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**EFFECTS OF 1988 RURAL  
HOSPITAL CLOSURES ON ACCESS  
TO MEDICAL CARE**

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**OFFICE OF INSPECTOR GENERAL**  
**OFFICE OF EVALUATION AND INSPECTIONS**

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AUGUST 1990

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HOSPITAL CLOSURES ON ACCESS  
TO MEDICAL CARE**

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**Richard P. Kusserow  
INSPECTOR GENERAL**

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## EXECUTIVE SUMMARY

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### PURPOSE

This inspection was conducted to determine how access to medical care was affected when rural hospitals closed in 1988.

### BACKGROUND

In recent years, the public and Congress have expressed concern about the closure of hospitals. The Office of Inspector General, Office of Evaluation and Inspections (OEI), examined the extent and nature of 1987 hospital closures, releasing its report, "Hospital Closures: 1987," in May 1989. That report prompted further analysis, including a follow-up study, "Hospital Closures: 1988," and this study of the "Effects of 1988 Rural Hospital Closures on Access to Medical Care." The "Hospital Closures: 1988" study found that rural hospitals that closed had fewer beds than the national average and that few patients had been using them in the years prior to closing. The average daily census of rural hospitals that closed in 1988 was only 11 patients.

This report also provides timely information supportive of Secretary Sullivan's recently set objective for the Department of Health and Human Services to improve access to health care.

### FINDINGS

A survey was conducted of households in communities where rural hospitals closed in 1988. The survey found that:

- Most residents do not express a serious problem with access to medical care since closure of the hospital in their community. However, close examination of the survey results reveals that whether the residents of a community where a rural hospital closed believe they have serious access problems<sup>1</sup> is largely determined by *proximity* to another hospital.
- In communities *with* a nearby hospital (where there is a hospital still open within 10 miles):
  - Only 11 percent of residents express a serious problem getting hospital care which they attribute to closure of the hospital.
  - 74 percent of residents say they want the hospital reopened.
  - 28 percent of those who received inpatient or emergency care in a hospital since mid-1984 actually used the now-closed hospital.
  - 23 percent of households, most citing higher quality of care, now would bypass the closest hospital for one more than ten miles away.

- In communities *without* a nearby hospital (where the nearest hospital is now over 10 miles away):
  - 40 percent of residents say they have a serious problem getting hospital care due to closure of the hospital.
  - 94 percent of residents say they want the hospital reopened.
  - 54 percent of those who actually received inpatient or emergency care in a hospital since mid-1984 used the now-closed hospital. Those who bypassed that hospital say the treatment they needed was not provided there, or their physicians referred them to other facilities.
  - While most have closer hospitals, over half say they will travel over 30 miles for hospital care, citing better quality or physician referral as the reason.

## **RECOMMENDATIONS**

Recent legislation gave the Department of Health and Human Services responsibility for several new programs. The programs provide assistance to rural communities for maintaining access to medical care in the face of hospital closures. Our recommendations focus on the programs in The Health Care Financing Administration (HCFA) and the Public Health Service (PHS).

The Administrator of HCFA should develop precise criteria for targeting Rural Health Care Transition Grants. In selecting grantees under this program, a higher priority should be given to remote hospitals. Further, HCFA should assure that the first seven states chosen to participate in the Essential Access Community Hospital (EACH) program will adequately test the effect of the program on access to care. Our findings indicate that to do so, remote hospitals must be included among the initial sites.

The PHS and HCFA should consult with each other on criteria for and award of grants and technical assistance in the similar programs which each agency administers.

## **COMMENTS**

The draft report was circulated for comment to the Assistant Secretary for Health, the Administrator of HCFA, the Assistant Secretary for Planning and Evaluation (ASPE), and the Assistant Secretary for Public Affairs in April 1990. The comments from ASPE support the final recommendations. Based on comments from HCFA and PHS, we clarified the wording of the recommendations and deleted a recommendation regarding placement of National Health Service Corps members. A number of technical suggestions were also incorporated into the report.

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## TABLE OF CONTENTS

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### EXECUTIVE SUMMARY

INTRODUCTION .....	1
Purpose .....	1
Background.....	1
Scope .....	2
Methodology .....	3
FINDINGS.....	4
Proximity is the Key Factor .....	4
Most With a Nearby Hospital Say They Do Not Have Serious Access Problems .....	5
Many Without a Nearby Hospital Express Serious Access Problems .....	7
RECOMMENDATIONS .....	10
COMMENTS ON DRAFT REPORT .....	11
APPENDIX A	
Department of Health and Human Services Criteria Related to Medical Provider Shortages.....	A-1
APPENDIX B	
Demographics of Respondents .....	B-1
APPENDIX C	
Methodology and Sample Selection.....	C-1
ENDNOTES.....	D-1

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## INTRODUCTION

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### **PURPOSE**

This inspection was conducted to determine how access to medical care was affected when rural hospitals closed in 1988.

### **BACKGROUND**

#### *National Criteria Related to Medical Provider Shortages*

The Department of Health and Human Services (HHS) has addressed access to health care in rural areas through a number of programs. In particular, it has developed standards to designate health manpower shortage areas and to qualify hospitals as sole community providers for enhanced Medicare reimbursement. Although these measures presume a generally accepted standard, they do not explicitly state what constitutes adequate access to medical care. (The criteria related to health provider shortages appear in appendix A.)

These criteria do not consider factors which vary from one individual to another, such as distance from one's residence to a hospital or the time it takes to travel the distance. Judgments regarding the adequacy of access to medical services must consider factors such as individuals' actual distance from and their ease of obtaining care. Surveys have been conducted by HHS and others to gather this individual and subjective information from samples of the U.S. population.

#### *Surveys on Access*

Researchers, in measuring access to medical care, have examined hospital discharge and financial records, interviewed health experts, and surveyed the population. These studies have identified factors which affect individuals' access to care, including mobility, existence of a personal physician, severity of illness, income, and insurance coverage.<sup>2</sup>

None of the existing studies have measured the effects of hospital closure on access to care in rural communities. Nor have prior national studies determined whether rural community residents themselves judge their access to care to be adequate.

#### *Studies of Hospital Closure*

In April 1989, the Office of Inspector General released a report on the extent and nature of 1987 hospital closures in the United States. The report prompted further analysis of the hospital closure phenomenon. Follow-up studies (planned or in process) include:

- "Hospital Closure: 1988" and "Hospital Closure: 1989;"
- "Access to Care in Urban Areas Where Hospitals Have Closed;"

- “Hill Burton Hospitals’ Community Service Obligations;”
- “The Effects of Hospital Mergers;” and
- this study on the “Effects of 1988 Rural Hospital Closures on Access to Medical Care.”

### ***Recent Legislation Related to Hospital Care in Rural Areas***

In 1987, Congress passed legislation authorizing the Health Care Financing Administration (HCFA) to establish the Rural Health Care Transition Grants Program. The program awards grants to small rural hospitals to modify the type and extent of their services, and to make other changes for improving the quality of care. The Essential Access Community Hospital (EACH) Program was authorized in the Omnibus Budget Reconciliation Act of 1989. The program will provide grants for up to seven states to create one or more rural health networks to improve access to hospital and other health services for rural residents. The program is designed to test the concept of a rural health network in which a new type of small hospital (called Rural Primary Care Hospital, RPCH) provides emergency and temporary care, and transfers stabilized patients to a larger, central hospital (termed an EACH).

Further, the Administration’s proposed 1991 Budget funds the Office of Rural Health Policy at \$4 million, an increase of \$1 million over the previous year. These additional funds are proposed to provide technical assistance to troubled rural hospitals. The Office will be developing a plan for providing assistance.

### **SCOPE**

The universe for this study was households in communities where rural hospitals closed in 1988. Interviews were conducted with people who lived near the closed hospital, and who had resided in these communities at least 5 years.

Residents were asked about their access to inpatient and emergency care before and after the hospital closed. Respondents provided information on each instance of inpatient hospitalization or emergency care (up to a maximum of five) during the previous five years for up to seven members of the household. (See appendix B for a description of the respondents and their hospitalizations.)

Inpatient hospital care was defined as treatment for general conditions such as appendicitis or pneumonia, rather than specialty care. Emergency care was defined as treatment for an accident or serious illness. Since hospital closure, the source for emergency care could be a provider other than a hospital. In this report the term “medical care” refers to these two types of care: inpatient and emergency.

## **METHODOLOGY**

A stratified random sample was pulled from phone directories of 49 communities where rural hospitals closed in 1988. Based on the presumption that access to care varied according to proximity to an open hospital, the sample was stratified into two groups or "clusters." Cluster A consisted of communities that had a second hospital in town or within 10 miles. Cluster B contained communities where the nearest hospital is now (since the closure) over 10 miles away.

The Social and Economic Sciences Research Center of Washington State University conducted telephone interviews in September 1989. The response rate was 69 percent. (appendix C contains a detailed description of the study methods.)

In this report, communities that still have a hospital within 10 miles since the closure are termed "communities with a nearby hospital." The converse, "communities without a nearby hospital," refers to those where the only hospital within 10 miles was the one that closed.



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## FINDINGS

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This survey of households in communities where rural hospitals closed in 1988 found that:

- Most residents do not express a serious problem with access to medical care since closure of the hospital in their community. Whether closure causes serious access problems<sup>1</sup> is largely determined by *proximity* to another hospital.
- Only 11 percent of residents *with* a nearby hospital (where there is a hospital still open within 10 miles) say they have a serious problem getting hospital care which they attribute to closure of the hospital.
- Forty percent of residents *without* a nearby hospital (where the nearest hospital now is over 10 miles away) say they have a serious problem getting hospital care and attribute it to closure of the hospital.

### PROXIMITY IS THE KEY FACTOR

The impact of rural hospital closures on access to medical care differs significantly depending on proximity to another hospital. Twenty of the communities where a rural hospital closed in 1988 have another hospital within 10 miles. In the remaining communities (29), the hospital that closed was the only one within 10 miles. Only 11 percent of those with a nearby hospital report a serious problem getting medical care due to the closure, while 40 percent of those without a nearby hospital say they have a serious access problem due to the closure. Analysis of the data at the conclusion of the study revealed that 10 miles marked the most accurate place for distinguishing the two groups.

It is important to keep in perspective that most of the residents of communities where rural hospitals closed in 1988 lived in those communities that have another hospital within 10 miles. In addition, the rural hospitals that closed were small. The "Hospital Closure: 1988" study found that the hospitals that closed averaged 40.2 beds, which is half the national average for rural hospitals. The average occupancy rates for the closed facilities (26.7 percent) were also below the national average. In fact, the average daily census of rural hospitals that closed in 1988 was only 11 patients.

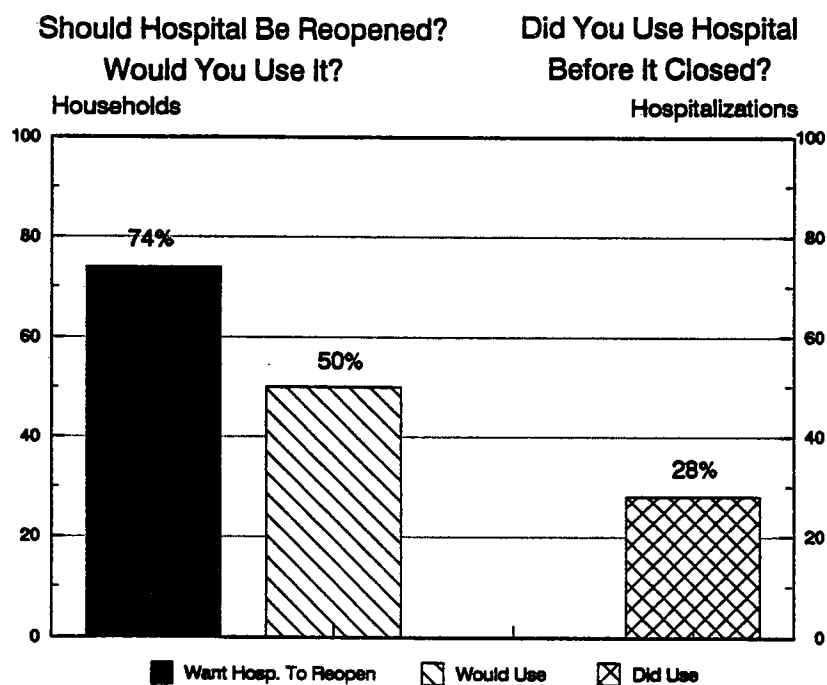
This report presents findings for the two sample strata separately so that the experiences of those with serious access problems are not obscured by the greater number who had no such problems.

## MOST WITH A NEARBY HOSPITAL SAY THEY DO NOT HAVE SERIOUS ACCESS PROBLEMS

In twenty of the communities where rural hospitals closed in 1988, there is another hospital within 10 miles. A small proportion of residents in these communities actually used the now-closed hospitals. Few now report having a serious problem getting medical care.

### ✓ How Do Opinions on Reopening Compare to Prior Use?

Although 74 percent of households in these communities say they want the hospital reopened, only half say they would use it. In fact, only 28 percent of all those who used a hospital for emergency or inpatient care between mid-1984 and the time the hospital closed actually used the now-closed facility.



The proportions of those who used the now-closed facility for emergencies and for general inpatient care are about the same. Thirty-three percent of all emergency room visits and 26 percent of all inpatient hospitalizations during the study period were in the now-closed hospital.

Those who bypassed the hospital prior to closure say they did so because the treatment they needed was not available at that facility, or because their physicians referred them elsewhere.

✓ **How Many Have a Serious Problem with Access?**

Only 11 percent of residents of communities with a nearby hospital express a serious problem getting general inpatient hospital care, and 13 percent have a serious problem getting emergency care due to the closures. These small proportions are not surprising, given that few used the facility when it was open and that another hospital is still operating nearby.

✓ **Where Will Residents Get Care in the Future?**

Twenty-three percent of households, most citing higher quality of care, would bypass the closest hospital for one more than ten miles away.

For emergency care, 19 percent of residents would bypass the nearest hospital.

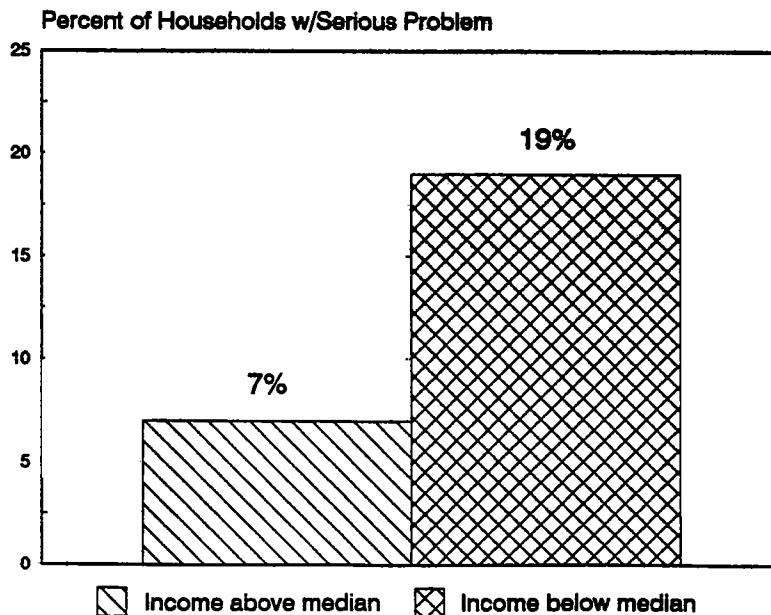
Almost all of those who would choose to travel beyond the closest hospital say they would go to another rural hospital. Only nine percent of households picked an urban hospital.

✓ **Does Income, Age or Insurance Affect Whether Households Report a Serious Problem with Access?**

The demographic characteristics of the respondents were analyzed to determine if there were differences in income, age or insurance of those who say they have a serious problem with access to medical care. The analysis revealed that households with incomes below \$25,894, the median income for rural areas in 1988,<sup>3</sup> more frequently report a serious problem getting hospital care than those with higher incomes.

**Comparison of Households with Serious Access Problems  
by Income Level**

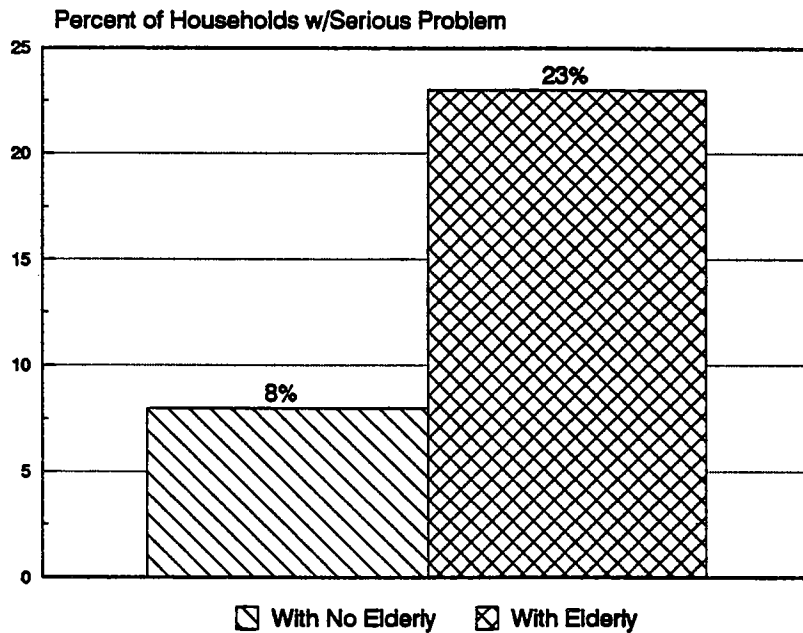
Communities with a Nearby Hospital



Analysis also revealed differences in the age of members of households reporting a serious access problem. A greater number of households with elderly members (over age 65) report a serious problem getting hospital care than households without elderly members.

### Comparison of Households with Serious Access Problems by Age of Members

#### Communities with a Nearby Hospital



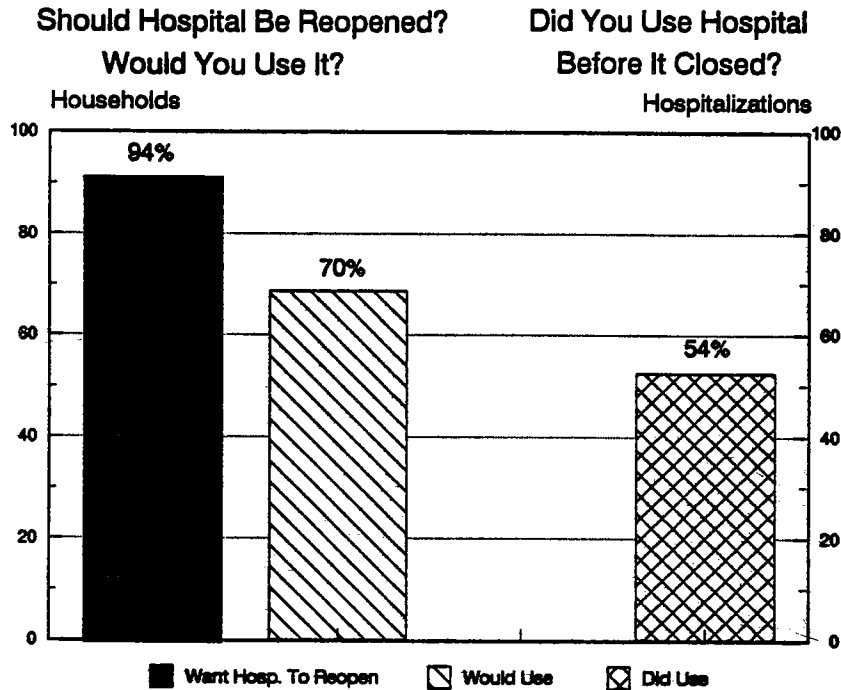
Analysis of insurance coverage revealed a significant difference between households with Medicare and those with private insurance who report a serious access problem. (The relationship is virtually identical to the one depicted in the previous chart on age.) Twenty-three percent of households with Medicare report a serious problem getting hospital care compared to only 9 percent with private insurance. The sample did not contain a sufficient number of households with Medicaid or with no insurance to include them in the comparisons.

### MANY WITHOUT A NEARBY HOSPITAL EXPRESS SERIOUS ACCESS PROBLEMS

In 1988, 29 of the 49 rural hospitals that closed were the only ones within 10 miles. In these communities, a significant proportion of the residents had used the now-closed hospitals. Since closure, 40 percent report a serious problem getting medical care and attribute that to the hospital closure.

✓ **How Do Opinions on Reopening Compare to Prior Use?**

Virtually all residents (94 percent) of communities without a nearby hospital want the hospital to reopen. Seventy percent indicate they would use it if reopened. In fact, a sizeable proportion (54 percent) of those who were hospitalized or received emergency care in a hospital between mid-1984 and the time the hospital closed actually used the facility.



About the same proportion of community residents used the now-closed hospital for emergencies (58 percent) as for general inpatient care (50 percent). Those who bypassed that hospital say they did so because the treatment they needed was not provided there, or their physicians referred them to other facilities.

✓ **How Many Have a Serious Problem with Access?**

Forty percent of residents in communities without a nearby hospital express a serious problem getting general inpatient hospital care, and attribute the problem to closure of the hospital.

Virtually the same proportion (42 percent) report a serious problem getting emergency care due to the closure. It was anticipated that more people would be seriously concerned about access for emergency care than for general inpatient care following the hospital closures. In many of these communities, emergency care is still available in close proximity since the hospital closure. The availability of emergency providers may have mitigated potential problems with access to emergency care for many residents.

✓ **Where Will Residents Get Care in the Future?**

Over half of residents of communities that no longer have a nearby hospital say they will go to a hospital over 30 miles away for future care. Almost all have a closer hospital; the "Hospital Closure: 1988" inspection found that in only four towns where a rural hospital closed is the next hospital over 30 miles away.

While only six percent of the households sampled in communities without a nearby hospital *must* travel over 30 miles for general inpatient hospital care, 53 percent say they plan to do so. The most often cited reasons for not using the closest hospital were quality of care (42 percent) and physician referral (20 percent). Asked why they would choose the hospitals they named, respondents commented:

"Because I trust them, they are more up to date, more modern."

"Doctors are more qualified."

"Better hospital--updated facilities--most doctors use it."

For emergency care, 36 percent of residents choose to travel over 30 miles.

In most cases, the hospital of choice is a rural one. However, 35 percent of households indicate they would use an urban hospital over a closer rural one.

✓ **Does Income, Age or Type of Insurance Affect Whether Households Report a Serious Problem with Access?**

In communities without a nearby hospital, the proportion of households reporting a serious problem getting hospital care does not vary with:

- income above or below the median;
- private insurance or Medicare; or
- presence or absence of elderly members in the household.

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## RECOMMENDATIONS

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Legislation has been enacted recently to give the Department of Health and Human Services (HHS) the means to assist rural communities to maintain access to medical care in the face of hospital closures. HHS should give higher priority in distributing resources for improving access to rural medical care to communities whose residents, following closure of the hospital, are most likely to have a serious access problem.

### *Health Care Financing Administration*

The HCFA administers Rural Health Care Transition Grants and will manage the Essential Access Community Hospital Program.

**Rural Health Care Transition Grants:** The Administrator of HCFA should develop precise guidelines for targeting the Rural Health Care Transition Grants. The guidelines should discuss the issue of proximity of applicant hospitals to other hospitals. In selecting grantees under this program, a higher priority should be given to remote hospitals.

**Essential Access Community Hospital (EACH):** The Administrator of HCFA should assure that the first seven states chosen to participate in the EACH program will adequately test the effect of the program on access to care. Our findings indicate that to test access remote hospitals must be included among the initial sites. Further, program regulations should require states to specifically address the access needs of elderly and low income residents in the required state rural health plan.

### *Coordination of PHS and HCFA Responsibilities*

Since both the PHS and HCFA are responsible for administration of programs for improving access to rural health care, those agencies should consult with each other on criteria for and award of grants and technical assistance to rural areas. Specifically, PHS and HCFA should coordinate their activities regarding grants and technical assistance from the Office of Rural Health Policy, the Rural Health Care Transition Grants program, and the EACH program, given that funds are appropriated for all of these.

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## COMMENTS ON DRAFT REPORT

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The comments from the *Assistant Secretary for Planning & Evaluation* support our final recommendations. Previously, ASPE had also advised HCFA to develop criteria for targeting the Rural Health Care Transition Grants.

The *Assistant Secretary for Health* supports the recommendation regarding coordination between the Public Health Service (PHS) and the Health Care Financing Administration. The PHS did not concur with a recommendation in the draft report regarding the National Health Service Corps (NHSC). That recommendation called for a modification in the criteria for placement of NHSC professionals to facilitate their placement in communities that no longer have a hospital. PHS objected to this because, "the current NHSC policy is to identify those designated Health Manpower Shortage Areas that have the greatest need...the present criteria do not target assignments only for communities that have hospitals."

We agree. We deleted the recommendation from the final report since NHSC placements *can* be made in areas without hospitals, and the existing NHSC policies currently provide for placement of Corps personnel in areas that have the greatest need.

The comments from the *Health Care Financing Administration* suggest that our recommendations were aimed at keeping failing hospitals open, and that assistance should be confined to hospitals more than a specified distance from another hospital. We did not intend that HCFA protect all failing hospitals from closure. As the transition grant program suggests, the best way to maintain access to care may be to assist the hospital in modifying its service offerings to better meet community needs.

On the second point, our draft did not intend to suggest that HCFA's assistance be *confined* to hospitals more than 10 miles from another hospital, or that HCFA adopt 10 miles as the absolute criterion for deciding which communities should be assisted. We do, however, recommend that HCFA consider the proximity of hospitals to each other when evaluating grant applicants, so that hospitals close to each other are *not* inadvertently funded over more remote facilities. Our research suggests that, if funds are limited, grants should be targeted on hospitals distant from other hospitals. HCFA suggests a greater distance -- 35 miles. We would defer to HCFA on specific mileage standards. In order to clarify our recommendations, we removed the reference to 10 miles and substituted the term "remote."

In regard to HCFA's general comments, we made the changes which updated our information where necessary.



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## APPENDIX A

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### **DEPARTMENT OF HEALTH AND HUMAN SERVICES CRITERIA RELATED TO MEDICAL PROVIDER SHORTAGES**

Criteria for designation of a health manpower shortage area:

- population to physician ratio is at least 3,500:1; or
- population to physician ratio is between 3,000:1 and 3,500:1, plus unusually high needs or insufficient capacity, as defined by specific formulas for such indicators as number of births, deaths, and office visits per physician; or
- primary medical care manpower in contiguous areas is overutilized; excessively distant; or inaccessible to the population, due to significant differences in demographic or socio-economic characteristics, or lack of economic access (i.e., contiguous areas do not accept Medicaid or provide services for those unable to pay).<sup>4</sup>

HCFA classifies a sole community hospital if it is located in a rural area and meets one of the following conditions:

- located more than 35 miles from other like hospitals;
- located between 25 and 35 miles from other like hospitals and meets one of the following criteria:
  - no more than 25 percent of residents who become hospital inpatients or no more than 25 percent of the Medicare beneficiaries who become hospital inpatients in the hospital's service area are admitted to other like hospitals located within a 35-mile radius of the hospital, or, if larger, within its service area;
  - the hospital has fewer than 50 beds and the intermediary certifies that the hospital would have met the criteria in the paragraph immediately above this one were it not for the fact that some beneficiaries or residents were forced to seek care outside the service area due to the unavailability of necessary specialty services at the community hospital; or
  - due to local topography or periods of prolonged severe weather conditions, other like hospitals are inaccessible for at least one month out of each year.
- located between 15 and 25 miles from other like hospitals but because of local topography or periods of prolonged severe weather conditions, other like hospitals are inaccessible for at least 30 days in each 2 out of 3 yrs.<sup>5</sup>

## APPENDIX B

### DEMOGRAPHICS OF RESPONDENTS

#### Household Composition

	(20) Cluster A Towns with nearby hospital		(29) Cluster B Towns without nearby hospital		Total all Towns	
	Number	Percent	Number	Percent	Number	Percent
<b>Households</b>	143	40%	210	60%	353	
<b>Members</b>	400	37%	671	63%	1071	
<b>Sex</b>						
Male	196	49%	331	50%	527	49%
Female	204	51%	337	50%	541	51%
Missing			3		3	
<b>Households by Age of Members</b>						
<b>TOTAL</b>	<b>143</b>		<b>210</b>		<b>353</b>	
All Elderly (age 65+)	35	24%	42	21%	77	22%
All Adults (age 19-64)	42	30%	43	21%	85	25%
Adults and Elderly only	15	11%	17	8%	32	9%
Adults and Children only	50	35%	95	47%	145	42%
All ages	0	—	4	2%	4	1%
Other	0	—	3	1%	3	1%
Unknown	1	—	6	—	7	—

## Household Description

	Cluster A Towns with nearby hospital		Cluster B Towns without nearby hospital		Total all Towns	
	Number	Percent	Number	Percent	Number	Percent
<b>Type of Insurance (Head of Household)</b>						+
Private	90	64%	123	59%	213	61%
Medicare	37	26%	41	20%	78	22%
Medicaid	4	3%	7	3%	11	3%
Other Govt.	0	—	5	2%	5	1%
Uninsured	9	6%	24	11%	33	9%
Other	1	1%	9	4%	10	3%
Don't Know/ Missing	2	—	1	—	3	—
<b>TOTAL</b>	<b>143</b>		<b>210</b>		<b>353</b>	
<b>Years lived in Town</b>						
5-9 years	17	12%	30	14%	47	13%
10-19 years	19	13%	45	21%	64	18%
20-49 years	64	45%	90	43%	154	44%
50+ years	43	30%	45	21%	88	25%
<b>TOTAL</b>	<b>143</b>		<b>210</b>		<b>353</b>	
<b>Household Income</b>						
0-\$5,000	10	8%	18	9%	28	9%
\$5,000-10,000	11	9%	28	15%	39	12%
\$10,000-15,000	24	19%	26	14%	50	16%
\$15,000-25,000	21	17%	50	26%	71	23%
\$25,000-50,000	49	39%	58	31%	107	34%
\$50,000+	10	8%	9	5%	19	6%
<b>TOTAL</b>	<b>125</b>		<b>189</b>		<b>314</b>	
Missing	18		21		39	

## Hospitalizations

	<b>Cluster A Towns with nearby hospital</b>	<b>Cluster B Towns without nearby hospital</b>	<b>Total all Towns</b>
	<b>Number</b>	<b>Number</b>	<b>Number</b>
<b>Hospitalizations by Household**</b>			
Prior to Closure:	25	57	82
At Closed	59	54	113
Bypassed			
Subtotal	84	111	195
After Closure:	50	45	95
<b>TOTAL</b>	<b>134</b>	<b>156</b>	<b>290</b>
Households in which no one was hospitalized	38	82	120

\*\* Household counts total more than 353 because households are counted more than once when members were hospitalized at different facilities or at different periods of time.

## Hospitalizations

	Cluster A Towns with nearby hospital		Cluster B Towns without nearby hospital		Total all Towns
	Number	Percent	Number	Percent	Number
<b>Hospitalizations by Incident</b>					
<b>Prior to Closure:</b>					
Used closed	31	28%	83	54%	114
Bypassed closed used next closest	52	47%	39	25%	91
Bypassed next closest, used one beyond	27	25%	33	21%	60
Subtotal Bypassing	79	72%	72	46%	151
<b>TOTAL (Prior)</b>	<b>110</b>		<b>155</b>		<b>265</b>
<b>After Closure:</b>					
Used closest	47	72%	30	50%	77
Used next closest	18	28%	30	50%	48
<b>TOTAL (After)</b>	<b>65</b>	<b>100%</b>	<b>60</b>	<b>100%</b>	<b>125</b>
Missing			4		4
<b>GRAND TOTAL (Prior to and After Closure)</b>	<b>175</b>		<b>219</b>		<b>394</b>

## Hospitalizations

	Cluster A Towns with nearby hospital		Cluster B Towns without nearby hospital		Total all Towns
	Number	Percent	Number	Percent	Number
<b>Type of Care Received</b>					
Inpatient	122	70%	153	70%	275
Emergency	53	30%	65	30%	118
Missing			1		1
<b>TOTAL</b>	<b>175</b>		<b>219</b>		<b>394</b>

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## APPENDIX C

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### METHODOLOGY AND SAMPLE SELECTION

This inspection was designed to determine how access to medical care was affected in rural communities where hospitals closed in 1988. A stratified random sample of the residents of these communities was surveyed by telephone during September 1989.

#### *Size and Source of Sample*

The Inspector General's report entitled "Hospital Closure: 1988" identifies 50 rural towns where hospitals closed in 1988. In one of those towns the hospital reopened 5 months later. The universe for this study is people who live in the remaining 49 rural towns, and whose telephone number prefixes match the closed hospitals'. By defining the universe in this way, we assured that households included in the sample are (a) near the closed hospitals and, therefore, (b) most likely to have been affected by the closure of the hospitals.

The complexity of the sequencing of questions required that the survey be conducted by phone. Ninety-three percent of U.S. households have a telephone; in rural areas most households have listed numbers.<sup>6</sup> Previous studies have found that households with phones differ demographically from those without phones. The potential bias introduced by these differences was considered acceptable for this study.

Standard statistical equations were used to determine that a sample of 350 would produce an estimate within 5 percent of the true value at the 95 percent confidence level, using binary questions. A sample of 350 permits generalization of findings across rural communities where hospitals closed in 1988. This sample size does not, however, permit analysis by individual community.

A response rate of 60 percent was considered acceptable and achievable. Given this expectation, a candidate pool of 600 names was drawn to obtain at least 350 completed interviews.

#### *Stratification: Procedures and Effects*

The research team recognized that the 49 communities under study are diverse, and that a bias might be introduced into the findings if important differences were not identified and controlled for. A major factor was presumed to be proximity to a still-operating hospital. To assure that we could measure the impact of this factor, and control for it, the 49 towns in the study were divided into two groups, or "clusters." Towns with a still-open hospital in town or within 10 miles were placed in Cluster A. Towns more than 10 miles from a still-open hospital were placed in Cluster B. Clusters A and B contained 20 and 29 towns respectively.

Analysis of the data at the conclusion of the study revealed that proximity to another hospital is an important factor and that 10 miles marked the most accurate place for distinguishing the clusters. Analysis entailed dividing the sample into 3 groups (those with hospitals within 0-10 miles, 11-20 miles, and greater than 20 miles) and comparing the responses. Responses from the middle group, those with a hospital between 11 and 20 miles away, more closely resembled responses of those with a hospital more than 20 miles away. Stratifying at 10 miles increased the deviation between strata and decreased the deviation within strata, thus maximizing the value of the stratified sampling.

The original intent was to appropriately weight and combine the data collected from the two clusters to achieve results generalizable across all rural towns where hospitals closed in 1988. However, dramatic differences were found between the clusters for nearly all tabulations. This final report is structured around those differences; findings for Cluster A and Cluster B are presented separately throughout.

At a confidence level of 95 percent, estimates for Cluster A are within 8 percent of the true value, and for Cluster B within 7 percent, for binary questions where all respondents in the cluster answered.

### ***Pulling the Sample***

Telephone directories were collected from all 49 towns. The directories were separated into Cluster A and Cluster B.

Telephone directories differ widely in number and size of pages, number of columns per page, print size, and number of names per page. If these differences are not accommodated, names in denser phone books will have a lower probability of selection than those in books with fewer names per page. In order to overcome this lack of standardization, each town was assigned a weight based on its population relative to other communities in the cluster. With this adjustment, every name in the cluster had an equal probability of selection.

A Statistical Analysis System (SAS) program was used to generate a set of random numbers. These numbers were used to specify a telephone directory page and a position on the page for each of the 600 names to be drawn into the candidate pool. The research team--staff of the Office of Evaluation and Inspections (OEI) in Atlanta--pulled the sample.



Out of the original 600 names in the pool, 89 were found to be inappropriate (or impossible) to include in the study:

- 6            were businesses (the study universe was households)
- 45          individuals had lived in the town less than 5 years  
(the study required 5 years' residence)
- 38          had disconnected phones with no forwarding number  
and could not be reached for interview

The final candidate pool, then, contained 511 names, representing households in residence for at least 5 years in rural towns where hospitals closed in 1988.

### ***Data Collection***

The research team prepared and sent a notification letter to explain the study and encourage cooperation with the telephone interview to follow in 1 to 2 weeks.

The OEI staff developed a telephone interview instrument with technical advice and assistance from the Director of Washington State University's Social and Economic Sciences Research Center (SESRC).

The SESRC, a comprehensive survey organization, conducted the telephone interviews in September 1989. At least four attempts at various times of the day were made to contact all names in the candidate pool. On contact, interviewers identified the adult in the household who makes most of the health care decisions, reminded him/her of the purpose of the study, and proceeded through the questionnaire. Interviewers used a computer-assisted telephone interviewing system to collect and enter data.

### ***Response Rate***

Of the 511 households appropriately included in the sample:

- 65            refused to be interviewed
- 82            could not be reached by phone
- 11            could not be interviewed due to language or hearing difficulties

The remaining 353 households were interviewed, producing a survey response rate of 69 percent.

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## ENDNOTES

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<sup>1</sup> Respondents defined “serious problem” for themselves; the interviewers did not provide any definition. Respondents were asked if getting hospital care is a serious problem, a mild problem or not a problem for them or members of the household. The same question was posed for getting emergency care. Approximately 20 percent of respondents in both clusters, regardless of demographic characteristics, reported having a mild problem getting either emergency or general hospital care.

<sup>2</sup> Christopher Hogan. *Patterns of Travel for Rural Individuals Hospitalized in New York State* (Washington, D. C.: National Center for Health Services Research, 1986), and

Minnesota Department of Health. *Access to Hospital Services in Rural Minnesota*, March 1989, and

LuAnn Aday, Ron Anderson, Gretchen Fleming. *Access to Medical Care in the U. S.* (Chicago, Il.: University of Chicago, Center for Health Administration, 1984), p. 69, and

S. M. Cageorge, L. L. Roos, and R. Danzinger, “Gallbladder Operations: A Population-based Analysis,” *Medical Care* 1981: 19, pp. 510-525.

<sup>3</sup> The median income for rural areas in 1988 was \$25,894 according to: *Current Population Report*, “Money Income and Poverty Status in U. S. - 1988,” Series P-60, No. 166.

<sup>4</sup> *Federal Register*, Vol. 45, No. 223, November 17, 1980, Appendix A, pp. 76001-76003.

<sup>5</sup> *Code of Federal Regulations* 42, Ch. IV (10-1-89 Edition), section 412.92.

<sup>6</sup> The Robert Wood Johnson Foundation, *Access to Health Care in the United States: Results of a 1986 Survey*, Special Report, Number Two/1987 (Princeton, N. J.: The Robert Wood Johnson Foundation).