The Economic Impact of a Rural Primary Care Physician and the Potential Health Dollars Lost to Out-migrating Health Services

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The health care sector at the rural community level is important for many reasons. Living in a rural area is appealing to many people, primarily for the quiet lifestyle and strong community relationships. These "quality of life" variables are important not only to those who want to continue living in a rural area, but also to urban residents that are searching for a change. However, for a rural community to survive, the local economy must be sustainable which will allow for the provision of important local services.

Typically, rural communities pay little attention to their health care system until they need it. As a result, many people have little idea of the non-medical importance of the health care system to the local communities. The employment opportunities and the resulting wages and salaries make the health care system an extremely important part of the local economy. Research from the National Center for Rural Health Works indicates that between 10 and 15 percent of the jobs in many rural counties are in the health care sector **[1]**. Hospitals often are the second largest employer in rural counties, trailing only local school systems. Furthermore, industrial and business location decisions are significantly influenced by the quality of the local schools and health care systems. The retention and recruitment of retirement aged residents are also impacted by quality health care systems. Business development and stable populations are important aspects of a solid community economy. A durable community economy is hard to maintain without quality health care services. Substantial economic growth is significantly less likely without a strong health care sector.

Primary care physicians are a major part of the health care system. In most rural communities, they are the principal provider of local health care services. They also contribute

to their communities through educational programs promoting healthy lifestyles and quite often serve as medical director for the local emergency medical service. Economically, they hire and pay staff to operate a clinic and also contribute to the local hospital through inpatient admissions and outpatient services. A key to achieving a sustainable economy is capturing local expenditures. Local expenditures support jobs, create additional wages and salaries and provide tax revenues that are vital to the local economy. If primary care services are not available locally, to meet the need for services residents have to purchase their services in nearby communities. In addition, out of town trips to obtain healthcare naturally offer opportunities to spend dollars out of town that may have been spent locally. These out-migrated dollars are missed opportunities and can significantly impact the local economic base. As America faces a growing physician shortage, it is absolutely critical that rural leadership across America understand that rural communities are at risk of losing much more than the opportunity to receive local medical care.

The objective of this study is to estimate the economic impact of a primary care physician on a rural community and to provide a methodology for estimating the economic potential of health care services for a rural community. To accomplish this objective, the study is divided into three sections.

1. Estimation of the benefits generated by a rural physician. This includes:
    - impacts to local employment, wages and salaries
    - impacts to local hospital inpatient services
    - impacts to local hospital outpatient services
    - revenues associated with primary care physician visits, inpatient and outpatient services

- the economic contributions from the direct and secondary impacts of a local primary care physician

2. Discussion of the impact to a community when health services are lost due to physician shortages. This includes:
    - office visits and revenue lost when services are purchased outside the medical service area
    - impacts to local hospital inpatient services
    - impacts to local hospital outpatient services
    - revenues associated with inpatient and outpatient services
    - the economic impacts from the direct and secondary impacts
3. Provision of guidelines to identify need for specialty physician services in a rural community.

For physicians and hospitals, these methodologies will estimate the potential increase in local health expenditures from recapturing dollars lost when health services are not purchased locally. In addition to primary care, there is interplay between local primary care physicians and the availability of local specialty services. Patients who out-migrate for primary care are going to generally "stay out-migrated" for derivate specialty services. The specialty physician section quantifies the potential specialty physician services needed in a rural medical service area. Additional dollars will be captured in the community with specialty physician services available locally as patients will also purchase subsequent laboratory services locally.

The Economic Contributions of a Rural Physician

Everyone knows that a primary care physician in rural areas provides needed medical services. However, the economic contribution of the physician to the rural economy is typically

less known. The first section of this study estimates the economic value that a primary care physician provides to a typical critical access hospital or rural community. Economic benefits from the clinic and hospital are estimated. This assessment underestimates the total value of a rural primary care physician as their impact on other sectors such as pharmacy and nursing homes is not included.

Visits to a primary care provider are a major part of our health care needs. An estimated 58.9 percent of all physician visits are made to primary care physicians or midlevel practitioners such as physician assistants or nurse practitioners **[2].** Availability of adequate primary care services is essential for a strong health care system and can account for significant health expenditures in the form of revenues to the physician practice.

A large portion of the revenues generated by a primary care physician practice will be returned to the local community. These primary care dollars will create employment opportunities for medical staff and will provide incomes that in turn will also be spent locally. This employee spending, along with physician office purchases from other local industries will stimulate economic growth in many other parts of the economy. As these dollars continue to be spent in the community, the multiplier effect generated by the physician becomes clear. Much of this economic activity also generates additional tax revenues that can be used by the local government to fund important community services.

Direct Impacts of a Primary Care Physician

Data in **Table 1** present the direct impacts that the primary care physician has on his or her clinic. In addition to the physician, new employment opportunities for physician medical staff will be created along with corresponding wages and salaries. Data from the American Medical Association (AMA) 2001 survey to its members indicated that a typical general/family

medical practice physician has three full time employees **[3]**. Therefore the total employment impact including the physician would be four jobs. U.S. Bureau of Labor Statistics wage and salary estimates these four jobs total $286,925 which includes 25 percent for benefits **[4]**. This estimate includes $169,312 earnings and benefits for a physician and $117,613 earnings and benefits for the three full-time employees: a nurse ($59,000), medical technician ($33,613) and a receptionist ($25,000). The 2001 AMA survey also provided total annual revenues from a general/family medical practice. The consumer price index was applied to update current revenues **[5]**. Total 2005 national average practice revenue adjusted for inflation was $394,275 after deferred compensation such as 401(k) or other retirement plans

Table 1
2005 Estimated Employment, Wage and Salaries and Revenues
at Rural Physician Clinic

Employment	4
Wages, Salaries and Benefits	$286,925
Revenues	$394,275

The direct impacts that a rural physician has on the hospital are reflected in **Table 2**. Hospitals are an integral part of the local health care sector. As previously mentioned, the community hospital is a major provider of jobs and income in the local community and medical service area. A strong viable hospital must have support from local physicians to maintain sufficient utilization. Lack of local physician support will significantly impact the financial stability of the hospital. In addition to the inpatient visits, physicians can generate significant outpatient activity that increases hospital net revenue. Data implies that on average a general practice/family medicine physician, which often is the predominant practitioner in critical access hospitals (CAHs) or rural hospitals, generates 134.4 hospital discharges per year **[6]**.

According to 2005 Medicare revenue data collected from Oklahoma CAHs, inpatient net revenue per hospital discharge is estimated at $3,397 **[7]**. The estimated total hospital revenue attributed to the primary care physician inpatient business is $456,557 (134.4 x $3,397). The additional net revenue from outpatient activity can vary among physicians. The 2005 Oklahoma data disclosed that average outpatient net revenue was approximately 64.7 percent of inpatient net revenues suggesting potential outpatient revenues of $295,392 to the hospital from a physician. Combining $456,557 from inpatient services and $295,392 from outpatient services, a rural physician will generate $751,949 for the hospital from his patient activity

Table 2
Inpatient Discharges, Revenues, Employment and Wage and Salaries at the Hospital Generated by a Rural Physician

No. of Inpatient Discharges	134.4
Inpatient Revenue	$456,557
Outpatient Revenue	$295,392
TOTAL Revenue	$751,949
Employment	12.6
Wage, Salary and Benefits	$434,627

This revenue will support hospital employment and generate payroll. The Oklahoma Data were used to estimate the number of hospital employees and wages and salaries that will be generated from patient revenue. First, average total employment costs (including benefits) were estimated from CAH total net revenue. An estimated 57.8 percent of hospital revenues were spent on wages and salaries including benefits in 2005 according to Oklahoma data. Wage, salary and benefits at the hospital produced from physician activity total $434,627 ($751,949 x 0.578). Average cost per employee was $34,447 resulting in direct hospital employment of 12.6 ($434,627/$34,447).

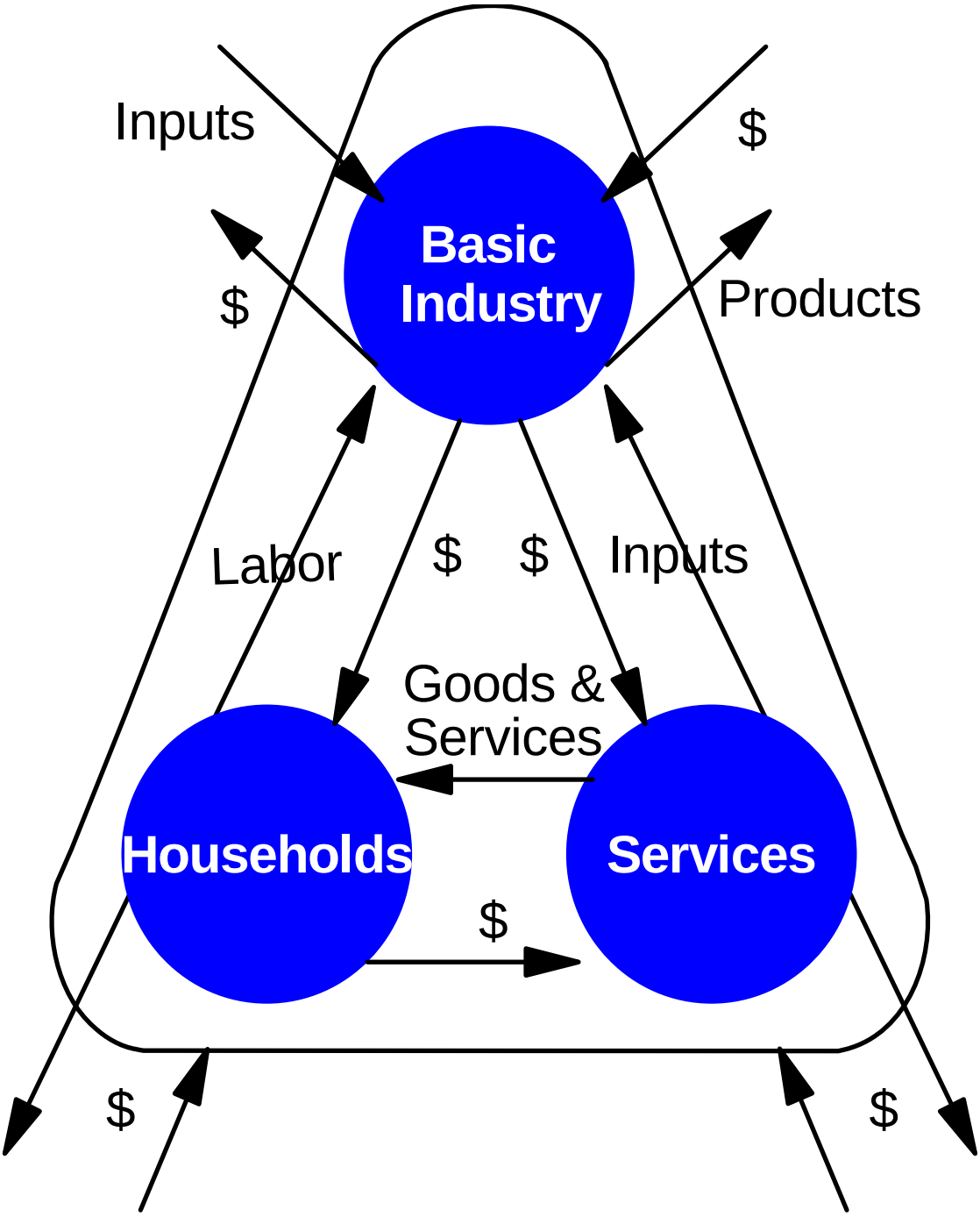
The Multiplier Effect

As stated earlier, these direct jobs and wages and salaries will further benefit the community through increased jobs and income. As the physician office, hospital and the medical staff purchase goods and services, additional employment and income are created in other businesses. The additional employment and income can be calculated with an input-output model and IMPLAN data. This model and data are explained in more detail in **Appendix A**.

The concept is depicted in **Figure 1**, which illustrates the major flows of goods, services, and dollars from a basic industry. The basic industry, in this case the physician office or hospital, purchases inputs from outside the community (upper left portion of **Figure 1**), labor from the residents or "households" of the community (left side of **Figure 1**), and inputs from service industries located within the community (right side of **Figure 1**). Households using their earnings to purchase goods and services from the community's service industries complete the flow of labor, goods, and services in the community. It is evident from the relationships illustrated in **Figure 1** that a change in any one segment of a community's economy will cause reverberations throughout the entire economic system of the community.

Total Contribution Including Secondary Impacts

Data in **Table 3** present the total impacts of the physician clinic and the business that the typical primary care physician brings to a local hospital. For this analysis, average multipliers for six CAH communities are utilized. The output multiplier indicates how this revenue moves through a local economy. For example, the clinic revenue multiplier of 1.37 estimates that for every $1 of revenue collected by the clinic, another $0.37 is generated by other businesses in the community due to local purchases made by the clinic and its employees. **Table 1** shows that the revenue to the clinic was $394,275. The total revenue impact of the clinic ($540,157) is shown



Community Economic System
Figure 1

in **Table 3**. The same methodology used for the hospital yields $992,573 of revenue generated throughout the community. The total revenue generated from the clinic and the hospital is $1,532,730.

Using the jobs and payroll data from **Tables 1 and 2,** an estimate of total income and employment created from the primary care physician practice and hospital discharges can be made. The bottom line is that the family practice physician will generate $889,156 in income (wages, salaries and benefits) in the community and create 22.9 jobs throughout the community. The estimate is low as the impact measures only the impacts from the clinic and hospital and does not include impacts from pharmacy, nursing home, etc.

Table 3
Total Impact of a Physician on Revenues, Income and Employment at Physician Clinic and Hospital[1]

	Revenue	Output Multiplier	Total Impact
Clinic	$394,275	1.37	$540,157
Hospital	$751,949	1.32	$992,573
Total	**$1,146,224**		**$1,532,730**
	Income	Income Multiplier	Total Impact
Clinic	$286,925	1.16	$332,833
Hospital	$434,627	1.28	$556,323
Total	**$721,552**		**$889,156**
	Employment	Employment Multiplier	Total Impact
Clinic	4.0	1.38	5.5
Hospital	12.6	1.38	17.4
Total	**16.6**		**22.9**

[1] Income includes wages, salaries and benefits

Source: 2005 IMPLAN database, Minnesota IMPLAN Group, Inc., Local data from six Oklahoma Critical Access Hospital communities.

This report clearly documents the importance of a rural physician. The physician generates approximately $1.5 million in revenue, $0.9 million in payroll and creates 23 jobs. The relatively large impact is created through clinic employment, inpatient services, outpatient activities and the multiplier effect of these contributions. Thus, the physician's *economic* contributions are as important to a community as their medical contributions

Procedure to Estimate Dollars Lost to Out-migration of Health Services

A physician shortage exists in many rural areas. Frequently, this local shortage occurs even when the statewide averages do not suggest it. Too often, the statewide distribution of physicians is the real issue. Obviously, this local shortage is made worse when there is a statewide shortage. In addition to the impact on the health status of the local population, a shortage of health professionals can significantly impact the local economic activity. A physician shortage in a community leads to residents purchasing their primary care health services in nearby communities. With this out-migration of health services, businesses and the overall local economy lose these primary care dollars.

A physician shortage can be determined by assessing the number of primary care physician office visits produced in a medical service area. The number of all physician office visits is estimated by using the service area population data and the data from state and national research **[2,8,9]**. Data in **Table 4** present the number of annual visits to physician offices by specified age and gender in 2004. For instance, for males under age 15, the average number of physician office visits was 2.5 visits per year. It has been suggested that utilization per capita in rural areas might be slightly lower than the

national average. However, in the absence of specific rural data, these national coefficients can serve as the best approximations available.

The U.S. Census Bureau population estimates by age and gender for an example medical service area of 9,138 which typifies a rural community are given in **Table 5**. The average annual visit rates from **Table 4** are applied to estimate the number of primary care physician office visits in the service area. For example, the 882 males in the medical service area under the age of 15 will generate 2,205 physician office visits (2.5 x 882). Females under 15 are estimated to generate 1,999 office visits. All the residents in the medical service area are estimated to make 28,914 total physician office visits per year. Data from the U.S. Department of Health and Human Services **[2]** estimate that 58.9 percent or 17,030 of these total physician office visits will be made to physicians active in primary patient care while the remainder will be made to specialists.

Table 4
Annual Visits in 2004 to Physician Offices by Age and Gender

Age	Visit Rate	
	Male	Female
Under 15	2.5	2.4
15-24	1.2	2.2
25-44	1.5	3.2
45-64	3.3	4.2
65-74	6.0	6.4
75+	7.7	7.1

*****Visit rates are based on July 1, 2004 estimates of civilian noninstitutional populations

Source: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center of Health Statistics, "National Ambulatory Medical Care Survey, 2004 Summary", No. 374, June 23, 2006

Table 5
Annual Primary Care Physician Office Visits
Generated in the Example Medical Service Area

PRIMARY MEDICAL SERVICE AREA							
	Male			Female			
Age	2004 Population	Visit Rate	Visits	2004 Population	Visit Rate	Visits	Total Visits
Under 15	882	2.5	2,205	833	2.4	1,999	4,204
15-24	782	1.2	938	751	2.2	1,652	2,591
25-44	1,270	1.5	1,905	1,203	3.2	3,850	5,755
45-64	1,089	3.3	3,594	1,135	4.2	4,767	8,361
65-74	310	6.0	1,860	357	6.4	2,285	4,145
75+	207	7.7	1,594	319	7.1	2,265	3,859
Total	4,540		12,096	4,598		16,818	28,914
Local Primary Care Physician Office Visits: (58.9%)							17,030

Source: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center of Health Statistics, "National Ambulatory Medical Care Survey, 2004 Summary", No. 374, June 23, 2006; U.S. Census Bureau.

Physician Shortage

The American Medical Association (AMA) survey from 2001 reported that a general /family physician practice averaged 4,870 visits per year based on visits per week and average weeks per year involved with their patients **[3]**. **Table 6** displays the number of primary care visits and the number of primary care physicians that could be supported based on various local usage rates. It is unrealistic to assume that a community can expect to capture all of the visits due to personal preferences and available alternatives, but the goal should be to capture as much of this activity as possible. For example, if 85 percent of the residents in the example medical service area used local physicians, this would generate 14,476 local visits, resulting in the need for 3.0 primary care physicians. Local decision makers and health care providers should be involved in determining the usage rate appropriate for the service area.

Economic Impact of Physician Shortage

To illustrate the procedure, it was assumed that two physicians were currently practicing in the example medical service area. The resulting shortages for various target usage rates are also shown in **Table 6.** An additional physician and/or part time physician would increase the number of local office visits and recapture the dollars leaving the area. One additional full-time physician would be required to achieve a target rate of 85 percent or an additional 0.6 full time equivalent (FTE) physician for a 75 percent rate. The results shown in **Table 3** can provide a simple method to estimate the economic benefits of capturing these additional clinic visits. For example, multiplying the total clinic revenue from one physician ($394,275) by 60 percent (0.6 FTE) yields an estimated $236,565 in additional revenue from an extra 0.6 FTE primary care physician.

Table 6
Primary Care Physician Office Visits and Physician Shortages for Different Local Usage by Residents in the Example Medical Service Area

Usage Level	70%	75%	80%	85%	90%	95%	100%
Primary Care Visits	11,921	12,773	13,624	**14,476**	15,327	16,179	17,030
Number of Primary Care Physicians	2.4	2.6	2.8	**3.0**	3.1	3.3	3.5
Primary Care Physician Shortage	0.4	0.6	0.8	**1.0**	1.1	1.3	1.5

For example, **85%** usage level generates **14,476** total primary care physician office visits which would support an estimated **3.0** total primary care physicians.

*****Based on **2.0** current physicians and **4,870** average annual primary office visits per primary care physician practice.

Source: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center of Health Statistics, "National Ambulatory Medical Care Survey, 2004 Summary", No. 374, June 23, 2006; U.S. Census Bureau; American Medical Association, Center for Health Policy Research, "Physician Socioeconomic Statistics, 2003 Edition."

The increased primary care clinic visits and dollars for target rates from 70 percent to 100 percent are shown in **Table 7.**

As discussed earlier, the local hospital also loses dollars from physician shortages. Data in **Table 8** exhibit the number of hospital discharges that are lost from shortages for different target rates. The additional 0.6 FTE physician would allow the hospital to recapture 80.6 out-migrated discharges assuming a rate of 134.4 hospital discharges per physician (**Table 2**). **Table 8** also illustrates the potential gain in inpatient dollars, outpatient dollars and total net revenue from meeting the target usage rate. Again, the results provided in **Table 3** can be used to demonstrate impacts from the various target rates. For instance, multiplying the total hospital revenue ($751,949) by 60 percent (0.6 FTE) yields an estimated $451,169 in additional revenue for a 75 percent target rate.

Total Impact of Additional Primary Care Dollars on Employment and Income

Assuming the 75 percent local usage rate, **Table 9** presents the total impact on employment and income from the increased revenue. As detailed earlier, the direct impacts are the jobs and wages, salaries and benefits created with additional revenue from the recaptured revenue. Applying the multipliers to the revenue, direct employment and income yields an estimate of the total impact on the medical service area. The additional 0.6 FTE physician will generate $687,734 in revenue for a total impact of $919,637. The recaptured activity will generate a total impact of 13.8 jobs and $533,493 in income including the physician net earnings and medical staff wages, salaries and benefits at the clinic and hospital. The results presented show that even a part time physician can have a significant impact on the economy of a rural economy. For many

Table 7
Potential Primary Care Office Visits and Increased Primary Care Dollars from Capturing Services Out-Migrating to Communities Outside the Example Medical Service Area

Target Usage	70%	75%	80%	85%	90%	95%	100%
Primary Care Physician Shortage	0.4	**0.6**	0.8	1.0	1.1	1.3	1.5
Out-migrated Office Visits	1,948	**2,922**	3,896	4,870	5,357	6,331	7,305
Increased Primary Care Dollars	$157,710	**$236,565**	$315,420	$394,275	$433,703	$512,558	$591,413

For example, **85%** target local usage rate of services would require **1.0** additional physician and generate **$394,275** potential additional primary care dollars.

*****Based on **2.0** current physicians and **$80.96** per primary care visit.

Source: American Medical Association, Center for Health Policy Research, "Physician Socioeconomic Statistics, 2003 Edition." U.S. Department of Labor, Bureau of Labor Statistics 2005 consumer price index used to inflate cost per primary care visit.

Table 8
Potential Inpatient Visits, Increased Inpatient Dollars, Increased Outpatient Dollars and Increased Net Revenue from Primary Care Services to Local Residents in the Example Medical Service Area

Target Usage	70%	75%	80%	85%	90%	95%	100%
Primary Care Physician Shortage	0.4	**0.6**	0.8	1.0	1.1	1.3	1.5
Out-migrated Inpatient Discharges	53.8	**80.6**	107.5	134.4	147.8	174.7	201.6
Increased Inpatient Dollars	$182,623	**$273,934**	$365,245	$456,557	$502,212	$593,524	$684,835
Increased Outpatient Dollars	$118,157	**$177,235**	$236,314	$295,392	$324,931	$384,010	$443,088
Increased Net Revenue	$300,780	**$451,169**	$601,559	$751,949	$827,143	$977,534	$1,127,923

*****Based on **2.0** current physicians, **134.4** hospital discharges per primary care physician, **$3,397** per discharge and **39.27** percent of total revenue from outpatient visits.

Source: Socioeconomic Characteristics of Medical Practice, 1994, American Medical Association, 2005
Medicare revenue data collected from Oklahoma Critical Access Hospitals.

Table 9
Total Impact of 0.6 FTE Primary Care Physician on Revenues, Income and Employment at Physician Clinic and Hospital[1]

	Revenue	Output Multiplier	Total Impact
Clinic	$236,565	1.37	$324,094
Hospital	$451,169	1.32	$595,543
Total	**$687,734**		**$919,637**
	Income	Income Multiplier	Total Impact
Clinic	$172,155	1.16	$199,700
Hospital	$260,776	1.28	$333,793
Total	**$432,931**		**$533,493**
	Employment	Employment Multiplier	Total Impact
Clinic	2.4	1.38	3.3
Hospital	7.6	1.38	10.5
Total	**10.0**		**13.8**

[1] Income includes wages, salaries and benefits

Source: 2005 IMPLAN database, Minnesota IMPLAN Group, Inc., Local data from six Oklahoma Critical Access Hospital communities.

rural communities, this impact will make a noticeable difference through increased services and the opportunity to keep their hospital from closing.

Specialty Physician Services

Primary care physician services are fundamental to quality rural health care systems, but there is still a need for some access to specialty physician services. Typically, many of the visits to a specialist will be to the larger urban facilities located in the adjoining metropolitan areas. Specialty services are sometimes technology driven and the necessary infrastructure is commonly unavailable or the provision of these services is cost prohibitive for a smaller rural hospital. Furthermore, the demands for some specialty services do not permit a cost efficient approach to support a full-time equivalent (FTE) specialist in the rural areas that have sparse populations. However, rural residents could and do receive a range of specialty services in the local community depending on the medical resources available in the community and the local need for service. Frequently, there is a desire for a local specialist for long term follow-up given the difficulties some patients have with repeated long distance travels to the specialist's office.

Staffing ratios from eight large prepaid group practices (PGPs) serving more than eight million enrollees at Kaiser Permanente and two other health maintenance organizations (HMOs) are used to estimate the potential for specialty services **[10,11]**. The data represents a comprehensive specialty-specific description of the PGP employed physicians in more than 40 specialties. Rates were reported in terms of employed full time equivalent patient care MDs and DOs on staff per 100,000 people enrolled at each site. Data converted to population to physician ratios in **Table 10** shows staffing ratios

from theses PGPs along with actual ratios from AMA to represent the populations indicated to support one full time specialist. An average of these ratios can be applied to the population of the example rural medical service area to estimate the need for a specialist in some of the more common medical and surgical areas.

Table 11 details the number of FTE specialists based on the example population (9,138) assuming the previously obtained physician to population ratios from **Table 10**. For example, the average need shown in **Table 11** for a cardiology specialist is 0.36 FTE (9,138/25,501). This can be compared to a specialist visiting the hospital on a basis of one to two times per week. To better explain, the AMA reported that in 2000 the average time spent in practice for cardiovascular specialists was 47 weeks per year **[3]**. If the average specialist spends five days per week and 47 weeks per year in practice (235 days), a 0.2 FTE specialist would practice 47 days per year or average one day per week. Likewise, a 0.4 FTE specialist would practice 94 days or average two days per week.

The economic impact of a specialist on the local community is difficult to ascertain. The average cost per visit is going to vary significantly among different diagnoses and from specialist to specialist. Although the number of visits per specialist will be less than the visits per primary care physician, it is reasonable to believe that the economic impact might still be significant as the average dollar per visit will exceed the $80.96 average per visit revenue estimated for primary care physicians in **Table 7**. Another economic benefit of having a specialist practice in the local community is capturing dollars from laboratory services. A 2006 survey in Louisiana found that over 90 percent of the patients who went out of town to visit a specialist also had their lab work at the specialist's location **[12]**.

Table 10
Population to Physician Ratios for Several Common Specialty Physicians

Specialist	Kaiser	Group Health	Health Partners	AMA Actual	Average
Medical					
Allergy	93,333	70,000	140,000	71,794	93,782
Cardiology	31,111	28,000	28,000	14,894	25,501
Gastroenterology	46,667	40,000	46,667	31,111	41,111
Hem/Oncology	46,667	46,667	46,667	NA	46,667
Nephrology	70,000	70,000	56,000	NA	65,333
Neurology	56,000	46,667	35,000	25,000	40,667
Pulmonary	93,333	46,667	56,000	38,356	58,589
Rheumatology	93,333	70,000	93,333	NA	85,557
Surgical					
ENT	40,000	35,000	NA	31,111	35,370
General	16,471	14,737	13,333	6,796	12,834
Ophthalmology	25,455	25,455	28,000	15,643	23,638
Orthopedic	23,333	14,737	NA	12,335	16,802
Urology	40,000	35,000	NA	26,923	33,974

NA: Not Available

Source: Weiner, Jonathan P., "Prepaid Group Practice Staffing and U.S. Physician Supply: Lessons for Workforce Policy," Health Affairs, February 4, 2004, pp.43-59; Shell, Eric, Stroudwater Associates, "Performance Improvement Strategies for Rural Hospitals."

Table 11
Specialty Physician Full Time Equivalents for the Example Medical Service Area

Specialist	Kaiser	Group Health	Health Partners	AMA Actual	Average
Medical					
Allergy	.10	.13	.07	.13	.10
Cardiology	.29	.33	.33	.61	.36
Gastroenterology	.20	.23	.20	.29	.22
Hem/Oncology	.20	.20	.20	NA	.20
Nephrology	.13	.13	.16	NA	.14
Neurology	.16	.20	.26	.37	.22
Pulmonary	.10	.20	.16	.24	.16
Rheumatology	.10	.13	.10	NA	.11
Surgical					
ENT	.23	.26	NA	.29	.26
General	.55	.62	.69	1.34	.71
Ophthalmology	.36	.36	.33	.58	.39
Orthopedic	.39	.62	NA	.74	.54
Urology	.23	.26	NA	.34	.27

NA: Not Available

Source: Weiner, Jonathan P., "Prepaid Group Practice Staffing and U.S. Physician Supply: Lessons for Workforce Policy," Health Affairs, February 4, 2004, pp.43-59; Shell, Eric, Stroudwater Associates, "Performance Improvement Strategies for Rural Hospitals."

Specialty Physician Visits

Another way to determine possible need for specialty services in a rural area is to investigate the number of visits that specialists make to rural hospitals. Rural hospitals in Oklahoma were surveyed in 2006 to assess specialty physician activity. Hospitals were asked the type of specialist and the monthly frequency in which each specialist visited the facility. The hospitals were aggregated by size or average daily patient census and the results are presented in **Appendix B. Tables B1** through **B3** clearly display that even hospitals with average daily census of five or less required some specialty physician services. For example, 72.2 percent of the hospitals surveyed with a daily census of five or less said they had a cardiologist visit the hospital at least once a month with the median or greatest number of hospitals reporting twice a month (**Table B1**). For most specialty types, the percent of hospitals reporting visits from those specialists increased significantly as hospital size increased to six to ten average daily census (**Table B2**). This information can be helpful to hospital decision makers exploring the feasibility of some specialty physician services by allowing comparative assessment with other hospitals of similar size.

Summary

The importance of a local physician and the medical contribution that he or she makes to the community can easily be revealed with improvements in residents' health and higher quality of life indicators. However, the economic contribution is not typically quantified. This study clearly demonstrates that economic contributions are equally as important as medical contributions. A rural physician generates approximately $1.5 million in revenue, $0.9 million in payroll (wages, salaries and benefits) and creates 22

local jobs. These effects are underestimated as the impact on the local pharmacy is not included.

When expenditures are being lost due to residents utilizing physicians or hospitals outside the community, the lost dollars can be significant. The actual amount of lost dollars was estimated for a theoretical rural community. The results revealed that if there was a 0.6 primary care physician shortage, the community would be missing an estimated $236,565 from the physician clinic visits and the hospital would be losing $451,169 net revenue that could be gained from inpatient services and outpatient activity. After adjusting for indirect and induced effect with economic multipliers, the total impact of this 0.6 physician shortage was 13.8 jobs and $533,493 in income. The lost income also has a negative impact on potential sales tax collections which affects a community's ability to fund other important services. Finally, in addition to missed revenues from the lack of certain specialty physicians, the community is not capturing all of its potential expenditures on laboratory services as patients tend to have laboratory work done at the specialist's location.

The methodologies presented here can serve as tools for community leaders to assess their local health services in terms of primary care physician visits. The results can serve as templates to identify potential health expenditures that might be recaptured with additional physicians or by introducing specialists to the area. All recaptured dollars can be regarded as new revenue that comes into the community. New revenues stimulate growth and economic development and are further amplified by the multiplier effect that comes with them. Local decision makers should exercise caution when estimating local spending, particularly when utilizing national coefficients that are implemented in this

study. Spending patterns and income levels vary across regions and from state to state. Available local data should be utilized to improve accuracy. However, in the absence of local data, these national coefficients serve as valuable estimators of potential health expenditures which could result in increased local revenues. The process of determining a local community's economic potential from health care services may expose issues that can and should be addressed as well as providing an avenue to potentially increase the community's economic health.

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Appendix A

Model and Data Used to Estimate Employment and Income Multipliers

Appendix A
Model and Data Used to Estimate Employment and Income Multipliers

A computer spreadsheet that uses state IMPLAN multipliers was developed to enable community development specialists to easily measure the secondary benefits of the health sector on a state, regional or county economy. The complete methodology, which includes an aggregate version, a disaggregate version, and a dynamic version, is presented in Measuring the Economic Importance of the Health Sector on a Local Economy: A Brief Literature Review and Procedures to Measure Local Impacts (Doeksen, et al., 1997). A brief review of input-output analysis and IMPLAN are presented here.

A Review of Input-Output Analysis

Input-output (I/O) (Miernyk, 1965) was designed to analyze the transactions among the industries in an economy. These models are largely based on the work of Wassily Leontief (1936). Detailed I/O analysis captures the indirect and induced interrelated circular behavior of the economy. For example, an increase in the demand for health services requires more equipment, more labor, and more supplies, which, in turn, requires more labor to produce the supplies, etc. By simultaneously accounting for structural interaction between sectors and industries, I/O analysis gives expression to the general economic equilibrium system. The analysis utilizes assumptions based on linear and fixed coefficients and limited substitutions among inputs and outputs. The analysis also assumes that average and marginal I/O coefficients are equal.

Nonetheless, the framework has been widely accepted and used. I/O analysis is useful when carefully executed and interpreted in defining the structure of a region, the interdependencies among industries, and forecasting economic outcomes.

The I/O model coefficients describe the structural interdependence of an economy. From the coefficients, various predictive devices can be computed, which can be useful in analyzing economic changes in a state, a region or a county. Multipliers indicate the relationship between some observed change in the economy and the total change in economic activity created throughout the economy.

MicroIMPLAN

MicroIMPLAN is a computer program developed by the United States Forest Service (Alward, et al., 1989) to construct I/O accounts and models. Typically, the complexity of I/O modeling has hindered practitioners from constructing models specific to a community requesting an analysis. Too often, inappropriate U.S. multipliers have been used to estimate local economic impacts. In contrast, IMPLAN can construct a model for any county, region, state, or zip code area in the United States by using available state, county, and zip code level data. Impact analysis can be performed once a regional I/O model is constructed.

Five different sets of multipliers are estimated by IMPLAN, corresponding to five measures of regional economic activity. These are: total industry output, personal income, total income, value added, and employment. The total impact of a change in the economy consists of direct, indirect, and induced impacts. Direct impacts are the changes in the activities of the impacting industry such as the addition of another physician and corresponding medical staff to the medical service area. The increased purchases of inputs by the new physician clinic as a result of the direct impact are the indirect impact on the business sectors.

Two types of multipliers are generated. Type I multipliers measure the impact in terms of direct and indirect effects. However, the total impact of a change in the economy consists of direct, indirect, and induced changes. Both the direct and indirect impacts change the flow of dollars to the state, region, or county's households. Subsequently, the households alter their consumption accordingly. The effect of the changes in household consumption on businesses in a community is referred to as an induced effect. To measure the total impact, a Type II multiplier is used. The Type II multiplier compares direct, indirect, and induced effects with the direct effects generated by a change in final demand (the sum of direct, indirect, and induced divided by direct). IMPLAN also estimates a modified Type II multiplier, called a Type SAM multiplier that also includes the direct, indirect, and induced effects. The Type SAM multiplier further modifies the induced effect to include spending patterns of households based on a breakdown of households by nine difference income groups.

Minnesota IMPLAN Group, Inc. (MIG)

Dr. Wilbur Maki at the University of Minnesota utilized the input/output model and database work from the U. S. Forest Service's Land Management Planning Unit in Fort Collins to further develop the methodology and to expand the data sources. Scott Lindall and Doug Olson joined the University of Minnesota in 1984 and worked with Maki and the model.

As an outgrowth of their work with the University of Minnesota, Lindall and Olson entered into a technology transfer agreement with the University of Minnesota that allowed them to form MIG. At first, MIG focused on database development and provided data that could be used in the Forest Service version of the software. In 1995,

MIG took on the task of writing a new version of the IMPLAN software from scratch. This new version extended the previous Forest Service version by creating an entirely new modeling system that included creating Social Accounting Matrices (SAMs) – an extension of input-output accounts, and resulting SAM multipliers. Version 2 of the new IMPLAN software became available in May of 1999. For more information about Minnesota IMPLAN Group, Inc., please contact Scott Lindall or Doug Olson by phone at 651-439-4421 or by email at info@implan.com or review their website at www.implan.com.

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Appendix B

Specialty Services in Rural Oklahoma Hospitals

Appendix Table B-1
Specialist Visits per Month for Rural Oklahoma Hospitals with 5 or Less Average Daily Census

Specialist	Percent of Hospitals	Maximum	Minimum	Median
Medical				
Cardiology	72.2	6	1	2
Gastroenterology	5.6	2	2	2
Hem/Oncology	0	0	0	0
Nephrology	0	0	0	0
Neurology	0	0	0	0
Pulmonary	5.6	8	8	8
Surgical				
ENT	0	0	0	0
General	16.7	8	4	4
OB/GYN	11.1	4	2	3
Ophthalmology	5.6	1	1	1
Orthopedic	11.1	8	4	4
Podiatry	11.1	4	1	2.5
Urology	16.7	4	1	1

Source: 2006 Survey of Rural Oklahoma Hospitals.

Appendix Table B-2
Specialist Visits per Month for Rural Oklahoma Hospitals with a 6 to 10 Average Daily Census

Specialist	Percent of Hospitals	Maximum	Minimum	Median
Medical				
Cardiology	58.8	8	1	2
Gastroenterology	11.8	8	2	5
Hem/Oncology	11.8	8	4	6
Nephrology	0	0	0	0
Neurology	5.9	2	2	2
Pulmonary	11.8	2	1	1.5
Surgical				
ENT	17.6	4	2	2
General	35.3	8	2	4
OB/GYN	11.8	4	2	3
Ophthalmology	41.2	2	1	2
Orthopedic	41.2	16	1	4
Podiatry	17.6	4	2	3
Urology	52.9	20	1	4

Source: 2006 Survey of Rural Oklahoma Hospitals.

Appendix Table B-3
Specialist Visits per Month for Rural Oklahoma Hospitals with an 11 to 15 Average Daily Census

Specialist	Percent of Hospitals	Maximum	Minimum	Median
Medical				
Cardiology	100	20	1	6
Gastroenterology	40	12	6	9
Hem/Oncology	40	4	1	3
Nephrology	20	2	2	2
Neurology	20	4	4	4
Pulmonary	20	20	20	20
Surgical				
ENT	60	4	1	2
General	40	10	2	6
OB/GYN	20	4	4	4
Ophthalmology	40	1	1	1
Orthopedic	80	8	2	2
Podiatry	80	8	2	3
Urology	100	10	2	4

Source: 2006 Survey of Rural Oklahoma Hospitals.