replacement. However, hospitals have neither the resources nor the support to undertake reconstruction.

**Care for the Indigent**

In the 1960s, the focus shifted back to ensuring access to care, but this time the government took aim at poverty. Migrant health centers and community health centers were first created in 1962 and 1966 to give indigent populations access to clinical services where there was no Hill Burton facility. These centers served over 1,100 rural communities (McGuire et al., 1993:34). A short time later, Medicare and Medicaid were created, and these programs have been both a saving grace and an Achilles' heel for rural hospitals ever since.

Medicare provides care to the aged and disabled for life, while Medicaid provides temporary assistance to qualifying individuals with low incomes. Since rural areas have become disproportionately older and poorer than their urban counterparts (McGuire et al.,1993; Hoeth, 2001; Center for Rural Health Initiatives, 2001; Medicare Payment Advisory Commission, 2001), these programs have become the primary source of revenue for most rural hospitals, the negatives of which are covered in the next section.

**Healthcare Workforce**

In the 1970s, federal initiatives shifted to a focus on the supply and distribution of healthcare professionals (McGuire et al., 1993). The National Health Service Corps

(NHSC) was created to train individuals who were willing to practice in an underserved area[6]. An individual who joins the NHSC is provided free training in a variety of healthcare fields, but for each year of training, they must fulfill one year of community service.

Area Health Education Centers (AHEC) were established in 1972. AHECs function as a bridge between university medical centers and local communities. These centers work in two ways. First, AHECs coordinate training in the local community, thus giving students exposure to rural practice. Also, professionals at the local level have a link back to the regional academic health science center that serves as an educational and clinical resource (McGuire et al., 1993).

GOVERNMENTAL INVOLVEMENT SINCE PROSPECTIVE PAYMENT

Buczko (2001:53) remarks "maintaining viable rural health providers has been an ongoing problem for over 30 years." This section examines the changes in Medicare during the early 1980s. Many of the problems come down to reimbursement and the ability of rural hospitals to cover their costs. The Tracking Team[7] (2001:83) remarks, "Rural hospitals have since 1983, been riding a financial roller coaster whose ups and downs have been driven largely by shifts in Medicare payment policy, along with demographic and technological changes." There is light at the end of the tunnel though.

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[6] Underserved areas are designated by the Health Resource Services Administration. They are either a Health Professional Shortage Area (HPSA) or a Medically Underserved Area (MUA). HPSA designations identify areas that have a shortage of either primary care, dental or mental health professionals. MUA designations identify areas that have both a lack of primary care professionals and difficulty with certain measures of public health.
[7] Rural Hospital Flexibility Program National Tracking Team.

McGuire et al. (1993:35) say, "Perhaps because of rural hospital closures and an increased awareness of the problem of access to healthcare in rural areas, four recent federal programs have been designed specifically to assist rural areas." This section reviews those programs.

**No More Cost Based Reimbursement**

Until recently, hospitals had almost forgotten what cost based reimbursement was. Early on, Medicare and many other third party insurers simply paid what the hospital charged for the care received by the beneficiary. Then, in 1982, as a result of the Tax Equity and Fiscal Responsibility Act[8] (TEFRA), Medicare started transitioning over to a new reimbursement methodology called the prospective payment system in an effort to control costs. For inpatient services, Medicare would pay a set amount per diagnosis related group (DRG)[9].

As McGuire et al. (1993) point out, PPS was designed to reward efficiency. If a hospital could find a way to keep its costs below the rate of payment, the difference could be considered a profit. This concept was problematic for many rural hospitals because costs were usually well above these generally determined reimbursement rates. Fluctuations in the cost of providing care were not taken into account by Medicare and were skewed toward urban providers. Medicare has saved a lot of money over the years but cost rural America a lot of hospitals as well. Ever since then, the government has tried to make it up to the rural areas by giving something back.

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[8] TEFRA was signed into law in 1982.
[9] Medicare has a code for every possible patient diagnosis and they pay a fixed amount that is determined by a code that appears on each claim submitted by a hospital.

**Clinic Assistance**

The first program to give back some of the money lost by rural hospitals was the Rural Health Clinic Act of 1977. This program assisted rural hospitals in two ways. McGuire et al. (1993:35) note that, "The intent of the law is to enhance access to primary health care in rural areas that have shortages of healthcare professionals." This enhancement was made possible through the authorization of payments to midlevel[10] practitioners who agree to practice in designated shortage areas. In addition, hospitals that opened provider or hospital-based rural health clinics were able to integrate the hospital services that were provided in an outpatient or clinical setting.

**Grant Assistance**

Additional federal dollars have been directed to rural hospitals in the form of grants. Rural Health Care Transition Grants, Rural Health Outreach Grants, Rural Health Network Grants, and others have been offered by the federal government to slowly replace some of the funding lost over the years. Transition grants were given to assist hospitals that expand or enhance the services they provide (McGuire et al., 1993). Outreach grants have been given to rural hospitals that reach out and provide services for populations to whom no service was available previously. Network grants helped to support rural healthcare providers that proposed working together to reduce costs, improve access to scarce resources, and expand services (Moscvice, 1999).

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[10] Midlevel practitioners include Advanced Practice Nurses and Physician Assistants who are specially trained to fulfill some of the roles that a more expensive and harder to recruit physician would typically fulfill.

**Special Designations**

Rather than try to correct one-size-fits-all policies such as PPS, Medicare has developed a number of special designations that rural hospitals may request. A hospital may, in most cases, have a number of designations, and each one carries special provisions typically in the areas of reimbursement or reduced regulatory burdens. Sole Community Hospital status is available to hospitals that can establish they are the community's sole source of care (Medicare Payment Advisory Commission, 2001). Typically, hospitals are either the only one in the county or over 35 miles away from the nearest facility. Medicare Dependent Hospital status recognizes hospitals whose revenues include a large share of payments by Medicare (Medicare Payment Advisory Commission, 2001). Both programs offer a blend of PPS rates and cost based reimbursement, allowing these facilities to recapture even more of the costs of treating Medicare patients.

**Pilot Programs**

The federal government funded two pilot programs during the late 1990s that targeted small rural hospitals vulnerable to closure (Campion, 1995; Kansas Rural Health Options Project 2000). These programs were only available in eight states and featured a "limited-service" hospital concept. The programs were the Montana Assistance Facility (MAF) and the Essential Access Community Hospital / Rural Primary Care Hospital (EACH/RPCH) program. These programs allowed hospitals to concentrate on services that they could reasonably afford to provide. In exchange for the limitations placed on

pilot hospitals, reimbursement was provided at full cost. These programs became the proving ground for more permanent programs discussed in the next section.

CURRENT ALTERNATIVES TO CLOSURE

Just when things were starting to stabilize and hospital closures had reached their lowest rate in nearly fifteen years, the Balanced Budget Act of 1997 was passed, and new fears arose about reductions in Medicare payments. Fortunately, there are a number of alternatives that rural hospitals now have to help deal with today's environment and prepare themselves for changes that might lie ahead. Thanks in part to the lessons learned through pilot programs like EACH/RPCH, there are several moves hospitals can now make to avoid closure. This section examines 1) service diversification, 2) multi-hospital systems, 3) internal restructuring, and 4) limited-service models. Subsequent sections discuss the characteristics of closed hospitals and prior research on the consequences thereof.

**Diversifying Services**

McGuire et al. (1993) suggest that the most widely used survival technique employed by hospitals is the diversification of hospital services. In other words, hospitals can enhance their revenues by expanding the type and amount of services and procedures offered to patients. Such diversification serves two codependent purposes. First, the hospital is responsive by basing its changes on the needs of the local community. Second, diversification allows a hospital to enter into more profitable services that increase revenue and offset losses in other areas.

Diverse facilities are better off than one-dimensional facilities. For instance, hospitals that shifted their focus more toward outpatient services were caught off guard when the Balanced Budget Act of 1997 called to cut payments for these services through a move to prospective pay (Dalton et al., 2000; Blanchfield et al., 2000). The Tracking Team (2001) reported that, as a result, outpatient payment rates will be cut by nearly 20 percent. Many hospitals are unable to reduce their costs in this area any further, and additional reductions will be simply too much to bear.

## Multi-hospital Systems

McGuire et al. (1993:28) note that a "number of hospitals have entered formal and informal agreements with other providers to enhance their financial viability." These organizations go by a variety of names: affiliations, cooperatives, consortia, et cetera. The intention is that by joining together as a group, hospitals will be better able to reduce costs, reduce competition, and share services rather than lose patient revenue to urban providers. Moscovice (1999:5) estimated that, in 1996, 40 percent of all rural hospitals were members of some type of provider network or alliance.

## Internal Restructuring

Internal restructuring refers to a set of business techniques that are not unique to the healthcare field. Many organizations employ these tactics when facing financial difficulty, and while the desired effect is rarely realized, restructuring is usually the first move management will make. McGuire et al. (1993:31) point out that, "many hospitals

have undergone internal organizational changes designed to allow them to move away from acute care while continuing to provide some health services that are needed in their communities."

Downsizing and conversion are the two restructuring methods discussed by McGuire et al. (1993). Downsizing is the most common and usually involves beds or services. Hospitals frequently reduce staff or the size of their operations as a way to save money. Either way, these reductions make life difficult for hospital employees who in a small town may not have many comparable employment opportunities. When the hospital becomes ready to expand once again, department heads face an even greater challenge trying to attract the necessary staff. Conversion, the other option, refers to the hospital transforming to a completely different model for the delivery of health care services, the specifics of which are discussed in the following section.

**Limited-Service Models**

Communities whose hospitals can no longer remain viable (despite the other steps taken to try and stabilize operations through restructuring and special designations) still have one other alternative, conversion to a 'limited-service' hospital model. The purpose of this option is to create a viable health care facility for rural communities that can no longer support a traditional hospital and are in danger of losing access to basic health care services altogether (Campion, 1995; McGuire et al. 1993; Reif and Ricketts, 1999; Shreffler et al., 1999). Never before has there been so much incentive to move to a limited service configuration. Now, faced with few remaining options and the incentive

of improved reimbursement, hospitals are turning to a model called the Critical Access Hospital program for relief.

The Critical Access Hospital (CAH) program is one of the more positive results of the Balanced Budget Act of 1997. Parrish (2000:15) went so far as to refer to CAH as "a program that may prove to be a savior of many small hospitals." The program limits hospitals to fifteen beds and requires that they only admit patients for an average of 96 hours. Also, there are certain limitations placed on the care that can be provided, but most CAHs are able to continue a majority of the services offered before conversion. In exchange for meeting these requirements, CAHs are reimbursed at reasonable cost for all Medicare patients. CAHs are also granted a reprieve from many of the costly and time consuming regulatory burdens faced by other rural hospitals (Campion, 1995).

Some states have even created unique limited-service hospital models of their own. Many states provide cost-based reimbursement to these facilities for their Medicaid beneficiaries. In regard to limited-service, experts caution that making the switch based solely on the bottom line is unwise because these programs are not a panacea and payment rates can change literally overnight (Hoeth, 1999; Parrish, 2000; Rural Hospital Flexibility Program National Tracking Team, 2001). However, Medicare hasn't changed them yet; and the goal remains the same – building a network of strong, vital facilities so that residents in rural and underserved areas can count on the timely, high quality care they need in a setting that is close to home (Center for Rural Health Initiatives, 2001).

REASONS BEHIND HOSPITAL CLOSURES

The Department of Health and Human Services (HHS) produced a report in 1993 that summarized five years of tracking the hospital closures between 1987 and 1991. HHS found that hospital closures during that period were due in large part to 1) declining occupancy; 2) lagging revenues; and 3) rising costs. Many of the barriers discussed above are confirmed by the results. HHS determined there was no single reason for closure; instead, numerous factors have gradually weakened the financial condition of rural hospitals (Department of Health and Human Services, 1993:9-11).

**Declining Occupancy**

According to HHS (1993), declining occupancy rates at closed facilities were due to several factors. First, physician availability was a problem. Since physicians are the only individuals who can legally admit patients to the hospital, having a hospital and no doctor is like having a car with no engine. Second, people are more mobile. McNamara (1999) points out that patients are more willing to travel to an alternate hospital now, even if the care they seek could have been provided locally. Third, for whatever reason, patients and physicians have less confidence in their once-trusted, local hospital. These combined effects create a true downward spiral from which many rural hospitals are unable to fully recover.

Another reason for declining occupancy is competition. HHS (1993) points out that competition among hospitals for both patients and resources is intense. However,

McKay and Dorner (1996) discovered that when rural hospitals do close, neighboring

facilities rarely benefit. Due to the negative impact on the community whose hospital is

lost, it would be better if hospitals worked together more cooperatively. Practice patterns

are also changing. Hospitals are providing increasing levels of care on an outpatient basis

because technology has made once invasive procedures a thing of the past. Lastly,

Medicare has done a better job of assessing appropriateness of hospital admissions.

Hospitals are more careful about whom they admit and for how long.

**Lagging Revenues**

A second major finding (lagging revenue) reported by HHS (1993) also

contributed to hospital closures. HHS noted that insurers are getting better at controlling

their own costs and restructuring payments to hospitals. Insurance companies, including

Medicare, used to bear the risk of caring for their beneficiaries. By negotiating reduced

rates with hospitals and physicians, some of the risk has been shifted to providers.

Hospitals are now guaranteed a certain number of patients, but the amount of revenue

that they can then expect to collect is limited.

The problem of the uninsured and underinsured also contributes to sagging

profits. These are patients with a very limited ability to pay. Unfortunately, rural areas

frequently have a disproportionate share of residents living in poverty, and their numbers

are increasing. In addition, payments made to urban and rural providers are not equal.

Even if the costs of providing hospital care were the same, rural providers should be paid

a higher amount due to the volume advantage that urban hospitals have. Actually, the

opposite is true. Urban providers are paid a higher rate for the exact same services that rural hospitals provide. Therefore, rural hospitals must find a way to do more with less.

**Rising Costs**

The other reason reported by HHS (1993) is the rising cost of providing care in rural areas. HHS notes that major expenses must be incurred to stay competitive in today's healthcare marketplace. First, technology is improving at an accelerated rate. In order to provide access to sophisticated diagnostic equipment that patients expect, hospitals must invest millions of dollars into instruments that will be obsolete before they are paid for. Also, recruiting and retaining trained staff is increasingly expensive and becoming even more difficult, especially near urbanized areas. Lastly, hospital facilities that were built with Hill-Burton funds (many of which are approaching fifty years old) are badly in need of repair, renovation or replacement. Hospitals are not profitable enough, however, to secure the necessary financing. The condition of the physical plant is quickly becoming an important issue. Soon there will be hospital closures if for no other reason than that they are too out of date.

The American Hospital Association (AHA) released guidelines for their members to address when considering whether to convert to a Critical Access Hospital (Hoeth, 1999; Parrish, 2000). This designation is often a hospital's last chance for survival, and many of AHA's recommendations are basically symptoms of closure or inefficient operations. They are: 1) costs in excess of DRG payments; 2) high Medicare inpatient utilization; 3) high contractual adjustments; 4) costs in excess of outpatient PPS rates;

and 5) difficulty retaining physicians. Many of these findings replicate the HHS findings discussed previously, thus underscoring the manner in which barriers can stifle a hospital's ability to remain viable.

## CONCLUSION

Hopefully, this chapter has summarized the difficult issues facing rural healthcare providers. The rural environment is a particularly volatile one in which to operate an efficient and financially sound hospital. Many of the barriers that administrators of these facilities face seem to be beyond their immediate control. Therefore, seeking to understand the impact that these facilities have economically is even more imperative. The next chapter reviews a portion of the literature dedicated to this pursuit. It seeks to narrow the focus down to the studies that most closely relate to the research purpose described in the first chapter.

**CHAPTER THREE:**
**ECONOMIC IMPACT ASSESSMENT LITERATURE**


INTRODUCTION

The purpose of this chapter is to explore the literature that examines the link between rural hospitals and the local economy. State governments are waking up to the need to assist rural communities in preserving their economies (Sharp,1997; Texas Department of Agriculture, 1999). Hospitals make a tremendous financial impact in each and every community that is fortunate enough to still have one[11] (Doeksen et al., 1997; Center for Rural Health Initiatives, 2001; Select Committee on Rural Development, 2000). McGuire et al. (1993:17) point out that, "The closure of a rural hospital often leads to the unraveling of a community's social fabric and the demise of its economy." It is this idea of hopelessness that many rural communities so desperately want to avoid, but does the literature support their fears?


RESEARCH AND CASE STUDY SUMMARIES

This section deals with a review of several studies that examine the impact of the health sector on the economy of rural areas. It establishes the important role that health care providers play in the local economy. One apparent drawback is that many studies involve the data of only one city or a single county. This narrow scope limits the external validity of the research findings. On the other hand, the Comparative Analysis Approach (discussed in the next section) shows how these same ideas and principles can be applied in a much larger setting.

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[11] See for example Doeksen et al, 1997; Center for Rural Health Initiatives, 2001; Select Committee on Rural Development, 2000.

**Impact of the Entire Health Sector**

Lichty et al.[12] (1986) address the impact of the entire health sector on a seven county area in Northern Minnesota. A simulation model called an input-output model was utilized to compute the regional earnings that would have been lost had the medical sector been eliminated based on certain population and employment projections. They found that such a scenario would result in the elimination of 51,301 jobs that were either directly or indirectly tied to the medical sector. The model also predicted losses of up to $1 billion over the six-year period under investigation. This research shows the tremendous economic benefit that health care providers can have at the county level.

**Impact of Rural Hospitals on the Local Economy**

Several additional studies have focused on the financial benefit that currently operating hospitals have on a local county or community. Two common themes emerge when reviewing this body of research. First, rural hospitals are one of the only entities that bring outside money into the economy. Second, healthcare is a powerful economic development tool that attracts new residents and new businesses alike (Doeksen et al., 1997).

These studies commonly look at the number of employees in the health sector and the wages and salaries for those individuals. Then, by using a multiplier effect, they calculate the number of jobs and amount of salary that health sector employers indirectly generate (Doeksen et al., 1997). Christianson and Faulkner (1981), as cited in Mick and

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[12] Lichty, RW. Jesswein, WA. McMillan, DJ.

Morlock (1990: 454), concluded that salaries generated by a rural hospital approximated $600,000 . The figure increased to between $700,000 and $1 million when these indirect benefits were taken into account.

**Impact of Rural Physicians**

A study performed by Doeksen et al.[13] (1997: 16) examines the impact that a group of physicians can have on a small rural community and is illustrative of the single community case study mentioned earlier.

> The community had three full-time physicians and one retired physician who worked one day a week. Thus it was assumed that 3.2 FTEs of physician services were available…It was estimated that the physicians and their offices accounted from 15.2 jobs. Based on an employment multiplier of 1.78, the total community employment effect was 27 jobs. The results also illustrated the impact of the physicians on income, retail sales and sales tax collections.

Such studies have been published in an effort to educate community leaders on the importance of adding or supporting health services within the local economy.

**Historical Observations of Closed Hospitals on a Community's Economy**

Two additional studies focused not on the hospitals' economic contributions, but rather on their overall effect on access to care and a sense of community. These works found that hospitals were an important part of the social foundation in a community. In one particular study, 70.7 percent of the respondents specified that the job loss that resulted from the hospital's closure was an important issue in the community (Hart et al., 1991). Doeksen et al. (1997:19) conclude that, "Without a doubt, all impact studies

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[13] Doeksen, GA, Johnson, T, Willoughby, C.

illustrate the importance of the health sector on the economy of the region, state or community."

**Post-Closure Impact Assessment**

The Department of Health and Human Services (HHS) report closed with an impact study of its own. HHS concluded three things after collecting data on hospital closures for the five-year period. First, since 75 percent of the communities studied had another hospital within 20 miles, access to inpatient care was not impacted (Department of Health and Human Services, 1993:12). Second, since 82 percent of the communities studied had emergency facilities within 20 miles, access to emergency care had not suffered (Department of Health and Human Services, 1993:12). Last, HHS concluded that rural communities without hospitals could still provide access to local health care (Department of Health and Human Services, 1993:13).

**Post-Closure Impact on Neighboring Hospitals**

A study by McKay and Dorner (1996) revealed that just because a neighboring rural hospital closes, it should not be automatically assumed that other area hospitals would benefit. As previously noted, there is a perception among policymakers that rural areas are 'over-bedded' and that hospitals should rightfully close in order to make it easier for stronger facilities. In fact, what their study showed was that while nearby hospitals saw increased patient volumes, they did not receive any of the accompanying financial benefit (McKay and Dorner, 1996).

**Effects of Market Position on Hospital Closures**

Succi et al.[14] found that rural hospitals operating in markets with a higher density of providers had increased risk of failure (Succi et al., 1997). Rural hospitals that maintained market share (either through differentiation of services or geographic isolation) decreased their risk of closure (Succi et al., 1997). Basically, their work highlights the effects of market position for policymakers who, as noted earlier, sometimes view all rural hospitals as quite alike.

**Conclusion**

The government falls somewhat short in its attempts to characterize rural hospital closures as harmless. The most obvious example is the fairly superficial HHS report on the impact of closed facilities (between 1987 and 1991). Most empirical research on the community effects of hospital closure to date has focused on the impact of existing healthcare providers. These studies are fairly small in scope and only address the sudden loss of the healthcare sector, not the long-term effects of the losses already incurred.

The next section discusses the article that laid the groundwork for this research project by analyzing actual financial losses experienced during the years following a hospital's demise. The following study is a key piece of research that overcomes the shortcomings of much of the previous literature. The study is broad in scope and focuses on effects at the county level. The authors analyzed actual losses rather than hypothetical ones.

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[14] Succi, MJ, Shoou-Yih, DL, Alexander, JA.

COMPARATIVE ANALYSIS APPROACH

In 1999, Probst et al.[15] analyzed the economic impact of hospital closures using a longitudinal study (1984-1988). The study examined the entire country's closed hospitals in an attempt to discover whether all the presupposed financial distress was actually reflected in well known economic indicators. The authors were clear to acknowledge previous studies when they remarked, "Economic modeling procedures have frequently been used to estimate the effects of [existing] hospitals on surrounding communities" (Probst et al., 1999:376). They go on to point out, however, that these studies did little to measure the effects of the closures themselves.

Probst et al. (1999) also note that empirical studies of hospital closures are complicated by the "impossibility of applying true experimental design to real world events" (p.376). The key to such studies lies in the creation of an appropriately selected control group. The observed difference between an experimental group and a control group should offer an estimate of the effects of the event (hospital closures) being studied. In this case, they chose to analyze a total of 103 rural counties. The following sections details the research process.

**Selecting the Comparison Group**

Probst et al. (1999) stress that the selection of the comparison group was the most important and the most intensive part of the process. Seven different scales reflecting population and economic characteristics were used to measure the similarity of the counties involved. They used a multi-state pool to select the three counties that ranked

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[15] Probst, JC, Samuels, ME, Hussey, JR, Berry, DE, Ricketts, TC.

closest to each member of the experimental group. They note, "In states with multiple closures (e.g., Alabama and Texas), nearly all rural counties adjoined at least one closure county" (Probst et al., 1999:378). Tests were then run for the five years prior to the base year in order to determine what differences might have emerged in the period leading to closure.

**Research Methodology**

The study points out that "Based on preliminary research, the researchers…were aware that detecting closure effects would require controlling for extraneous economic differences not fully resolved by matching" (Probst et al., 1999:379). The authors used a procedure called stepwise multiple regression to mitigate these effects. The dependent variables selected were 1) percentage change from the baseline year in population, 2) labor force, 3) unemployment rate, 4) total personal income, 5) earned income, 6) earned income exclusive of farming, and 7) earned income exclusive of farming and mining. The primary independent variable in each case was hospital closure, while controlling for significant economic and demographic variables.

Probst et al. (1999) note that percentage changes were used in lieu of absolute differences in dollars and people due to their ability to standardize such measurements. Differences were observed and computed annually for the five years immediately following closure. The results were then presented in two separate tables, one that displayed the results of the regression for the population variables and one that displayed the results for the economic variables.

**Research Findings**

The research did suggest that economic and population growth was slower for closure counties than it was for comparison counties. It also revealed however, that few of the observed differences were statistically significant (Probst et al., 1999). The technique the researchers used failed to provide answers about how the effects of hospital closure could be resolved. Nevertheless, they did suggest communities that failed to make use of defunct facilities "had a less positive economic trajectory than their peers" (Probst et al., 1999:385).

Probst et al. (1999) admit that the use of federal data to determine the economic effects of hospital closure is promising but underdeveloped. They note that the real benefit lies in the ability to one day identify 'at risk' facilities proactively and to understand the health effects of these losses as well. These suggestions are made in an effort to persuade and convince the hospital community and the economic development community to work together in an effort to solidify each other's continued existence in rural America.

CONCEPTUAL FRAMEWORK

This section of the paper will clarify and develop the project's conceptual framework. Conceptual frameworks link the information gained during a review of the literature with the chosen methodology. These frameworks actually operate on two different levels, according to Shields (1998). The meta-framework is a broader issue, policy or theory that defines the entire body of research. In this case, the meta-framework involves rural healthcare, which could be narrowed down further and described as rural hospital economics.

The micro-framework is considerably more focused and falls into one of five categories. The categories include 1) working hypotheses, 2) descriptive categories, 3) practical ideal types, 4) models of operations research, and 5) formal hypotheses. This particular project involves a formal hypothesis. Therefore, this section does not involve any description of the first four types and focuses only on the last. Formal hypotheses are a hallmark of explanatory research. Formal hypotheses take the form of "if X then Y" (Shields, 1998: 57), but the micro-framework must be developed first in order to ensure that the hypothesis appropriately addresses the research question.

In this case, the micro-framework is based upon an idea that has been perpetuated by elected officials and key stakeholders in rural health. McGuire et al. (1993) say, "The closure of a rural hospital often leads to the unraveling of a community's social fabric and the demise of its economy." This research tests McGuire's claim while concentrating on the economic impact rather than the nebulous idea of the so-called 'social fabric'.

Shields states that "explanatory research addresses the 'why' question" (1998: 57). If the purpose of explanatory research is to ask why, then it is important to discover a link between hospitals that close and the actual performance of the local economy.

A recent study by Probst et al. (1999) looked at the economic effects of closure on 103 small rural counties across the country three to five years after the fact. Their research identified 26 counties in Texas that lost hospitals during this period between 1984 and 1988. While this research examines the effect that closure had on a different group of closed hospitals, both studies analyze the effects on the local economy when measured against a comparison group in the years after operations ceased. Also, in both cases, the county is the unit of analysis.

The hypothesis is therefore based loosely on the ones that Probst et al. (1999) used but includes a reference to long-term effects in order to see if observations need to be carried forward further. The hypothesis for this research study is: Hospital closures negatively effect the local economies of the counties where they were once located, over both the short-term and the long-term. The hypothesis and supporting literature are represented in Table 3.1.

Table 3.1 – Hypothesis and Supporting Literature

| Hypothesis | Supporting Literature |
|---|---|
| Hospital closures negatively effect the local economies of the counties where they were once located, over both the short-term and the long-term. | McGuire et al. 1993, Doeksen et al. 1997, Probst et al. 1999 |

In summary, previous studies focus largely on the financial impact that existing facilities have on economic development activities in rural communities. Probst et al. (1999) observed the impact that previously closed facilities had on communities in the short-run (a three to five-year period from the date of closure). This research builds upon the study performed by Probst et al. (1999) with the intention of identifying longer-term differences in the economies of some of the same rural communities and utilizing different statistical procedures that respond to the hypothesis in a more useful manner.

CONCLUSION

Preserving existing rural hospitals has and should continue to be a priority for elected officials and key stakeholders in rural health because it is the only thing over which these parties have any real control. This paper strives to bring the tools of scholarship and quantitative analysis to the research question and disprove the proposition that most of the hospitals that have been forced to close to date were no longer necessary, while supporting their substantial economic impact at the same time.

Regardless of whether there was another hospital within 20 miles or residents were deemed to still have minimal access to basic health care services (like an ambulance), a community lost their local hospital. Typically, that loss was due to changes that were outside of the communities' immediate control. Additional research is needed to help policymakers understand what rural residents and economic developers already know; hospitals provide more than healthcare. They provide economic stability in rural communities that are becoming increasingly difficult to sustain.

# CHAPTER FOUR:
# METHODOLOGY

## INTRODUCTION

This chapter will describe the steps taken to test the hypothesis discussed in the previous section. The research model gives a visual representation of the methodology and of the timing of observations where data was collected for further testing. It discusses the development of both the sample and the comparison group. Also included in the chapter are descriptions of the statistical procedures used to test the hypothesis. All concepts presented in this chapter help to explain the procedures taken to address the research question. Afterward, the results of this research become the basis for new conclusions about the links between hospital closures and the local economy.

## RESEARCH MODEL

The research model described in this chapter is a quasi-experimental design. Bingham and Felbinger state that like true experimental design, "the change in performance of the target group is measured against the performance of a comparison group" (2001: 18). The only difference is that, in true experimental design, the comparison group is both randomly selected and assigned. Researchers default to quasi-experimental design when randomization is impractical or not possible.

The research purpose is to measure the effect of hospital closures on the local economy over both the short-term and the long-term. To test this hypothesis, the study employs a pretest/posttest comparison group design. Observations are recorded during

the base year ($O_1$), one year before a hospital closure, then again one year after closure ($O_2$) for both groups. The difference between the two observations represents the short-term change. Another observation is recorded ten years after closure ($O_3$), and it is again compared to the base year ($O_1$) to find the long-term change. A simple diagram to illustrate this model might look like this:

|  | t-1 | closure | t+1 | … | t+10 |
|---|---|---|---|---|---|
| treatment | $O_1$ | X | $O_2$ | … | $O_3$ |
| comparison | $O_1$ | | $O_2$ | … | $O_3$ |

where $O_n$ = (O) observation & (n) number in sequence
and $t \pm n$ = (t) time & (n) number of years

The independent or treatment variable is a hospital closure. The dependent variables selected for this study are based upon those that were identified in research by Probst et al. (1999). They are population, labor force, unemployment rate, total personal income, and earned income. These variables come together to roughly define the 'health' of the overall local (county) economy. Various other intervening variables are controlled for during the selection of the comparison group and are discussed later in this section.

OPERATIONALIZING THE HYPOTHESIS

After the hypothesis has been developed, the direction or relationship between the variables must be understood. The purpose of this section is to describe these relationships and to clearly state the source of the data that was used to make the observations. The direction of each variable is denoted with a (+) or (-) depending on the

direction of the expected change, and the two time columns represent short-term and long-term change.

It was posited that hospital closures experienced by rural Texas counties would lead to a decrease in the labor force as well as in the overall population. Closures were likely to negatively impact personal as well as earned income. Earned income is the total of all wages and salaries in the county, while personal income is earned income plus all other earnings such as interest income from savings or investments. Lastly, an increase in the county unemployment rate was seen as an expected result. The operationalization of the hypotheses is expressed in Table 4.1.

Table 4.1 - Operationalization of the Hypothesis

| Variables (unit of measure) | Time | | Data Source |
|---|---|---|---|
| | **1 Year Later** | **10 Years Later** | |
| *Dependent* | | | |
| Labor force (# employed) | (-) | (-) | Bureau of Economic Analysis |
| Unemployment rate (% unemployed) | (+) | (+) | Bureau of Labor Statistics |
| Total personal income ($ per county) | (-) | (-) | Bureau of Economic Analysis |
| Total earned income ($ per county) | (-) | (-) | Bureau of Economic Analysis |
| Population (# residents) | (-) | (-) | U.S. Census Bureau |
| *Independent* | | | |
| Hospital Closure (0,1 variable) | 1 = hospital closure 0 = comparison | | U.S. Dept. of Health and Human Services |

Unobtrusive research techniques best describe the method used in the comparison group selection process and the final statistical analysis. Since the dependent variables and other figures are expressed as numbers, analysis of existing statistics was preferred (Babbie, 1995). Such analysis was advantageous for two reasons. First, all of the data were available through government agencies either online or in print. Second, this technique is transparent to the counties involved and has no effect on the relationship that is being studied and observed (Babbie, 1995).

DEVELOPMENT OF THE TREATMENT GROUP

This study compares counties that lost a hospital with a comparison group of counties that maintained their hospital services. Probst et al. (1999) analyzed counties that lost a hospital between 1984 and 1988. This study uses hospitals that closed nearer to the end of the same decade for a very important reason. The availability of online data drops off significantly beyond the beginning of the previous decade (in this case, the year 1990). Since most people are most concerned with getting the most recent information available, archiving years worth of old data is not necessary and, therefore, only available by special request. The years 1987 – 1989 were selected based on data availability and the model's ten-year timeframe.

The treatment group consists of a total of 24 rural Texas counties that lost a hospital during the last three years of the 1980s according to the U.S. Department of Health and Human Services. Again, the county is the unit of analysis based upon the relative difficulty of locating city level statistics and the sheer number of cities that would

have needed to be considered while developing the comparison group. A list of the 24

rural counties that make up the treatment group can be found in Table 4.2 (Sterling

County was omitted due to the lack of a suitable match).

Table 4.2 – Treatment Group

| County | City | Hospital Name | Closed |
|---|---|---|---|
| Shelby | Center | Shelby General Hospital | 1987 |
| Foard | Crowell | Foard County Hospital | 1987 |
| Hamilton | Hamilton | Hamilton General Hospital | 1987 |
| Morris | Lone Star | Hospital in the Pines | 1987 |
| Bosque | Meridian | Meridian Hospital | 1987 |
| Falls | Rosebud | Rosebud Community Hospital | 1987 |
| Austin | Sealy | Brazos Valley Hospital | 1987 |
| Freestone ** | Wortham | Wortham Hospital | 1987 |
| Hutchinson | Borger | Golden Plains Community Hospital | 1988 |
| Milam ** | Cameron | Milam Regional Medical Center | 1988 |
| Lavaca | Shiner | Shiner Hospital | 1988 |
| Robertson | Hearne | Robertson Medical Center | 1988 |
| Bastrop | Bastrop | Bastrop Hospital | 1988 |
| Marion | Jefferson | Marion County Hospital | 1988 |
| Freestone ** | Teague | Teague General Hospital | 1988 |
| Jasper | Kirbyville | Kirbyville Community Hospital | 1988 |
| Kendall | Comfort | Comfort Community Hospital | 1988 |
| Milam ** | Cameron | St. Edward Hospital | 1989 |
| Lamb | Amherst | South Plains Hospital Clinic | 1989 |
| Howard | Big Spring | Hall-Bennett Memorial Hospital | 1989 |
| Archer | Archer City | Archer County Hospital | 1989 |
| Sterling * | Sterling City | Sterling County Hospital | 1989 |
| San Saba | San Saba | San Saba Hospital | 1989 |
| Menard | Menard | Menard Hospital | 1989 |
| Newton | Newton | Newton County Memorial Hospital | 1989 |
| Leon | Buffalo | Leon Memorial Hospital | 1989 |
| Jackson | Ganado | Mauritz Memorial Hospital | 1989 |
| * This hospital's data was not used | | | |
| ** The earlier year was used for counties that experienced 2 closures | | | |

DEVELOPMENT OF THE COMPARISON GROUP

According to Bingham and Felbinger (2001), in quasi-experimental design, the comparison group must be as close to the experimental group in all relevant aspects as possible in order to assure valid outcomes. In order to select a valid comparison group of counties that retained their hospitals through the year 2000, a method had to be developed and tested. The comparison group was chosen using nearly the same demographic information that the Health Resources Services Administration (HRSA) uses to select peer counties for their Community Health Status Indicators Project (HRSA, 2000). In their project, counties are grouped according to frontier status (population density), population size, poverty and age structure in that order.

When adapting HRSA's method of selection, it was necessary to make some changes specific to Texas. Due to the ethnic diversity of the state, this research substituted minority status for poverty (typically, these two items are highly correlated) and rearranged the priorities to reflect the importance of two other issues. First, population density is driven by population and, therefore, total population was made the top priority. Second, the percent of residents over age 65 was given a higher priority due to the fact that, as established earlier, rural hospitals are heavily dependent on revenues generated from treating this particular segment of the population.

Data from 1980 (several years before closure) was collected for all 254 Texas counties and then sorted based on the following criteria listed in priority order: 1) population, 2) number of persons per square mile, 3) percent of the population age 65 and

older, and 4) percent of the population that is considered minority or non-Anglo. The

selection criteria, unit of measurement and the data source are illustrated in Table 4.3.

Table 4.3 – Comparison Group Selection Criteria and Data Sources

| Selection Criteria (unit of measure) | Data Source |
|---|---|
| Population at baseline (# residents in 1980) | U.S. Census Bureau |
| Population density (# residents/sq. mile) | U.S. Census Bureau |
| Population 65 or older (% residents $\geq$ age 65) | U.S. Census Bureau |
| Minority population (% minority residents) | U.S. Census Bureau |
| Currently licensed hospital (# hospital) | Texas Department of Health |

After the data were collected and the sort was completed, the county that most

closely matched each member of the treatment group and also included at least one

currently licensed acute care hospital was added to the comparison group. Both groups

now consist of 24 different counties. The counties that make up the treatment and

comparison groups are listed in matched pairs in Table 4.4.

Table 4.4 – Treatment and Comparison Group Pairings

| Treatment Group | Pair # | Comparison Group |
|---|---|---|
| Foard | 1 | Throckmorton |
| Menard | 2 | Stonewall |
| San Saba | 3 | Fisher |
| Archer | 4 | Jack |
| Hamilton | 5 | Bailey |
| Leon | 6 | Clay |
| Marion | 7 | Madison |
| Kendall | 8 | Castro |
| Newton | 9 | Burleson |
| Jackson | 10 | Grimes |
| Bosque | 11 | Gillespie |
| Morris | 12 | Aransas |
| Robertson | 13 | Terry |
| Freestone | 14 | Wilbarger |
| Austin | 15 | Hood |
| Falls | 16 | Burnet |
| Lamb | 17 | Colorado |
| Lavaca | 18 | Fayette |
| Shelby | 19 | Washington |
| Milam | 20 | Erath |
| Bastrop | 21 | Hopkins |
| Hutchinson | 22 | Bee |
| Jasper | 23 | Cass |
| Howard | 24 | Brown |

Paired t-tests were used to verify the equivalency of the comparison group. According to Norusis (2000), paired-samples t-tests are used to analyze the results of studies in which there are a pair of subjects that are matched in some way. The advantage of paired design is that it is easier to detect true differences when they exist. In this case, the tests were performed to determine the strength of the relationship between the two groups and their true compatability.

Table 4.5 reveals that the counties selected for the comparison group are indeed considered to be equivalent to those in the treatment group on each of the four selected variables. Equivalency is vital to establishing the validity of the comparison group and to controlling for intervening variables. In this case, no significant differences were found between the treatment and comparison groups on total county population, population density, percent elderly or percent minority.

Table 4.5 – Paired t-test Results

| Testing for Validity of Comparison Group Using Paired t-tests | Results |
|---|---|
| Total Population<br>    Treatment Group Mean (N=24)<br>    Comparison Group Mean (N=24)<br>        Mean difference<br>        t value<br>        p value | <br>15628.88<br>15516.83<br>112.04<br>1.10<br>.282 |
| Population Density<br>    Treatment Group Mean (N=24)<br>    Comparison Group Mean (N=24)<br>        Mean difference<br>        t value<br>        p value | <br>20.14<br>20.60<br>-.46<br>-.56<br>.584 |
| Percent Age 65+<br>    Treatment Group Mean (N=24)<br>    Comparison Group Mean (N=24)<br>        Mean difference<br>        t value<br>        p value | <br>18.76<br>17.67<br>1.08<br>1.05<br>.306 |
| Percent Minority<br>    Treatment Group Mean (N=24)<br>    Comparison Group Mean (N=24)<br>        Mean difference<br>        t value<br>        p value | <br>18.12<br>14.38<br>3.73<br>1.48<br>.151 |

DATA ANALYSIS

Once the treatment and comparison groups were deemed comparable, data relating to the dependent variables were collected for a year before, plus both one and ten years after closure to give a short-term comparison as well as a longer-term picture of how things look closer to today. The five dependent variables are population, labor force, unemployment rate, personal income and earned income. Data were mined from recognized governmental agencies that are charged with the collection and standardization of this type of information. Most data were available online and easily transferable; although, it was necessary to enter some of the earlier data by hand.

The next step in the research involved determining whether any observed difference between the two groups was truly significant. According to Norusis (2000), independent-samples t-tests are used when one needs to test whether two population means are equal based on the results observed in two independent samples. Since the objective is to measure the difference between the two independent groups of counties, independent t-tests were selected for this purpose.

Economic indicators (aggregated at the county level) were used as the dependent variables. The influence of hospital closures was examined using ten separate independent t-tests (the five dependent variables in short and long-term). The tests will show whether or not the hospital closure had any bearing on the economic status of the counties. The next chapter will discuss the results of these tests and discuss whether they support or fail to support the research hypothesis.

CONCLUSION

This chapter discussed the methodology that has been selected in the completion of this study regarding rural hospitals. Existing data were used to both validate the comparison group and to test the hypothesis that closure and the local economy are related according to the research hypothesis. A comparison group was selected and tested for comparability using paired t-tests. The treatment and comparison groups were found to be equivalent. Then quantitative data analysis, in the form of independent t-tests, was selected in order to test the hypothesis on the five dependent variables. The next chapter will describe the results of the independent t-tests that were generated using an automated program called SPSS.

**CHAPTER FIVE:**
**RESULTS**


INTRODUCTION

This chapter tests the research hypothesis and gives an accounting of the results of

the statistical procedures performed for this study. Ten separate independent t-tests were

performed in order to test the hypothesis that hospital closures negatively effect the local

economies of the counties where they were once located, over both the short term and the

long term. The results of these tests are presented in a tabular format. They are also

summarized and interpreted in the text.


INDEPENDENT T-TEST RESULTS

Table 5.1 depicts the results of the data analysis, which reveals that there is no

significant difference between the treatment and comparison group on any of the five

indicators of economic health. This outcome was true over both the short and long-term.

None of the expected results discussed in Chapter 4 held true. The total population

increased in each group, both short and long-term. Treatment increased by 718 and 3,005

respectively, while comparison grew by 1,620 and 4,462. The labor force also grew on

both sides, although the comparison group did actually drop initially. The figures were 23

and 957 for treatment, while comparison went from –47 to 1,283.


The unemployment rate dropped for both groups. The treatment group had rate

reductions of –2.25 and –2.90 while the rate in comparison counties decreased by –1.83

before ending at  –2.52. Both personal and earned income also rose over both time

periods. The treatment group's earned income increased by $594,900 and $5,464,400 while the figures for the comparison group were $391,400 and $5,723,300. Finally, personal income increased for the treatment group by $1,611,500 and $15,031,600. The comparison group also increased by an even greater amount, $1,935,800 over the short-term and $17,696,200 over the long-term.

Again, the only remarkable difference observed was that the labor force in the comparison group dropped slightly over the short term. Over the long-term, however, growth in the comparison group's labor force well exceeded that of the counties whose hospitals had closed some ten years earlier. In every other instance, there was a positive relationship between the treatment and comparison groups, both short-term and long-term. No significant differences, however, were observed in any of the ten tests that were completed.

In essence, both groups saw positive growth among the selected economic indicators, growth that persisted throughout the course of the 1990s. It does not appear that the loss of this particular group of hospitals has had a significant effect on the local economies of the counties in which they were once located. Nor does it seem to matter that the observations were extended over a longer time period than was measured by Probst et al. (1999). Again, table 5.1 illustrates the lack of impact that rural hospital closures had on the rural economy. The evidence in this case clearly fails to support the claim that rural hospital closures hurt local economies.

Table 5.1 – Independent t-test Results

| Dependent Variable | Short-term change ( t + 1 ) – ( t - 1 ) | Long-term change ( t + 10 ) – ( t - 1 ) |
|---|---|---|
| Labor Force | | |
|     Treatment Group Mean (N=24) | 22.54 | 957 |
|     Comparison Group Mean (N=24) | -46.63 | 1283 |
|         Mean difference | -69.17 | 326 |
|         t value | -.627 | .924 |
|         p value | .534 | .361 |
| Unemployment Rate | | |
|     Treatment Group (N=24) | -2.25 | -2.90 |
|     Comparison Group (N=24) | -1.83 | -2.52 |
|         Mean difference | .42 | .38 |
|         t value | .555 | .332 |
|         p value | .581 | .741 |
| Total Personal Income (in thousands) | | |
|     Treatment Group (N=24) | 16115 | 150316 |
|     Comparison Group (N=24) | 19358 | 176962 |
|         Mean difference | 3243 | 26646 |
|         t value | .555 | .745 |
|         p value | .582 | .460 |
| Total Earned Income (in thousands) | | |
|     Treatment Group (N=24) | 5949 | 54644 |
|     Comparison Group (N=24) | 3914 | 57233 |
|         Mean difference | -2035 | 2588 |
|         t value | -.794 | .185 |
|         p value | .431 | .854 |
| *Population is only measured reliably at the beginning of each decade* | Short-term change ( **1990** ) – ( **1980** ) | Long-term change ( **2000** ) – ( **1980** ) |
| Population * | | |
|     Treatment Group (N=24) | 718 | 3005 |
|     Comparison Group (N=24) | 1620 | 4462 |
|         Mean difference | 902 | 1456 |
|         t value | 1.010 | .748 |
|         p value | .318 | .459 |

CONCLUSION

This chapter described the results of this quasi-experimental study . The hypothesis was that hospital closures would negatively impact the local economies of the counties in which they were once located. These tests showed that there were no significant differences between the 24 counties with rural hospitals and the 24 without on any of the five economic indicators that represent the 'health' of the local economy. These results support the findings obtained by Probst et al. (1999) during their earlier research into the economic effects of rural hospital closures. The next chapter discusses some of the possible explanations for these results along with suggestions for future research.

**CHAPTER SIX:**
**SUMMARY AND CONCLUSIONS**


RESEARCH SUMMARY

The purpose of this research was to test whether counties whose hospitals had closed fared any worse economically than comparable counties. Chapter one introduced the topic of research. Chapter two began a review of the literature with a comprehensive overview of the rural healthcare environment. More specifically, it discussed the many barriers that rural hospitals must contend with in order to remain viable, as well as some of the governmental programs and other alternatives available both historically and currently.


The third chapter addressed the research topic more directly. It chronicled prior research into the links between the healthcare sector and the local economy. This research project was modeled after one such study that used a comparative analysis approach to study the differences between two groups of counties. The treatment group consisted of counties nationwide whose hospitals closed between 1984 and 1988. The conceptual framework and research hypothesis can also be found near the end of this chapter.


The fourth chapter describes the research methodology developed to address the research question. An analysis of existing data was selected as the research method. The treatment group consisted of rural Texas counties that lost a hospital between 1987 and 1989. A comparison group was selected and verified using paired t-tests. A pretest-posttest with comparison group design was developed to test the hypothesis. A statistical

analysis (in the form of independent t-tests) was utilized to measure the difference between the treatment and comparison groups, since economic data is largely quantitative.

Chapter five was the results chapter. The results show that there are no statistical differences between the two groups on any of the economic indicators, either short or long-term. With one exception (the short-term change in the labor force), the two groups were positively related over both the short-term and long-term. These results support the findings by Probst et al. (1999), in that neither study was able to confirm that rural hospital closures negatively affect the rural economy.

POSSIBLE EXPLANATIONS

There are a few explanations for the results that were obtained through this research. One idea is that at the time these hospitals were forced to shut down, their operations had basically receded to the point of no return. They closed beds, made staffing reductions, eliminated services, and made any other change they could in order to try and stay open. By that time, they were no longer the powerhouses that are commonly the targets of such an economic study. This finding is not meant to suggest that hospitals are not important contributors to the local economy. Clearly, hospitals are as long as they remain financially and operationally viable. However, once the point of closure has been reached the economic impact has been severely diminished.

Another observation is that the financial and population booms that occurred in Texas over the decade of the 1990s helped both groups to expand economically. Job creation and other such benefits from these two events were major contributors to the positive growth reflected in the selected economic indicators. Unfortunately, those economic growth rates were not sustainable and the rapid expansion subsided by the end of the decade. It is likely that the results would differ substantially during a weaker economy such as the one we are experiencing today.

Last, for those who see these results as a success for closure counties, the fact that they held their own economically against counties with hospitals may serve as a hollow victory. If other research on the subject is considered, one must take into account the growth potential that the closure counties have lost. Once a hospital has been closed, it is infinitely more difficult to get it reopened. Therefore, the closure counties will always find it more difficult to access care, attract new businesses and new residents. If they had managed to keep the doors to their local hospital open, the same group of counties might have actually come out on top.

## SUGGESTIONS FOR FUTURE RESEARCH

Sometimes the actual results can be unexpected. This study was performed because it was conceivable that Texas, which was especially hard hit by rural hospital closures during the 1980s, would have different results than those observed by Probst et al. (1999). Apparently, there is a certain resilience to be found in the local economies of Texas' rural communities, and they don't receive the positive recognition that they

should. Even so, there are other effects, outside the financial that deserve more attention and further study.

Obviously, this research was fairly one sided in that it only considered the economic effects of hospital closures. There are a number of other less tangible effects that have real immediate consequences as noted by Doeksen et al. (1997). First, there are the repercussions that stem from a lack of access to acute care services. Another is the decreased sense of community identity that comes as a result of losing an entity that has touched so many lives. Research in these areas might be more remarkable due to its tangible effects on a greater share of individual citizens.

Also, it might be worthwhile to somehow limit this study to the segment of the population most disaffected by the closure. It is clear that somebody was negatively affected by these events. Individuals lost their jobs, and other healthcare providers (pharmacies, therapists, nursing homes) lost business. If just one individual expired due to the lack of available hospital services, their future income is lost forever. Perhaps, using county level data is not specific enough and the results would be dramatically different if the right place level data could be tested in the same way.

CLOSING REMARKS

As was stated previously, this researcher does not in any way support the closure of rural hospitals, nor is this research meant to undermine the important role that they play in the long-term viability of rural Texas. If anything, this research has proven that

more must be done to ensure that these facilities are stronger financially. If an organization as large as a hospital can close without leaving so much as a ripple on recognized economic indicators, then how can it be expected that regulators and elected officials would become overly concerned about their passing? The answer to that question must be found before that next spate of rural hospital closures occurs.

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