The Changing Face of Economic Development: Health Care as an Economic Engine

By:

Gerald A. Doeksen
Regents Professor
Department of Agricultural Economics
Oklahoma State University
Stillwater, OK 74078-0488
405-744-6083
E-mail: gad@okstate.edu

Paper presented at the EcoMod International Conference on
Regional and Urban Modeling, June 1-3, 2006 in Brussels, Belgium

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Everyone knows that hospitals provide access to vital health care services 24 hours a day, 7 days a week, and 365 days a year. Other health care providers, such as physicians, are also available to ensure quality health care services throughout the year. But the role of hospitals and other health care providers play as a major contributor to economic development is often overlooked. The purpose of this report is to demonstrate how important health services are to the economy of a rural community. More specifically, the report will:

1. briefly review trends in the health care industry;
2. measure the impact the health care sector has on a rural economy;
3. measure the impact of a large urban hospital on an urban economy; and
4. discuss why a viable health care sector is vital to economy development.

Trends in the Health Care Industry

The health care sector is an extremely fast growing sector, and based on the current demographics, there is every reason to expect this trend to continue. Data in **Table 1** provide selected expenditure and employment data for the United States. Several highlights from the national data are:

- In 1970, health care services as a share of the national gross domestic product (GDP) were 7.2 percent. This increased to 16.0 percent in 2004:
- Per capita health expenditures increased from $357 in 1970 to $6,280 in 2004;
- Employment in the health sector increased 250 percent from 1970 to 2002; and
- Annual increases in employment from 1995 to 2002 ranged from 2.8 percent up to 7.3 percent.

Table 1
United Stated Health Expenditures and Employment Data
1970-2004; Projected for 2005, 2010 & 2015

	United States Data							
Year	Total Health Exp. ($$ Billions)	Per Capita Health Exp. ($$)	Health Exp. as % of GDP (%)	Health Sector Emp. (000)	Ave. /Yr. Increase in Emp. (%)	Hlth & Soc Asst Emp. (000)	Ave./ Yr. Increase in Emp. (%)	
1970	$75.10	$357	7.2%	3,052				
1980	254.9	1,106	9.1%	5,278	7.3%			Emp.
1990	717.3	2,821	12.4%	7,814	4.8%	N/A	N/A	Based
2000	1,358.5	4,729	13.8%	10,103	2.9%	N/A	N/A	on
2001	1,474.2	5,079	14.6%	10,381	2.8%	N/A	N/A	SIC[1]
2002	1,607.9	5,485	15.4%	10,673	2.8%	N/A	N/A	
2003	1,740.6	5,879	15.9%	N/A	N/A	14,759	N/A	Emp.
2004	1,877.6	6,280	16.0%	N/A	N/A	15,052	2.0%	Based
Projections								on
2005	2,016.0	6,683	16.2%					NAICS[2]
2010	2,879.4	9,148	18.0%					
2015	4,031.7	12,320	20.0%					

SOURCES: Bureau of Labor Statistics; Bureau of Economic Analysis; Centers for Medicare & Medicaid Services, National Health Expenditures 1970-2004 and National Health Expenditure Projections 2005-2015, website: http://www.cms.hhs.gov/NationalHealthExpendData, data as of February 2006

N/A - Not Available

[1] Based on Standard Industrial Classification (SIC) codes for health sector employment and health & social assistance employment.

[2] Based on North American Industrial Classification System (NAICS) for health and social assistance employment.

In addition, the Bureau of Labor Statistics projects substantial increases in health care expenditures from 2004 through 2015; in fact, it is predicted that health care expenditures will account for 18.0 percent of GDP by 2010 and increase to 20.0 percent of GDP in 2015. Per capita health care expenditures are projected to increase to over $9,000 in 2010 and further increase to $12,320 in 2015. Total health expenditures are projected to increase to over $4 trillion in 2015.

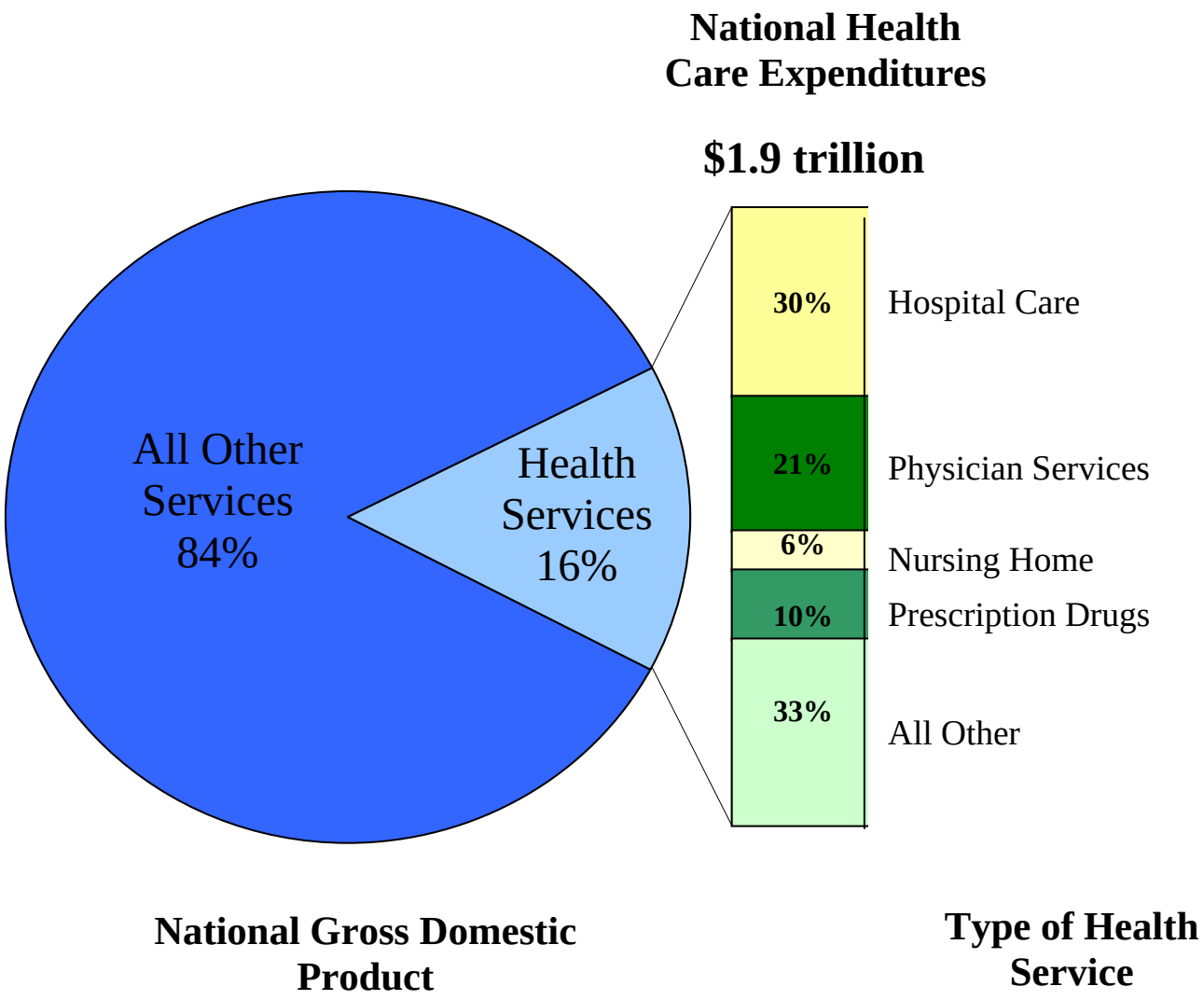
Of the 16.0 percent of GDP or $1.9 trillion spent on health care in 2004, thirty percent of the expenditures were for hospital care and another 21 percent were for physician services (**Figure 1**).

Impact of the Health Care Sector on the Local Economy

To illustrate the economic impact of the health care sector on a rural community's economy, an application of an impact model is presented for a rural county in Oklahoma. The county is located in central Oklahoma and has approximately 12,000 residents. A model to estimate the economic impact of the health sector has been developed by Doeksen, Johnson, and Willoughby [1]. It utilizes regional tools and data that are available at the county level. The model has five health care sectors, which are:

- Hospitals'
- Doctors and Dentists (including other medical professionals)'
- Nursing and Protective Care'
- Pharmacies; and
- Other Medical and Health Services (includes home health care and county health departments).

Figure 1.
National Health Expenditures
as a Percent of Gross Domestic Product and by Health Service Type, 2004



Employment and payroll information associated with each sector must be collected locally. For this rural county, the data are presented in **Table 2**. For example, the hospitals employ 125 and have a payroll of $3,420,000. The total health sector in the county employs 527 employees and has a payroll of $12,094,643.

Table 2
Direct Economic Activities of the Health Sector
for a Rural County in Oklahoma

Component	Employed	Income
Hospitals	125	$ 3,420,000
Doctors and Dentists	51	$ 2,318,000
Nursing & Protective Care	209	$ 2,351,783
Other Medical & Health Services	118	$ 3,041,860
Pharmacies	24	$ 963,000
TOTAL	527	$12,094,643

SOURCE: Local survey and estimated from research

In summary, the health sector is vitally important as an employer in the county. In fact, the health sector accounts for a total of 527 jobs or 12 percent of the county's total employment. These numbers do not tell the complete impact, as health service providers and employees purchase goods and services from businesses in the county, creating additional jobs and wages and salaries. The impact on other business is referred to as secondary benefits and is measured by multipliers.

Basic Concepts of community Economics and Multipliers

The concept of community economics and multipliers is illustrated in **Figure 2**. The triangle depicts a community's economy with basic industry, services, and households. Basic industry buys labor from households and inputs from service providers. The arrows indicate the flow of dollars in exchange for labor and services. Households need to purchase services, such as groceries, clothes, etc., and again dollars flow for the purchase of these services. As soon as businesses and households purchase labor or services outside the community, the impact on the community's economy will decrease. A model is available which can measure the secondary effect on other businesses due to health care expenditures. The model generates employment and income multipliers, which measure all secondary impacts that occur in a community's economy. For example, a hospital employment multiplier of 1.5 would indicate that for each job in the hospital, another 0.5 job is created in other businesses due to the hospital and its employees purchasing goods and services within the community.

The multipliers measure the total impact of the health sector, but can also measure the impact or decrease in business activity. Consider, for instance, the closing of a hospital. The hospital will no longer pay employees and dollars going to households will stop. Likewise, the hospital will not purchase goods from other businesses and dollars flowing to other businesses will stop. This decreases income in the household segment of the economy. Since earnings would decrease, households decrease their purchases of goods and services from businesses within the services segment of the economy. This, in turn, decreases these businesses' purchases of labor and inputs. Thus, the change in the economic base works its way throughout the entire local economy as reflected by the multipliers.

Total Impact of Health Care Services

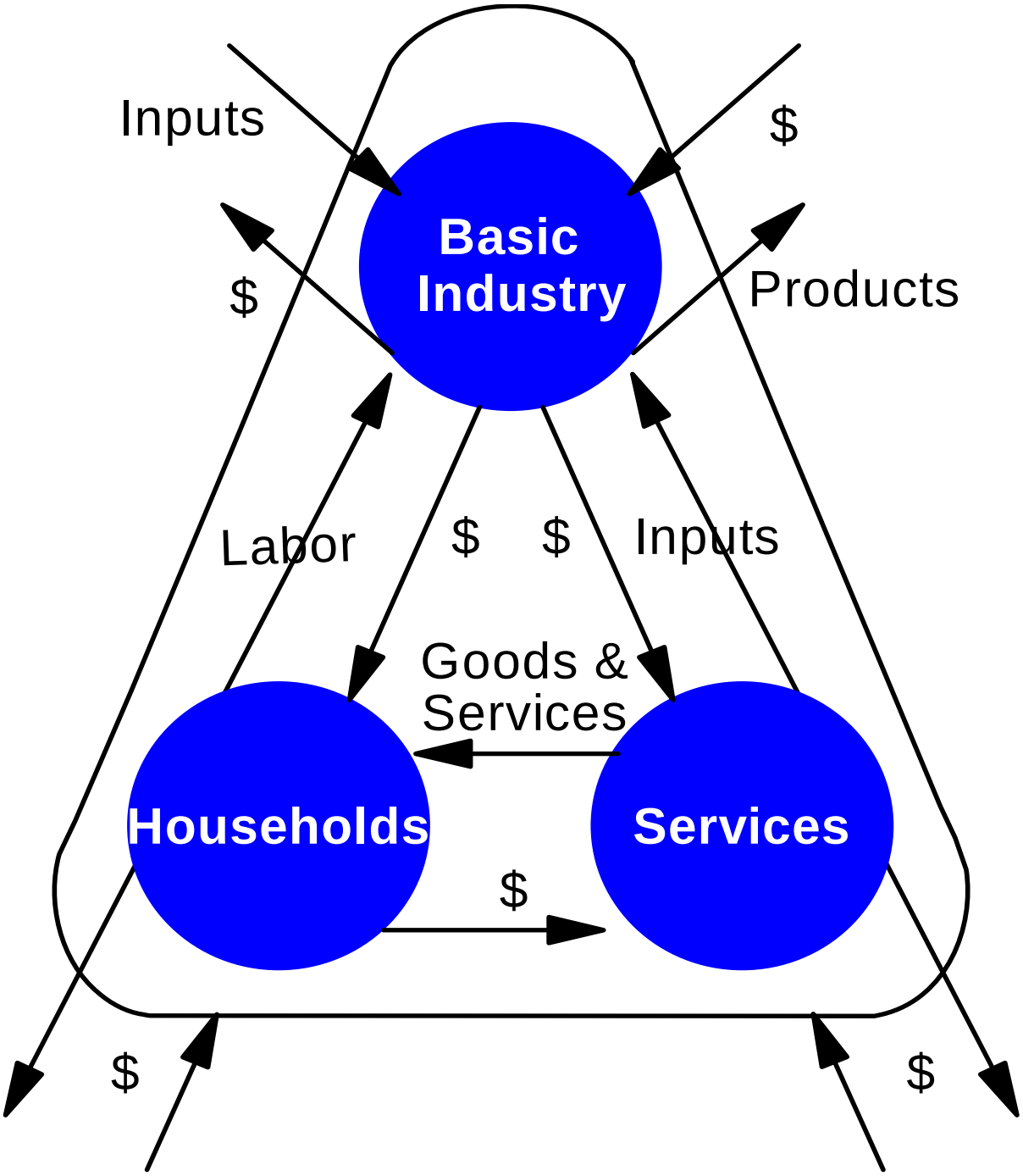


Figure 2.
Concept of Community Economics and Economic Multipliers

The total impact of the health care services in the rural county in Oklahoma is presented in **Table 3**. The first column under employment indicates the employment in the five health care sectors. The second column indicates the employment multipliers. For example, the hospital employment multiplier of 1.59 indicates that for each job in the hospital another 0.59 jobs are created in other businesses in the county. Thus, the total impact of the hospital sector in the county is 199 jobs (1.59 x 125). After estimating the secondary employment impact for all health sectors, the total impact of the health services on the county is 780 jobs or 18 percent of the county's employment.

A similar methodology is used to measure the impact on wages and salaries. For instance, the hospital income multiplier is 1.38, which states that for each dollar paid in wages and salaries by the hospital, another 38 cents of wages and salaries is generated in other businesses in the county. The $3,420,000 payroll of the hospital sector generates a total wage and salary impact in the rural county of $4,719,000. The total wage and salary impact of the health services in the county is $17,304,031.

The model can also estimate how much of the wage and salary income is spent in retail stores in the county. It is estimated that retail merchants receive $3,840,253 in retail sales due to the economic activities generated by the health services in the rural county. A one cent sales tax on these retail sales would generate $38,403 annually.

Impact of an Urban Health System on an Urban Economy

To illustrate the economic impact of a large urban health system, the impact model is applied to an urban health system. The economic impact of the large system, as measured by employment, payroll, and capital investment is huge (**Table 4).** The system employs 10,351 full

Table 3
Total Economic Impact of the Health Sector on Employment and Income

Health Sectors	EMPLOYMENT			WAGES AND SALARIES			Retail Sales	1 Cent Sales Tax Collection
	Employed	Multiplier	Impact	Income	Multiplier	Impact		
Hospitals	125	1.59	199	$3,420,000	1.38	$4,719,600	$1,047,413	$10,474
Physicians, Dentists, and Other Professionals	51	1.57	80	$2,318,000	1.31	$3,036,580	$673,903	$6,739
Nursing & Protective Care	209	1.41	295	$2,351,783	1.41	$3,316,014	$735,917	$7,359
Other Medical & Health Services	118	1.46	172	$3,041,860	1.52	$4,623,627	$1,026,114	$10,261
Pharmacies	24	1.40	34	$ 963,000	1.67	$1,608,210	$356,907	$3,5694
Total	**527**		**780**	**$12,094,643**		**$17,304,031**	**$3,840,253**	**$38,403**

NOTE: Most data were obtained from secondary sources. In a few instances, data were unavailable, extrapolated and/or estimated.

SOURCE: www.okruralhealthworks.org

Table 4
Employment, Payroll, and Capital Expenditures for the Urban Health System

Health Care Business	No. of Full-Time & Part-Time Employees	Wages, Salaries & Benefits ($1,000s)	Capital Expenditures ($1,000s)
Administration	224	12,417	23,798
Hospitals	8,455	374,627	47,502
Physician Services	1,292	107,360	1,689
Other Health Services	380	22,663	2,096
TOTAL	**10,351**	**517,067**	**75,085**

and part-time people and has a payroll (wages, salaries, and benefits) of $517,067 million. Of the total employment, 224 are employed in administration, 8,455 in hospital, 1,292 in physician offices, and 380 in other health services. Data were collected relative to capital expenditures. The results document the fact that the system invests tremendous amounts each year to improve their physical plants. The impact of this investment on the regional economy is often overlooked. The system had capital expenditures of over $75.1 million.

As presented in the previous section, the economic impact of the urban system, measured by its employment and payroll, is significant. However, this does not tell the complete story as secondary economic impacts are created when the health facilities and their employees spend money. These secondary benefits are measured by multipliers using an input-output model and data from IMPLAN, a model that is widely used by economists and other academics across the U.S. The IMPLAN model and data are further discussed in **Appendix A**. The multiplier effect was discussed in the rural impact analysis in the previous section of this paper.

The Impact on the State's Economy

The total employment impact of the health system on the state's economy is presented in **Table 5.** The system creates jobs from their operating activities and from their construction activities. Employment (jobs) and income (payroll including wages, salaries, and benefits) from operating activities were obtained from the urban system. Annual employment and income from construction activities had to be estimated from capital investment data provided by the system.

As noted from Table 5, there are 10,351 full-time and part-time employees working in the system. The jobs were divided by type of services provided. Each type of service or sector has its own multiplier. For example, the hospitals employ 8,455 workers. The hospital sector has an employment multiplier of 2.60; this means for every job created in the hospital sector, another

Table 5
Total Employment Impact of
the Urban Health System

Health Care Business	Number of Employees	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
Administration	224	2.06	237	461
Hospital	8,455	2.60	13,528	21,983
Physician Services	1,292	2.01	1,305	2,597
Other Health Services	380	1.85	324	704
Total Operating Activities	**10,351**		**15,394**	**25,745**
Construction Activities	589	2.26	743	1,332
Total Activities	**10,940**		**16,137**	**27,077**

1.60 jobs are created in other sectors (businesses) in the state. The number of jobs created in other businesses is 13,528 (1.60 x 8,455) and is referred to as secondary jobs. The total employment impact of the hospitals is 21,983 jobs. The physician services employ 1,292 and have an employment multiplier of 2.01. Thus, 1,305 secondary jobs are created in other businesses due to the employees of the physician services spending money in the state. The total employment impact in the state due to physician services is 2,597 jobs. In summary, secondary jobs created by operational activities of the system are 15,394 and the total jobs are 25,745.

The system has spent about 25.5 million on construction activities per year; $27 million on information technology and $23 million on other capital equipment. This expenditure creates significant construction employment and is part of the impact the system has on the state's economy. Using the construction employment output ratio, it was estimated that the capital expenditures create 589 full-time and part-time jobs annually. These are the construction workers that are working directly on hospital construction projects. The secondary jobs created by construction activities on hospital construction equal 743 and total jobs equal 1,332.

When the construction jobs are combined with operational jobs, there are 10,940 total jobs created by the health system. The total number of secondary jobs is 16,137. In total, the system generates 27,077 jobs in the state due to both operating and construction activities.

Data on the income impact of the system are presented in **Table 6**. The health system paid $404.5 million in wages and salaries. As with the employment impact, the services are classified into four sectors or types of business. Each sector has its own income multiplier. For example, the hospital sector has an income multiplier of 2.16. This means that for each $1.00 of income paid in hospital wages and salaries, another $1.16 of wages and salaries is generated in other businesses due to the hospital spending in the state. The total income from operational

Table 6
Total Income Impact of the Urban Health System

	($1,000s)					
	Wages and Salaries	**Income Multiplier**	**Secondary Income**	**Total Income**	**Retail Sales**	**State Sales Tax**
Administration	$ 10,130	1.44	$ 4,457	$ 14,587	$ 5,368	$ 322
Hospitals	292,449	2.16	339,241	631,690	232,462	13,948
Physicians Services	83,477	1.52	43,408	126,885	46,694	2,802
Other Health Services	18,467	1.83	15,262	33,729	12,412	,744
Total Operating Activities	404,523		402,368	806,891	296,936	17,816
Construction Activities	$ 22,831	1.98	$ 22,375	$ 45,206	$ 16,635	$ 998
Total Activities	**$427,354**		**$424,743**	**$852,097**	**$313,571**	**$18,814**

activities is direct wages and salaries of $404.5 million and secondary income of $402.4 million, resulting in an income impact of $806.9 million. This is the amount of wages and salaries generated throughout the state from operational activities of the health system. When the income impact of construction activities is added, the total wages and salary impact on the state is $852.1 million.

In the state, 36.83 percent of income is spent in retail stores that collect sales tax. Using the state average, an estimate of the amount of retail sales that the system generates is calculated. It is estimated that the $852.1 million in income impact generated $313.6 million in retail sales. The state collects a 6 percent sales tax; thus, the activities of the health system generate $18.8 million in state sales tax revenue each year.

The Impact on Federal, State, and Local Taxes

The fact that the system is a tax-exempt entity does not mean that it does not generate many dollars worth of taxes through its employees and the secondary employment that the system generates in the economy. Data on **Table 7** summarize the Federal, state, and local taxes generated by the total health system employment and payroll. These total over $145.3 million annually. When available, the tax data from the system were utilized in the estimation process. In many cases tax data were not available and estimates were made using the best available estimation procedures. The estimation assumptions are discussed below.

The Impact of Federal Income Taxes Federal income taxes were estimated utilizing health system data. The system indicated that $28.1 million was withheld from the employees' paychecks for federal income taxes. The ratio of federal income taxes withheld for system employees to total payroll system employees was applied to the secondary employees' wages and salaries, resulting in an estimate of $28.0 million in federal income taxes from secondary

Table 7
Summary of Taxes Generated Annually
by Health System Employees and Secondary Employees
($1,000)

Tax		Estimated Amount
Federal Taxes		
Income Tax	$ 56,100	
Subtotal		$56,100
State Taxes		
State Income Taxes	$ 24,710	
State Sales Taxes	18,830	
Subtotal		43,540
Local Taxes		
Homeowner Property Taxes	$ 26,245	
City wage Taxes	11,370	
County Sales Taxes	4,499	
Other Consumption taxes[1]	3,565	
Subtotal		45,679
TOTAL ESTIMATED TAXES		**$145,319**

[1] Other consumption taxes include state and county tobacco product taxes, state and county alcoholic beverage taxes, lodging taxes, and admission taxes.

employment. The total federal income tax estimated for both system employees and secondary employees is $56.1 million. Federal income taxes withheld from payroll may not match the final federal income tax liability, but this is the best data available and thus, is the proxy for the federal income taxes paid by the health system employees and secondary employees.

The Impact on State Income Taxes. State income taxes were estimated utilizing the health system data. The health system indicated that $11.7 million was withheld from their employees' paychecks for state income taxes. The ratio of state income taxes withheld for the system employees to total payroll of the health system employees was applied to the secondary employees' wages and salaries, resulting in an estimate of $13.0 million of state income taxes from secondary employment. The total state income tax estimate for both the system employees and secondary employees is $24.7 million. State income taxes withheld from payroll may not match the final personal income liability, but this is the best data available and thus, is the proxy for the state income taxes paid by the system employees and secondary employees.

State sales taxes paid by the system employees and secondary employees were estimated at $18.8 million. It was estimated that the system employees and secondary employees generate $313.8 million in retail sales annually. Using the 6% state sales tax rate yields the state sales tax estimated total. Total state taxes generated by the health system were estimated at $43.5 million.

An Estimate of Local Taxes. Local taxes consisted of property taxes, city wage taxes, county sales taxes and others. Homeowner property taxes were estimated at $26.2 million. This estimate was based on average property taxes per employee. Wage taxes data were estimated from the health system records and sales taxes from retail sales estimates from previous section. In total, local taxes generated by the health system were estimated at $45.7 million.

Health Services and Economic Development

The above sections have documented the economic contributions that the health sector makes on a rural county and a large urban community from operational activities and from construction projects. It has also been documented that a quality health sector is needed to attract businesses and industry and retirees.

The Importance of the Health sector for Business and Industrial Growth

Studies have found that quality-of-life (QOL) factors are playing a dramatic role in business and industry location decisions. Among the most significant of those QOL variables are health care and educational services (**Table 8**). Health care services are important for at least three reasons.

Table 8
Services that Impact Rural Development

Type of Growth	Services Important to Attract Growth
Industry and Business	Health and Education
Retirees	Health and Safety

First, as noted by a member of the Board of Directors [2] of a community economic development corporation, good health and education services are imperative to industrial and business leaders as they select a community for location. Employees and participating management may offer strong resistance if they are asked to move into a community with substandard or inconveniently located health services.

Second, when a business or industry makes a location decision, it wants to ensure that the local labor force will be productive, and a key factor in productivity is good health. Thus,

investments in health care services can be expected to yield dividends in the form of increased labor productivity.

The cost of health care services is the third factor that is considered by business and industry in development decisions. A 1990 site selection survey by Lyne [3] concluded that corporations are taking a serious look at health care costs. Sites that provide health care services at a low cost are sometimes given priority. In fact, 17 percent of the respondents indicated that their companies used health care costs as a tie-breaking factor between comparable sites.

The Importance of the Health Sector for Retirement Growth

A strong and convenient health care system is important to retirees, a special group of residents whose spending and purchasing can be a significant source of income for the local economy. Many rural areas have environments (e.g., good climate and outdoor activities) that enable them to be in a good position to attract and retain retirees. The amount of spending embodied in this population, including the purchasing power associated with Social Security, Medicare, and other transfer payments, is substantial. Additionally, middle and upper income retirees often have substantial net worth. Although the data are limited, several studies suggest health services may be critical variable that influences the location decision of retirees. For example, one study [4] found that four items were the best predictors of retirement locations: safety, recreational facilities, dwelling units, and health care. Another study [5] found that nearly 60 percent of potential retirees noted that health services were a “must have” attribute when considering a retirement community. Only protective services were mentioned more often than health services as a “must have” service.

Summary and Conclusion

The evidence provided above is clearly compelling that the health sector is an important development tool. A summary of the evidence is:

1. the health sector is a growing sector proven by demographics and more demands for services;
2. the health sector pays higher than average wages;
3. the health sector employs a large number of people
    a. rural county – 12%
    b. urban community – 13%
4. the health sector impact from health sector employees and secondary employees is huge
    a. rural county – employment multiplier for hospital was 1.38
    b. urban community – employment multiplier for hospital was 2.60
5. the health sector is extremely important in attracting businesses and industry; and
6. the health sector is extremely important in attracting retirees.

Rural and urban leaders may wish to use this type of data to:

1. gain community support for tax issues to support certain health issues;
2. demonstrate to local residents the importance of using local health services; and
3. plan and promote their local health care system such as helping to attract physicians or expand services.

References

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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. Two types of multipliers are generated. Type I multipliers measure the impact in terms of direct and indirect effects. Direct impacts are the changes in the activities of the focus industry or firm, such as the closing of a hospital. The focus business changes its purchases of inputs as a result of the direct impacts. This produces indirect impacts in other business sectors. 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 III multiplier that also includes the direct, indirect, and induced effects. The Type III 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.