

**An Analysis of the Financial Conditions of Health Care Institutions
in the Appalachian Region and their Economic Impacts**

Final Report

December 2002

**Prepared for:
Appalachian Regional Commission
Washington, D.C.**

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Executive Summary

This report describes the availability of health care services in Appalachia, the financial stability of Appalachian health care institutions, and the effect of hospital closures on Appalachian counties. The report serves two purposes. First, the report provides the Appalachian Regional Commission with data on the financial condition of the region's health care infrastructure. Second, the report can assist the Commission in setting priorities for future health care programs and research. Our key findings are described in the body of the report. Detailed county-level data on access to services and the financial condition of providers are presented in a technical appendix. The data in the technical appendix are designed to serve as reference documents and benchmarks for future evaluations of Appalachia's health care infrastructure.

Key Findings

Most of the data and findings in this report are consistent with the beliefs espoused in mainstream academic journals and the trade press. However, there are at least two instances where the data does not support conventional wisdom. Table I summarizes key findings, lists which findings are consistent with conventional wisdom, and more importantly lists which findings are not consistent with conventional wisdom.

Table I: Does Conventional Wisdom Match Appalachian Data?

| Issue Area | Conventional Wisdom | Is Appalachian data consistent with conventional wisdom? |
|---|--|--|
| Physician supply | Slow growth in supply with physicians concentrated in higher income areas. ¹ | Largely consistent |
| Dentist supply | No growth in supply and shortages in rural areas. ² | Consistent |
| Hospital profitability | Many small hospitals are struggling, but larger facilities are usually profitable. ³ | Largely consistent |
| Nursing home profitability | Many nursing homes are having severe financial difficulty. ⁴ | Not consistent. Most Appalachian nursing homes were financially healthy. |
| Home health services | Home health services continue to be available in most communities. ⁵ | Consistent |
| Mental health services | There is a shortage in rural areas. ⁶ | Consistent |
| Drug and alcohol treatment | There is less access in rural areas. ⁷ | Consistent |
| Obstetric Services | Fewer hospitals are offering services. ⁸ | Consistent |
| Economic impact of health care institutions | Local hospitals play a critical role in maintaining the health of small-town economies. ⁹ | Not consistent. Most counties that lost their only hospital continued to see employment growth at rates similar to rural Appalachian averages. |

References for conventional wisdom: ¹Cooper et al. 2002, Hart et al. 2002. ²Mertz et al. 2002. ³HCFM 2002, Stensland et al. 2002. ⁴GAO, 1999. ⁵GAO, 2002. ⁶Hartley et al. 2002. ⁷SAMHSA, 2002. ⁸Heaphy et al. 2000. ⁹Doeksen et al. 1997.

To focus the reader, the key findings of this report are divided into the strengths and weaknesses of the Appalachian health care infrastructure. We start with five strengths (success stories) and then turn to four areas where our data indicate there may be weaknesses in the health care infrastructure.

Success Stories

- ❖ Physician supply increased from 1990–1999
- ❖ Distressed counties attracted increasing numbers of primary-care physicians
- ❖ The number of skilled nursing facilities increased through 1999
- ❖ Profits at Appalachian skilled nursing facilities were above national averages
- ❖ Most county economies were resilient to the closure of hospitals
 - In counties that lost a hospital, income per capita grew at rates similar to the average for Appalachia.
 - Counties that lost their only hospital experienced a rate of population growth that was similar to average for rural Appalachia.
 - Counties that lost their only hospital usually experienced employment growth, though the long-term rate of job growth tended to be slightly lower than Appalachian averages.

Discussion of Strengths

The core of the Appalachian health care infrastructure has been getting stronger. There has been an expansion in the number of primary-care physicians per capita in Appalachia. Even distressed counties are attracting more primary care physicians. With the addition of the Pikesville College School of Osteopathic Medicine in Pikesville Kentucky, we expect the supply of primary-care physicians to continue expanding.

Skilled nursing homes. Approximately 10,000 skilled nursing facilities provide rehabilitative care to Medicare patients in Appalachia. To be deemed a skilled nursing facility (SNF), a nursing home must be licensed to provide rehabilitative services to Medicare patients; this is in contrast to residential facilities for the elderly that only provide a minimal level of medical services. Our data indicates that Appalachian SNFs have tended to be more financially successful than SNFs in most other parts of the nation. The higher level of profitability appears to be due to slightly lower wage rates in Appalachia compared to the rest of the nation and slightly lower staffing levels. Due to the solid condition of most skilled nursing facilities, we expect stable or improving access to long-term care.

Hospital financial condition. While the data indicate that most Appalachian hospitals are financially sound, approximately 25 percent of hospitals are facing severe financial challenges. The struggling facilities tend to be smaller hospitals that lack economies of scale.

When we examined our list of hospitals that were suffering significant losses at the end of the 1990s, we found that only the smaller hospitals or hospitals with nearby competitors were closed. The data suggest that larger hospitals that are the sole source of care in a region rarely close. When a hospital in a large market became financially strained, the hospital was always restructured or sold to a new owner. However, in smaller less profitable markets, the closure of a hospital may mean the lack of access to inpatient care.

Economic impact of hospital closures. A key policy question is whether preservation of small-town hospitals is necessary for economic growth. We found that most counties continued to experience job growth following the closure of a hospital. Among the ten Appalachian counties that lost their only hospital during the 1986–1996 time frame, eight had more jobs four years after closure than they did two years prior to closure. As is shown in Figures A-1, A-2, and A-3 of the Technical Appendix, population growth, income growth, and employment growth do not appear to be dramatically affected by the closure of small rural hospitals.

The loss of small rural hospitals had small effects on local economies since the closed hospitals usually only represented about 1 percent of their county’s employment. Input-output analysis suggests that closed hospitals indirectly support less than 1 percent of additional county jobs since many outputs are purchased from outside the county. In some cases, local physicians and business leaders thought the closure of their local hospital was a positive result for the community, in one case it reduced the need for on-call coverage allowing improved physician recruitment. In addition, dollars that were being used to support an unprofitable hospital have been used to improve long-term care and ambulance service.

Because rural economies appear to be resilient to the closure of a hospital, regional policy makers may want to focus on whether the facility is needed to preserve access to quality care rather than its role in economic development. Our data indicate that when a hospital is not critical for access, it is not critical for economic growth.

Current Challenges

- ❖ Low levels of dentists per capita, particularly in distressed counties. The supply did not improve from 1987 through 1998
- ❖ A lack of hospital-affiliated substance abuse treatment services, particularly in distressed counties
- ❖ A lack of hospital-affiliated psychiatric services, particularly in distressed counties
- ❖ Lack of obstetric care in economically distressed counties

Discussion of Challenges

Our analysis of American Hospital Association (AHA) data revealed weakness in access to certain services that fall outside the core functions of primary-care physicians, rural hospitals, and skilled nursing care facilities. Most Appalachian counties have not been successful at improving access to dentistry, outpatient alcohol treatment, outpatient drug treatment, and outpatient mental health services. The Commission may want to investigate opportunities to support improvements in access to these services.

Dentistry. Data compiled by the project team suggest that access to dental care is impaired by a limited supply of dentists in most Appalachian counties. We are especially concerned about limited access to dental services in distressed counties, where the supply of dentists is the lowest in the Appalachian region.

A long-run goal would be to increase the supply of dentists or achieve a more even geographic distribution of dental health professionals. Thus, the ARC might encourage research into the effects of policies that could be used to increase the dental workforce in Appalachia. Potential strategies to improve dental access include:

- a) Pursue subsidies of dental education or practice expenses that are contingent on location of practice in an area that is underserved. The *Health Care Safety Net Amendment Act* (S. 1533) , which was signed into law on October 26, 2002, directs the Secretary of HHS to develop a plan to increase dentist and dental hygienists participation in loan repayment programs.
- b) Conduct outreach efforts under the State Children’s Health Insurance Program (SCHIP) to sign up children for dental coverage in the region.
- c) Medicaid bonus payments could be targeted to dentists who serve areas with the greatest need.

Mental health and substance abuse. Our data indicate that economically distressed counties have few hospital-affiliated providers of mental health and substance abuse treatment. Across the nation, the percentage of counties with hospital-affiliated outpatient drug and/or alcohol treatment fell from 29 percent in 1994 to 25 percent in 2000. The number of hospital-affiliated drug and alcohol treatment facilities are even more limited in distressed counties of Appalachia. Only 8 percent of distressed Appalachian counties had a provider offering hospital-affiliated substance abuse outpatient services. Only 20 percent of distressed counties had hospital-affiliated mental health services.

One difficulty with providing mental health and substance abuse services in small communities is that there is often a stigma attached to seeking help with mental health or substance abuse problems. Therefore, patients may choose to seek care in neighboring

communities or at primary care facilities that are not identified as serving mental health and/or substance abuse patients. A second difficulty is that there is often a lack of local support for setting up regional treatment centers to serve substance abuse patients. An administrator of a closed hospital specifically mentioned that he thought the community was less willing to support capital campaigns of the hospital due to the hospital's large substance abuse treatment center that primarily served patients from outside of the local community. The administrator's comments suggest that there may be a need for regional planning and regional funding of substance abuse and mental health services.

While evaluating the promise of new programs is beyond the scope of this report, the Commission may want to investigate the feasibility of the following initiatives:

- a) Conduct an analysis of all sources of mental health and substance abuse treatment. In this study, we only present data on services provided by hospitals or their affiliates.
- b) Evaluate the cost effectiveness of providing financial support for the coordination of state and local substance abuse initiatives in the Appalachian region.
- c) Investigate supporting the use of community health centers to expand access to mental health services. In the fall of 2001 Health and Human Services Secretary Tommy Thomson announced \$24.8 million in grants to existing Community Health Centers to expand their scope of services to include mental health services. New Community Health Centers were required to include a mental health component in their service mix.
- d) Expand the work by the Commission that addresses the use of telemedicine to improve access to mental health therapy via video conferencing.

Obstetrics. Access to obstetric care is declining in rural areas. Only 35 percent of distressed counties have a hospital that provides obstetric services. The result has been a consolidation of services into higher-volume larger hospitals.

It is not clear from the literature whether consolidating obstetric services improves or harms obstetric outcomes. Patients lose local access, but they gain the benefit of being served by more specialized staff and facilities. Nesbitt et al. (1997) found that rural areas of Washington State with access to obstetrical care had better obstetric outcomes than other rural areas of Washington. While Nesbitt's study appears to suggest that expanding access to obstetric care in rural areas would improve outcomes, a separate study by Heaphy and Bernard (2000) found that rural hospitals tend to have higher complication rates than urban facilities. A third study by Larson et al. (1997) found neonatal death rates were similar for urban and rural mothers. While many areas of Appalachia lack hospitals that provide obstetric services, we cannot conclude that the consolidation of obstetric services has negatively affected obstetric outcomes. The Appalachian Regional Commission may want to wait for more definitive evidence on the impact of consolidation on birth outcomes before it institutes any programs to stem the tide of declining local access to obstetric services in Appalachian counties.

I. INTRODUCTION

This study reports on the availability of health care services in Appalachia, the financial condition of health care providers, and the impact of health care providers on the Appalachian economy. We compare data on the current state of Appalachia's health care infrastructure to historical data and national benchmarks. After evaluating the current financial condition of Appalachian health care institutions, we discuss the importance of these institutions to the local economy.

The first section of this report discusses access to physicians, dentists, and specific health care services. The objective is to determine whether access to specific services is improving and if access in Appalachia is comparable to that in other parts of the country.

The second section examines the financial condition of hospitals and nursing homes. The objective is to determine whether these key health care providers are financially sustainable.

The third section examines the theoretical impact of health care providers on the Appalachian economy. We discuss how input-output models can be used to estimate how many jobs are directly and indirectly supported by health care providers. We use data on Appalachian hospitals to report on the economic importance of hospitals to Appalachian counties and highlight ten examples in which a financially strained hospital is an important part of the county's economic base.

In the fourth section we examine changes in county demographics and economics pursuant to the closures of local hospitals. We present economic data from 41 counties that lost 42 hospitals between 1986 and 1996. This allows us to examine how the loss of a health care provider impacts employment, income, and population. We also summarize findings

from more in-depth analysis and interviews of leaders at ten communities that lost a hospital. In each case, we report on how access to care changed and on how the closure affected the local economy.

Relationship to Other ARC Research and Priorities

A key feature of this report is an examination of the connection between health care services and the strength of regional economies. In an effort to remain consistent with other ARC research, we categorized Appalachian counties using ARC's index of Economic Status (Wood and Bischak, 2000). The index is based on four categories, which in ascending order of prosperity are—distressed counties, transitional counties, competitive counties, and attainment counties. Distressed counties have a poverty level at 150 percent of the national average, an unemployment level above 150 percent of the national average, and an income level below 67 percent of the national average.¹ Transitional counties are not poor enough to meet the criteria of a distressed county but are not prosperous enough to be called competitive. Competitive counties have poverty rates at or below the national average, three-year unemployment rates at or below national averages, and per capita market income no less than 80 percent of the national average. Attainment counties have above average economies as indicated by all three measures.

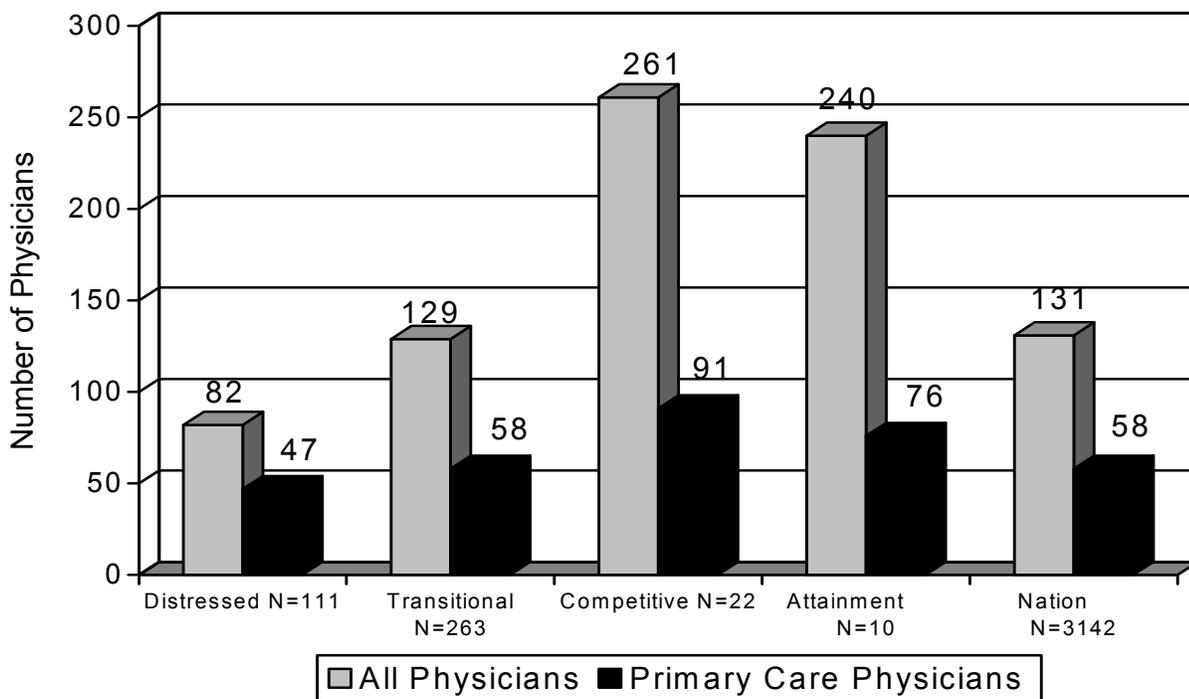
We present data on the level of economic distress of counties along with data on physician availability and hospital's financial condition. We anticipate that the Appalachian Regional Commission will use these data to determine whether efforts to improve the health care infrastructure should be targeted to distressed counties.

¹ If a county has a poverty rate that is at least 200 percent of the national average, then it only needs to match one of the two remaining criteria.

II. PROVIDERS AND ACCESS TO SERVICES

Physicians. Our objective in this section is to examine the availability of physician services, growth in physician supply, and the relationship between a county's economic status and physician supply. We obtained data on the number of practicing physicians in each county from the Area Resource File (ARF), which compiles data from the American Medical Association and the American Osteopathic Association. As is shown in Figure 1, physicians in Appalachia tend to be clustered in the more prosperous (and usually urban) counties. This is similar to national trends (DHHS, 2001). Figure 1 also informs us that the supply of physicians in all but the distressed Appalachian counties tends to be at or near the national norms.

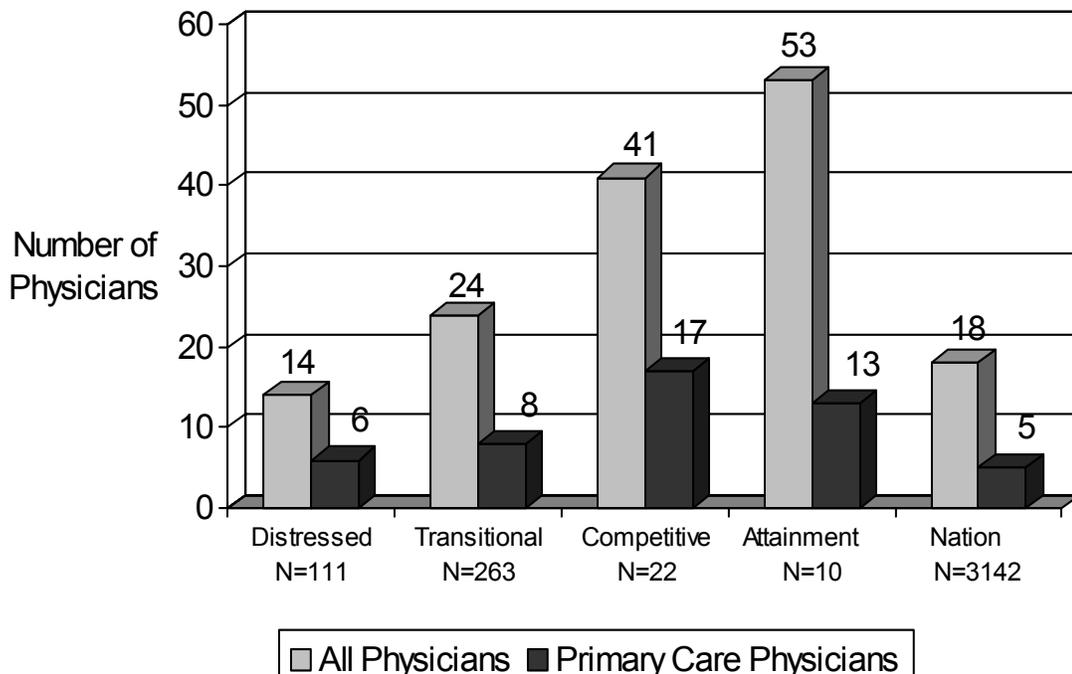
Figure 1. Physicians per 100,000 People in 1999, by Economic Status of Appalachian Counties in 1999



Source: 2001 Non-Federal Physicians as reported in the Area Resource File

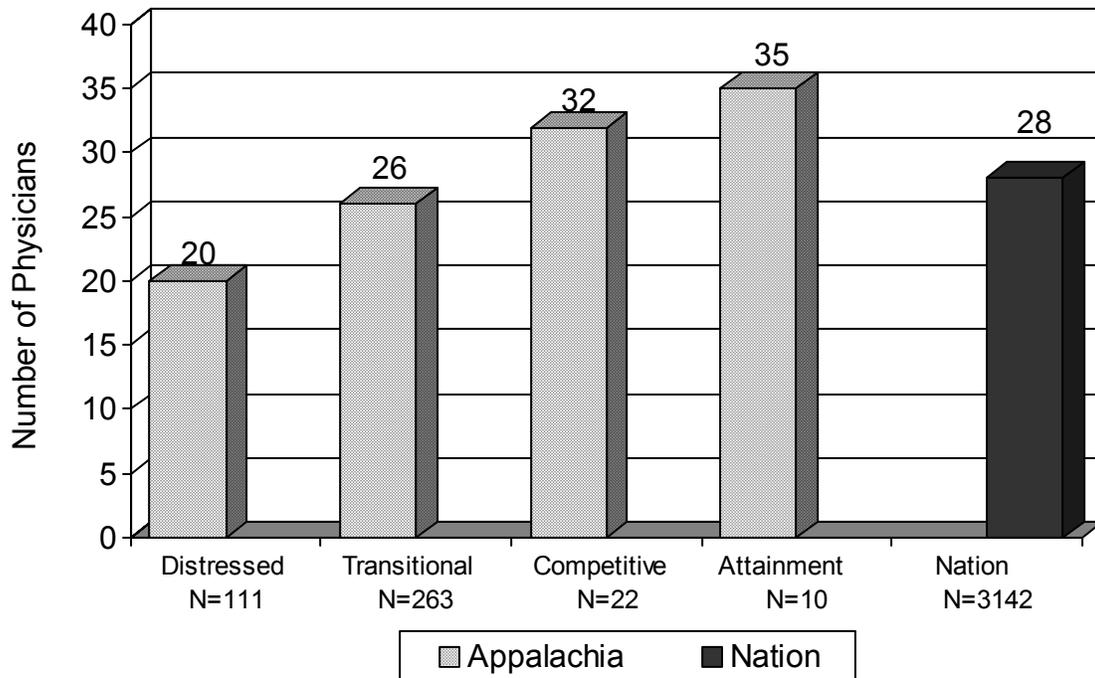
To examine recent trends in access to physician services, we compared physician-to-population ratios in 1990 to physician-to-population ratios in 1999. As Figure 2 illustrates, the supply of physicians has grown in Appalachia. The most positive sign is that the number of primary-care physicians is growing in distressed counties. From 1990 to 1999 the average distressed county experienced a net increase of two primary-care physicians, equivalent to an increase of six physicians per 100,000 people. However, while the average county has experienced growth in physician supply, there are some counties that have experienced declines or do not have a physician. And due to rapid growth in prosperous counties, the distribution of physicians continues to be skewed toward more prosperous counties. A detailed table of physician supply in every Appalachian county is available in section A of the Technical Appendix to this paper.

Figure 2. Increase in Physicians per 100,000 People by Economic Status of Appalachian Counties, 1990 to 1999



Dentists. We used data from the American Dental Association as reported in the ARF to evaluate the supply of dentists in Appalachia. As is shown in Figure 3, full-time dentists tend to be clustered in the more prosperous (and usually urban) counties. While 1998 data are available for full time dentists, data on part-time dentists are only available through 1995. An examination of part-time dentists shows a similar pattern with higher concentrations averaging 10 part-time dentists per 100,000 people in attainment counties and 4 part-time dentists per 100,000 in distressed counties.

Figure 3. Full-Time Private Practice Dentists per 100,000 people by Economic Status of Appalachian Counties (unweighted average per county)



Source: 2002 Area Resource File

The relative number of dentists in most Appalachian counties is less than for the U.S. overall, and there is a direct relationship between the supply of dentists and the county's economic vitality, as measured by the economic status measure. Our analysis indicates that this relationship has not changed over the past 15 years. Our concern is that access to dental care may be compromised in many Appalachian counties, especially those that are most distressed.

Studies have demonstrated that there are large disparities in dental care utilization between urban and rural areas and by income. In 1998 there were approximately 61 dentists per 100,000 population (all dentists full-time and part-time) in larger metropolitan counties compared to 29 per 100,000 in rural counties that were lacking in dentists (Eberhardt et al. 2001). In five studies spanning the period 1983 to 1993, the proportion of people living in poverty who had a dental visit during the year was close to 30 percentage points lower than for those above the poverty line. Data from 1996 show that poor children and adults visited the dentist at half the rate of individuals with higher incomes (GAO 2000B). Low-income individuals also have higher levels of unmet dental needs. A 1994 survey revealed that the percent of people who could not obtain wanted dental care was inversely related to income; 16.4 percent of those below 150 percent of the poverty level and only 6.3 percent of those with higher incomes had unmet dental needs (Mueller, Schur, Paramore 1998).

While we do not have data on access to dental services among persons residing in distressed Appalachian counties, we have no reason to expect that access barriers are less severe there than in other distressed areas. It is also important to emphasize that access

problems associated with a lack of dental supply are likely to be compounded for low-income individuals because dentist participation in the Medicaid program has been very limited.²

Hospital-Based and Post-Acute Services

In the following tables we present data from American Hospital Association (AHA) surveys on the provision of services by hospital and/or their local affiliates such as a local clinic or local MRI service. We also present data on the availability of skilled nursing facilities and home health agencies using data from the Centers for Medicare and Medicaid Services (CMS).

Basic Hospital Services. The availability of services at Appalachian hospitals is closely tied to the supply of physicians. Provision of surgical and obstetric services depends on having physicians in the region willing and able to provide these services. Table 1 shows that there has been a stable level of emergency room coverage in Appalachia, but there has been a slight decline in the availability of obstetric services. Only 35 percent of distressed counties have a hospital that offers obstetric services.³ Other than the very low level of obstetric care in rural counties, the availability of emergency and surgical services in Appalachia appears to be similar to the nation as a whole. The lack of emergency room services in approximately one third of distressed counties is usually due to the lack of a

² Of 39 states surveyed in 1999, 23 reported that fewer than half of the states' dentists saw at least one Medicaid patient during that year; no states reported that more than half of their dentists saw 100 or more Medicaid patients in 1999. Reasons cited by dentists for refusing to treat Medicaid patients were low payment rates, administrative issues, and frequently missed appointments (GAO 2000A).

³ Table 1 indicates a surprising drop in obstetric services in attainment counties. However, due to the small number of attainment counties (10), we should not read too much into the drop. In 2000, two fewer hospitals in attainment counties reported offering obstetric services and one hospital failed to answer the survey question.

hospital in the county. Table one also indicates that poorer counties are less likely to have a hospital, and the hospitals that do exist in poor counties will be less likely to offer obstetric and surgical services.

Table 1: Percentage of Counties with Hospitals Offering Key Hospital Services

| Type of service | Distressed Counties N=111 | | Transitional Counties N=263 | | Competitive Counties N=22 | | Attainment Counties N=10 | | National Average | |
|----------------------|------------------------------|------|--------------------------------|------|------------------------------|------|-----------------------------|------|------------------|------|
| | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 |
| Emergency Department | 66% | 66% | 84% | 81% | 86% | 82% | 90% | 89% | 78% | 77% |
| Surgical Services | 66% | 62% | 83% | 81% | 86% | 82% | 100% | 100% | 77% | 76% |
| Obstetric Services | 37% | 35% | 64% | 65% | 76% | 77% | 70% | 55% | 66% | 61% |

Note: Some counties have hospitals that did not respond to all questions in the AHA survey. In these cases the county is omitted when calculating the percentage of counties that have provide the services.

While beyond the scope of this paper, a logical next step would be to examine the birth outcomes of children in counties with and without obstetric services. The literature does not provide a clear guide as to whether outcomes are better with distant low-volume local hospitals providing obstetric services as opposed to having obstetric services consolidated in higher-volume hospitals. Nesbitt et al. (1997) found that obstetrical outcomes of rural areas of Washington State with access to obstetric care were better than in other rural areas of Washington. Larson et al. (1997) found that neonatal death rates were similar for urban and rural mothers. However, Heaphy and Bernard (2000) found that rural hospitals tend to have higher complication rates than urban facilities. Given the mixed evidence in the literature, it is not clear that expanding obstetric services to low-volume hospitals would improve neonatal health.

Diagnostic Services. A review of the data indicates that almost all Appalachian hospitals have ultrasound machines and CT scanners. Therefore, if a county has a hospital, it will almost always have ultrasound and CT services. There is a somewhat lower rate of counties with mammogram and MRI machines. However, due to the need for expert reading of mammograms, it may not be prudent to have mammogram services in hospitals with very low volumes of patients. With respect to MRI services, we see that the growth in Appalachian mirrors the growth across the nation.

Table 2. Percentage of Counties with Diagnostic Services Offered by Local Hospitals or their Affiliates

| Type of service | Distressed Counties N=111 | | Transitional Counties N=263 | | Competitive Counties N=22 | | Attainment Counties N=10 | | National Average | |
|-----------------|------------------------------|------|--------------------------------|------|------------------------------|------|-----------------------------|------|------------------|------|
| | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 |
| Year | | | | | | | | | | |
| Mammogram | 48% | 59% | 75% | 75% | 81% | 82% | 90% | 89% | 67% | 70% |
| Ultrasound | 68% | 65% | 82% | 81% | 86% | 82% | 90% | 100% | 77% | 76% |
| CT Scanner | 64% | 64% | 82% | 80% | 86% | 82% | 90% | 100% | 73% | 74% |
| MRI | 30% | 41% | 63% | 69% | 76% | 82% | 80% | 89% | 52% | 61% |

Note: Some counties have hospitals that did not respond to all questions in the AHA survey. In these cases the county is omitted when calculating the percentage of counties that have provide the services.

Specialty Services. Table 3 presents a troubling picture of access to specialty services. The table presents trends in the availability of drug treatment, alcohol treatment, outpatient psychiatric treatment and oncology services at hospitals or their affiliates. The lack of mental health services in distressed counties is consistent with the lack of mental health professionals in rural areas in general (Hartley et al., 2002). The AHA annual survey of hospitals indicates that hospitals—and their local affiliates—are becoming less active in

outpatient drug and alcohol treatment. It is important to evaluate whether there are alternative sources of care in Appalachian communities, particularly in distressed counties.

Table 3. Percentage of Counties with Specialty Services by Hospitals or their Affiliates

| Type of service | Distressed Counties N=111 | | Transitional Counties N=263 | | Competitive Counties N=22 | | Attainment Counties N=10 | | National Average | |
|-----------------------------------|------------------------------|------|--------------------------------|------|------------------------------|------|-----------------------------|------|------------------|------|
| | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 |
| Year | | | | | | | | | | |
| Outpatient Drug/Alcohol Treatment | 11% | 8% | 29% | 27% | 38% | 36% | 70% | 44% | 29% | 25% |
| Outpatient Psychiatric | 15% | 20% | 33% | 34% | 57% | 59% | 70% | 56% | 32% | 33% |
| Oncology Services | 26% | 25% | 51% | 56% | 67% | 59% | 70% | 67% | 45% | 49% |

Note: Some counties have hospitals that did not respond to all questions in the AHA survey. In these cases the county is omitted when calculating the percentage of counties that have provide the services.

Post-Acute Care. To examine availability of post-acute care services, we examined CMS records with respect to the availability of care at skilled nursing facilities or via home health services. As Table 4 shows, access to home health and skilled nursing facilities is improving. This suggests that the providers were of sufficient financial health to expand into new areas. While distressed counties are less likely to have post-acute care, we see improvement during the seven years 1994 through 2000.

Table 4. Percentage of Counties with Post Acute / Long-term Care Services

| Type of service | Distressed Counties N=111 | | Transitional Counties N=263 | | Competitive Counties N=22 | | Attainment Counties N=10 | | National Average | |
|--------------------------|------------------------------|------|--------------------------------|------|------------------------------|------|-----------------------------|------|------------------|------|
| | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 | 1994 | 2000 |
| Year | | | | | | | | | | |
| Home Health | 49% | 59% | 62% | 78% | 73% | 91% | 90% | 70% | 64% | 76% |
| Skilled Nursing Facility | 79% | 91% | 92% | 94% | 91% | 95% | 100% | 100% | 80% | 87% |
| Hospice Services | 22% | 23% | 50% | 50% | 62% | 50% | 70% | 67% | 47% | 48% |

Conclusions. In general we see improved access to the core services provided by physicians, hospitals, and nursing homes. However, hospitals and their affiliates are often not providing treatment for substance abuse and mental health services. In addition, access to dental care appears to be a chronic problem in distressed areas. The Appalachian Regional Commission may want to focus their efforts on ways to assure access to services such as substance abuse treatment and dental care that are currently lacking in many counties.

III. FINANCIAL STABILITY OF HOSPITALS AND NURSING HOMES

A. Methodology for Analyzing Financial Stability of Hospitals and Nursing Homes

A primary objective of this study is to evaluate the financial condition of Appalachian nursing homes and hospitals. We categorize the financial condition of hospitals and nursing homes into four groups based on the degree to which the facilities are generating a sustainable level of income. The two highest levels of profitability describe institutions that are financially sustainable over the long-term. The third category describes facilities that are sustainable over the short-term, and the fourth is used to describe facilities that are at risk of closure in the next several years unless they restructure operations or obtain additional support from governments or private donors. Following a more detailed discussion of our methodology, we present data on the distribution of hospitals and nursing homes among the four categories of financial sustainability.

Sustainable Operating Income. The most financially secure providers are those that generate sufficient operating profits to ensure that net assets grow at a rate equal to or greater than the rate of inflation. This is equivalent to saying that the provider can maintain the purchasing power of its financial reserves purely through operating income. These hospitals and nursing homes are not dependent on investment income, charitable donations, or other non-operating income for their survival. Since the medical CPI has been approximately 4 percent in recent years (HRSA, 2001), providers in this category have operating income averaging more than 4 percent of net assets over the most recent three years.

It should be noted that when evaluating sustainability, we are measuring income as a percentage of net assets, not of total revenue. The focus is on whether the provider is able to generate enough income to compensate for inflation's impact on the purchasing power of the

provider's financial reserves. Hence we need to look at income in relation to financial reserves (net assets), not in terms of revenue. It is common in the popular press to suggest that operating margins (operating income/operating revenue) should be at least 3 percent for sustainability (Jaklevic, 2000), but there is no theoretical foundation for this rule of thumb. The level of operating margin needed for sustainability will depend on the provider's ratio of debt to net assets.

Dependent on Non-Operating Income. The second most financially secure providers do not generate enough income from operations to maintain their facilities, but receive enough non-operating revenue to fill in the gap between operating revenue and the hospital's needs for capital improvement. The primary sources of non-operating income are investment income, government contributions, and contributions from private donors. The sustainability of these providers depends on the ability to maintain current levels of charitable contributions and other non-operating income to fund their financial reserves. We categorize a provider as being dependent on non-operating income if it did not generate operating income greater than 4 percent of net assets over the past three years, but did generate total income (including non operating revenue) greater than 4 percent of assets over the past three years.

Atrophying Providers. The third category of provider is generating either a small profit or a small net loss. These providers are not losing a significant portion of their financial reserves in any year, but every year the purchasing power of their financial reserves is slowly dwindling. These providers simply do not generate enough profits to update their plant and equipment as technology changes. Financial atrophy of these providers will cause the vintage of their plant and equipment to lag behind the state of the art. A provider is

categorized as an “atrophying provider” if its net income is less than 4 percent of net assets and it does not lose more 5 percent of its net assets in a year. Some of the atrophying providers will be able to survive through periodic capital campaigns or through restructuring their operations. Providers in this category will continue to fall behind state-of-the-art providers but without successful capital campaigns or successful restructuring.

Significant Losses. We will categorize hospitals and nursing homes as having a significant loss if their losses are greater than 1 percent of revenues in two of the past three years and the hospital lost an average of 5 percent or more of its financial reserves (i.e. net assets) over the past three years. In a study of hospital closures, Stensland, et al. (2002) found that 58 percent of the hospitals that closed during the period 1989 to 1996 had suffered annual losses greater than 1 percent of revenue and 5 percent of their equity during 1987-1989. Only 3 percent of those that stayed open through 1996 suffered losses greater than 1 percent of equity and 5 percent of net assets during the 1987-1989 period. Given that over 50 percent of hospitals in this category eventually closed, any provider suffering this level of losses will be viewed as being “at-risk” for closure.

In the Technical Appendix, Table A-4 lists hospitals that have generated significant losses. Table A-8 lists nursing homes that have generated significant losses. The number of providers on the lists can serve as benchmarks for evaluating changes in the financial viability of Appalachian health care institutions.

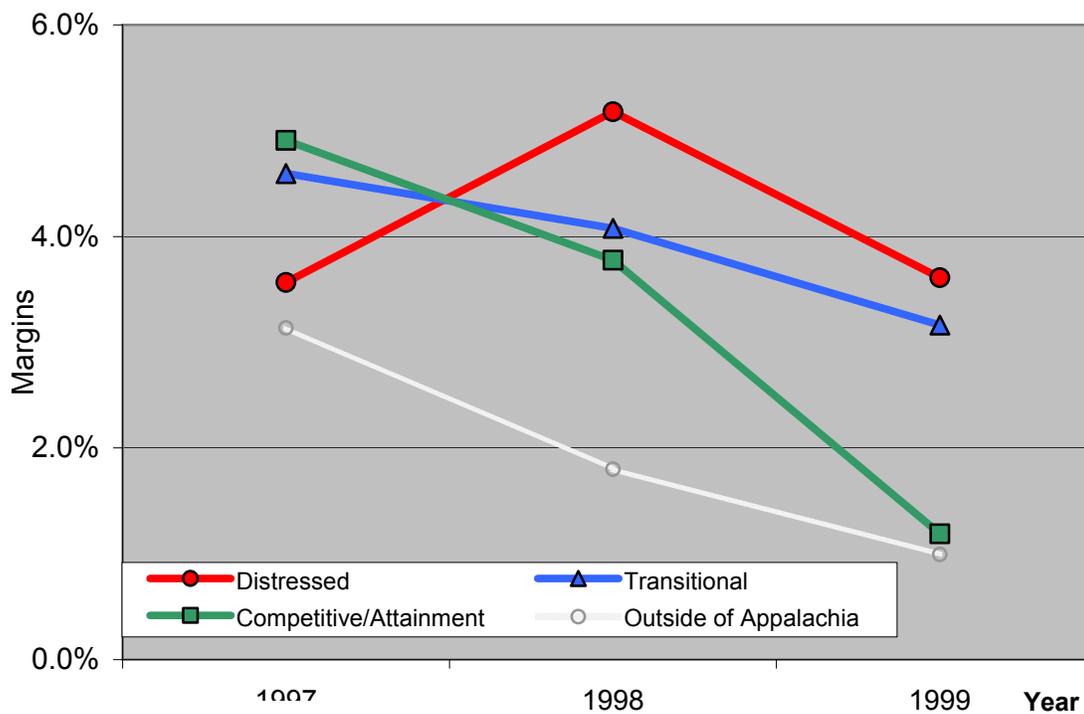
B. Skilled Nursing Facilities in Appalachia

To evaluate the financial condition of skilled nursing facilities (SNFs) in Appalachia we obtained financial data for 9,842 free standing skilled nursing facilities from the Centers for Medicare and Medicaid Services. These data include essentially all of the nursing homes

in Appalachia other than those that are part of a hospital, known as hospital-based nursing homes. Our objective is to provide a picture of the financial condition of Appalachian nursing homes and compare that condition to national averages. We are focusing our analysis on skilled nursing facilities, which provide rehabilitative care to Medicare patients, as opposed to residential facilities for the elderly that do not provide skilled nursing care.

In Figure 4 we present trends in SNF profit margins over the years 1997 through 1999. Appalachian nursing homes have tended to be more profitable than nursing homes in other parts of the country. Among the 894 Appalachian free-standing skilled nursing facilities that filed complete cost reports for 1997–1999, only 61 or 6.8 percent suffered from a level of financial stress than placed them at risk of bankruptcy. This compares to 11.5 percent of nursing homes nationally.

Figure 4. SNF's Median Total Margins by Economic Status of the County

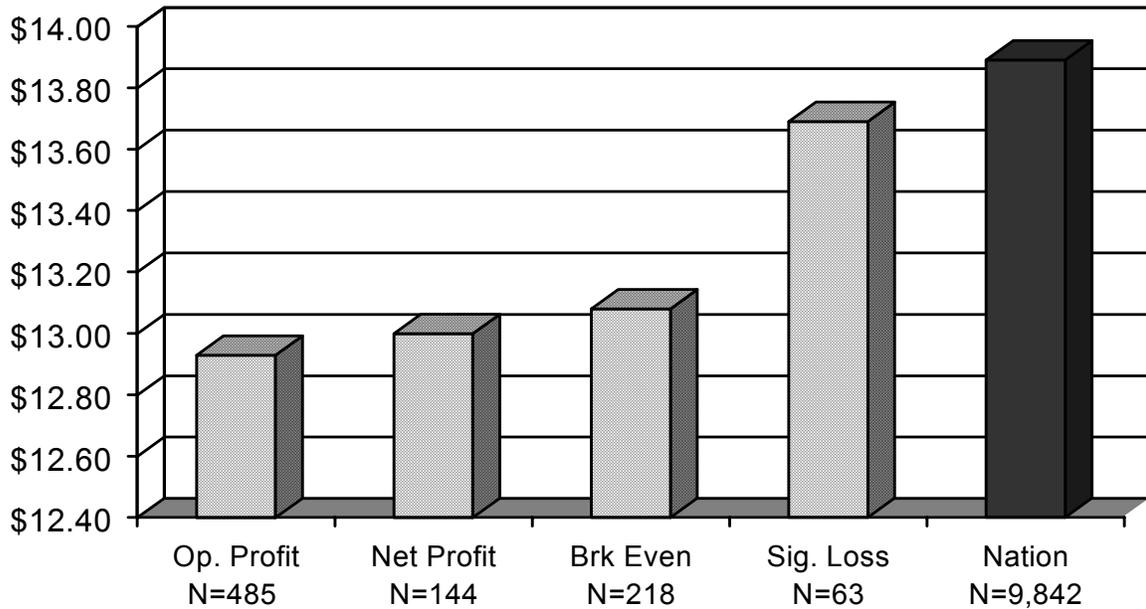


When examining the factors that distinguish profitable Appalachian nursing homes from financially struggling homes within Appalachia, we find that differences in revenue per patient day do not appear to drive differences in profitability. Table A-6 in the Technical Appendix indicates that average revenue per patient is similar at profitable and struggling SNFs. A comparison of Medicaid rates across states shows that while Medicaid rates per inpatient day vary widely from state to state, these differences are not highly correlated with profitability (Table A-7, Technical Appendix).

We did find that providers with low wages tended to have higher profitability. This could explain the finding that profitability tends to be slightly higher in distressed counties than in counties that have reached a higher level of economic prosperity. In distressed Appalachian counties, the average nursing home wage was \$11.71 compared to \$14.28 in counties that were classified as attainment counties, and \$13.88 across the nation. Because a majority of patient-stays are being paid for by either Medicare or Medicaid, the nursing home's income stream is partially insulated from poor local economic conditions. At the same time, the nursing home may be able to hire employees at lower wage rates if the local economy is distressed. The wage levels of nursing homes are shown in Figure 5. Average wages in Appalachian nursing homes during 1999 were \$12.98 per hour and outside of Appalachia the average wage was \$13.90.

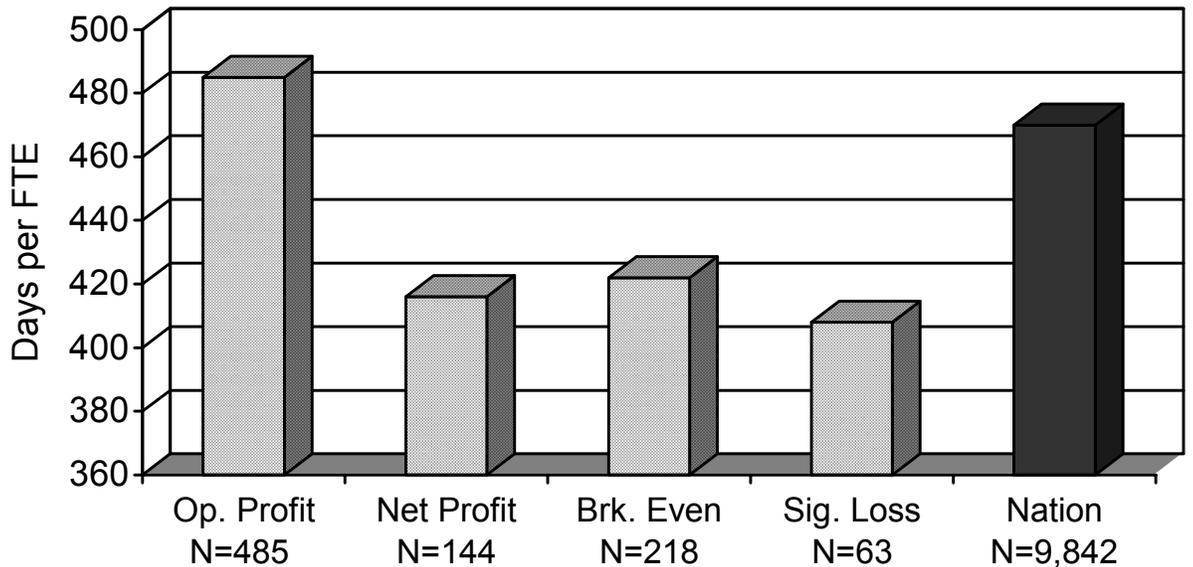
Lower wages in Appalachia is only one of the reasons for higher nursing home profitability. Figure 6 indicates that highly profitable nursing homes in Appalachia also have lower staffing levels. We are not able to determine from our limited data whether lower staffing levels result in quality-of-care problems or represent increased efficiency.

Figure 5. Hourly Wage by Category of SNF Profitability in 1999



Source: Medicare Cost Reports

Figure 6. SNF Inpatient Days per FTE by Profitability Category



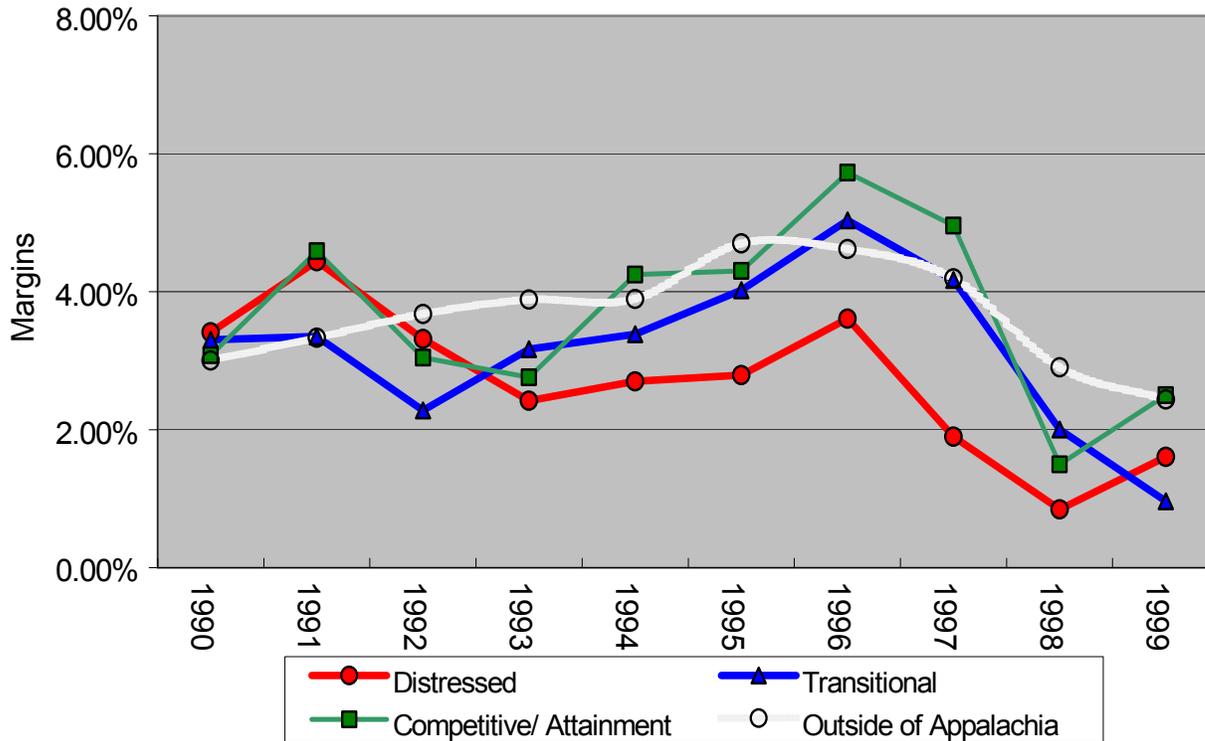
Conclusions Regarding Skilled Nursing Facilities

In general, the risk of losing nursing homes and nursing home jobs appears slight. Table A-8 in the Technical Appendix lists 63 Appalachian nursing homes that have generated significant losses. These nursing homes do face a significant risk of bankruptcy, however their losses are generally less than their capital costs. Therefore, if one of these nursing homes is forced into bankruptcy, we would expect a new owner to acquire the facility. The owners of the facility may lose their investment, but the odds of patients losing access to these facilities appears to be low.

C. Hospitals in Appalachia

In contrast to nursing homes, hospitals in Appalachia have historically had profitability levels that were similar or slightly lower than national averages. As Figure 7 shows, profitability increased in the mid-1990s and then fell at the end of the decade due to reductions in Medicare payments mandated by the Balanced Budget Act of 1997. Since 1999, total margins across the nation have improved slightly (MedPAC, 2002). Figure 7 also shows that the economic condition of the county has not dramatically affected the profitability of hospitals.

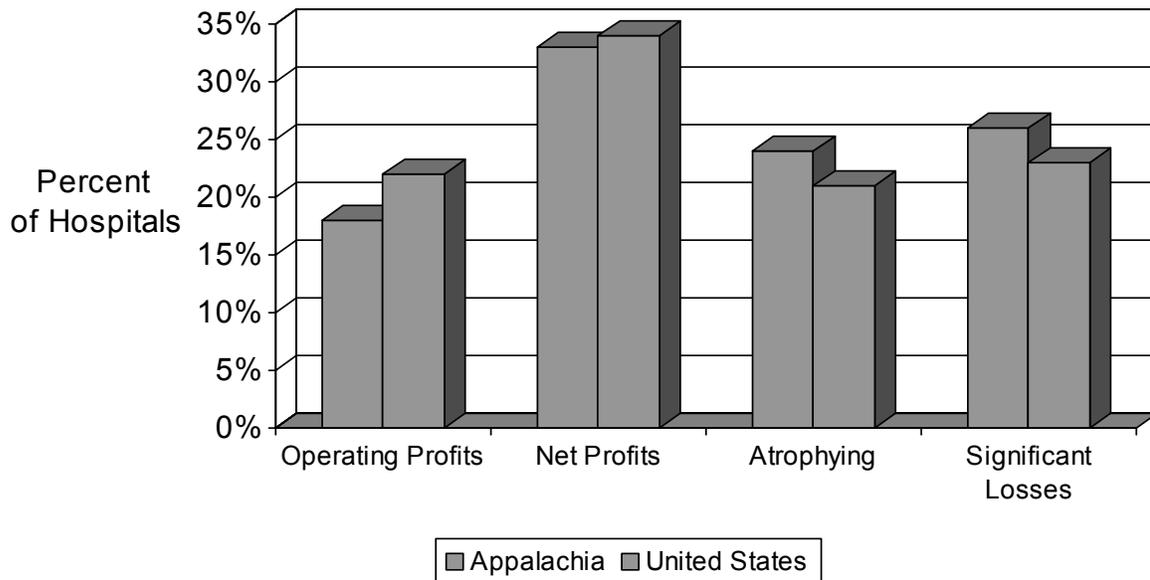
Figure 7. Hospitals' Median Total Margin by County's Economic Status



Source: Medicare Cost Reports

A perennial concern has been whether hospitals are in sufficiently sound financial condition to remain sustainable. In Figure 8 we show the distribution of hospitals based on their levels of historical profitability. We find that Appalachian hospitals are slightly more likely to be generating significant losses or atrophying and slightly less likely to be generating sustainable levels of operating income.

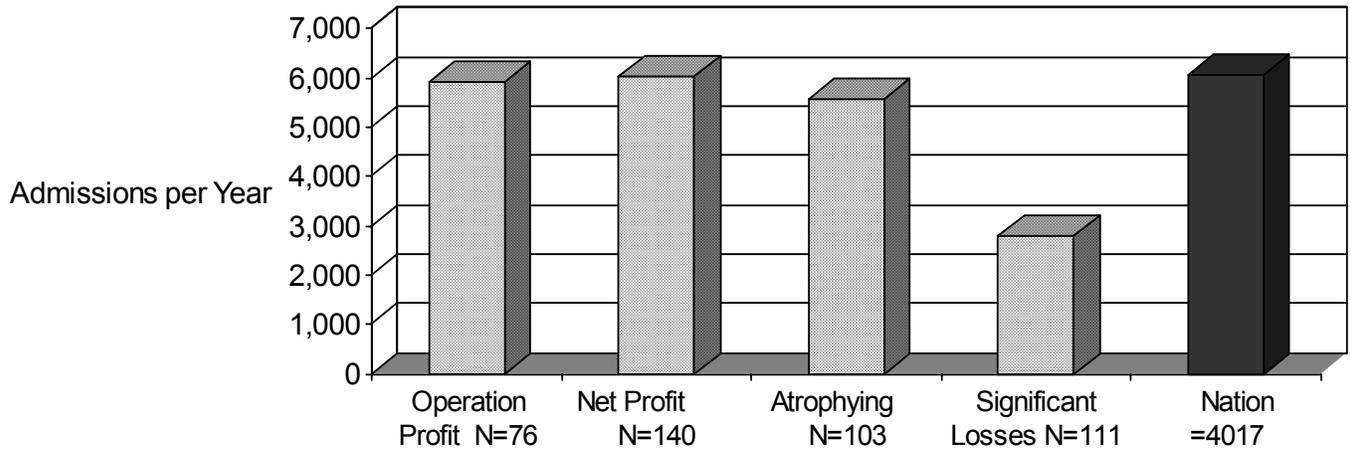
Figure 8. Hospital Profitability Categories in 1999



Source: Medicare Cost Reports

Why are Appalachian hospitals doing slightly worse than the nation as a whole? Figure 9 shows that the hospitals generating significant losses tend to have fewer admissions than the national average. Appalachia is largely rural and has many small hospitals that lack economies of scale. In contrast with nursing homes, hospitals are much more capital-intensive and would benefit from spreading these capital costs over a wide patient base. In regions with low population density, hospitals often struggle to cover their capital costs and generate significant operating losses. The slightly lower level of hospital profitability in Appalachia can largely be explained by the low population density in many areas of Appalachia and the small size of many rural Appalachian hospitals.

Figure 9. Hospital Admissions by Category of Profitability



Source: Medicare Cost Reports

In the Technical Appendix, Table A-3 shows that there is not a strong linear relationship between the financial condition of local hospitals and the economic condition of the county. Twenty percent of hospitals with high levels of operating profits are in distressed counties, and twenty-three percent of hospitals that are suffering significant losses are in distressed counties. The limited connection between hospital and county-level economics could stem from the fact that a significant portion of hospital revenue is derived from Medicare patients and hence not dependent on the income level of local citizens.

In general, struggling hospitals tend to be smaller, serve a disproportionate share of Medicare patients and tend to admit patients for less serious conditions. While hospitals suffering substantial losses have fewer employees on average (358), they still have lower levels of discharges per employee (7.7 vs. 9.5 for highly profitable hospitals).

This could be due to a lack of economies of scale and/or inefficient operation of the facilities.

In Table A-4 in the Technical Appendix we provide a list of the Appalachian hospitals that were at risk of closure due to significant financial losses. There is concern regarding what may happen to local economies if these facilities are forced to close. We will address this question in the next two sections conceptually and with information from past experiences.

IV. THEORETICAL IMPACTS OF HEALTH CARE INSTITUTIONS ON LOCAL ECONOMIES

In the previous chapter of this report, we discussed how 111 Appalachian hospitals were at risk of closure at the start of 1999. In this section we discuss how hospital closure can affect a local economy. If a hospital supports a large share of jobs in the county, closure of the hospital may have a severe impact on the local economy. Because the amount of resources that city and county officials provide to prevent closure may depend on the economic benefits of preventing closure, it is useful to estimate the economic impact of at-risk hospitals on the local economy.

Theoretical Framework

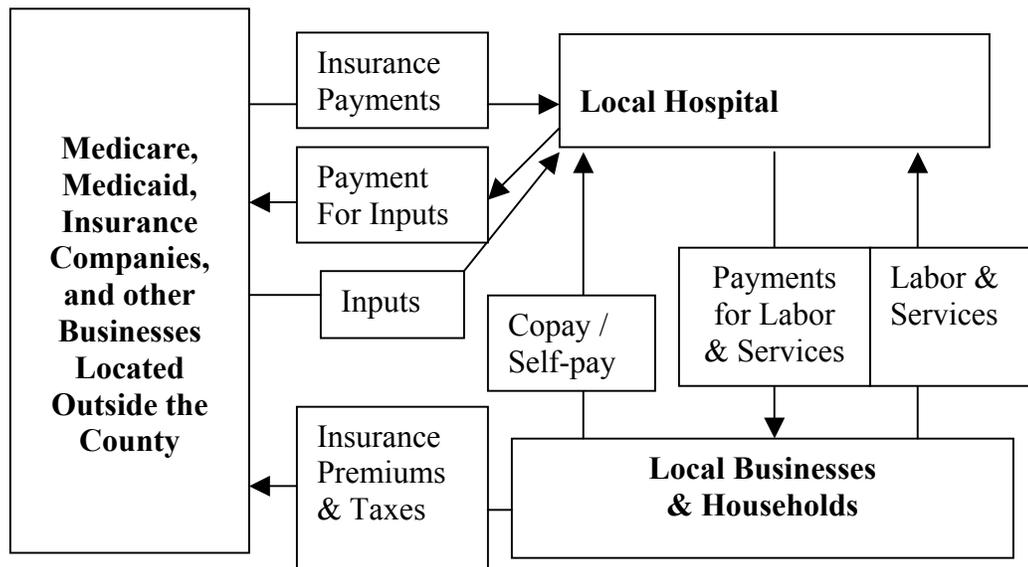
Most economic impact studies use “input-output multipliers” to examine the direct and indirect effects of a specific industry on an area economy. For example, the Bureau of Economic Analysis RIMS II input-output model (BEA, 1997) estimates that for every dollar of hospital services provided in Appalachia, \$2.10 of total economic activity is generated. The additional \$1.10 of economic activity is generated by the hospital’s purchase of inputs as well as the purchase of goods and services by hospital employees. The input-output models also generate employment “multipliers.” For example, each employee of a physician’s office (a high-wage employer) is expected to support 1 additional job in Appalachia. Each employee of a nursing home (a low-wage employer) is expected to support .45 additional jobs in the region. The employment multipliers of 2 for physician offices and 1.45 for nursing facilities represent multipliers for the whole Appalachian Region. Smaller regions such as counties will have lower

multipliers because smaller regions purchase a larger proportion of inputs from outside of the region. Cordes et al (1999) estimated that county level employment multipliers for rural Nebraska hospitals range from 1.2 for hospitals in smaller rural communities to 1.5 for hospitals in larger rural communities.

In this study we examined the input-output multipliers provided by the Bureau of Economic Analysis (BEA). The BEA data indicate that the employment multipliers for counties in the Appalachian region also tend to be in the 1.2 to 1.5 range. This means that if a hospital employs 100 people, there are an additional 20 to 50 jobs in the county that are indirectly supported by the hospital.

Figure 10 is used to illustrate how the local hospital acts to bring insurance premium and tax dollars back into the local economy.

Figure 10. Recycling Insurance Dollars Back into the Rural Economy



Hospital services have an impact on the local economy similar to manufacturing activities because they bring in dollars from outside the local economy via payments from insurance companies, Medicaid and Medicare. This is in contrast to a local service business such as a grocery store that is dependent on payments from local citizens. As is shown in Figure 10, local citizen's health insurance premiums and the Medicare and Medicaid portion of their taxes all represent leakage from the local economy. Those dollars are only returned to the community to the degree that health care services are available locally. If a local hospital closes, insurance premiums and taxes are less likely to recycle back into the local community.

Input-Output Results

We selected ten Appalachian counties for input-output analysis based on a three-step process. First, we started with the 111 at-risk hospitals. (At-risk is defined in the previous chapter.) From the 111 hospitals, we selected the 20 that represented the largest percentage of jobs in their county. From the 20 hospitals, we selected ten hospitals that would provide geographic diversity. The ten selected counties are shown below in Table

5

Table 5: Ten at-risk hospitals that are key employers

| City | State | Hospital full-time equivalents in 1999 | Input-output employment multiplier | County jobs supported by the hospital | Percent of county jobs supported by the hospital |
|---|-------|--|------------------------------------|---------------------------------------|--|
| LOGAN | WV | 847 | 1.57 | 1329 | 11.31% |
| GALAX | VA | 516 | 1.37 | 707 | 9.32% |
| CELINA | TN | 139 | 1.29 | 179 | 7.44% |
| MOUNT STERLING | KY | 303 | 1.48 | 447 | 3.73% |
| NORWICH | NY | 534 | 1.36 | 726 | 3.24% |
| WEST UNION | OH | 236 | 1.35 | 318 | 2.98% |
| HUNTINGDON | PA | 373 | 1.49 | 555 | 3.24% |
| HIAWASSEE | GA | 76 | 1.37 | 104 | 2.91% |
| ROANOKE | AL | 183 | 1.43 | 261 | 2.95% |
| ANDREWS | NC | 209 | 1.63 | 341 | 3.31% |
| Average percentage of county jobs supported by the hospital | | | | | 5.04% |

Table 5 illustrates the potential importance of hospitals to certain counties. One interesting finding is that all ten of these hospitals were able to avoid closure during 1999–2001 despite having severe financial difficulties during 1996 through 1998. The hospital in Logan, West Virginia declared bankruptcy, but has since been restructured. The hospitals in Hiawassee, Georgia, and Celina, Tennessee, were sold to new owners. One lesson from this data is that hospital closures may be less likely when the hospital represents a large share of local employment.

There are two reasons why hospitals that employ a large share of local workers are less likely to permanently close. First, if the hospital employs a large number of people and serves a well-populated market area, there will usually be another hospital willing to operate in that market area. For example, the bankrupt Logan hospital has a large number of patients and was financially restructured. Second, if the hospital is deemed critical for access to care and for the local economy, county governments, city

governments, and charitable donors may be willing to spend more to preserve the hospital.

Among the 111 hospitals that were at risk at the start of 1999, five closed (Technical Appendix, Table A-5). However, none of these hospitals employed more than 1.2 percent of the counties' employees. Access to care was preserved despite the closures. Among the five closed hospitals, only the hospital in Taylorville, North Carolina, was more than 10 miles from the next hospital, and the Taylorville hospital reopened in June 2002 to provide emergency services and limited inpatient care.

Caveats From Other Input-Output Studies

Many counties have estimated the impact of their hospital on their local economy as part of a program called Rural Health Works. The Rural Health Works was a cooperative venture of the federal Office of Rural Health Policy, Rural Policy Research Institute and the USDA extension service. Expertise with input-output models is provided by Gerald Doeksen of Oklahoma State University. One aspect of the program is to use the IMPLAN input-output model to estimate how many local jobs are being supported by the health care industry. Doeksen et al. (1997) stress that health care is an important element of a county's economic base and that physician and hospital services may be necessary to attract retirees and businesses. Doeksen suggests that IMPLAN models may underestimate the importance of hospitals to the local economy due to the impact of hospitals on physician recruitment, business recruitment, and recruitment of retirees. In other words, Doeksen's work suggests that the ten hospitals shown in Table 10 may support an average of even more than the 5 percent of county jobs indicated by input-output analysis.

While there are some reasons why input-output analysis may underestimate the importance of a health care provider on the local economy, there are also some reasons why the importance could be overstated. Scorsone et al. (2001) in a study of Knox County hospital in Kentucky found that traditional input-output models can overestimate the importance of the hospital on the local economy because some hospital employees live outside the county and because limited government data tends to over estimate the amount of inputs that are purchased locally. If a hospital needs a certain category of inputs and one or more inputs from that category are produced locally, then the input-output model assumes that the hospital will acquire all their needed inputs in that category locally up to the output of local producers. The problem is that a hospital's needs may not exactly match what is produced locally, and a hospital may choose to buy non-locally even if locally produced products are available. When Dr. Scorsone examined the Knox County hospital's books to see where they were purchasing inputs, he found that very few of the hospital's inputs were being purchased locally, less than were estimated using input-output models. This points to the need to frequently modify input-output multipliers downward.

The most important caveat to remember when looking at input-output multipliers is that they do not account for other jobs that hospital employees may obtain if the hospital is closed or converted to a different use such as a nursing home or outpatient clinic. Miller (1995) used the IMPLAN input-output model to predict changes in employment and income following the closure of a rural hospital in Arkansas. He concluded that if hospital employees could find other jobs and still live in town, the closure of the hospital might have a very small effect on the local economy.

Due to the limitations of input-output analysis, our estimates of at-risk hospital's impact on the local economy will be supplemented with historical data that examines what actually has happened when Appalachian health care providers closed their doors. This will allow us to examine whether the input-output models systematically under or overestimate the impact of hospital closure.

V. FORTY-TWO HOSPITAL CLOSURES

In this section we report on historical data from 42 Appalachian hospital closures that occurred from 1987 through 1996. To add richness to our analysis, we also include data obtained from interviews with leaders in ten of the communities that lost hospitals. The purpose is twofold. First, we can use historical evidence as a guide for what may happen to local economies if hospitals close in the future. Second, we can evaluate whether input-output multipliers are good predictors of the impact of hospital closures.

Other Studies of Hospital Closures

In a previous national study of 108 rural hospital closures that took place between 1984 and 1988, Janice Probst and colleagues reported that earned income and employment increased as fast at rural counties with closures, as was the case in comparable rural counties. However, when controlling for other factors that may affect income and employment, Probst et al. (1999) concluded that closures cause employment and income to grow at a slightly lower rate than would have occurred without the closure of the rural hospital. Her findings were generally consistent with what would be predicted by input-output models. The Maine Rural Health Research Center conducted four case studies of small rural hospitals that closed. The Maine studies stressed the sense of community loss when a hospital closed, but found that conversions of hospitals to nursing homes or small limited service hospitals can mitigate possible negative effects on the community. The hospital's financial condition was usually tied to larger economic trends such as reductions in population due to farm consolidation or the decline of mining in an area.

Methodology

Identifying closures. The American Hospital Association annually reports on hospital closures across the country in the documentation for the Annual Survey of Hospitals Data Base. We compiled all of the reported hospital closures during the ten-year period 1987 through 1996. Of the 915 closures reported by the AHA, 48 of the closed hospitals were in Appalachia. After contacting health care providers in the 48 communities, we were able to confirm that 42 of the hospitals had ceased to offer inpatient care and that a replacement hospital had not been built by 2001. In 10 of the 42 cases, the closed hospital was the only hospital in the county.

Measuring Economic Impacts. In this paper we evaluate the impact of hospital closures on employment, population, and per capita income. Employment data is measured as total full and part-time jobs as reported by the Bureau of Economic Analysis. One limitation of this measure is that it does not account for people losing higher paying full time jobs at a hospital and accepting lower paying jobs in the community. For that reason we also measure income per capita. This is total income in the county divided by the population living in the county. It is possible that the number of jobs in the county declines without a reduction in income if the population stays in the community but more residents commute to other communities for work. Changes in population are used to evaluate whether the loss of a hospital has a significant impact on the willingness to live in the county.

Time frame of analysis. We examine economic and demographic changes over a six and nine-year time frame. Two time frames are used to see if short-term affects differ from long-term effects. Both timeframes start two years prior to the hospital's closure to

capture employment levels prior to the time that the provider closed operation. The short-term time frame ends four years after closure. The long-term timeframe starts two years prior to closure and ends seven years after closure. We limit our analysis to seven years post closure to maintain a reasonable number of closed facilities in our sample.

Results

In this study, we examine 42 Appalachian hospitals that have closed between 1986 and 1996. The 42 hospitals that closed were responsible for a small share of the jobs in their county, averaging 0.8 percent of county employment. During the four years following the closure of the 42 hospitals, a decline in total employment occurred in four counties. As is shown in Table 6, the average rate of job growth in counties with a hospital closure was 9 percent over the six-year period that started two years prior to closure and ended four years after closure. Job growth at the reference group (Appalachia as a whole) grew 12 percent over matched sets of years. The three percent difference in job growth is small in relation to the variance between hospitals and is not statistically significant using a $p < .05$ criterion. Data on each individual closure are shown in Table A-5 of the Technical Appendix.

During the nine-year window, employment in counties with a closed hospital grew by an average of 11 percent compared to 19 percent for all of Appalachia. This 8 percent difference is statistically significant. While we see a correlation between hospital closure and slow job growth, we cannot conclude that hospital closures are causing slow job growth. It is possible that other factors, such as financial strain on local employers, caused slow job growth and the closure of the hospital. If hospital closures were the

force driving slow rates of job growth, we would expect the job growth rates to be slowest at counties that lost their only hospital. This is not the case as is shown in Table 6.

Table 6. Closure has a Small Effect on County Economies

| Employment Growth | All Counties with a closed hospital | Rural Counties with a closed hospital | Counties where the only hospital closed | Appalachian Average |
|--------------------------|--|--|--|----------------------------|
| Over six years | 9% (n=42) | 6% (n=24) | 9% (n=10) | 12% (n=400) |
| Over nine years | 11% (n=36) | 9% (n=21) | 11% (n=9) | 19% (n=400) |

Notes: (1) The six and nine year periods start two years prior to closure.
 (2) Employment growth for the 292 Rural Appalachian counties is within 1% of the Appalachian average and therefore not reported separately.

Losing the Only Hospital. Graphs of job growth, population growth and income growth for counties that lost their only hospital are displayed in Figures A-1, A-2 and A-3 of the Technical Appendix. In general, we find slightly lower rates of job growth in counties that lost a hospital, but failed to find any evidence that the loss of a county’s only hospital affected income or population growth. We also tested for changes in the population of senior citizens to see if the loss of a county’s only source of inpatient care was driving away senior citizens. We found no correlation between hospital closure and growth in the number of individuals over 65 years of age.

While the closure of a small hospital is correlated with slower job growth, it should be noted that three counties lost their only hospital but proceeded to have above average employment growth over the seven years following the hospital’s closure.

Among the thirty-six counties with ten years of post-closure data, only three had declines

in total employment. Given this information we can conclude that the closure of a hospital often has a negative impact on county employment, but this is small relative to other factors that can affect the county.

Comparison of Input-Output Projections to Historical Data. The average BEA county-level multiplier of the hospital's employment is approximately 1.3. Given that closed hospitals represented an average of .8 percent of county jobs, we could expect approximately a 1 percent decline in employment following the hospital's closure based on input-output analysis. When we look at rural counties that lost their only hospital and compare their job growth to other rural hospitals, we see very similar levels of job growth in the first four years following closure. Over the seven-year period following closure, counties that lost a hospital have slightly lower rates of job growth. The bottom line is that our data are consistent with a hospital closure causing a 1 percent reduction in a county's rate of job growth over a seven-year period of time. Unfortunately, since there are many factors with a greater affect on job growth, we cannot definitively accept or definitively reject input-output multipliers as estimates of the long-term impact of hospital closures.

Summary

- 1) Over a nine-year time span, counties with closures experienced an 11 percent increase in jobs compared to 19 percent for Appalachia as a whole. While the 8 percent difference is statistically significant, we cannot conclude that the hospital closure caused the lower job growth. Other factors such as a mine closures could cause both a loss of jobs and the closure of a hospital.
- 2) In the ten counties losing their only hospital, there were an average of 9 percent more jobs four years after closure than two years prior to closure. We conclude that most of the closed hospitals were not critical to the local economy at the time of closure.

- 3) The closure of a hospital does not appear to be a significant factor in determining if a county will be classified as “distressed” using ARC criteria. (See Table A-5 in the Technical Appendix).

VI. TEN CASE STUDIES OF HOSPITAL CLOSURE

Our analysis of 42 hospital closures revealed that hospital closure was a weak predictor of future job growth in a county. Following the closure of the county's only hospital, some economies grew rapidly and others suffered declines in employment. In this section, we report on interviews of informed respondents in 10 of the 42 counties that lost a hospital. Our objective was to hear the stories behind the closures and opinions on the impact of the closures on local economies and the delivery of health care to the communities.

We start by reporting on six cases where closure of the local hospital appeared to have minimal effects on the community. Then we report on four cases where the closure of a hospital appears to have slightly negative effects on the local economy. We stress that in none of the ten case communities was closure of the local hospital seen as a primary cause of a significant decline in the local economy.

Case Study 1: Sequatchie County Tennessee

The Sequatchie General Hospital in Dunlap, Tennessee served many of the approximately 11,000 people of Sequatchie County including the 4,000 people who lived in Dunlap. After a long period of financial strain, the hospital was closed in 1993. Despite the fact that the Sequatchie hospital represented a large share of county jobs (about 3 percent), the executive director of the local chamber of commerce stated that there was not too much concern about the economic impact of the closure. There were other jobs for displaced workers in Chattanooga, which is less than a one-hour drive from Dunlap. However, the community was proud of their hospital and was concerned about the closure's effect on access to care.

Following the closure, an outpatient clinic and twenty-four-hour emergency room was opened in Dunlap. The facility stabilizes patients and transfers them to a hospital with inpatient capability when needed. The emergency facility is owned by the Hospital Corporation of America (HCA), which operates a hospital in Jasper, Tennessee, 23 miles from Dunlap. The number of physicians that live in town has remained steady at four. When asked whether the closure had any adverse impact on the community, one long time local physician responded: “there was no bad effect in my book.”

The executive director of the chamber of commerce stated that the county did not want to lose its hospital, but it has not had much of an impact on economic development. The economy of Sequatchie County has been improving for a long time and was removed from the Appalachian Regional Commission’s list of distressed counties in 1988. Following the closure of the hospital, the county continued to grow through the 1990s. Recently a Japanese company expressed interest in building an automotive parts factory in Dunlap. Prior to building the factory, representatives of the parts company asked to see the local health care facilities. They were shown the emergency room and outpatient clinic. The Japanese company built the plant in Dunlap and the town is “booming.” The closure of the hospital did not appear to have any negative effect on the local economy.

Case Study 2: Grundy County Tennessee

Grundy County, population 14,000, is located next to Sequatchie County in Southeastern Tennessee. The county’s only hospital was located in Coalmont, a town of approximately 1,000 people. Due to continual financial losses, the hospital was closed in 1986. Following closure of the hospital, employment and population in the county have been relatively flat. The Appalachian Regional Commission considered Grundy County

a distressed county prior to the hospital's closure and still considers the county economically distressed.

The number of physicians in the town has declined from three prior to closure, to one at present. The remaining physician stressed that the community focused on improving their EMS service following the hospital's closure. The service is staffed with paramedics with advanced life support equipment. The nearest emergency room is in Sawanee, which is about 30 minutes away. If needed, the Erlanger Hospital in Chattanooga can provide Life Force helicopter service to the area. The drive to Chattanooga takes about an hour. The closure of the Coalmont hospital was not seen as a great loss for patient's access to care because the hospital had limited capabilities and the Sawanee hospital (located ten miles from the county line) was a "backup."

However, Grundy County's executive officer has been informed by the administrator of the Sawanee hospital that the hospital may close if it does not turn around in sixteen months. The loss of this backup would place the nearest hospital 40 miles from many people in Grundy County. He is considering building a 24-hour emergency facility similar to the facility in Dunlap, Tennessee.

The economic impact of the hospital's closure was seen as minimal. The local physician stated the closure "did not have a profound effect on the community." The County's executive officer believes that the closure did not have a dramatic effect on the economy because the hospital did not employ many community residents. His primary concern is the potential closure of the Sawanee hospital and its implication for access to emergency medical services. The key concern regarding the hospital closure is access to care, not county economics.

Case Study 3: Heard County Georgia

Heard County Memorial Hospital was located in Franklin, Georgia, a city of 900 people located 70 miles southwest of downtown Atlanta. The population of Heard County increased by 28 percent from 1990 to 2000, which is a slightly faster rate than for the average Georgia county. Unemployment remained close to the state average of 4.5 percent.

The hospital was originally owned by the Heard County Hospital Authority but was sold in 1981 because it was considered a “drain on the taxpayers of the county.” It was operated as a privately-owned hospital until it was closed in 1987. The building is now used as a hotel.

For some time prior to closure residents of the area were traveling to Carrollton, Lagrange or Newnan for medical care. The twenty-mile drive to Carrollton or Newman can be an inconvenience for senior citizens, but does not appear to have posed a particular hardship. One beneficial consequence of the closure was that the county increased support for its EMS infrastructure. In light of improved EMS staffing, it is not clear whether the overall delivery of health care services has improved or declined due to the hospital closure. When asked what the county needed to improve health care of the community, two respondents suggested another dentist. There does not appear to be a strong desire to acquire a local hospital.

It was reported that employees of the hospital were able to find other jobs in neighboring towns, so the economic impact appears to be minimal. While some interviewees thought the loss of the hospital might have hurt the town’s ability to attract businesses, others did not think the impact was serious. Based on demographic and

employment statistics it appears that the closure did not have a significant, negative impact on the community.

Case Study 4: Scioto County Ohio

The Southern Hills Hospital, located in Portsmouth, a town of approximately 21,000 people in South-Central Ohio, closed its doors in 1987. At that time, the Southern Hills physical structure was turned into a nursing facility. The remaining two hospitals in town were merged with the nursing home to form U.S. Health of Southern Ohio. The existence of two other hospitals in town minimized the impact of the conversion (to a nursing facility) on access to care.

The city of Portsmouth in Scioto County continues to be a hub for services, retail trade, health care and manufacturing industries. Although substantially higher than the national average, the rate of unemployment in Scioto County did not change markedly in the period immediately following the hospital closure. Indeed, community leaders indicated that the closure of Southern Hills Hospital had little impact on the community. In fact, a city administrator stated that the hospital's closure and merger into Southern Ohio Medical Center in the 1990s had a positive impact on access to care and the local economy. With over 1,800 employees, SOMC is presently the largest employer in Scioto County. The county is home to approximately 137 physicians and maintains 421 hospital beds, and 937 nursing home beds.

Case Study 5: Calhoun County Mississippi

The Bruce Hospital was located near the communities of Pittsboro and Bruce, which had a combined population of approximately 2000. Calhoun County is still served

by a hospital and EMS service in the city of Calhoun, which is approximately ten miles south of Bruce. The county's population, income per capita, and total employment continued to grow at levels similar to the Appalachian average following the hospital's closure. The county has a total population of 15,000 people.

When the hospital ran into financial difficulties in the late 1980s, the local community was very concerned about the potential loss of local health care services and the impact on the economy. The city issued bonds to buy and maintain the hospital building. It was then leased to a private management company. The company abandoned the facility and defaulted on lease payments. The town was not able to provide continuing financial support for inpatient care. In 1991 the building was leased to a company that converted the hospital into a nursing home.

Conversion to a nursing facility appears to have benefited the community by enhancing its access to long-term care. Prior to the closure, the town did not have a nursing home. The mayor believes there are more nursing home jobs now than at the hospital prior to conversion. The mayor does not think the hospital conversion adversely affected the community's ability to attract businesses. He examined census numbers before and after the closure, and concluded that there was "not any adverse effect" on the economy.

The impact on access to medical care has been relatively small. The closure did not affect the number of doctors in town (still two) or the number of pharmacies (still three). The people of Pittsboro often travel approximately 30 minutes to the hospital in Oxford, Mississippi, or 50 minutes to the tertiary care hospital in Tupelo, Mississippi. While Calhoun Hospital, located ten miles to the south, provides ambulance service to

the area, non-emergency patients often bypass that hospital for larger facilities. The Mayor described the hospital closure as the loss of a luxury—now they “just travel a little further” for inpatient care.

Case Study 6: Itawamba County Mississippi

The Itawamba County Hospital was converted into a nursing home in 1993. The hospital was located in Fulton, Mississippi, which is a city of approximately 4,000 people. Despite losing the only hospital in the county, the population of the county has been slowly growing over the past decade. The total population of the county is 22,858.

The director of the local community development association stated that there is still very good access to health care, even after the hospital closed. It only takes about twenty minutes down a four-lane highway to reach the North Mississippi Medical Center in Tupelo, a large rural tertiary care hospital with a level-one trauma center. Employment continues to grow and the community development board does not think that the lack of a hospital had any impact on their ability to attract businesses. The closure did not appear to have any impact on attracting retirees; it is still common for people who grew up in Fulton to return to retire.

When the hospital closed, it was operated by the Tupelo tertiary care facility. Employees had the option of working for the local clinic run by the hospital, for the tertiary care hospital, at the nursing home, or to retire. A local physician thought that local employment actually increased following conversion because the nursing home is at full capacity, whereas the hospital consistently operated at low capacity. He stated that the town had been short on nursing home beds prior to the conversion.

We also asked the local physician whether the closure had any negative impacts on the delivery of health care or the community's ability to attract physicians. He called the closure of the hospital "one of the best days in my life." He was very relieved to not have on-call emergency room duties. In his opinion, hospital closures can improve some towns' ability to recruit physicians because the community can offer the physician a job with minimal on-call responsibilities. Since the hospital closed, the number of physicians in town has increased from four to six; a seventh physician will soon be joining the local practice. It should be noted that the situation might be unique due to the presence of a tertiary care hospital within a twenty-minute drive from the closed hospital.

Case Study 7: Cattaraugus County New York

Salamanca District Hospital was located in the city of Salamanca, NY. The city has approximately 6,000 people and is located in Cattaraugus County. The hospital was closed due to a lack of capital for significant capital improvements including asbestos abatement. The hospital still could have remained open if the local community was willing to cover the cost of uncompensated care and capital improvements. However, the hospital was primarily a drug and alcohol rehabilitation facility that served patients from a wide area, not just the local town or county. Due to having a regional rather than local patient base, the former administrator felt the town was less willing to subsidize capital expenditures at the hospital. The hospital did make a last ditch effort to stay open by converting to Rural Primary Care Hospital status which allowed it to receive cost-based reimbursement from Medicare. But this was not sufficient to cover the costs of uncompensated care and the cost of needed capital improvements. According to a former

board member of the hospital, the bank eventually foreclosed on the facility and auctioned off the equipment.

Patients now travel twenty miles to Olean, New York, the county seat and home of a regional hospital. As we have seen following other hospital closures, the city increased spending on ambulance services following hospital closure. The service is operated out of the fire department, and all employees have since received advanced life support training.

While Cattaraugus County has never been categorized as distressed by the Appalachian Regional Commission, the city of Salamanca has been in a state of decline. Census figures indicate that the town's population has declined from approximately 6,500 in 1990 to approximately 6,000 in 2000. It is hard to determine if the decline in the town is tied to the closure of the hospital or other factors. While no one thought the closure has had a dramatic affect on the town's ability to attract businesses, the closure appears to have had a small negative effect on the local economy and caused a slight decline in the accessibility of health care services. The current chamber of commerce president and former mayor described the closure as "one more nail in the city's coffin." People receiving health care in Olean also shop in Olean, and the town of Salamanca is in decline. The hospital had been the only source of inpatient drug and alcohol rehabilitation in the area.

Case Study 8: Lamar County Alabama

The Lamar Regional Hospital was located in Vernon, Alabama, a town of 2,200 people. The population of Lamar County has remained steady between 15,500 and 16,000 people over the past 12 years. Income has remained slightly below the statewide

average, and unemployment is slightly higher, 10.5 percent, in July 2002. The Appalachian Regional Commission has never classified Lamar County as distressed.

The hospital closed after a period of low occupancy and financial losses. Prior to the hospital's closure, many people in the county bypassed Lamar Regional for Fayette Medical Center in Fayette, Alabama. Following closure in 1996, the remaining physicians in Vernon started admitting their patients to the Fayette hospital.

The community of Vernon was concerned about the economic impact of the hospital's closing, but it appears that most former hospital employees were able to find work, some at neighboring hospitals. While some community leaders we interviewed thought the closure might have affected the town's ability to attract businesses, it is difficult to say if the closure was truly a key factor. While it has always been difficult to attract physicians to the area, one local physician thought that the effective supply of physician services actually increased in recent years due to an increased number of specialists that hold office hours at the local rural health clinic.

In summary, we were not able to find any demographic information or information from our interviews that suggests the hospital closure had a significantly negative impact on the local economy.

Case Study 9: Wyoming County West Virginia

Wyoming General Hospital closed its doors in 1988. Wyoming General was located in Mullens, West Virginia, a town whose local economy was fueled largely by the coal mining and railroading industries. Throughout the 1930s and into the 1950s Wyoming General was operated by a single owner—a local physician. In the 1950s,

stock in the hospital was sold to four area physicians who ran the hospital until the mid 1980s. In the 1980s the physician owners began to retire due to health problems and hospital stock was transferred to each of the remaining partners until they, too, retired. In the mid-1980s the remaining physician owners made a decision to sell the hospital to an Ohio-based group practice. This group was able to hold onto the hospital for two to three years. However, financial circumstances led to the facility's closure in 1988. According to the hospitals' legal counsel at the time, among the reasons for the financial failure of the hospital was the fact that contracted physician staff were overpaid, and the hospital set up an employee retirement system that lost money because it didn't generate enough income and did not require investments on the part of staff. The last of several coal mines also shut down in the mid 1980s, preceding hospital closure and perhaps contributing to the hospital's financial failure (respondents did not agree on this). Attempts to save the hospital by locating another buyer were unsuccessful and the hospital was converted to a nursing facility.

At the time that it closed, Wyoming General was the largest employer in the town. Many of the hospital's former employees sought employment in neighboring hospitals, retired, or transitioned into other professions (e.g., education). Subsequent to the hospital's closure and particularly after local roads improved, Mullens residents traveled to either Welch or Raleigh Counties for care. A nurse who was formerly employed at the hospital indicated that travel to the nearest hospital increased to about 45 minutes but that access to hospital services was not greatly affected. Few, if any, businesses have since moved into the area.

There are currently no other hospitals located in Mullens and three physicians are practicing in the town.

Case Study 10. Red Bird Mountain (Bell and Clay Counties) Kentucky

The market area around the former Red Bird Mountain hospital is home to approximately 5,000 people that are spread over 150 square miles. There is no formal town in the area, and the main road to the hospital was not paved until 1984. While not formally a town, there is series of buildings along the paved road that act as the center of the Red Bird Community. The hospital was located next to a church mission, a school, and senior citizen's center. The hospital building is now used as a local health clinic/dental clinic/pharmacy. There are no retail businesses in Red Bird, but three to five miles away there is a small store.

The hospital closed in 1986 and the local volunteer ambulance service now takes patients to Manchester Kentucky, a 30-minute drive away. Bell and Clay Counties both include parts of the Red Bird mountain area and are considered economically distressed by the Appalachian Regional Commission.

Due to a loss of coal mining jobs in the area and an improvement in the road leading to other larger hospitals, the number of admissions at the Red Bird Hospital declined from approximately 1,000 in 1980 to 500 in 1985. The hospital closed in 1986 due to consistent losses of over \$10,000 per month and difficulty recruiting staff. Seventy jobs were lost. Some of those employees were hired by the community health clinic that was opened in the hospital building. There was not a "ripple effect" on other area businesses, largely because there were not any major employers in the area.

In a recent customer satisfaction survey by the Red Bird clinic, the number one request was to bring back the hospital. That is where local people were born, and it acted as a centering point for the community. But a hospital is probably not economically viable given local demographics. For various reasons including a decline in the mining employment, the population continues to dwindle and those that remain are very poor. At the local clinic, 34 percent of the patients are on Medicaid and most of the 19 percent that are self-pay patients pay based on a sliding scale that is tied to their income.

The people of Red Bird Mountain still have access to outpatient care and are a thirty-minute drive from emergency and inpatient care. While the community has reasonable access to care, the manager of the local clinic stresses that people still miss their hospital. It was a place where babies could be born locally and the elderly could receive inpatient care without leaving their community.

Summary of Case Study Findings

- 1) The hospital closures that we evaluated resulted in few negative economic impacts.
- 2) In the cases where the local economy declined following the loss of a hospital, the local economy was already suffering from other economic events such as mine closures.
- 3) The closures do not seem to have severely hampered access to physicians, pharmacists, or nursing home services.
- 4) Nursing home access can improve with conversion of hospital buildings to nursing homes.
- 5) The decline and closure of a hospital often stretches over a number of years. The hospital staff can decline prior to closure and people start to use other providers in the area. The final blow of the hospital closing can be limited in part due to communities having time to adjust to alternative sources of care.
- 5) In three cases, EMS services improved following closure of the hospital. The communities increased EMS funding due to the increase in travel times to emergency rooms and corresponding increase in the services expected of EMS personnel.

A caveat of our work, of course, is that our findings are most applicable to Appalachia. They may not hold in areas of the west where there is more distance between providers. Most people that thought the closures had a minimal or positive impact on their community stressed that alternative sources of care were available within a reasonable distance.

VII. CONCLUSIONS

This report has presented a large amount of data on health care institutions in Appalachia. Most of the data are consistent with beliefs espoused in the mainstream academic journals and trade press. However, there are at least two instances where our data are not consistent with conventional wisdom. Table 7 summarizes our key findings and identifies findings consistent with conventional wisdom.

Table 7: Does Conventional Wisdom Match Appalachian Data?

| Issue Area | Conventional Wisdom | Is Appalachian data consistent with conventional wisdom? |
|---|--|--|
| Physician supply | Slow growth in supply with physicians concentrated in higher income areas. ¹ | Largely consistent |
| Dentist supply | No growth in supply and shortages in rural areas. ² | Consistent |
| Hospital profitability | Many small hospitals are struggling, but larger facilities are usually profitable. ³ | Largely consistent |
| Nursing home profitability | Many nursing homes are having severe financial difficulty. ⁴ | Not consistent. Most Appalachian nursing homes were financially healthy. |
| Home health services | Home health services continue to be available in most communities. ⁵ | Consistent |
| Mental health services | There is a shortage in rural areas. ⁶ | Consistent |
| Drug and alcohol treatment | There is less access in rural areas. ⁷ | Consistent |
| Obstetric Services | Fewer hospitals are offering services. ⁸ | Consistent |
| Economic impact of health care institutions | Local hospitals play a critical role in maintaining the health of small-town economies. ⁹ | Not consistent. Most counties that lost their only hospital continued to see employment growth at rates similar to rural Appalachian averages. |

References for conventional wisdom: ¹Cooper et al. 2002, Hart et al. 2002. ²Mertz et al. 2002. ³HCFM 2002, Stensland et al. 2002. ⁴GAO, 1999. ⁵GAO, 2002. ⁶Hartley et al. 2002. ⁷SAMHSA, 2002. ⁸Heaphy et al. 2000. ⁹Doeksen et al. 1997.

In contrast with conventional wisdom, our data suggest that Appalachian nursing homes tend to be in good financial shape. Above average profitability is associated with low staffing levels and low wages at Appalachian nursing homes. Our report does not evaluate whether there is a need to improve the quality of care in Appalachian nursing homes.

Our research also indicates that hospital closures have caused limited adverse affects in Appalachia. Large hospitals that are the only source of care have not closed in Appalachia. When large hospitals that lack competitors get into financial trouble, they are usually sold or restructured following bankruptcy. In contrast, very small hospitals close because they are often in markets without sufficient population density to support hospital profitability. However, when these hospitals have closed they have had only minor negative impacts on the local economy. It appears that if a closure does not have a significant impact on patient's access to care, it is unlikely that they will have a significant impact on the local economy. One important caveat is that all the Appalachian hospital closures were facilities within 45 minutes of another facility. The closures of more isolated facilities may have a larger impact on access to care in the community.

Consistent with the literature, our data suggest that there is a need for programs that improve access to mental health, substance abuse, and dental services. The lack of access to these services suggests that they may not be sufficiently profitable to entice providers into rural areas. Low volumes of patients and a lack of insurance coverage for these types of services may make certain areas unattractive to providers.

Addressing Current Challenges

Dentistry. Data compiled by the project team suggest that access to dental care is impaired by a limited supply of dentists in most Appalachian counties, where the supply of dentists per capita is less than for the nation overall. As noted above, we are especially concerned about distressed counties, where the supply of dentists is the lowest in the Appalachian region. From a policy perspective, a shortage of dentists is not unlike a shortage of physicians. Appropriate policy responses are those that improve the supply and distribution of components of the professional workforce. A difference, however, between the markets for physician and dentist services, is that financial barriers may be more stringent for dentist services: relatively fewer persons have comprehensive dental benefits, which disproportionately limits access in markets where personal income is lower.

A long-run goal would be to increase the supply of dentists or achieve a more even geographic distribution of dental health professionals. Thus, the ARC might encourage research into the effects of policies that could be used increase dental workforce supply in Appalachia. Possibilities include subsidies of dental education or practice expenses that are contingent on location of practice in an underserved area. Programs that subsidize the purchase of dental care might also help in attracting dentists to Appalachia. For example, outreach efforts under the State Children's Health Insurance Program (SCHIP) could be targeted at Appalachian counties by states in the region. An increase in the numbers of children and adult family members with SCHIP dental coverage should improve revenues of dentists in areas where the population was

previously lacking in dental coverage, making these areas relatively more attractive to dentists who are establishing new practices.

In the short run, policies might be used to increase the numbers of low-income patients treated by existing dental service providers. Although states are currently facing budget shortfalls, increases in Medicaid payments for dental services might improve access to care for the most needy. Alternatively, Medicaid payment increases could be targeted to dentists who serve areas with the greatest needs, as bonus payments to physicians are targeted at services provided in certain shortage areas under the Medicare Incentive Program. State- and local-government support for education efforts on the importance of adequate dental care to one's health status might also be effective in encouraging persons in distressed counties to seek dental services in neighboring communities in spite of high travel time and transportation expenses.

Mental health and substance abuse. Our data indicate that economically distressed counties have few hospital-affiliated providers of mental health and substance abuse treatment. Across the nation, the percentage of counties with hospital affiliated outpatient drug and/or alcohol treatment fell from 29 percent in 1994 to 25 percent in 2000. The number of hospital-affiliated drug and alcohol treatment facilities are particularly limited in distressed counties of Appalachia. Only 8 percent of distressed Appalachian counties had a provider of hospital-affiliated substance abuse outpatient services. Only 20 percent of distressed counties had hospital-affiliated mental health services.

One difficulty with providing these services in small communities is that there is often a stigma attached to seeking help with mental health or substance abuse problems.

Therefore, patients may choose to seek care in neighboring communities or at primary care facilities that are not identified in the community as purely serving mental health and/or substance abuse patients. A second difficulty is the chronic shortage of mental health professionals (Hartley, 2002). Third, there is often a lack of local support for setting up regional treatment centers that will treat substance abuse patients. An administrator of a closed hospital specifically mentioned that he thought the community was less willing to support capital campaigns of the hospital due to the hospital's large substance abuse treatment center that primarily served patients from outside of the local community. The administrator's comments suggest that there may be a need for regional planning and regional funding of mental health services.

While the development of new programs is beyond the scope of this report, the Commission may want to investigate the feasibility of the following initiatives:

- a) Conduct an analysis of all sources of mental health and substance abuse treatment. In this study we only present data on services provided by hospitals or their affiliates.
- b) Evaluate the cost effectiveness of providing financial support for the coordination of state and local substance abuse initiatives in the Appalachian region.
- c) Investigate supporting the use of community health centers to expand access to mental health services. In the fall of 2001 Health and Human Services Secretary Tommy Thomson announced \$24.8 million in grants to existing Community Health Centers to expand their scope of services to include mental health services. New Community Health Centers were required to include a mental health component in their service mix.
- d) Expand on the work by the Commission that addresses Telemedicine to improve access to mental health therapy via video conferencing.

Obstetrics. Access to obstetric care is declining in rural areas. Only 35 percent of distressed counties have a hospital that provides obstetric services. The result has been a consolidation of services into higher-volume larger hospitals.

It is not clear from the literature whether consolidating obstetric services improves or harms obstetric outcomes. Patients lose local access, but they gain the benefit of giving birth at a high-volume hospital. As we mentioned earlier, the Appalachian Regional Commission may want to wait for more definitive evidence on the impact of consolidation on birth outcomes before it institutes any programs to stem the tide of declining local access to obstetric services in Appalachian counties.

Summary

In general, the core of the Appalachian health care infrastructure is improving. There is an expansion in the number of physicians per capita, and most nursing homes and hospitals are financially healthy. While some small hospitals have been forced into closure, the closures that we studied had very limited economic impacts. Although travel times to inpatient care have increased slightly following the hospitals' closure, community members have secured access to inpatient services in neighboring counties—sometimes with the assistance of enhanced, county-funded services (e.g. EMS).

In contrast to the improvement in the supply of core health care services, we did not find improvement in the supply of services that are frequently not provided by general practitioners, hospitals and nursing homes. Specifically, there may be a need to improve the supply and delivery of dental care, obstetrics, mental health services, and substance abuse services in the Appalachian region.

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