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EFFECTS OF RURAL HOSPITAL CLOSURE ON ACCESS TO CARE

Working Paper No. 58

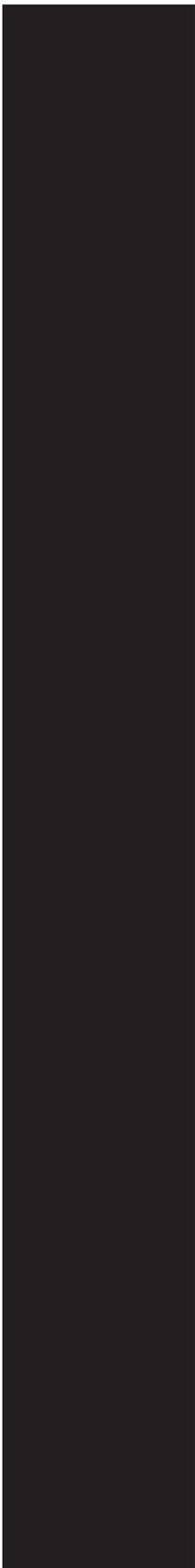
WORKING PAPER SERIES

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May 1998

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Supported by a grant from the Federal Office of Rural Health Policy, HRSA, PHS
(Grant Number CSR000002-04-2)

ABSTRACT

The purpose of this case study was to ascertain the impact of hospital closures on the populations living in communities served by six rural hospitals that closed between 1991-1994. We assessed the effects of hospital closures on the availability of medical services, such as emergency care, physician services, hospital services, and nursing home care. The study design included comparison areas where similar hospitals remained open in order to control for medical services utilization trends unrelated to hospital closure. A standardized questionnaire was administered to three health professionals in each of the areas that experienced a hospital closure and also in the matched comparison areas.

Interviews of health professionals located in the areas where rural hospital closures occurred provide evidence suggestive of some negative effects of hospital closure on these communities. These negative effects include difficulty in recruiting and retaining physicians, concern of residents over the loss of their local emergency room, and increased travel times to receive hospital services. Increased travel times are indicated to impact most significantly on vulnerable populations, such as the elderly, the disabled, and persons of low socioeconomic status. Respondents in the majority of comparison areas also reported access barriers for these vulnerable populations. These barriers primarily center around problems of obtaining transportation and enduring the rigors of travel.

Improvements in the availability of transportation to medical care may offer some stabilization to communities where hospitals closed; however, it is also the case that transportation improvements are needed to increase access to care in rural communities where hospitals remained open.

INTRODUCTION

The fate of rural hospitals has been the subject of much concern and debate over the last decade. During the 1980s, nearly 10% of all U.S. rural hospitals closed [Hart et al, 1991]. Although the rate of rural hospital closure has decreased in the 1990s, rural hospitals still continue to close, and many questions about the effects of closure

on residents previously utilizing their services have not been resolved.

The closure of a rural hospital could result in a critical loss of access to necessary medical services for the community or service area served by the hospital. This potential decrease in access to hospital care may lead to poorer quality of care or higher costs for those who had previously utilized the hospital that closed. Reduction in access to hospital care may be particularly problematic for rural residents, who already must contend with more chronic or serious illness and higher injury-related mortality rates. Rural residents are more likely to be uninsured and have longer travel times to medical care than urban residents do [GAO et al, 1991]. In addition, rural areas have a greater proportion of the population that are elderly, disabled, poor or under eighteen. [Braden et al., 1994]. Overcoming barriers to medical care that are created or exacerbated by rural hospital closure may be especially problematic for these vulnerable populations. Other potential repercussions of rural hospital closure may include reduced availability of emergency services and loss of physicians, nurses and other vital medical professionals.

The loss of a rural hospital may have other repercussions beyond the critical concerns of access and costs. Often these rural hospitals serve as the organizational core for community health activities and social services, such as home health care and services for the elderly. The presence of a rural hospital often serves to attract physicians and assist in physician recruitment to rural areas [Weisgrau 1995]. Rural hospitals play an important role in sustaining the economic health of their host communities through employment of local residents and provision of one of the basic community services that is crucial to attract and retain other employers [Hart et al., 1991].

Opinions of the actual impact of rural hospital closures vary widely. Some view closure as an appropriate reduction in hospital capacity, while others see closure as the loss of necessary services and a threat to the health of those affected populations, especially their most vulnerable members [Hadley et al., 1991]. However, it may be that the impact of closure varies by characteristics of the

hospital that closed or of the community where the hospital was located, resulting in some areas being greatly affected, while others suffer only minor repercussions of closure. This case study was designed to explore whether there are adverse effects of closure and in what specific circumstances these effects occur. This information is critical to future decisions concerning rural health policy.

Background: Assessment of the Effects of Rural Hospital Closures

A number of studies have been performed to address substantive concerns of the effects of rural hospital closure. The methodologies used in the studies fall into four main categories: surveys, case studies, utilization of measures such as distance to care as proxies for access, and observations of changes in patterns of care based on analysis of Medicare utilization data. Several surveys have documented serious concerns regarding access in closure communities. These effects appear to be greatest for the more vulnerable members of society, such as the elderly, the poor, the disabled, pregnant women and small children [Hart et al, 1991; Bindman et al, 1990; Muus et al, 1995]. The methodology of the studies involved surveying professionals and residents of communities where hospitals closed to ascertain effects of hospital closure. Specific negative repercussions of closure that were identified by these studies include perception of a loss of quality of life and health status [Hart et al, 1991], an increase in the waiting time for routine medical care, and a decrease in medication compliance [Bindman et al, 1991]. Three quarters of the residents of a North Dakota community that experienced hospital closure stated that diminished access to emergency care was a problem for them and 17% said they or a family member had decided not to seek needed medical attention on one or more occasion because of inconvenience [Muus et al, 1995].

These surveys do indicate potentially serious effects of closure on access; however, the studies must be considered in the context of their limitations. Surveys are subject to bias because of the

possibility that those who will take the time to respond to the survey may be different from those who do not respond. Those that perceive problems with access may be more likely to respond to the survey than those who do not, thereby biasing reports of access problems. In addition, surveys that focus on only one closure are limited in the generalizability of their results to other geographic areas. Because such studies examine events in only one specific region, results may not be applicable to other areas or types of hospitals.

A case study of eleven closure areas in the South and Midwest were performed by the General Accounting Office as a component of an in-depth study of hospital closure [GAO, 1991]. The case study involved interviews of officials, such as the town mayor or area physicians, to assess the impact of closure on the community. This study identified access concerns for the medically fragile and for those requiring emergency or obstetrical services in several communities that experienced closure. However, the study does not include comparison areas where no closure occurred, to control for secular trends or issues that are seen in rural areas in general and unrelated to closure.

Studies that use travel time, distance to nearest hospitals and services provided by hospitals that closed as proxies for access have found some evidence of adverse effects of closure. For example, a study of the 1990 nationwide hospital closures looked at travel time to the nearest hospital [Fleming et al., 1995]. The study found an average travel time from the closed hospital to the nearest neighboring hospital of 30.2 minutes. Forty percent of closure areas had longer than a 30 minute travel time, with the longest being 110 minutes. These long travel times, while offering no proof of barriers to access, certainly could create a situation where the most fragile, vulnerable patients such as the elderly, disabled and poor, may have more difficulty in managing this burden. Fleming also found that the hospitals closest to closure hospital areas often provided a broader scope of services than had the hospital that closed. He concluded that the hospital closures "resulted in a trade-off between breadth of services and rapid access for emergency conditions"

[Fleming et al., 1995]. Several other studies found no significant reduction in access at an aggregate level but did find specific concerns, such as reduction in physician availability [McKay et al., 1995 and Hart et al. 1991] or long travel time for certain residents [Marder et al., 1991]. Because these studies utilized proxies for access, they can only suggest potential problems created by closure, such as long travel times or decrease in availability of physician services; however, they are limited in their ability to conclude that closure actually did result in restricted access to care.

Several studies used Medicare utilization data to evaluate the effects of rural hospital closure on outcomes such as admission rates, average length of stay or costs of care [Rosenbach et al. 1995, GAO, 1991 and Hadley and Nair, 1991, DesHarnais et al.]. These studies hypothesized that a decrease in access would occur after hospitals closed which would result in poorer outcomes. However, results of the Medicare utilization data studies provide little evidence of negative effects of closure at an aggregate level.

Limitations that may not have allowed these studies to detect effects of closure are small sample size and observing hospital areas for only a small window of time. In most of the studies utilizing hospital discharge data, the observation time was only one to two years. This time period may fail to capture adequate baseline measures or effects of closure after some stabilization has had an opportunity to occur. In addition, the studies that used hospital discharge data use only Medicare data. This is due to the unavailability of national all-payers data. The patterns of medical use of Medicare beneficiaries may not adequately reflect patterns of use of the general population [GAO, 1991]. Use of Medicare data also does not allow for evaluation of outcome measures for some specific groups such as pregnant women, children and the uninsured/underinsured. These groups may experience difficulties with increased travel time for care or be faced with decreased availability of local emergency room services.

In addition to the studies of rural hospital closure, there are also case studies of rural hospitals that have stayed open. These case studies document the concerns and problems of the rural

communities served by the hospitals and the strategies rural hospitals have used to stay open and thrive. Seavey and colleagues studied rural hospitals with less than 50 beds in eleven areas to identify the challenges faced by these small hospitals and evaluate the strategies they used to remain viable. Their in-depth case studies find that despite the success of the hospitals in remaining open, many of them have had to cope with problematic issues such as physician retention and recruitment and difficulty in obtaining specialty services and new technology. In addition, these hospitals often struggled with issues common to many rural areas, such as poor economies, outmigration for care, lack of insurance of a high percentage of the rural population and the complexity of the social and medical problems of residents in rural areas [Seavey et al, 1992]. The findings of these case studies reiterate the problems that rural hospitals and communities face regardless of closure. Rural hospital closure may serve to exacerbate already existing dilemmas faced by rural communities and create additional barriers to access.

Purpose/Research Question

The purpose of this case study was to ascertain the impact of rural hospital closure on access to medical services for the populations living in communities previously served by the hospitals that closed. We used key informants to assess the effects of hospital closure on the availability of medical services such as emergency care, physician services and nursing home care. We also examined the impact of closures on specific vulnerable populations, such as the elderly, persons of low socioeconomic status and pregnant women. This study addresses the question of whether hospital closures are followed by the loss of other important local medical services or whether closure areas experienced stability in medical services or conversely, growth of new providers.

This case study was designed to supplement a rural hospital closure study* done by DesHarnais and colleagues, 1998, that utilized aggregated hospital discharge data. Studies using aggregated data

* The study is currently in the data processing and analysis stage

may often fail to capture specific problems of access or health status changes that occur because of closure. These effects may be too subtle to be identified by hospital discharge data analysis and are better identified by talking with key persons in the community who actually experienced the closure. Case studies can be valuable in providing information that is unobtainable by the use of aggregated data.

METHODS:

This study design includes six closure areas and six matched hospitals located in different regions of the country. The hospitals were chosen to be as geographically representative as possible to maximize generalizability. The closed hospitals were selected from a sample of 78 rural hospitals that closed from 1991-94. In states that had more than one hospital closure, the closure to be used in the study was selected by use of a random number generator. The study design included matched comparison areas where hospitals remained open in order to control for medical service trends that are unrelated to closure. Comparison hospital areas were matched to closed hospital areas by state, hospital size and distance to the nearest hospital.

Health professionals from each closure county were contacted and telephone interviews were conducted. These key informants were asked to provide insight into what the closing of the hospital meant to the community. Health professionals from each comparison county were interviewed to assess changes that occurred in medical services during the time period since the closure of the matched hospital. The telephone interview consisted of questions regarding changes in physician services, physician extenders and nursing homes; travel necessary to obtain specialty services; opinions on impact of closure on general medical services and specific services such as ER and OB; and the current availability of services. Questions were also asked to ascertain whether the hospital had converted to another type of medical facility such as nursing home or medical clinic or if the hospital had reopened at any time. Conversion of the closed hospital to an alternate facility, such as an outpa-

tient clinic, is thought to reduce the impact of closure by maintaining access to certain medical services [McKay et al, 1993].

Thirty-six interviews were completed, three in each closure and each comparison area. These interviews were with a 1) nursing home administrator 2) physician's office representative 3) health department nurse or physician. All physicians' offices and nursing homes where interviews were completed were located in the same town that the closure occurred. All health department personnel interviewed worked in the same town or were very familiar with the town where closure occurred. Interview sites were identified through the Internet GTE yellow pages. The different types of facilities were selected to provide distinct perspectives on effects of closure. Often providers from diverse types of facilities serve a range of clients in terms of income, age, insurance coverage and medical needs.

Distance to the nearest hospital was studied to identify any trends in structures of medical care and their accessibility that varied by this distance variable. This variable was estimated using the ZIP code reported in the 1989 American Hospital Association Survey of Hospitals, which was linked with zip code location data from the Claritas Data Systems. The MapInfo program was then used to calculate the distance from the hospital of interest (closed and comparison) to the nearest neighboring hospital. The distance variable represented straight line or linear distance to the nearest hospital so would usually underestimate the miles required to travel to the nearest hospital.

The US Census Bureau data from 1990 was utilized to compare demographic characteristics, including age categories, percentage of county residents living in poverty, race, ethnicity and education attainment, of the counties where the closed and comparison hospitals were located. The county demographic characteristics were similar for the majority of closed and comparison pairs. However in the Hospital B and Hospital E pairings, the closed hospital counties had much larger proportions of residents that were living in poverty, nonwhite, younger and had not graduated high school than counties where hospitals

remained open. Demographics characteristics varied for the closed hospital counties with some closed hospital counties having higher poverty rates and lower educational attainment than other counties (See Table 1 for a description of demographic characteristics). In addition, the population size varied greatly between counties where hospitals were located (see Figure 1).

American Hospital Association data were used to obtain characteristics of the closed and comparison hospitals. The number of staffed beds of the closed and comparison hospitals ranged from 17 to 65 and the mean number of beds for closed hospitals and comparison hospitals were 43 and 41 respectively. Occupancy rates in the two years prior to closure varied greatly for the three closed hospitals that reported this data (See Table 2 for characteristics of hospitals that closed).

RESULTS:

The majority of closed hospitals, five out of six, eventually converted to some other type of medical facility. Two hospitals, Hospitals B and C (see Table one for more detailed hospital information), were converted into medical clinics, one became a rural health clinic and the other hospital was purchased by a private company and converted into a private medical clinic. After Hospital A closed, several clinics opened and closed in the hospital's previous facility. It is now a rural health clinic that has been open for several years. The leaders and health practitioners in that area have expressed a strong desire to reopen that hospital as a designated critical access facility and have been working toward this goal. Two hospitals, Hospitals D and F, had nursing home units prior to closure, and after closure the hospital beds were converted to nursing home beds. Both of these nursing homes have remained open. Hospital E has not been converted to any other type of facility and still remains empty.

Physician Supply: The results of the case interviews revealed that the stability of physician services after closure differed by closure area, although certain trends can be identified. Two closed hospital areas appeared to have some

growth in physician services in the time since closure. In one of these areas the hospital had converted to a rural health clinic. In two areas, physician supply remained fairly stable and in two areas respondents reported loss of physicians because of closure and difficulty in recruiting and retaining physicians. One closure area where respondents reported instability in physician services after closure still does not have local physicians but has achieved some stability by having physicians from nearby areas practice in their local clinic on a rotating basis. In the comparison areas, where hospitals remained open, respondents in four areas reported stability, and respondents in two areas reported mild to moderate growth (See Table 2 for a summary of results).

Changes in physician extenders, such as physician's assistants and nurse practitioners, were fairly consistent across closed and control areas. This appears to follow the nationwide trend for an increase in these types of practitioners in rural areas [Hughes et al, 1996]. One of the professionals interviewed from Hospital A, where instability in physician supply after closure was experienced, mentioned that they had difficulty recruiting physician extenders for several years after closure because no physicians were available to supervise them.

Nursing Home: No effects of hospital closure were detected on the number of nursing homes or nursing home beds. Both closed hospital and control area respondents reported that nursing home supply remained stable from the time of closure to the present. This finding supports information on changes in nursing homes that was obtained from the facility licensure divisions in each state. One closure area nursing home director did state that they had to find a medical director that was willing to travel to see their residents as they had no physicians in the area post closure.

Perceived Effects of Closure: The health professionals interviewed were asked to rate the effect of closure on the availability of medical services in their area. Possible responses were "very significant", "fairly significant", "moderate", "slight" or "no impact". Responses ranged from no impact to

fairly significant. If the three respondents in an area were not consistent, then the answer closest to the average of the responses was selected. "Fairly significant" was selected by respondents in two of the closure areas, "moderately" significant was selected by respondents in three areas and "no impact" selected by those interviewed in one area. Explanations given by respondents for the significance of closure fall into several categories: concern about loss of the emergency room, problems with travel, and issues for vulnerable populations. Pregnancy and delivery services were not stated as a major concern created by closure in most areas, as they did not have obstetricians and did not do deliveries on a regular basis prior to closure.

Emergency Room: Respondents in five of the six closure areas stated that the closure of the hospital's emergency room was disconcerting to residents and could have created barriers to accessing crucial emergency services. In the Hospital A area, respondents stated that residents were concerned about the approximately thirty mile distance to the nearest emergency room. Hospital area C experienced the problem of having no local paramedics at the time of closure. The health professional that cited this example stated that this was of great concern to residents and has since been rectified by creation of local paramedic services. One respondent from the Hospital D area stated that the travel necessary to reach the closest ER can lead to patients with emergent conditions such as myocardial infarction, either dying or having a worse prognosis than if services had been available at closer proximity. She cited an example where she thought this had occurred. She also stated that travel for emergency care may be particularly difficult for residents who already had been traveling 10-15 miles to the hospital that closed, who then had to add the time necessary to reach the nearest open hospital to what they were already traveling. In the Hospital F area, which is at the closest proximity to the nearest hospital, the loss of their emergency room was not identified as a problem for any residents.

Issues of Travel and Transportation: Difficulty in traveling for hospital care was identified by respondents from all areas except for the Hospital F area, where the distance from the closed hospital to the nearest hospital was only seven miles. These difficulties fall into four categories: problems in securing transportation, concerns of travel for medical emergencies, difficulty in travel for the medically fragile, and inclement weather that creates additional hardships in traveling. The first three of these difficulties were found primarily in vulnerable populations such as children, the disabled and the elderly. Respondents in the Hospital B area cited anecdotes of transportation inaccessibility where ambulances had been used to transport medically fragile residents who did not really require an ambulance. Ambulance transport was the only travel mechanism available since no other transportation, such as wheelchair transport or car travel with assistance from family or friends, was available to and from hospitals in neighboring areas. Respondents from the Hospital A area said their usual thirty minute drive to the nearest hospital can be substantially increased in the winter months because of treacherous road conditions.

Vulnerable Populations: Concerns of access for vulnerable populations such as children, elderly, pregnant women, those of lower socioeconomic status and the disabled were cited by all areas except the Hospital F area. These potential barriers to access primarily concerned lack of transportation to emergency and other services. One respondent from the Hospital A area identified many of those with low socioeconomic status as having no means of transportation. As transportation services are limited, barriers to access to medical services are not uncommon in this area. In one area, access to nonemergent hospital care at the nearest hospital, which is located in a neighboring county, was not available to the uninsured as the county government had made arrangements for other county hospitals to care for the uninsured. According to respondents this increased the travel to access hospital care from 20 to 40 miles.

DISTANCE TO THE NEAREST HOSPITAL:

Distance from the hospital of interest to the nearest hospital was studied to ascertain whether this variable was related to the extent to which hospital closure affected the community where closure occurred. As the distance variable is measured from the hospital of interest to the nearest neighboring hospital, the actual distance residents will have to travel will differ depending on where they live in relation to the nearest neighboring hospital. In virtually all areas the calculated distance variable underestimated the mileage for travel necessary to receive care that was stated by respondents. This is primarily because the distance variable was calculated as the linear distance between the closed and neighboring hospital rather than the actual distance necessary to travel to the nearest hospital.

Distance to the nearest hospital appears to be a contributor to perception of the degree to which closure affected the availability of medical services. Respondents in the two areas farthest from the nearest hospital responded that the impact of closure was fairly significant. Respondents in the three areas that are the next farthest from the nearest hospital responded that the impact of closure was moderately significant. Respondents in the area closest to the nearest hospital reported that the closure had no impact on the availability of medical services in their area. Respondents from that area said that the nearest hospital was five to ten minutes away and that the hospital that closed did not have many of the desired services so residents were traveling for care prior to closure.

Current Availability of Medical Services:

Respondents from both closure and control areas were asked about the current availability of medical services in their area and could select from the responses of "very available", "mostly available", "somewhat available", "slightly available" and "difficult to access". For the closure areas, 4-6 years had passed since the hospital closed as all of the closures occurred between 1991-1993. Despite the concerns stated about the ramifications of closures on travel for hospital services, especially emergency room services, the responses were not

extremely different for the closure and control areas. Of the hospital areas experiencing closure, respondents in five areas said that medical services are mostly available and respondents in one area said somewhat available. The somewhat available response came from the Hospital A area where community members are working toward reopening the hospital as a critical access facility. The control areas were only slightly more optimistic with five responding mostly available and one saying very available.

Current Access Issues: Respondents were also asked about current access issues in the specific areas: travel to specialty services, travel for pregnancy and delivery services and waiting times for physician appointments. No closure area respondents reported specialists in their immediate area, whereas two of the comparison areas reported having specialists located in their areas. The majority of closed and comparison areas have recruited specialists from nearby areas, of larger populations, that visit local clinics or hospitals on a weekly or monthly basis. The visiting specialists primarily represent common specialty areas such as cardiology, neurology, dermatology or general surgery. Most areas only have a few visiting specialists so do not have local access to a range of specialties. There appears to be a slight trend toward greater availability of visiting specialists in comparison areas as all comparison areas reported having visiting specialists while two of the six closure areas did not report this. Some of the respondents in comparison areas reported that these specialists would see patients at the local hospital. Perhaps the availability of hospital facilities may provide incentive for specialists to visit these rural areas.

Distance to the nearest hospital did appear to be related to the travel time required to see specialists practicing in the more common specialties. However travel for certain types of specialty care, such as that provided by an endocrinologist, oncologist, thoracic surgeon, neurosurgeon etc., is extensive in most areas where hospitals closed as well as in the matched comparison areas. In some areas the travel can be as long as 1-2 hours for specific types of care.

Travel outside the town where hospitals were located is necessary to see an obstetrician in four of the comparison areas and all of the closed hospital areas. Women in the Hospital A area were reported to have to travel at least an hour for delivery. Respondents from one other closure area and two comparison areas reported that travel of more than 30 minutes is necessary for delivery. Three of the comparison area hospitals were reported as not routinely doing deliveries and most of the closed hospitals did not routinely do deliveries prior to closure. However, several respondents from closure areas did report having local obstetrics and hospital delivery services that had ceased to operate five to ten years prior to hospital closure. This finding is consistent with a trend toward loss of rural obstetrical providers and obstetrical services in hospitals in the eighties identified in a number of studies [Lambrew and Ricketts, 1993].

Difficulty in getting appointments with physician or physician extenders was identified as a problem in most closure and comparison areas primarily because certain physicians are no longer taking patients. Respondents in three closure areas did identify lack of consistency of provider as a problem. This was primarily because physicians and physician extenders staff the medical clinics on a rotating basis so patients may see a different provider if they need an appointment on a day when their provider is not working. According to respondents, rotating schedules were developed to accommodate practitioners who also work in other areas.

DISCUSSION:

Interviews with health professionals in the towns where hospital closure occurred and in comparison areas where no closure occurred suggest that hospital closure resulted in some negative effects on most of the communities where hospitals closed. These effects include distress of residents over the loss of a local emergency room and increased travel times to receive hospital services. These negative effects appear to have the greatest impact on the more vulnerable populations, such as elderly, those of lower socioeco-

omic status, disabled persons and children. Other more indirect effects of closure appear to be difficulty in recruiting and retaining physicians and potentially more difficulty in recruiting visiting specialists, including obstetric practitioners, compared to towns where the local hospital did not close.

Survey responses regarding *current* availability of care indicate that health professionals interviewed in closure areas, with the exception of Hospital A area, do not perceive their community to have much less availability of care than those in the comparison areas where the hospital did not close. There are several possible reasons for the similarity in groups. One potential explanation is that although many short-term effects were noted post closure, the majority of residents in the closure areas were able to adapt to the changes necessitated by the closure of the hospital, such as extended travel time. Several respondents did report that residents were initially very concerned about the closure of the hospital and what this would mean for accessibility of medical services in their communities. However, they had eventually adapted to the change. Respondents cited vulnerable populations as having the most difficulty with adapting to the changes that occur after closure. These populations were also cited by the control groups as having the most difficulty in accessing services. The fact that both closed and control groups identified the access problems of vulnerable populations, as well as travel for medical services, as the explanation for why care was not optimal in their areas could have contributed to their similarity in ratings of medical services availability. In addition, the question asks respondents to rate to services as a whole so this may dilute the effect of loss of hospital services to some extent. The residual effects of closure in these communities appear to be concerns about having no local emergency services and travel to receive services, which is most problematic for vulnerable populations. Hospital A area health professionals are attempting to reopen the hospital as a critical access facility because of long travel times and lack of local emergency services.

Several problems identified in rural closure areas were also identified in their matched comparison

hospital areas and appear to be problems of rural areas in general [Braden et al. 94; Lishner et al 1996; Comer et al, 1996]. These include travel of 45-60 minutes for maternity care, waits for physician appointments, travel 45-120 minutes for specialty care and poor access to transportation services. These hardships appeared to be common in rural areas regardless of hospital closure and could certainly act as barriers to adequate prevention and medical care for rural citizens.

The distance to the nearest hospital appears to exert some influence on the degree of impact that hospital closure has on the community. Communities located the farthest from the nearest hospital experienced the most significant effects on medical services, while those at nearer proximity experienced fewer problems. The hospital area with the shortest distance to the nearest hospital (7 miles) reported virtually no effect of closure on medical care. Other case-specific factors that may influence the magnitude of the effect closure will have on a community appear to be availability of transportation and paramedic services and what services were provided by the hospital prior to closure. Many closure communities did not have local obstetrical services, so women were already traveling for obstetrical care and delivery. However, the loss of the hospital did result in the inaccessibility of local emergency delivery or stabilization for transport to another area that provided the obstetrical treatment.

Demographic characteristics of the community, such as proportion of residents over 65, may also influence the impact of hospital closure on community residents. A study of the travel patterns of rural New York residents found that patients over seventy-five tended to be hospitalized locally in contrast to younger patients who often traveled to receive care. The authors concluded that hospital closure may have a more profound effect on the elderly because of their low propensity to travel [Hogan et al., 1988]. No obvious effects of demographics or hospital characteristics were identified in this case study. For instance in hospital area A, where the greatest effects of closure were cited, the proportion of the population that was over 65 was not very differ-

ent from the other closure areas. However, because of the small size of the study and the inability to control for other factors that may have contributed to the effects of closure, it is difficult to access the actual effects of hospital and community characteristics.

There are certainly limitations of this study that may have reduced the ability to detect the 'true effects' of closure. These include only three interviews for each area which may not be sufficient to obtain a representative sample of opinion. However, three different types of respondents were chosen in an attempt to capture different perspectives. In addition, community residents who were not health professionals were not included in this study. Consequently this perspective is unavailable, as health professionals may not be aware of all possible impacts of closure on residents. Another potential study limitation is that of recall. The closures occurred 4-6 years prior to the interviews so adequate recall of the events occurring at closure and immediately following closure may be somewhat compromised. One particular problem in this situation is that recall of events may be different in the comparison group and closed hospital groups as the closed hospital group may have better recall of the events because of the significant event of having the town's hospital close. Finally, this study like all case reports and surveys, provides only subjective responses. However, the opportunity to hear first hand how residents perceived the hospital closure and its impact on their community can also be considered a strength of the study.

CONCLUSIONS:

This case study was consistent with previous case studies of rural hospital closures in identifying vulnerable populations, such as the poor, medically fragile, elderly and children, as experiencing negative effects of closure. These adverse effects primarily include difficulty in accessing care due to a lack of available transportation and the hardship of travel.

The majority of studies using hospital discharge data have not revealed negative impacts on access or costs after rural hospital closure. There are sev-

eral potential explanations for the disparity in findings between case studies and studies using hospital discharge data. Studies utilizing hospital discharge data examine changes in proxies for access to medical care, such as admission rates, lengths of stay, and readmissions, to evaluate whether closure has reduced access to inpatient and outpatient care, thereby resulting in decreases in hospital admission rates, increases in lengths of stay and increases in hospital readmission rates. However, these aggregated measures do not adequately capture changes in access to care that do not result in altered hospital admission patterns, but may actually lead to decreases in health status and quality of life. In addition, most studies of the effects of rural hospital closure using hospital discharge data have been limited to Medicare beneficiaries. Restriction of studies to only Medicare beneficiaries may fail to adequately portray the impact of closure for rural residents with no insurance or residents under 65. Furthermore, aggregated data may not be sensitive enough to detect changes in specific populations that are not present for the majority of the population. Because of these factors, a case study approach may yield different results than studies utilizing hospital discharge data.

This case study indicated that in most areas the general population may have suffered short term negative effects of closure, but only vulnerable populations appear to have experienced longer term effects of closure with the exception of Hospital A area, the farthest from the nearest hospital. In Hospital A area, respondents expressed continuing difficulty with access to care and are seeking a way to reopen their hospital as a critical access facility. Their struggles illustrate that geographical isolation or distance from medical services influences the impact of closure on the communities where closure occurs. The finding also reiterates the statement made by Seavey and colleagues, authors of case studies where hospitals remain open, that the term “rural hospitals” has been described as containing a disparate collection of hospitals with different characteristics, such as strengths and weaknesses, strategic opportunities and environmental constraints. Seavey

and colleagues state that the policy proposals regarding rural hospitals need to be examined from “multiple rural environments” in order to meet the needs of the diverse group of rural hospitals (Seavey et al, 1992). Solutions for minimizing the effects of hospital closure will need to consider the characteristics of hospitals and communities where hospitals closed. The findings from this study suggest that repercussions of closure may be influenced by the following characteristics: distance to the nearest hospital, availability of emergency services, whether the hospital was providing services necessary to the community prior to closure, and availability of transportation. For instance, health professionals in the Hospital F area, which is less than 10 miles to the nearest hospital, reported few negative effects of closure. This hospital was also reported as not providing many of the medical services that were needed in the community, therefore residents were already traveling to receive care prior to the closure of the hospital. Conversely, residents at the farthest distance to the nearest hospital reported substantial negative effects of closure.

The majority of comparison areas also report access barriers for vulnerable populations. These barriers, like those found in closure areas, primarily center around problems with enduring the discomforts of travel or securing means of transportation. Policy interventions aimed at enhancing transportation services appear to be needed in rural areas regardless of whether a closure occurred. Improving the availability of transportation could provide some stabilization for rural areas experiencing closure and also may be beneficial in improving access to medical services in communities where hospitals remain open. In addition, in areas where hospital closure is imminent, public health officials should investigate the viability of emergency services, such as ambulances and emergency medical technicians, to provide the timely medical care necessary until the patient reaches the nearest hospital. If services are identified to be substandard, then steps should be taken to bring these services to an acceptable level prior to closure of the hospital.

TABLE 1: Demographic Characteristics of Counties Where Closed and Comparison Hospitals Were Located

Hospital Area	A	B	C	D	E	F
Region	North-west	West Coast	East	Midwest	Southern Midwest	Southeast
% over 65	Closed	8	14	21	19	12
	Comparison	17	12	16	16	13
% without high school education	Closed	34	24	26	38	40
	Comparison	20	17	23	26	44
% nonwhite, nonHispanic	Closed	1	13	2	1	12
	Comparison	1	5	2	1	7
% Hispanic	Closed	5	33	1	0	1
	Comparison	0	5	7	1	0
% living in poverty	Closed	16	18	11	12	21
	Comparison	14	12	9	10	14

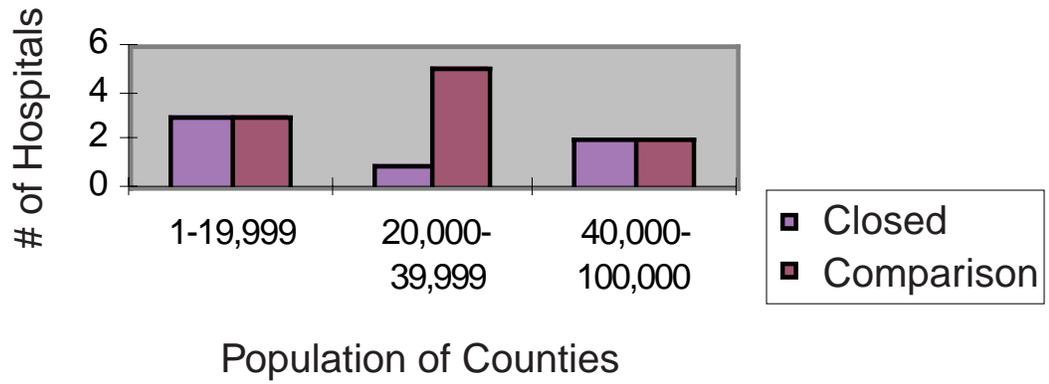
TABLE 2: Characteristics of Closed and Comparison Hospitals

Hospital Area	Region	Distance (miles) to the Nearest Hospital from the Closed Hospital Area	Distance (miles) to the Nearest Hospital from the Comparison Area	Number of Beds - Closed Hospital	Number of Beds - Comparison Hospital	Occupancy Rate Closed Hospital and 2 yrs prior to closure	Occupancy Rate Comparison Hospital, 1 and 2 yrs prior to closure	Conversion Status of Closed Hospital Facility	Date of Closure
A	Northwest	28	26	57	48	Did not report this information	2 yrs prior: .73 1 yr prior: .77	Now a rural health clinic	2/93
B	West Coast	17	19	28	26	Did not report this information	2 yrs: .65 1 yr: .65	Converted to a rural health clinic	12/92
C	East	16	15	17	30	2 yrs: .17 1 yr: .17	Did not report this information	Converted to a private clinic	10/93
D	Midwest	11	11	63	59	2 yrs: .84 1 yr: .86	2 yrs: .81 1 yr: .59	Converted to nursing home beds	8/92
E	Southern Midwest	10	11	28	25	2 yrs: .32 1 yr: .29	2 yrs: .29 1 yr: .28	Remains empty	2/91
F	Southeast	7	10	65	59	Did report this information	2 yrs: .41 1 yr: .37	Converted to a nursing home beds	10/92

Table 3: Results of Interviews with Health Professionals

OUTCOME	CLOSED	COMPARISONS
Stability in Physician Services	<ul style="list-style-type: none"> - 2 areas reported stability after closure - 2 areas reported mild to moderate growth in quantity of services - 2 areas reported difficulty in recruiting and retaining physicians 	<ul style="list-style-type: none"> - 4 areas reported stability in the availability of physician services after closure - 2 areas reported mild to moderate growth in physician services
Physician Extenders (Nurse Practitioners and Physician Assistants)	<ul style="list-style-type: none"> - 4 areas reported increases in physician extender supply - 1 experienced stability in physician extender in supply - 1 area has no physician extenders 	<ul style="list-style-type: none"> - 4 areas reported increased supply of physician extenders - 2 areas reported stability in physician extenders
Nursing Home Supply	Number of nursing homes and bed supply stable for all closure areas after closure	Number of nursing homes and bed supply stable for all comparisons
Perceived Effects of Closure on the availability of medical services	<ul style="list-style-type: none"> 3 areas - "Fairly significant" 2 areas - "Moderately Significant" 1 area - "No impact" 	Not applicable
Perceived Effects of Closure on availability of emergency services	5 out of 6 closed area respondents cited this as a concern post closure	Not applicable
Effects of Closure on travel and transportation	5 out of 6 areas reported this as a concern particularly for vulnerable populations	Not applicable
Effects of Closure on vulnerable populations	5 out of 6 areas stated concerns regarding vulnerable populations particularly because of lack of transportation or inability to withstand travel	Not applicable
Current availability of medical services	<ul style="list-style-type: none"> 5 areas responded "mostly available" 1 are responded "somewhat available" 	<ul style="list-style-type: none"> 5 areas responded "mostly available" 1 responded "very available"
Availability of specialty services	<ul style="list-style-type: none"> None had specialists in immediate area 4 areas reported having visiting specialists 	<ul style="list-style-type: none"> 2 areas have specialty services in the town where the hospital is located All areas report having visiting specialists
Travel (outside town where hospital located) for Obstetric Care	Necessary for all six areas	Necessary for 4 areas

Figure1: Population of Closed and Comparison Hospital Counties



REFERENCES

- Bindman A, Keane K, Lurie N. (1990). A Public Hospital Closes: Impact on Patients' Access to Care and Health Status. *JAMA*, 264(22):2899-2904.
- Braden J, Bearegard K. (1994). *Health Status and Access to Care of Rural and Urban Populations* (AHCPR Pub. No 94-0031). Rockville, MD: US Public Health Service.
- Comer J, Mueller K. (1995). Access to Health Care: Urban-Rural Comparisons from a Midwestern Agricultural State. *Journal of Rural Health*, 11(2):128-135.
- DesHarnais S, Fowler C, Gansky S, Lavalley R, Simpson K. (1998). *Rural Hospital Closure: Utilization and Cost of Care* (Working paper). Commission on Professional and Hospital Activities, University of North Carolina at Chapel Hill.
- Fleming S, Williamson H, Hicks L, Rife, I. (1995). Rural Hospital Closures and Access to Services. *Hospital and Health Services Administration*, 40(2):247-262.
- General Accounting Office. (1991). *Rural Hospitals: Federal Hospitals Should Target Areas Where Closures Would Threaten Access to Care* (Report GAO/HRD-91-41). Washington DC:U.S. General Accounting Office.
- Hadley J, Nair K, Feder J. (1991). *Hospital Closures, Financial Status and Access to Care: A Rural and Urban Analysis* (Prepared under HCFA Cooperative Agreement Number 17-C-99499). Washington DC: Georgetown University Center for Health Policy Studies.
- Hart L, Pirani M, Rosenblatt R. (1991). Causes and Consequences of Rural Small Hospital Closures from the Perspectives of Mayors. *Journal of Rural Health*, 7(3):222-246.
- Hart L, Pirani M, Rosenblatt, R. (1991). *Rural Hospital Closure and Local Physician Supply: A National Study* (Working paper). Seattle, WA: WAMI Rural Health Research Center, University of Washington.
- Hughes, N. (1996). Solid Partner: PAs and Rural Hospitals. *AAPA News*, 17(16):1.
- Lambrew J, Ricketts T. (1993). Patterns of Obstetrical Care in Single-Hospital, Rural Counties. *Medical Care*, 31(9):822-833.
- Lishner D, Richardson M, Levine P, Patrick D. (1996). Access to Primary Health Care Among Persons With Disabilities in Rural Areas: A Summary of the Literature. *Journal of Rural Health*, 12(1):45-53.
- McKay N. (1995). Access Implications of Rural Hospital Closures and Conversion. *Hospital and Health Service Administration*, 40(2):227-246.
- McKay N, Coventry J. (1993). Rural Hospital Closures, Determinants of Conversion to an Alternative Health Care Facility. *Medical Care*, 31(2):130-140.
- Mick SS, Morlock LL. (1990). America's Rural Hospitals: A Selective Review of 1980s Research. *Journal of Rural Health*, 6(4):437-466.
- Muus K, Ludtke R, Gibbens B. (1995). Community Perceptions of Rural Hospital Closure. *Journal of Community Health*, 20(1):65-73.
- Rosenbach ML, Dayhoff DA. (1995). Access to Care in Rural America: Impact of Hospital Closures. *Health Care Financing Review*, 17(1):15-37.
- Seavey J, Berry E, Bogue R. (1992). *The Strategies and Environments of America's Small Rural Hospitals*. Chicago, IL: The Hospital Research and Educational Trust of the American Hospital Association.