

Health Sector Contribution to a Rural Economy: Western New York Region

The health sector in the Western New York region is an important source of employment and economic vitality. The input-output economic model, IMPLAN, is used to calculate employment and personal income multipliers for this region. It is estimated that, on average, a new job in health care is associated with 0.35 additional jobs. A dollar in new personal income for local health care providers generates, on average, \$.44 in additional personal income.

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Introduction

Rural community hospitals, nursing homes, health care providers, drug stores and other related services not only contribute to population health status but are also important sources of employment, tax revenues, and indirectly provide revenues for other local businesses. For local leaders to integrate the economic and health status needs of their populations they must have a better understanding of the economic contribution the health sector makes to their region. In this research, the health sector of three contiguous counties in Western New York state is examined using multiple data sources. First, the contributions which the health sector can make to a regional economy is discussed. Then, the theoretical structure of the input-output economic model, IMPLAN, is presented. Next, the economic contributions of the health sector in Western New York State, based on the IMPLAN simulation model, are summarized. Lastly, the implications of these findings and their effects on consumers and rural communities are offered.

The health sector in a regional economy

The dominant industry in the three-county (Allegany, Cattaraugus, and Chautauqua) region of Western New York State is manufacturing which accounted for \$3.4 billion or 38 percent of the total output in 1995 (BLS 1996). Services, the second largest industry sector in this region, contributed \$1.5 billion or 17 percent of the region's gross output (BLS 1996). The medical sector is by far the largest component of the service sector, accounting for more than a third of all services output and six percent of the total value for goods and services produced in Allegany, Cattaraugus, and Chautauqua counties.

The health sector in a small regional economy is often a major source of employment, provides economic multiplier effects on other local industries, and is one measure of quality of life used by employers and retirees. Health sector employment ranges from hospital and nursing home administrators, doctors, nurse practitioners and professional health care providers to nurses' aides, medical records technicians and accountants to building maintenance and custodial jobs. In this region of study, the health sector contributed 6.5 percent of all employment in 1995 or 8,950 health sector jobs (BLS 1996). Without employment, individuals and families are unable to sustainably live in rural regions. In addition, when individuals are employed locally, they are more likely to make local purchases in support of businesses within the region.

The health sector draws new dollars into a rural economy through Medicare, Medicaid, and commercial health insurance claim payments. In this Western New York region 19.3 percent of the population were 65 years and older in 1993 (US Census Bureau 1998). Health Care Financing Review (1996) reports that in 1994 the average Medicare payment per enrollee was \$4,301. For this three-county region, this means that 55,570 Social Security recipients had potentially \$239,006,570 Medicare dollars to spend on their health care needs. Where these dollars are spent at local health care firms or urban based medical complexes has an impact on the local economy. When patients use out-of-region health care services, these dollars are lost to the region. When patients spend locally, many of these dollars are recirculated in the regional economy when the health sector purchases employee and contract services, supplies, rents, and utilities from local firms.

The health care infrastructure of a region influences its desirability as a place to live. Retirees are concerned that quality health care services be available to them as they age and experience increasing chronic diseases. Research on predictors of retirement location include safety, recreational facilities, dwelling units, and

health care (Doeksen, Johnson, Willoughby 1997). Business facility site selection criteria include health care in the top six quality of life characteristics considered as important (Lyne 1988). Employees of relocating firms want to move to an area that has a good health care infrastructure which assures them access to care when they or family members become ill.

IMPLAN: An Input-Output Economic Model

Policy analysis of counties and regions frequently include economic simulation models (Rickman and Schwer 1995). One of the most widely used input-output economic models in the United States is IMPLAN, a ready-made program developed by the U.S. Department of Agriculture for examining rural industries such as agriculture, forestry, and mining (Charney and Leones 1997). Policy makers and economists have also used IMPLAN to analyze the economic impact of the health sector on rural economies (Doeksen, Johnson, and Willoughby 1997).

IMPLAN disaggregates 528 industry sectors and permits analysis of the linkages among industries within the region. This model uses county economic patterns, employment and household income data to simulate transactions between local industries, sales to local households and exports to other regions to develop economic impact of the health care industry (and other industries in the region) and create income and employment multipliers as summary measures of that position. Once the proportion of each sector's final demand that is associated with the operation of the health care sector is identified, then this portion of the total final demand vector can be pre-multiplied by the Leontief inverse matrix to obtain the economic contribution of the entire health care sector to the regional economies. IMPLAN simulates an input-output model combining three employment data sets: ES202, County Business Patterns, and Regional Economic Information systems (REIS). The foundation of the IMPLAN model is the national input-output tables which are used to create technical coefficients. Bureau of Labor Statistics ES-202 data collected for the mandatory unemployment program form the basic structure of the input-output tables. National costs of production-wages, raw materials, capital- may under or over-estimate actual costs within the region. The assumptions that the input-output simulation makes in each of these reiterations will have important impacts on how well the simulation represents the reality of a specific region.

The IMPLAN health industry consists of four sectors: doctors and dentists, nursing and protective care, hospitals, and other medical and health services. The IMPLAN sectors, doctors and dentists, cover the 1987 Standard Industrial Classifications (SIC) 801 (doctors of medicine), 802 (dentists), 803 (doctors of osteopathy, and 804 (chiropractors, optometrists, podiatrists, and a wide range of other health practitioners such as acupuncturists, audiologists, Christian Scientist practitioners, midwives, naturopaths, physical therapists, psychotherapists, etc.). The IMPLAN sector, nursing and protective care, encompasses SIC 805, which includes skilled nursing care facilities, intermediate care facilities, and miscellaneous other nursing and person care facilities. The IMPLAN sector, hospitals, includes SIC 806 (hospitals). The last health sector, other medical and health services, includes SIC 807 (medical and dental labs), 808 (home health care services), 809 (miscellaneous health services, ranging from medical artists to biofeedback centers to outpatient clinics to childbirth preparatory classes).

Estimates of Economic Multipliers

For the purposes of our study, we have calculated economic multipliers for two variables: total personal income (PI), and employment (EMP). Multipliers for total personal income (PI) report the change in the sum of employee compensation, proprietary income from self-employment, and other property income per \$1 of direct increase in regional income or payrolls. Employment (EMP) multipliers account for the total change in total jobs associated with the direct creation of one initial job to produce output going to final demand.

Tables 1 and 2 and Figures 1 and 2 report the total personal income PI and employment EMP economic multipliers estimated in this study. The multiplier results are shown in the context of the underlying direct, indirect, induced and total changes in the economy stimulated by a hypothetical \$100,000 increase in the demand for final goods and services for each of the sectors in turn. In terms of employment Table 1 shows a \$100,000 increase in the demand for goods and services has the largest total effect (3.25 new jobs throughout the entire economy) if the spending initially occurs in the health care services sector, followed by the trade (2.67 jobs) and other services (2.37 jobs) sectors. The health sector results are dominated by the direct impacts (2.41 jobs within the health sector itself), though the induced effects (local responding of incomes throughout the economy) are also larger (0.57 jobs) than for any other sector. Regarding the employment multipliers, it can be seen that the health care sector has a relatively low multiplier of 1.35. Thus, while the 2.41 jobs directly generated in the health care sector itself outweigh the direct effects of spending in other sectors, spending in the health sector generates additional indirect (0.27 jobs) and induced (0.57 jobs) employment throughout the rest of the economy that is small in relation to the direct effects.

Table 1
 Number of jobs stimulated by a \$100,000 increase in final demand from each sector*

Aggregated Sector	Direct Effects	Indirect Effects	Induced Effects	Total Effects	Multiplier**
Agriculture	0.69	0.22	0.16	1.07	1.55
Mining	0.93	0.18	0.10	1.20	1.29
Construction	0.99	0.28	0.41	1.68	1.71
Manufacturing	0.26	0.12	0.15	0.53	2.09
Transportation and Utilities	0.46	0.27	0.33	1.06	2.29
Wholesale & Retail Trade	2.06	0.16	0.45	2.67	1.30
Finance, Insurance, Real Estate	0.30	0.13	0.12	0.55	1.85
Services, Except Health	1.59	0.28	0.50	2.37	1.49
Health Care Services	2.41	0.27	0.57	3.25	1.35

*Demand was distributed across subsectors consistently with the proportion of total output within the sector.
 **Multipliers are the ratio of the total/direct effects.

Allegany, Chautauqua, and Cattaraugus counties, 1995.

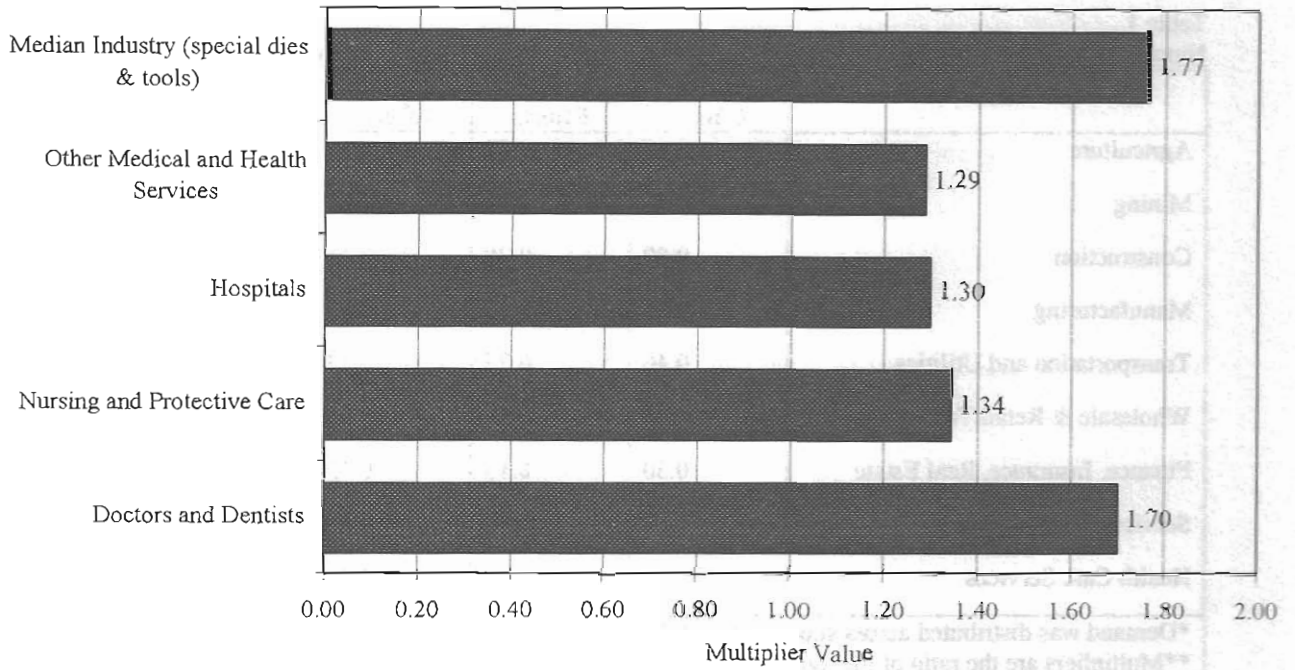
Table 2
 Personal income generated by a hypothetical \$100,000 increase in new production from each sector*

Aggregated Sector	Direct Effects	Indirect Effects	Induced Effects	Total Effects	Multiplier**
Agriculture	\$10,054	\$3,032	\$2,947	\$16,033	1.59
Mining	\$6,849	\$1,017	\$1,772	\$9,638	1.41
Construction	\$27,752	\$6,523	\$7,719	\$41,994	1.51
Manufacturing	\$9,357	\$3,447	\$2,884	\$15,688	1.68
Transportation and Utilities	\$20,406	\$6,534	\$6,067	\$33,007	1.62
Wholesale & Retail Trade	\$32,908	\$4,400	\$8,402	\$45,710	1.39
Finance, Insurance, Real Estate	\$6,923	\$3,219	\$2,284	\$12,426	1.79
Services, Except Health	\$33,498	\$7,716	\$9,282	\$50,496	1.51
Health Care Services	\$39,999	\$7,051	\$10,596	\$57,647	1.44

*Demand was distributed across subsectors consistently with the proportion of total output within the sector.
 **Multipliers are the ratio of the total/direct effects.

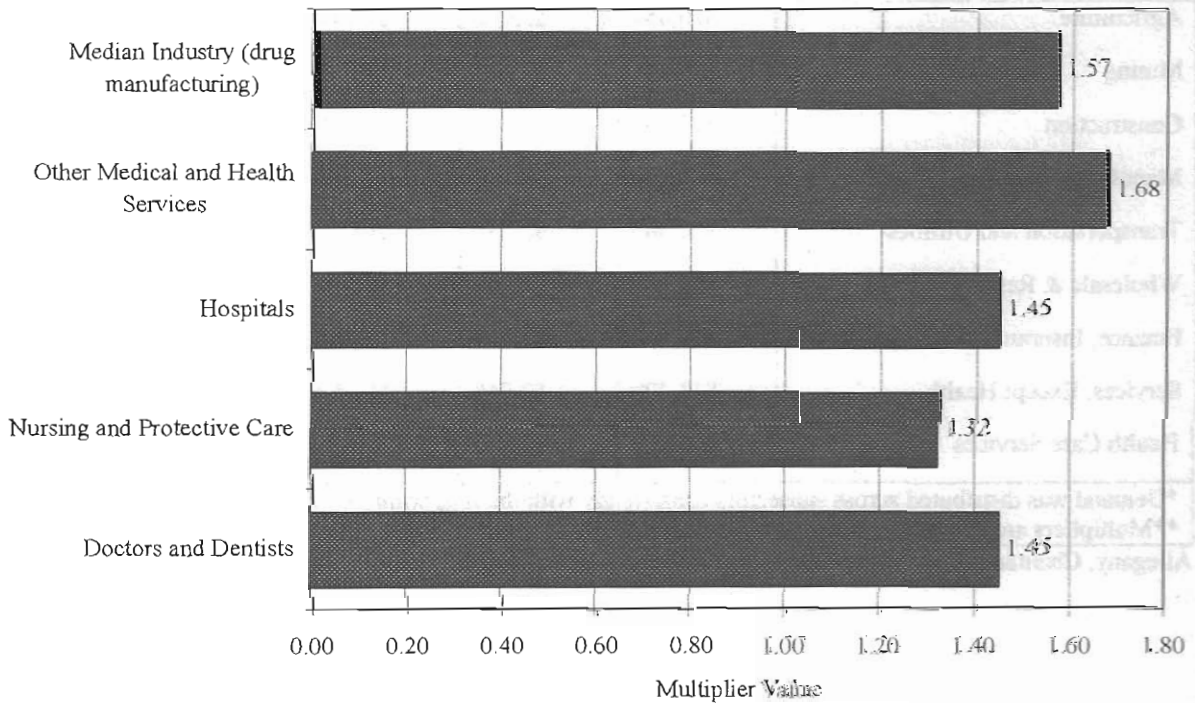
Allegany, Chautauqua, and Cattaraugus counties, 1995.

Figure 1. Employment Multipliers: Health Care Sectors and Sector with Median Multiplier



IMPLAN 1995 Allegany, Chautauqua and Cattaraugus Region

Figure 2. Personal Income Multipliers: Health Care Sectors and Sector with Median Multiplier



IMPLAN 1995 Allegany, Chautauqua and Cattaraugus Region

The pattern looks similar in terms of personal income impacts (Table 2). Total income effects are again greatest in the health care sector (\$57,647 in personal income), followed by other services (\$50,496) and trade (\$45,710). Direct income effects are also largest in the health care (\$39,999), trade (\$32,908) and services (\$33,498) sectors. However, the differences compared to the other sectors are narrower than for the employment impacts. The health care sector multiplier is 1.44. Again this is one of the lower multipliers, signifying that direct expenditures in sectors other than health care have proportionately larger impacts on other sectors of the economy relative to the initial direct impact within the sector.

This pattern of impacts is generally influenced by three major factors. First, the proportion of the total expenditures going to labor (or labor intensive business/industry) affects both the number of jobs that the initial \$100,000 can create directly and the amount of income that is available for household spending on other goods and services. Second, the proportion of the \$100,000 that gets spent on locally produced goods and services (i.e., without "leaking" from the economy) varies from sector to sector. Third, in sectors where employee compensation levels are relatively low, the initial \$100,000 increase has a bigger impact on creating a large number of (low-wage) jobs, even as personal income generated is more or less constant.

Examination of the subsectors of the health sector in this region show that the doctors, dentists, and other similar care providers subsector has the highest employment multiplier in the sector (1.77) (Figure 1). However, compared to the other industry subsectors in this region, it falls below the median (special dies & tools). Nursing and protective care, hospitals and other medical and health services multipliers fall below doctors and dentists and the median industry employment multipliers. Although other medical and health services subsector has the lowest employment multiplier in the health sector, it has the highest personal income multiplier (1.68) of the sector (Figure 2). It falls above the median industry (drug manufacturing) personal income multiplier for this region. The nursing and protective care subsector has the lowest personal income multiplier (1.32). From these multipliers, it can be estimated that the doctor subsector has the largest potential within the health sector to generate additional jobs in the region. However, other subsectors from other industries are likely to generate more jobs than the doctor subsector. The medical and health services subsector is estimated to recirculate more personal income dollars within the local economy than other subsectors of the health sector. The economic impact of each subsector is influenced by average industry wages, the proportion of industry sector employees who live and make purchases within the region, and the proportion of other non-wage purchases firms make within the region.

Limitations of Multiplier Analysis

Multipliers are constructed based on a "snapshot" of a regional economy. That is, the analysis is keyed to a pattern of economic transactions between firms and the final users of their products for a single year—1995 in this case. Multipliers can go out of date as the "structural" relationships between sectors change. Structural changes can result from technological developments, important shifts in relative prices, regional trade patterns, and several other sources.

Another, and closely related, concern with multipliers is that they best represent the effects of small or marginal changes in deliveries to final demand in any one sector. Large shifts in a regional economic system require a more detailed analysis before their effect on total income or employment can be measured. This is largely because such large shifts rarely occur without important associated structural change.

Finally, our estimates rest on models utilizing local secondary data combined with coefficients from a national model. This procedure avoids the prohibitively high costs of conducting an exhaustive survey of all inter-industry transactions in a regional economy. However, reliance on this procedure requires the assumption that differences between the structure of the local economy and the national economy have been accurately estimated within the model.

Implications for Consumers and Rural Communities

The health sector in this region is an important source of employment and economic vitality. It contributes 8,950 jobs and 17 percent of the region's gross output (BLS 1996). The direct effects of a \$100,000 investment in this sector on employment (2.41 jobs) and personal income (\$39,999) and total effects (3.25 jobs and \$57,647) are larger than any other sector in the region. However, the multiplier effects of employment and personal income, are not as large as several other sectors in this region. Investments in manufacturing, transportation and utilities, finance, insurance, & real estate, construction and agriculture are more likely to have a greater economic impact. This is because the largest portion of the health sector expenditures, employee wages, are usually low paying service jobs. Investments in the health sector result in more people able to be employed throughout the region, but smaller indirect effects on personal income and new jobs created in other industries in the region relative to the investment.

These findings have implications to both consumers and citizens of rural communities. When consumers make out-of-region health care purchases, those dollars are lost to their community. Consumers travel outside of their community for health care for a number of reasons. The kind of care they need may not be available. Or care may be available but not at the quality or price they are willing or able to pay. Patient consumer preferences-high quality care at affordable prices-may be at odds with the citizen preferences of their rural region. Citizens are concerned about the tax base of their community, the provision of goods and services for the regional population, and the general economic climate to support the quality of life they prefer.

To stop a downward economic spiral in the health sector caused by the loss of access to and quality health services (consumers not willing to use poor quality services and spending outside the community), citizens must find ways to work together with their providers and community organizations to improve both access and quality issues. In a large urban area, the consumer can take their business to another firm in the region and the dollars still stay in the economy. In a small regional economy with a limited range and variety of health care firms, consumer choice to switch to another health care firm is limited. Choice is only available when the consumer travels out of the region. This means that consumer-citizens must actively engage in giving consumer feedback and pressure to improve rural health care services and commit to assisting those organizations in successfully responding before resorting to firms outside their region. If rural citizens want to retain health care services in their area they must take intermediate consumer complaint steps to push their local health firms to look for value added services and improved quality. In this context, the doctor subsector has the best potential to multiply employment and other medical and health related services has the greatest potential to increase personal incomes recirculated in the economy.

Leaders who are active in community economic development must consider that more low wage health jobs may not be the only answer to their economic vitality. Once the basic health infrastructure is in place, rural community leaders may find that other industry sectors offer greater potential to improve the economic climate of their region.

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Endnotes

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- ⁴ As an illustration, this multiplier means that for every increase in the final demand for health care services sufficient to support one new health care sector job directly, an additional 0.35 jobs will be created throughout the entire regional economy as that initial final demand purchase is spent and respent.