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The Economic Impact of the Health Sector on the Economy of Appanoose County, Iowa

Daniel Otto


Iowa State University, dmozzo@iastate.edu

Georgeanne Artz

Iowa State University, gartz@iastate.edu

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The Economic Impact of the Health Sector on the Economy of Appanoose County, Iowa

Abstract

The importance of medical and health facilities as community service providers is well

established, yet their role in generating significant economic impacts for the community is less often acknowledged. Health care facilities, such as hospitals and nursing homes, not only employ many people with a sizeable payroll, but also draw a large number of people from rural areas into the community for medical services. In this study, we attempt to identify and measure the economic importance of the health sector for the economy of Appanoose County, Iowa. The specific objectives of this report are to:

1. summarize the direct economic activities of the health sector;
2. review concepts of community economics and multipliers related to healthcare; and
3. estimate the secondary impacts of the health sector on Appanoose County's economy.

Disciplines

Health Economics | Medicine and Health | Regional Economics | Regional Sociology | Work, Economy and Organizations

THE ECONOMIC IMPACT OF THE HEALTH SECTOR ON THE ECONOMY OF APPANOOSE COUNTY, IOWA

Daniel Otto and Georgeanne Artz¹

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¹ Extension Economist and Extension Program Specialist respectively, Department of Economics, Iowa State University

The Economic Impact of the Health Sector on the Economy of Appanoose County, Iowa^a

Daniel Otto and Georgeanne Artz ^b

The importance of medical and health facilities as community service providers is well established, yet their role in generating significant economic impacts for the community is less often acknowledged. Health care facilities, such as hospitals and nursing homes, not only employ many people with a sizeable payroll, but also draw a large number of people from rural areas into the community for medical services. In this study, we attempt to identify and measure the economic importance of the health sector for the economy of Appanoose County, Iowa. The specific objectives of this report are to:

1. summarize the direct economic activities of the health sector;
2. review concepts of community economics and multipliers related to healthcare; and
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County Demographic and Economic Data

This section will illustrate the population and employment patterns for Appanoose County.

Table 1 presents the population figures for Appanoose County. In 1990, the population of Appanoose County was 13,743. By 2000, the county population had decreased slightly to 13,721. The population of Centerville, the county seat, was 5,936 in 1990 and decreased to 5,924 in 2000. Moravia, the next largest town, gained about 30 people. About half of the remaining towns in the county had population increases over this decade, while in the other half, the population decreased between 1990 and 2000. The population in the rural areas of Appanoose County decreased about 2 percent, from 4,896 in 1990 to 4,779 in 2000.

a Based on materials originally developed for the Rural Health Works program through the Federal Office of Rural health Policy with Oklahoma State University as project leader.

b Extension Economist and Extension Program Specialist respectively, Department of Economics, Iowa State University

Table 1. Population of Appanoose County, Iowa

	1990 Population	2000 Population
Appanoose County	13,743	13,721
Centerville	5,936	5,924
Cincinnati	363	428
Exline	187	191
Moravia	679	713
Moulton	613	658
Mystic	545	588
Numa	151	109
Plano	75	58
Rathbun	89	88
Udell	76	58
Unionville	133	127
Balance of Appanoose County	4,896	4,779

¹SOURCE: Population data from the U.S. Bureau of the Census, 1990, 2000.

Map 1. Appanoose County, Iowa

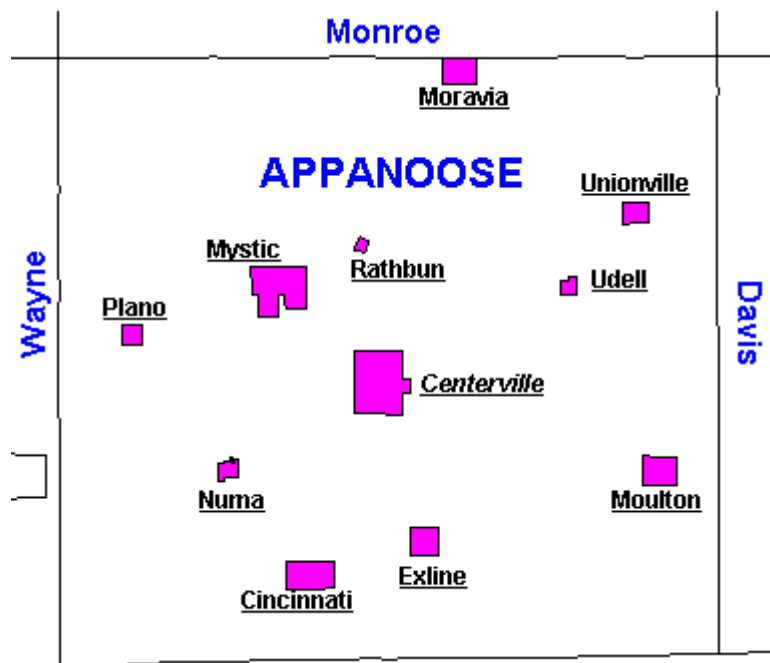


Table 2. Personal Employment by Industry

	1980	1990	1995	2000
Total full-time and part-time employment	6,634	6,525	7,101	7,756
Wage and salary employment	4,422	4,540	4,941	5,213
Proprietors' employment	2,212	1,985	2,160	2,543
Farm proprietors' employment	987	937	935	917
Nonfarm proprietors' employment	1,225	1,048	1,225	1,626
Farm employment	1,109	1,026	990	947
Nonfarm employment	5,525	5,499	6,111	6,809
Private employment	4,760	4,657	5,209	5,919
Ag. services, forestry, fishing, & other	56	(D)	(D)	(D)
Mining	91	(D)	(D)	(D)
Construction	295	169	192	290
Manufacturing	912	1,185	1,370	1,560
Transportation and public utilities	521	410	434	458
Wholesale trade	214	188	169	124
Retail trade	1,030	1,059	1,181	1,287
Finance, insurance, and real estate	328	219	233	346
Services	1,313	1,326	1,507	1,730
Government and government enterprises	765	842	902	890
Federal, civilian	92	94	85	87
Military	61	78	67	64
State and local	612	670	750	739
State	42	60	65	67
Local	570	610	685	672

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Local Area Personal Income and Employment, 2000.

(D) Not disclosed for reasons of confidentiality

(L) Less than 10 employees

Table 2 presents employment data for Appanoose County; data are from the Bureau of Economic Analysis' Regional Economic Information System for years between 1980 and 2000. In contrast to the population numbers, total employment in Appanoose County increased. This suggests that workers are commuting into the county. The industry sectors with the largest employment are services (1,730) and manufacturing (1,560). Retail trade (1,287), farms (947) and state and local government (739) also employ a significant number of workers in Appanoose County.

Table 3 presents income data for Appanoose County; these data are also from the Bureau of Economic Analysis' Regional Economic Information System. Total personal income in Appanoose County increased from about \$125 million in 1980 to \$281 million in 2000. Accounting for inflation, real personal income in the county rose 8% over this time period. Per capita income increased from \$8,052 per person in 1980 to \$20,487 per person in 2000. This is an increase of 22% in inflation-adjusted terms.

In 2000, approximately 56% of the personal income in Appanoose County was earned through wage and salary work or other labor income. The manufacturing (\$46,761,000), services (\$28,907,000) and government (\$27,091,000) sectors accounted for the largest share of these earnings. The remainder of personal income in the county was derived from other sources, such as transfer payments and income from dividends, interest and rent.

Table 3. Personal Income by Industry
(in thousands of current dollars)

	1980	1990	1995	2000
<i>Income By Place of Residence</i>				
Personal income	\$124,715	\$182,469	\$219,932	\$280,933
Nonfarm personal income	\$123,762	\$177,584	\$221,145	\$273,713
Farm income	\$953	\$4,885	-\$1,213	\$7,220
Per capita personal income (dollars)	\$8,052	\$13,276	\$16,027	\$20,487
<u>Derivation of personal income</u>				
Earnings by place of work	\$68,913	\$96,965	\$115,478	\$159,776
less: Personal contrb. for social insurance	\$3,885	\$6,839	\$8,901	\$11,038
plus: Adjustment for residence	\$6,148	\$6,053	\$8,094	\$8,164
equals: Net earnings by place of residence	\$71,176	\$96,179	\$114,671	\$156,902
plus: Dividends, interest, and rent	\$24,704	\$42,946	\$49,249	\$59,796
plus: Transfer payments	\$28,835	\$43,344	\$56,012	\$64,235
<i>Earnings By Place of Work</i>				
<u>Components of Earnings</u>				
Wage and salary disbursements	\$46,452	\$70,075	\$86,500	\$111,267
Other labor income	\$5,907	\$10,037	\$13,173	\$13,481
Proprietors' income	\$16,554	\$16,853	\$15,805	\$35,028
Farm proprietors' income	\$132	\$4,230	-\$1,718	\$6,690
Nonfarm proprietors' income	\$16,422	\$12,623	\$17,523	\$28,338
<u>Earnings By Industry</u>				
Farm earnings	\$953	\$4,885	-\$1,213	\$7,220
Nonfarm earnings	\$67,960	\$92,080	\$116,691	\$152,556
Private earnings	\$58,212	\$74,676	\$94,399	\$125,465
Ag. services, forestry, fishing, & other 8/	\$459	(D)	(D)	(D)
Mining	\$1,877	(D)	(D)	(D)
Construction	\$3,686	\$2,752	\$3,019	\$5,803
Manufacturing	\$13,166	\$25,511	\$34,999	\$46,761
Transportation and public utilities	\$10,305	\$12,758	\$14,976	\$17,301
Wholesale trade	\$3,691	\$3,685	\$2,738	\$2,725
Retail trade	\$8,221	\$9,760	\$12,542	\$16,779
Finance, insurance, and real estate	\$2,067	\$2,724	\$3,647	\$5,221
Services	\$14,740	\$15,247	\$20,161	\$28,907
Government and government enterprises	\$9,748	\$17,404	\$22,292	\$27,091
Federal	\$2,306	\$4,163	\$4,491	\$5,223
State	\$811	\$1,523	\$2,128	\$2,452
Local	\$6,631	\$11,718	\$15,673	\$19,416

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Local Area Personal Income and Employment, 2000.

(D) Not disclosed for reasons of confidentiality

The Direct Economic Activities

The health sector in Appanoose County most directly affects the area's economy through its employment and payroll. Federal and state employment and earnings reports can be used to measure the direct employment and income levels in the health-related sectors. The health sector is divided into the following five components:

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

The total health sector in Appanoose County employs 608 people and has an estimated payroll of \$14,726,674 (**Table 4**). Data from the U.S. Census Bureau's 2000 *County Business Patterns* indicate that the health sector in Appanoose County is typical of many rural areas, with one hospital, four physician offices, four dental offices, four nursing homes, and two pharmacies. The Hospital component employs 216 people with an annual payroll of \$5,217,458. The Doctors and Dentists (& Other Medical Professionals) component employs 92 people, with an annual payroll of \$4,804,000. Employment in the Nursing and Protective Care Component totals 192 people with an annual payroll of \$3,315,000. The Other Medical and Health Services component employs 80 workers, with an annual payroll cost of \$860,000. The Pharmacies component has an estimated 28 employees and a payroll of \$530,216. Nursing and Protective Care facilities are a particularly important component of the health sector in many rural communities, which have a large number of elderly, including farmers who often retire in the towns to be near medical facilities.

Table 4.
Direct Economic Activities of Health Sector in
Appanoose County, Iowa

Component	Estimated Employees	Estimated Payroll
Hospital	216	\$5,217,458
Doctors and Dentists	92	\$4,804,000
Nursing and Protective Care	192	\$3,315,000
Other Medical Health Services	80	\$860,000
Pharmacies (Health and Personal Care)	28	\$530,216
TOTALS	608	\$14,726,674

In summary, the health sector, as a large community employer, is valuable to the community's economy. In addition to this direct employment impact, firms in the health sector and their employees purchase many goods and services from businesses in Appanoose County. These purchases are referred to as secondary impacts to the economy. Before the secondary impacts of the health sector are discussed, several basic concepts of community economics will be presented. This will provide a context for understanding the relationships between different sectors of the local economy.

**Some Basic Concepts of Community Economics and
Income and Employment Multipliers**

A community's economy can be viewed as an interrelated flow of goods and services.

Figure 1 illustrates the major conceptual flows of goods, services, and dollars of any economy.

The foundations of a community's economy are those businesses which sell some or all of their

goods and services to buyers outside of the community. Such a business is called a basic industry.

The two arrows in the upper right portion of **Figure 1** represent the flow of products out of, and dollars into, a community. To produce these goods and services for “export” outside the community, the basic industry purchases inputs from outside of 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**). The flow of labor, goods, and services in the community is completed when households use their earnings to purchase goods and services from the community's service industries (bottom of **Figure 1**). It is evident from the interrelationships illustrated in **Figure 1** that a change in any one segment of a community's economy will have impacts throughout the entire economic system of the community.

Consider, for instance, the closing of a hospital. The services section will reduce employment and dollars going to households will decline. Likewise, hospital purchases from other businesses and the related dollar flow will stop. This decreases income in the “households” segment of the economy. Since earnings decrease, households reduce 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. Because some of the supplies are specialized and not available locally, and because of consumer preferences for non-local goods and services, part of this spending “leaks” out of the community.

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 closing of a hospital. The impacting business, such as the hospital, changes its purchases of

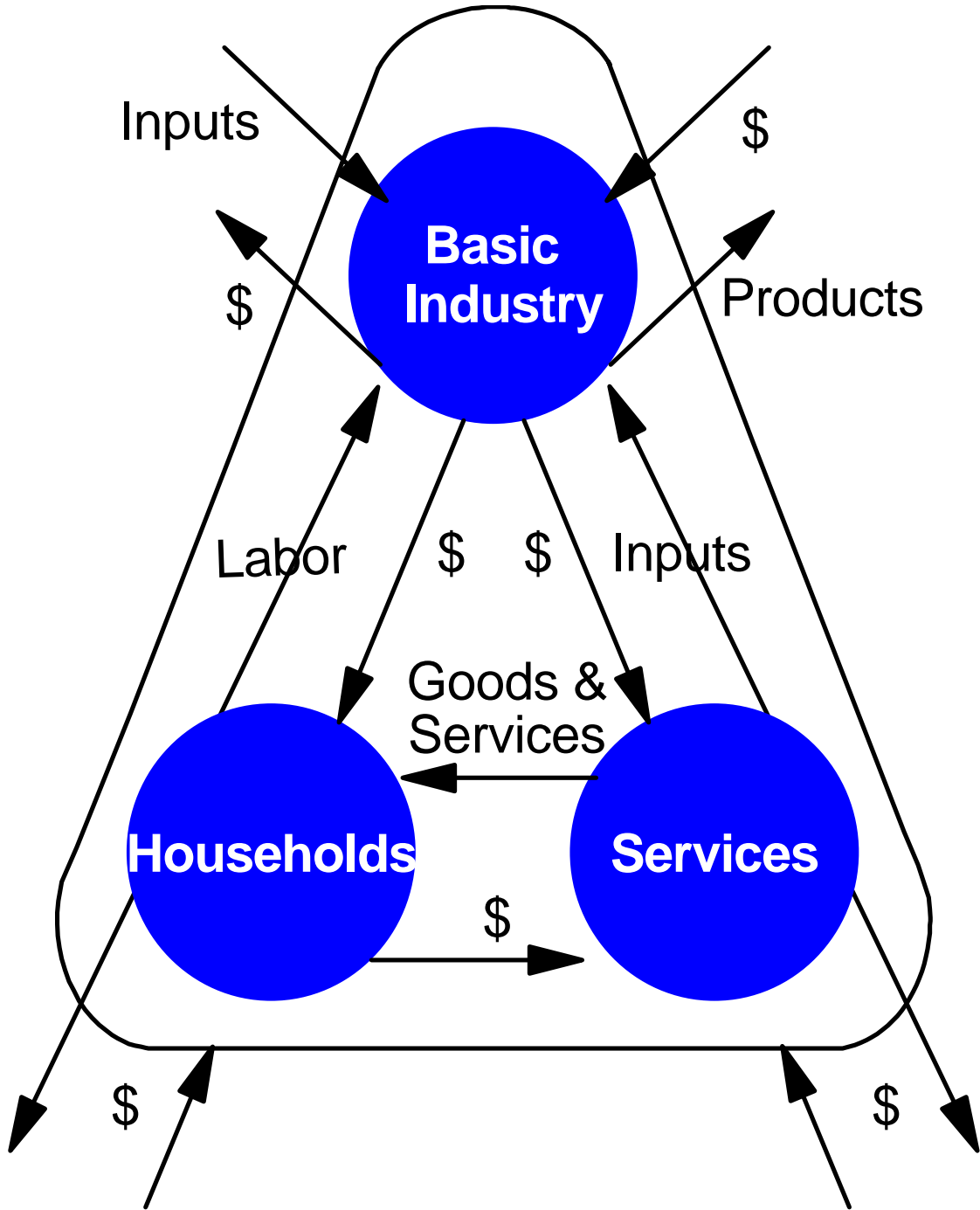


Figure 1. Community Economic System

supplies and services as a result of the direct impact. This produces an indirect impact in the business sectors. Both the direct and indirect impacts change the flow of dollars to the community's households, who alter their consumption accordingly. The effect of this change in household consumption upon businesses in a community is referred to as an induced impact.

In economics, the summary measure that describes the total effects created by an increase or decrease in economic activity is called the multiplier effect. An economic multiplier is defined as the ratio between the total (sum of the direct, indirect, and induced effects (employment, income, etc.)) and the direct economic effect stimulated by the industry initially experiencing a change in final demand. It is the total change in the local economy resulting from the initial change. This report provides Type II^c multipliers for income and employment effects. For example, an employment multiplier of 2.2 indicates that if one job is created by a new industry, 1.2 jobs are created in other sectors due to business (indirect) and household (induced) spending.

Secondary Impacts of Health Sector on the Economy of Appanoose County, Iowa

The IMPLAN model was used to calculate employment and income multipliers for Appanoose County. IMPLAN was developed by the U.S. Forest Service^d and is a model that allows for development of county-level multipliers. The Appanoose County Type II employment multipliers for each of the five components of the health sector are shown in **Table 5**, column 3. The Type II employment multiplier for the hospital component is 1.37. This indicates that for each job created in that sector, 0.37 jobs are created throughout the area due to business (indirect) and household (induced) spending. The Type II employment multipliers for the other

^c Type II multipliers include household spending effects based on new income generated

^d For complete details of model, see [1], [2], and [3].

health sector components are also shown in **Table 5**, column 3. The Type II income multiplier for the hospital sector is 1.24 (**Table 5**, column 6). This indicates that for each \$10.00 of payroll created in that sector, \$2.40 is created throughout the area due to business (indirect) and household (induced) spending. The Type II income multipliers for the other four health sector components are also given in **Table 5**, column 6.

Applying the employment multipliers to the employment levels for each of the five health sector components yields an estimate of each component's employment impact on Appanoose County (**Table 5**, columns 2, 3, and 4). For example, the hospital sector has 216 employees; applying the Type II employment multiplier of 1.37 to this employment number brings the total employment impact of the hospital to 296 employees ($216 \times 1.37 = 296$). The Doctors and Dentists component has 92 employees. With the application of the Type II multiplier of 1.74, the total impact comes to 160 employees ($92 \times 1.74 = 160$). The Nursing and Protective Care component has 192 employees and an employment multiplier of 1.23, bringing the total impact to 236 employees ($192 \times 1.23 = 236$). The Other Medical & Health Services component has a direct effect of 80 employees, an employment multiplier of 1.24, and a total employment impact of 99 employees ($80 \times 1.24 = 99$). The Pharmacies component has an estimated 28 employees and a total impact of 32 employees, applying the employment multiplier of 1.14 ($28 \times 1.14 = 32$). The total employment impact associated with the health sector in Appanoose County is an estimated 823 employees (**Table 5**, total of column 4).

Similarly, applying the income multipliers to the income (payroll) for each of the five health sector components yields an estimate of each component's income impact on Appanoose County (**Table 5**, columns 5, 6, and 7). The Hospital component has a total payroll of \$5,217,458; applying the Type II income multiplier of 1.24 brings the total Hospital income

Table 5.
Economic Impact of the Health Sector
On Employment and Income in Appanoose County, Iowa

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Health Sector Component	Employment	Type II Multiplier	Employment Impact	Income	Type II Multiplier	Income Impact	Retail Sales
Hospitals	216	1.37	296	\$5,217,458	1.24	\$6,444,922	\$1,917,597
Doctors & Dentists	92	1.74	160	\$4,804,000	1.25	\$6,025,652	\$1,792,849
Nursing & Protective Care	192	1.23	236	\$3,315,000	1.20	\$3,991,475	\$1,187,608
Other Medical & Health Services	80	1.24	99	\$860,000	1.31	\$1,127,834	\$335,571
Pharmacies	<u>28</u>	1.14	<u>32</u>	<u>\$530,216</u>	1.21	<u>\$642,090</u>	<u>\$191,045</u>
TOTALS	608		823	\$14,726,674		\$18,231,974	\$5,424,671

SOURCE: 1998 IMPLAN Data Base.

impact to \$6,444,922 ($\$5,217,458 \times 1.24 = \$6,444,922$). The Doctors and Dentists sector has a total income impact of \$6,025,652 ($\$4,804,000 \times 1.25 = \$6,025,652$), based on the application of the income multiplier of 1.25 to the payroll of the Doctors and Dentists component of \$4,804,000. The Nursing & Protective Care component has a payroll of \$3,315,000, and a multiplier of 1.20, resulting in an income impact of \$3,991,475 ($\$3,315,000 \times 1.20 = \$3,991,475$). The Other Medical & Health Services has an income impact of \$1,127,834, based on the direct payroll of \$860,000 and the income multiplier of 1.31. The Pharmacies component has an income impact of \$642,090, based on the direct payroll of \$530,216 and the income multiplier of 1.21. The total income impact associated with the health sector in Appanoose County is a projected \$18,231,974 (**Table 5**, total of column 7).

Income also affects retail sales. Based on the ratio between retail sales and income in the county over the past several years, the quantity of retail sales directly and indirectly supported by the health sector and its employees totals an estimated \$5,424,671 (**Table 5**, total of column 8). The bottom line is that the health sector not only contributes noticeably to the medical health of the community, but also to the economic health of the community.

Summary

The health sector in Appanoose County contributes significantly to the area's economy. It directly employs approximately 600 people with an annual payroll of \$14.7 million. In total, through its linkages with the local economy, this sector supports an estimated 823 employees and \$18.2 million in payroll within the county.

Availability of quality health care is often thought of as important for the attraction and retention of industrial firms, businesses, and retirees. Yet the fact that a prosperous health sector also contributes to the economic health of the community is often overlooked. The health sector

employs a large number of residents and generates economic benefits similar to a large industrial firm. The secondary impacts occurring in the community are sizeable and contribute to the total impact of the health sector. An increase or decrease in the size of the health sector affects not only the medical health of the community but the community's economic health as well.

References

- [1] Palmer, Charles and Eric Siverts, IMPLAN ANALYSIS GUIDE. U.S. Department of Agriculture, Forest Service Land Management Planning Systems Section, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, 1985.
- [2] Siverts, Eric, Charles Palmer, Ken Walters, and Greg Alward, IMPLAN USER'S GUIDE, U.S. Department of Agriculture, Forest Service, Systems Application Unit, Land Management Planning, Fort Collins, Colorado, 1983.
- [3] Minnesota IMPLAN Group Inc. USER'S GUIDE, ANALYSIS GUIDE, DATA GUIDE, IMPLAN Professional, Version 2.0, 1999.