

Institute for Public Policy
and Economic Analysis

**The Economic
Impact
of Health Care
in Spokane County**

**Sponsors: The Spokane Regional
Chamber of Commerce, Avista
Corporation, Inland Northwest Health
Services, the Spokane Area Economic
Development Council, the Spokane
County Medical Society, and SIRT**

The Economic Impact of Health Care in Spokane County

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1. Executive Summary

In 2001 total national spending on health was \$1.4 trillion or about 14 percent of GDP. This spending, over \$5,000 per capita, resulted in the employment of over 10 million workers. While anecdotal opinions exist in abundance, the actual impact of this health care spending on the Spokane County economy is unknown. Because of this, civic and business groups in the community can not accurately determine the potential role of health care industries in economic development plans or proposals. To overcome this deficiency, the Spokane Regional Chamber of Commerce contracted with the Institute for Public Policy and Economic Analysis of Eastern Washington University to conduct an economic impact analysis of the local health care sector. Co-sponsors of the research include Avista Corporation, Inland Northwest Health Services, the Spokane Area Economic Development Council, the Spokane County Medical Society and the Spokane Intercollegiate Research and Technology Institute.

The analysis utilizes data and economic impact multipliers compiled and estimated by the Minnesota IMPLAN Group for its IMPLAN impact analysis modeling system. While the focus of the study is on the direct and total impact of health care in Spokane County, comparisons with impacts in King County and Washington State, as well as with other counties in the Western United States, are considered as well.

Using recent revisions in U.S. Census Bureau industry definitions, the health care sector includes five constituent industries: (1) Hospitals, (2) Physicians, Dentists, and their office staffs, (3) Nursing Care, Facilities. (including residential care), (4) Other Health Care (including ambulatory care), and (5) Other Health Services. The last industry is a collection of several health care related industries, such as home health care, pharmacies and drug stores, direct health and medical insurance carriers, medical technology and equipment manufacturing, pharmaceuticals, apparatus, furniture, instruments, appliances and supplies, ophthalmic and dental goods.

Economic impacts are measured by three indicators: output or sales, employment as total jobs and income paid to employees or received from self-employment. In Spokane County, data for 2001 (the latest year data are available) indicate that the output of the health care sector was \$2.6 billion, almost 12 percent of total county output of \$21.6 billion and more than twice that of the next leading industry, wholesale trade. Direct employment was 29,300, almost 12 percent of the county labor force of 252,000 and 60 percent larger than that of State and Local Education, the second leading employer. Finally, direct health care employment income was \$1.2 billion, 14 percent of total county income of \$8.2 billion, and 70 percent larger than the next industry.

Clearly, health care is the leading industry in Spokane County. While still important, the dominance of health care does not carry over to King County where software publishing and aircraft manufacturing compete for industrial leadership. However, when the entire state is considered, health care ranks first by all the measures of economic influence considered but by smaller percentages than in Spokane County.

Economic activities that arise to facilitate and support the production of health industry goods and services represent the indirect impact of the health care sector. Using Spokane County hospitals as an example, their indirect impacts on county output was \$360 million, of which \$63 million (17 percent) went to the real estate industry, followed by \$31 million (9 percent) to wholesale trade. The indirect impact of hospitals on county employment was the equivalent of 4,800 jobs. This produced an additional 697 jobs in real estate (14 percent of the total indirect impact) followed by 433 jobs in employment services (9 percent). Finally, the indirect impact of hospitals on county income was \$134 million. This increased wholesale trade incomes by \$12 million (9 percent of the total impact) followed by securities and investments with an increase of \$10 million (8 percent).

Induced impacts make up the final component of the impact of health care. These are measured by increases in output, employment and income caused by the spending of earnings received either directly from employment in health activities or indirectly from support of health related activities. Again using Spokane County hospitals as an example, their induced impact on county output was \$335 million. Of this, \$27 million (8 percent of the total induced impact) went for owner-occupied dwellings, followed by \$26 million (8 percent) to hospitals. The induced impact of hospitals on county employment was the equivalent of 4,390 jobs, led by an additional 495 jobs in food and drinking places (11 percent of the total impact) followed by 251 jobs as physicians, dentists and their office staffs (6 percent). Finally, the induced impact of hospitals on county income was \$120 million, led by the increased incomes of physicians, dentists and their office staffs of \$10 million (12 percent of the total impact) followed by increases in hospital incomes of \$9 million (10 percent of the impact).

These indirect and induced impacts represent the “multiplier” effects of health care since they are some multiple of direct impact of health care. Estimates of these multiplier effects indicate that the total impact of health care spending (direct plus indirect plus induced) on the Spokane County economy is significant. The output total impact of spending was \$4.4 billion, about 20 percent of total county output, while the total impact on employment was 53,500 equivalent jobs, accounting for 21 percent of county employment, and the total impact on income was \$1.8 billion, 22 percent of county income.

Health care is about twice as important in Spokane County as in King County or the state, regardless of economic indicator. The total output impact of the health care sector in King County was 10 percent of total output, 11 percent of county employment, and 10 percent of all income. For the state, 2001 health care impacts were 12 percent of all output, 14 percent of all employment and 13 percent of all income. Since the impact multipliers among the three regions are similar, differences in total impacts reflect the extent to which each regional specializes in the production and delivery of health related goods and services.

When compared to software publishing and aircraft manufacturing, two traditional leading Washington industries, health care dominates in Spokane County, while in King County, it leads in

employment and compares favorably with regard to output and income. Of all industries in Washington State, health care has greatest direct and total impact, measured by output, employment or income.

Health care is also relatively more significant in Spokane County than in comparable counties in the Western United States. In Sacramento County CA, the relative impact of health care was about 40 percent less than in Spokane County, while in Pima County AZ it was about 20 percent less and in both Washoe NV and Ada ID Counties about 35 percent less. These findings carry over to total impacts where impacts were 20 to 40 percent less than they were in Spokane County.

Since the impact multipliers for Spokane County are similar to those found for the other four counties, the reason health care has such a significantly larger impact in Spokane is that the industry is relatively larger. That is, since proportionally more resources are already devoted to health related activities in Spokane County, the sector has a proportionally greater impact on county economic activity than in the other counties.

The economic impact of health care has been studied hundreds of times in a variety of contexts with the consistent finding that the provision of health care has significant economic impacts. Finally, future prospects of the health care sector appear bright. Employment forecasts indicate that the sector will provide more new jobs than any other industry either regionally or in the state. This strong growth also suggests similar output and income growth.

2. Analytical Framework

2.1 Introduction

Composed of various industries that produce and deliver goods and services related to either maintaining or improving human well-being, health care has become an enormous force in the U.S. Its actions touch nearly every person and community in the country. As Table 1 shows, total national

Table 1
National Health Expenditures and
Employment: 1970-2001

Year	Total	Per Capita	% GDP	Empl	% Empl Change
1970	\$73B	\$348	7.0	3.05M	
1980	246	1,067	8.8	5.28	7.3
1990	696	2,738	12.0	7.81	4.8
1996	1,038	3,842	13.3	9.48	2.7
1997	1,094	4,011	13.2	9.70	2.4
1998	1,150	4,177	13.1	9.85	1.5
1999	1,216	4,377	13.1	9.98	1.3
2000	1,300	4,637	13.2	10.10	1.2
2001	1,424	5,039	14.0	10.34	2.5

Source: Eilrich, St.Clair, and Doeksen

spending on health in 2001 was \$1.4 trillion or about 14 percent of GDP. This spending, over \$5,000 per capita, resulted in the employment of over 10 million workers. Growth of the health care sector has been spectacular. In 1970, health expenditures represented 7 percent of GDP and accounted for 3 million jobs. By 1990, its share of GDP was 12 percent and provided almost 8 million jobs. During the 1990s, despite a protracted debate over how to “manage” health care costs, the sector nonetheless continued to grow, adding another 2.5 million jobs.

The health care sector consists of more industries than just hospitals and doctors. It also involves diagnostic centers, dentists, nurses and other professionals, nursing and outpatient facilities, laboratories, health insurance carriers and pharmacies. Also included are a number of medical technology and equipment industries manufacturing items such as pharmaceuticals, laboratory apparatus, medical instruments and appliances, hospital furniture, and ophthalmic and dental goods.

As an employer and purchaser of local goods and services, this collection of industries and activities, broadly the “health care sector,” can directly affect the output, employment and income of a community, county, or region. It also can have many indirect impacts, both measurable and nonmeasurable. A large health care sector indicates the availability of services necessary to ensure a healthy community and labor force, important factors for the location of new industries and the relocation of old ones. The availability of health services is both an important consideration in retirement relocation decisions and an important “quality of life” indicator that adds to the attractiveness of a community. The sector has synergistic qualities in that larger health facilities allow specialization and economies of scale, permitting more complex medical treatments to be undertaken at lower cost and less risk. This specialization creates economic opportunities and attracts other complementary facilities, as well as research funding.

While anecdotal opinions exist in abundance, the actual impact of health care on the Spokane economy is unknown. Because of this, civic and business groups in the community can not accurately determine the potential role of health care industries in economic development plans or proposals. To overcome this deficiency, the Spokane Regional Chamber of Commerce contracted with the Institute for Public Policy and Economic Analysis of Eastern Washington University to conduct an economic impact analysis of the local health care sector. Co-sponsors of the research include Avista Corporation, Inland Northwest Health Services, the Spokane Area Economic Development Council, the Spokane County Medical Society and the Spokane Intercollegiate Research and Technology Institute.

The analysis utilizes data and economic impact multipliers compiled and estimated by the Minnesota IMPLAN Group for its impact analysis modeling system. While the focus of the study is on the direct and total impact of health care in Spokane County, comparisons with impacts in King County and Washington state, as well as with other counties in the Western United States, are considered as well.

The analysis begins with a discussion of the data and methods, followed by an explanation of different types of economic impacts, definitions of economic measures and a discussion of the composition of the health care sector. Direct, total, indirect and induced economic impacts are then

presented and contrasted with those for King County and the state. Next, the local and regional impact of health care is compared with that of aircraft manufacturing and software publishing, industries that include two of the largest private employers in the state, Boeing and Microsoft. Following this, the results of the impact analysis are compared against those for other regions and from similar studies, both regionally and nationally. Finally, the short term (2000 – 2010) future employment prospects of health care are considered using Washington State Employment Security Department occupational forecasts.

2.2 Data and Method

Data describing county or regional industrial activity and multipliers showing industry by industry relationships were prepared by the IMPLAN Group (MIG) for use in its IMPLAN Pro impact analysis modeling system. As described by MIG,

the IMPLAN (IMPact Analysis for PLANing) program was originally developed by the USDA Forest Service in cooperation with the Federal Emergency Management Agency and the USDA Bureau of Land management to assist the Forest Service in land and resource management planning. MIG was formed in 1993 to privatize the development of IMPLAN data and software. Its software performs the necessary calculations, using study area data, to create models and provides an interface to study changes in a region's economic description, create impact scenarios and to introduce changes to the local model. IMPLAN data and accounts closely follow the accounting conventions used by the Bureau of Economic Analysis (BEA) when developing an Input-Output (I-O) model of the U.S. economy as well as formats recommended by the United Nations. (MIG, i-iii).

According to the BEA, the input-output (I-O) accounts show how the more than

500 industries that comprise the U.S. economy interact; specifically, how industries provide input to, and use output from, each other to produce gross domestic product. These accounts provide detailed information on the flows of the goods and services that make up the production processes of industries. Benchmark I-O accounts are based on detailed data from the economic censuses that are conducted every five years by the Bureau of the Census while annual accounts are prepared for selected years between the benchmarks based on less comprehensive data. The most recent benchmarks, for 1997, use a new classification system that is based on the North American Industry Classification System (NAICS) while the most recent annual account is for 1999.

I-O accounts can be used to study industry production or as a framework for preparing economic statistics. The accounts are an important analysis tool because they show the production functions of individual industries and the interactions among producers and between producers and final users in the economy. Specifically, these accounts can be used to estimate the direct and indirect effects of changes in final uses on industries and commodities; for example, to estimate the effects of a strike or a natural disaster on the economy, or, supplemented with additional information, to estimate the effects of an increase in U.S. exports on employment. (BEA)

To develop models to study local economies, MIG reconfigures coefficients and relationships from the national input-output model for local application. Data for this analysis are taken from state and federal sources compiled by the BEA, Bureau of Labor Statistics (BLS), U.S. Department of Commerce and state agencies like the Labor Market and Economic Analysis Branch (LMEA) of the Washington Employment Security Department. Because of missing data, disclosure rules and collection procedures,

some of these county data have to be estimated from more aggregate state or national sources. Data currently provided by MIG are for 2001, the most recent available. Greater details on MIG multiplier estimation procedures and data compilation methods are found in the “Data Guide” section of the IMPLAN Professional Version 2.0 user guide.

2.3 Definitions

The IMPLAN impact analysis model based on input-output methodology, as previously described, will be used to estimate the impacts of health care on the regional economy and the other industries that compose it. These impacts are measured by three conventional indicators of economic activity: output, employment and labor income. These are defined as follows:

Output is the value of production by industry for annual calendar year production. Output can be measured either by the total value of purchases by intermediate and final consumers (final sales), or by intermediate outlays plus value-added. Output can also be thought of as a value of sales plus or minus inventory. (MIG, 253)

Employment includes total wage and salary employees as well as self-employed jobs in a region. It includes both full-time and part-time workers and is measured in annual average jobs. (MIG, 231)

Income is the sum of employee compensation and proprietary income. Employee compensation is wage and salary payments as well as benefits, including health and life insurance, retirement payments, and any other non-cash compensation. Proprietary income consists of payments received by self-employed individuals as income. This is income recorded on Federal Tax Form 1040C. Proprietary income includes income received by private business owners, doctors, lawyers, and so forth. Any income a person receives for payment of self-employed work is counted. (MIG, 249)

The relative size of the output, employment and labor income of the health care sector has an initial, direct impact the regional economy. Further, changes in the sector also have impacts. I-O analysis consequently considers three types of impacts (MIG, 183):

Direct Impacts: Changes in the industry used to describe the events being analyzed. For example, hospital output increases by \$1,000,000.

Indirect Impacts: Changes in inter-industry purchases in response to the new demands of the directly affected industry. For example, sales in the plastic pipe industry increase by \$30,000 because hospitals require additional pipe in their facilities due to their increased output.

Induced Impacts: Changes in spending from households as income increases or decreases due to changes in production. For example, output in the region increases by \$100,000 as the additional income paid to employees to produce the additional output in the hospital and plastic pipe industries is spent.

It should be noted that these impacts are not one time events. Instead, the pipe industry might require additional trucking services that could lead to additional truck sales and then on to additional truck

insurance, fuel, tires and so on. Induced spending has this same “multiplied” effect, in that employees hired as a consequence of additional household spending also receive additional income which, when spent, leads to still further output and income.

However, these rounds of spending and respending do not continue indefinitely. Instead, the impacts of the initial output change and subsequent rise in earnings quickly leak out of the region in the form of imports or purchases of goods and services produced in other regions, out-of-area spending, taxes and saving.

When added, the three impacts measure the **Total Impacts** of the initial output change. Thus,

Direct Impacts-----> Indirect and Induced Impacts----->Total Impacts

and

Direct Impacts + Indirect Impacts + Induced Impacts = Total Impacts.

The ratio of the total to the direct impacts is called a **multiplier**, viz.,

$$\text{Multiplier} = \frac{\text{Total Impacts}}{\text{Direct Impacts}}$$

Obviously, for the same initial change in output, industries with the largest multipliers will have the greatest economic impact on the regional economy. However, large multipliers do not imply large industries. Since technical production and employee compensation characteristics of an industry determine the size of its multiplier, a relatively large industry could have output, employment and income multipliers much smaller than a relatively insignificant one. Usually, because of spending leakages, multipliers are rarely larger than 2.0.

Using Census Bureau Standard Industrial Classification (SIC) definitions, revised as the North American Industry Classification System (NAICS), the health care sector includes five constituent industries. Some of these, such as Hospitals, or Doctors, Dentists and their office staffs, are unchanged from their NAICS definitions. Others are composites, created by combining smaller industries into larger groups to facilitate analysis. Each of these industries has different characteristics and, according to the IMPLAN multipliers, has slightly different total economic impacts. Described in greater detail in the Appendix, “Industry Definitions,” these industries, with a short description, include:

Hospitals. This industry provides diagnostic and treatment services that include physician, nursing, and other health services and the specialized accommodation services required by inpatients. Outpatient services also may be provided as a secondary activity.

Physicians, Dentists. These practitioners, including their office staffs, operate private or group practices in their own offices (e.g., centers, clinics) or in the facilities of others, such as hospitals or HMO medical centers. The industry also includes other health practitioners who are not physicians and dentists.

Nursing Care, Facilities. Residential care combined with either nursing, supervisory, or other types of care as required by the residents. Facilities are a significant part of the production process and

the care provided is a mix of health and social services, with the health services largely some level of nursing services.

Other Health Care. Includes ambulatory health care services, outpatient care centers, family planning centers, outpatient mental health and substance abuse centers, medical and diagnostic laboratories

Other Health Services. Industries of lesser relative impact were collected in this composite industry. They include home health care services, pharmacies and drug stores, and direct health and medical insurance carriers. Also included are a variety of medical technology and equipment industries producing items such as pharmaceuticals and medicines, electro-medical, irradiation and laboratory apparatus, furniture, surgical and medical instruments and appliances, dental equipment and supplies, ophthalmic goods, and dental laboratories,

3. Findings

3.1 Direct Impacts

People go to hospitals and clinics when sick. Doctors employ not only themselves but also nurses, receptionists, and laboratory technicians. Patients, private insurance companies and government social insurance funds pay hospital bills. Some people write health insurance policies while others work in nursing homes or factories that manufacture dental instruments. Together, all these activities represent the direct impacts of health care. The output or sales of companies, organizations and people that provide health related goods and services constitutes one measure of the direct impact of health care, while the number of people employed or the wages, benefits and income paid are other measures.

How does health care compare to other industries, not only in Spokane County but also in other regions of Washington? Table 2 contains a listing of leading industries in Spokane County, King County and the entire state, ranked by output or sales, employment, and income paid to employees or earned by self-employed industry proprietors. More extensive tables, including the actual values underlying Table 2, for each of the regions are found in Appendices 7.2, 7.3 and 7.4.

In 2001, the direct output of the health care sector in Spokane County was \$2.6 billion, almost 12 percent (shown in parenthesis) of total county output of \$21.6 billion and more than twice that of the next leading industry, wholesale trade. Sector employment was 29,300, almost 12 percent of the county labor force of 252,000 and 60 percent larger than that of State and Local Education, the second leading employer. Finally, direct health care employment income of \$1.2 billion or 14 percent of total county income of \$8.2 billion was 70 percent larger than the next industry. Clearly, the sector, as defined, is the leading industry in Spokane County.

In terms of relative importance, health care is nearly as dominant in King County as in Spokane County. As Table 2 shows, in the largest county in the state, it ranks fourth with output of \$11 billion, trailing software publishing, aircraft manufacturing and wholesale trade. In 2001, it employed 100,900

people, more than any other industry, and followed software publishing with \$5 billion in income. However, while dollar amounts or employees in King County are much larger, shares of particular indicators are 40 or 50 percent smaller than in Spokane County. Health care accounted for 11.8 percent of output in Spokane County but only 5.9 percent in King County. For employment, the shares were 11.6 and 6.9 percent, respectively, and for income, 14.1 and 6.6 percent, respectively.

Table 2
Leading Industries in Spokane County, King County and Washington State
(shares in parentheses)

Rank	Output	Employment	Income
Spokane County			
1	Health care (12)	Health care (12)	Health care (14)
2	Wholesale trade (5)	State & Local Ed. (7)	State & Local Ed. (8)
3	**Hospitals (4)	Food & drinking places (6)	Wholesale trade (5)
4	Owner-occupied dwellings (4)	Wholesale trade (4)	State & Local Non-Ed. (5)
5	State & Local Ed. (4)	State & Local Non-Ed (4)	**Physicians, dentists. (5)
King County			
1	Software publishing (11)	Health care (7)	Software publishing (12)
2	Aircraft manufacturing (7)	Food & drinking places (6)	Health care (7)
3	Wholesale trade (6)	Wholesale trade (5)	Wholesale trade (6)
4	Health care (6)	State & Local Ed. (5)	Aircraft manufacturing (5)
5	Real estate (5)	State & Local Non-Ed. (4)	Custom computer serv (4)
Washington State			
1	Health care (7)	Health care (8)	Health care (8)
2	Aircraft manufacturing (6)	State & Local Ed. (7)	Software publishing (6)
3	Software publishing (6)	Food & drinking places (6)	State & Local Ed. (6)
4	Wholesale trade (5)	State & Local Non-Ed. (5)	State & Local Non-Ed. (5)
5	Real estate (4)	Wholesale trade (4)	Wholesale trade (5)

Source: MIG (2001 data).

**Included in Health Industry

Rankings of leading industries for the entire State are also included in Table 2. These show that health care is the leading industry, regardless of economic measure. Its output of \$26 billion or 7 percent of the total was \$4 billion larger than the second industry, aircraft manufacturing, while its employment of 278,000 or 8 percent of the total was 45,000 larger than the next industry, State and Local Education, and its income of \$12 billion, again 8 percent of the total, was \$2.7 billion larger than software publishing.

The health care sector clearly dominates the Spokane County economy by any measure. Its output is twice that of the next largest industry, its employment is 60 percent larger than the next largest, and its income paid or generated is 80 percent larger than the second largest industry. This dominance does not carry over to King County where software publishing and aircraft manufacturing compete for industrial leadership. But when the entire state is considered, health care again ranks first by each measure of economic influence.

Because health care is composed of a number of NAICS industries, differences in direct impacts in the three regions could simply reflect local differences in industrial structure. That is, one component

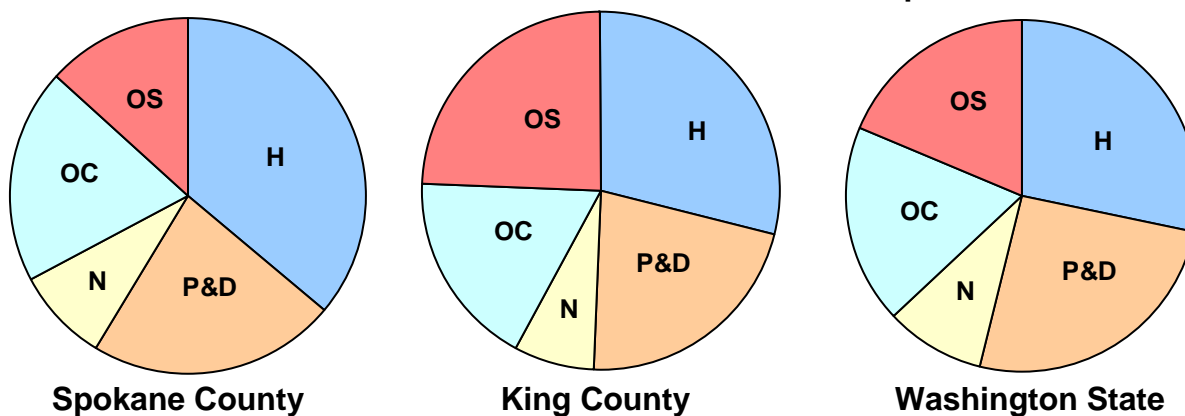
could be relatively more important in Spokane County while another more important in King County or the State. Table 3 and Figure 1 show that structural differences are slight. In each region, hospitals and doctors and dentists dominate with about 60 percent of output, employment or income with the remainder spread among the other components with somewhat greater local variability. While local differences are significant in some cases, as in the example of the relative importance of Other Health Services in King County, probably reflecting medical manufacturing and biotechnical activities, the basic structure of the health care sector remains similar in the three regions.

Table 3
Structure of the Health Care Sector

Industry	Output Share (%)			Employ. Share (%)			Income Share (%)		
	Spk.	King	State	Spk.	King	State	Spk.	King	State
Hospitals	36.2	28.8	28.4	32.5	27.8	25.7	33.7	28.6	27.0
Physicians, Dentists	22.5	21.8	25.6	24.7	26.6	29.3	28.1	27.6	31.7
Nursing Care, Facilities	8.6	7.2	9.1	14.0	13.4	15.5	10.6	9.3	11.2
Other Health Care	19.4	17.7	18.4	14.4	14.1	14.0	15.3	14.6	14.5
Other Health Services	13.3	24.5	18.5	14.4	18.2	15.6	12.3	19.9	15.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: MIG (2001 data).

Figure 1
Structure of the Health Care Sector for Output



(H = Hospitals, P&D = Physicians, Dentists, N = Nursing Care, Facilities, OC = Other Health Care, OS = Other Health Services)

3.2 Indirect Impacts

Industries not only directly impact the output, employment and income of a region but also have indirect and induced effects. Health providers require legal, accounting, computer and telecommunication services. Construction and equipment supply industries build medical facilities, hospitals, manufacturing plants, laboratories, care centers and nursing homes so that health related services and products can be delivered or produced. All these structures, including their equipment, require maintenance and protection

and, when obsolete, replacement. Mail and special handling packages are sent and received. Financial transactions abound as receivables are deposited and payments made. All these activities, as well as many more, represent the indirect impact of the health care sector--that is, economic activities undertaken to facilitate and support the production of health industry goods and services.

Table 4 illustrates the extent of indirect impacts on the Spokane economy, using the largest health care industry, hospitals, as an example. Included in the table are the ten industries (listed alphabetically) that hospitals had the greatest impact on, ranked by output, employment or income as well as the percentage distribution of these impacts. Overall, the industries found in the tables account for about 50 percent of the indirect impact of hospitals on the county economy.

The indirect impact of hospitals on county output was \$360 million. Of this, \$63 million (17 percent of the total) went to the real estate industry, followed by \$31 million (9 percent) to wholesale trade and \$20 million (6 percent) for securities and investments. The indirect impact on county employment was 4,800 equivalent jobs. This supported an additional 697 jobs in real estate (14 percent of the total impact) followed by 433 jobs in employment services (9 percent) and 317 jobs (7 percent) in food and drinking places. Finally, the indirect impact of hospitals on county income was \$134 million. This increased wholesale trade incomes by \$12 million (9 percent of the total impact) followed by securities and investments with an increase of \$10 million (8 percent) and postal services with \$9 million (7 percent). While the tables indicate that neither the amounts nor shares of the indirect impacts of hospitals are equally distributed in the county, they are nonetheless distributed across a broad array of industries.

Table 4
Indirect Impacts of Hospitals

Industry	Output (\$M)	Employ (Jobs)	Income (\$M)	Output (%)	Employ (%)	Income (%)
Automotive repair	9.2	74	1.8	2.5	1.5	1.3
Business support services	5.2	153	2.6	1.5	3.2	1.9
Employment services	10.2	433	8.6	2.8	9.0	6.4
Food & drinking places	12.6	317	5.5	3.5	6.6	4.1
Legal services	15.0	225	8.4	4.2	4.7	6.3
Maintenance nonres. build.	7.2	88	3.3	2.0	1.8	2.5
Mgt companies & enterprises	9.2	104	5.6	2.6	2.2	4.2
Plastics plumbing fixtures	9.5	56	1.8	2.6	1.2	1.3
Postal service	10.9	155	8.9	3.0	3.2	6.6
Real estate	62.6	697	7.3	17.4	14.4	5.5
Securities, investments	20.0	313	10.1	5.6	6.5	7.5
Services to buildings	6.7	264	3.8	1.9	5.5	2.8
Wholesale trade	30.5	283	11.6	8.5	5.9	8.6
Other	169.8	1,895	61.1	47.2	39.2	46.6
Total	359.5	4,838	134.1	100.0	100.0	100.0

Source: MIG (2001 data).

3.3 Induced Impacts

People receive incomes as a consequence of either direct or indirect employment in the health care sector. As this income is spent, regional output expands, employment increases to facilitate the spending and additional incomes are earned. In turn, this activity causes still further increases in output, employment and income. For example, more houses are built and sold because hospital workers purchase homes; food and drinking places hire additional employees because hospital workers purchase out-of-home meals. Hospitals themselves have to expand their capacity because hospital workers, when sick themselves, go to hospitals. However, this induced impact, caused by the effects of spending incomes earned by some sort of health sector related employment, does not continue forever. The income eventually “leaks” out of the region as people save, pay taxes, make out-of-region purchases or purchase goods and services produced in other places.

Increases in output, employment and income caused by this spending of earnings received either directly from employment in health activities or indirectly from support of health related activities, represent the induced impacts of health care. Again, using hospitals as an example, Table 5 illustrates the extent of induced impacts in the Spokane economy. Included in the table are the ten industries (listed alphabetically) that hospitals had the greatest impact on, ranked by output, employment or income as well as the percentage distribution of these impacts. Overall, the industries found in the tables account for about 50 percent of the induced impact of hospitals on the county economy.

Industry	Output (\$M)	Employ (Jobs)	Income (\$M)	Output (%)	Employ (%)	Income (%)
Automotive repair	10.3	84	2.0	3.1	1.9	1.7
Food & beverage stores	7.1	124	3.2	2.1	2.8	2.7
Food & drinking places	19.6	495	8.6	5.9	11.3	7.1
General merchandise stores	5.5	124	2.7	1.6	2.8	2.3
Hospitals	25.5	231	10.3	7.6	5.3	8.6
Insurance carriers	8.5	--	2.3	2.5	--	1.9
Legal services	4.9	73	2.7	1.5	1.7	2.3
Monetary authorities, credit	11.3	--	2.4	3.4	--	2.0
Motor vehicle dealers	8.4	106	4.3	2.5	2.4	3.6
Nursing & res. care facilities	6.0	145	3.7	1.8	3.3	3.1
Physicians, dentists	18.8	251	11.6	5.6	5.7	9.7
Owner-occupied dwellings	26.7	--	--	8.0	--	--
Private households	--	110	--	--	2.5	--
Real estate	17.4	194	2.0	5.2	4.4	1.7
Securities, investments	6.0	93	3.0	1.8	2.1	2.5
Wholesale trade	21.2	197	8.1	6.3	4.5	6.7
Other	167.2	2,412	61.4	49.9	54.9	51.4
Total	334.9	4,390	119.8	100.0	100.0	100.0

Source: MIG (2001 data).

The induced impact of hospitals on county output was \$335 million. Of this, \$27 million (8 percent of the total) went for owner-occupied dwellings, followed by \$26 million (8 percent) to hospitals and \$21 million (6 percent) to the wholesale trade. The induced impact on county employment was 4,390 equivalent jobs. This produced an additional 495 jobs in food and drinking places (11 percent of the total impact) followed by 251 jobs as physicians, dentists or their office staffs (6 percent) and 231 jobs (5 percent) in hospitals. Finally, the induced impact of hospitals on county income was \$120 million. This increased the incomes of physicians, dentists or their office staffs by \$10 million (12 percent of the total impact) hospital incomes by \$9 million (10 percent) and food and drinking places by \$7 million (9 percent). Again, the tables indicate that neither the amounts nor shares of the induced impacts of hospitals are equally distributed in the county; nonetheless, again the impacts are distributed across a broad array of industries.

3.4 Total Impacts

Since indirect and induced impacts are some multiple of the direct impact, they represent the “multiplier” effects of health care. The actual indirect and induced multipliers used in this study were calculated by the IMPLAN Group for its economic impact modeling system. Direct impacts are simple shares of total output, but when combined with the indirect and induced impacts, the total impact of health care can be determined. This total impact measures the extent health care supports, or is associated with, regional economic activity. That is, it indicates any change in regional income, employment or income from a change in the output of the health care sector, holding the activities of all other industries constant.

Table 6
Total Impact of Health Care Industries in Spokane County

Industry	Output (\$M)			Employment (Jobs)			Income (\$M)		
	Direct	Mult.	Total	Direct	Mult.	Total	Direct	Mult.	Total
Hospitals	899	1.77	1,593	8,133	2.13	17,360	364	1.70	618
Physicians, Dentists	600	1.65	990	8,011	1.65	13,193	372	1.39	516
Nursing Care, Facilities	218	1.74	380	5,316	1.41	7,502	136	1.42	194
Other Health Care	492	1.73	852	3,105	2.49	7,723	150	1.87	280
Other Health Services	350	1.68	587	4,823	1.59	7,689	140	1.61	226
All Health Industries	2,559	1.72	4,401	29,386	1.82	53,467	1,162	1.58	1,834
All Industries	21,621	--	21,621	252,485	--	252,485	8,263	--	8,263
Health Care Share (%)	11.8	--	20.4	11.6	--	21.2	14.1	--	22.2

Source: MIG (2001 data).

Table 6 shows the total impact of health care in Spokane County. As a consequence of the direct output of hospitals of \$899 million, various other industries sold goods and services to hospitals and the spending of incomes earned by people associated with hospitals had, as indicated by the IMPLAN output multiplier, a total impact of \$1,593 billion. Another health industry, Other Health Care, directly employed

3,105 people and indirectly caused or induced employment of the equivalent of another 4,573 people for a total employment impact of 7,723 workers. The direct income of physicians or dentists and those working in their offices was \$372 million. When spent, this income as well as that paid to those employed to support these providers and their staffs, had a total impact of \$516 million.

The total impact of health care on the Spokane County economy is highly significant. Its total output impact of \$4.4 billion represents 20 percent of county output while its total employment impact of 53,500 and income impact of \$1.8 billion account for 21 percent of county employment and 22 percent of county income.

The total impact of health care on King County and the State are shown in Tables 7 and 8. The impact multipliers for each industry are similar in all three tables suggesting that regional differences in total impacts reflect the extent to which each region specializes in the production and delivery of health-related goods and services. As can be seen, the sector is about twice as important in Spokane County as in the other two regions, regardless of economic indicator.

Table 7
Total Impact of Health Care Industries in King County

Industry	Output (\$M)			Employment (Jobs)			Income (\$M)		
	Direct	Mult.	Total	Direct	Mult.	Total	Direct	Mult.	Total
Hospitals	3,042	1.73	5,261	25,577	1.80	46,151	1,357	1.62	2,196
Physicians, Dentists	2,528	1.57	3,976	29,865	1.48	44,069	1,566	1.35	2,119
Nursing Care, Facilities	795	1.65	1,313	17,057	1.30	22,190	519	1.37	710
Other Health Care	1,898	1.70	3,227	11,356	2.05	23,306	618	1.81	1,117
Other Health Services	2,847	1.57	4,476	17,063	1.76	30,099	925	1.65	1,527
All Health Industries	11,111	1.64	18,253	100,917	1.64	165,816	4,984	1.54	7,668
All Industries	189,885	--	189,885	1,459,132	--	1,459,132	75,625	--	75,625
Health Care Share (%)	5.9	--	9.6	6.9	--	11.4	6.6	--	10.1

Source: MIG (2001 data).

Table 8
Total Impact of Health Care Industries in Washington State

Industry	Output (\$M)			Employment (Jobs)			Income (\$M)		
	Direct	Mult.	Total	Direct	Mult.	Total	Direct	Mult.	Total
Hospitals	7,037	1.82	12,830	61,327	2.02	124,028	3,001	1.70	5,102
Physicians, Dentists	6,950	1.66	11,564	89,480	1.58	141,433	4,304	1.39	5,999
Nursing Care, Facilities	2,330	1.76	4,111	54,378	1.37	74,683	1,481	1.42	2,109
Other Health Care	4,686	1.78	8,333	29,496	2.29	67,627	1,434	1.92	2,748
Other Health Services	5,103	1.64	8,381	43,380	1.74	75,436	1,753	1.68	2,940
All Health Industries	26,106	1.73	45,219	278,062	1.74	483,207	11,974	1.58	18,899
All Industries	377,975	--	377,975	3,584,811	--	3,584,811	145,504	--	145,504
Health Care Share (%)	6.9	--	12.0	7.8	--	13.5	8.2	--	13.0

Source: MIG (2001 data).

The total output impact of the health care sector in King County was \$18.3 billion or 10 percent of total output, while total employment was 165,800 or 11 percent of county employment and total income was \$7.7 billion or 10 percent of all income. At the State level the size of the total impact of the health care sector is impressive. As Table 8 discloses, in total, health care throughout the state accounted for total output of \$45 billion, 483,000 equivalent employees and total income of \$18.9 billion. However, these state figures, as shares of overall totals, fell closer to those for King County than for Spokane County. Total sector output represented 12 percent of all output in the state, 14 percent of all employment and 13 percent of all income.

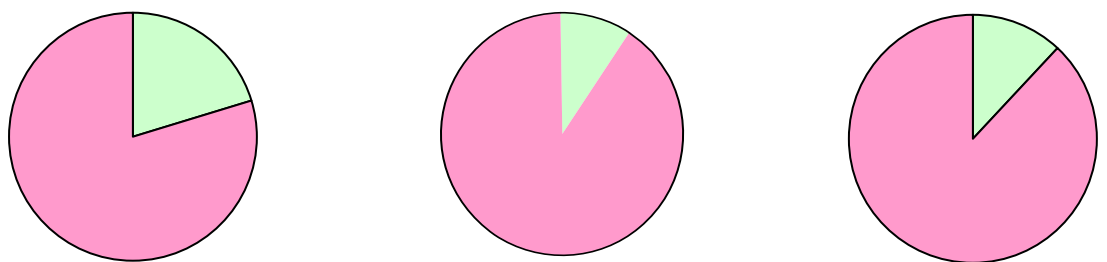
Table 9 and Figure 2 show the relative distribution of the total impact of various health industries as compared with all other industries in the three regions. Hospitals, doctors, dentists and their office staffs accounted for 12 percent of total output in Spokane County as opposed to 5 percent in King County and 6.5 percent in the State. This pattern of relative importance continues for the other measures, where hospitals, doctors and dentists show twice the economic impact in Spokane County as they did in the other regions. The impact of any of the other health industries is also relatively more important in Spokane County. The table clearly indicates the relative importance of health care in Spokane County. It accounts for 20 percent or more of total output, employment or income, much larger shares than those found for King County or the State.

Table 9
Regional Industrial Structure

Industry	Output Share (%)			Employ. Share (%)			Income Share (%)		
	Spk.	King	State	Spk.	King	State	Spk.	King	State
Hospitals	7.4	2.8	3.4	6.9	3.2	3.5	7.5	2.9	3.5
Physicians, Dentists	4.6	2.1	3.1	5.2	3.0	3.9	6.2	2.8	4.1
Nursing Care, Facilities	1.8	.7	1.1	3.0	1.5	2.1	2.3	.9	1.4
Other Health Care	3.9	1.7	2.2	3.1	1.6	1.9	3.4	1.5	1.9
Other Health Services	2.7	2.4	2.2	3.0	2.1	2.1	2.7	2.0	2.0
All Health Industries	20.4	9.6	12.0	21.2	11.4	13.5	22.2	10.1	13.0
All Other Industries	79.6	90.4	88.0	78.8	88.6	86.5	77.8	89.9	87.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: MIG (2001 data).

Figure 2
Health Care's Share of Regional Output



Spokane County

King County

Washington State

Light areas equal the share taken by All Health Industries (from Table 9)

3.5 Trade Flows

Specialized health facilities have important interregional trade and tax expenditure consequences. From an economic perspective, when patients in areas with fewer specialized facilities travel to larger health centers, the specialized centers are “exporting” their services while the patients are “importing” the same services. Payment for the services represents an expenditure injection into the economy of the providing area and a spending leakage from the economy of the receiving area. More than 80 percent of the expenditures on health care are paid from taxes, social insurance payments and private insurance premiums. Since these taxes, payments and premiums are usually sent to out-of-area governments and companies, they represent leakages from the local economy. If sufficient local health facilities exist, these leakages can be recaptured as payments when health services are locally provided; if the facilities do not exist, the local economic impact of the health taxes and insurance premiums will not be realized.

The determination of health care spending in Spokane County by non-county residents as well as the net effect of tax and premium leakages later recaptured as local spending is beyond the scope of this study. However, some recent data suggests the magnitude of this spending. A review of hospital discharges in 2003 by Inland Northwest Health Services found 26 percent had addresses with ZIP codes that were not in Spokane County. Since people most likely travel for more specialized (and expensive) care, the share of hospital billings represented by these discharges is probably much more than 26 percent. In 2002, Medicare and Medicaid funds accounted for 54 percent of all revenues for the five largest hospitals in Spokane County (excluding State or Federal hospitals), according to data compiled by the Washington State Department of Health Center for Health Statistics. Both these examples indicate significant trade flows as Spokane County exports health care and accounts are settled by payments from out-of-county sources.

4. Comparisons

4.1 Comparisons with Other Industries

Health expenditures in 2001 were nearly 15 percent of GDP. Locally and regionally, the health sector accounted for 20 percent of total employment in Spokane County, 11 percent in King County and 14 percent for the entire state. Yet economic conditions in Washington are typically discussed in terms of its two best known companies: Boeing, an aircraft manufacturer, and Microsoft, a software publisher. How do the direct and total impacts of these companies compare with those of health care? While data on these companies that are compatible with both the BEA and IMPLAN industrial classification schemes are not available because of disclosure restrictions, the impact of the industries which the companies dominate will be compared against that of health care.

Table 10 compares the direct and total impacts of the three industries as shares of total regional output, employment or income. Software publishing and aircraft manufacturing have virtually no impact on

output in Spokane County. As expected, in King County total output shares for these two industries are much larger at 16 and 12 percent, respectively. However, the 10 percent share of the health sector is nearly as significant. For the entire State, leadership is reversed as health care accounts for 12 percent of total output while aircraft manufacturing and software publishing shares are 10 and 8 percent, respectively. The impact multipliers of all three industries, that is, how much their direct impact converts into a total impact, are similar.

**Table 10
Industry Impacts and Multipliers**

Industry	Output			Employment			Income		
	Spok.	King	State	Spok.	King	State	Spok.	King	State
Direct Impact (%)									
Health Care	11.8	5.9	6.9	11.6	6.9	7.8	14.1	6.6	8.2
Software Pub	.1	10.9	5.5	.1	2.5	1.0	.1	12.1	6.3
Aircraft Mfg	.0	7.3	5.7	.0	3.2	2.1	.0	5.3	4.2
Total Impact (%)									
Health Care	20.4	9.6	12.0	21.2	11.4	13.5	22.2	10.1	13.0
Software Pub	.1	15.8	8.4	.1	8.5	4.4	.1	16.8	9.1
Aircraft Mfg	.0	11.7	9.6	.0	7.6	5.6	.0	9.3	7.7
Impact Multipliers									
Health Care	1.72	1.64	1.73	1.82	1.64	1.74	1.58	1.54	1.58
Software Pub	1.51	1.45	1.52	1.88	3.48	4.24	1.42	1.39	1.43
Aircraft Mfg	1.71	1.61	1.67	3.39	2.36	2.72	1.69	1.75	1.82

Source: MIG (2001 data).

In terms of employment impacts, health care dominates all three of the regions. Software publishing and aircraft manufacturing in Spokane County again have nearly no impact. However, in King County, where all three industries are important, health care directly employs more than twice the other two while its total employment impact is 30 percent larger. For the entire State, the sector employs almost eight times more than software publishing and three times more than aircraft manufacturing. The total employment impact of health care is three times larger than software publishing and twice as large as aircraft manufacturing. However, the impact multipliers indicate that production changes in software publishing and aircraft manufacturing have significantly greater employment impacts than those in the health sector. The implications of these different multipliers are discussed below.

In Spokane County, relative income impacts are similar to those for output. In King County, the total income impact of software publishing, probably reflecting the dot.com boom, should be noted. This impact is almost 70 percent larger than health care and 80 percent larger than aircraft manufacturing. Interestingly, the income share of aircraft manufacturing, the industry traditionally identified as dominating the King County economy, is less than that of health care. At the State level, health care again is the leading industry. Its direct income impact is 30 percent larger and its total impact 40 percent larger than

that of the second ranked industry, software publishing. Finally, the impact multipliers show little variation by either industry or region.

Overall, when compared to software publishing and aircraft manufacturing, health care dominates Spokane County. It leads in employment in King County and represents a significant share of output and income. Finally, it has the largest direct and total impacts on the entire Washington State economy, measured by output, employment or income.

However, this conclusion is based entirely on conditions existing at a point in time--that is, the direct and total impacts of industries as they existed in 2001. Conditions can quickly change. Microsoft has continued to grow since then while current employment levels at Boeing are half or less of those just a few years ago. As economic conditions change, it is entirely possible that the relative impacts described above could also change. An indication of the dynamic effects of these industries is shown by their impact multipliers. As the ratio of total to direct impacts, these multipliers show the total impact of changes in each of the industries. For example, a \$1 million increase in health care output in Spokane will cause total output to increase 1.72 times or to \$1.72 million.

As has been shown, the output and income impacts of the industries are roughly similar in all three regions. However, the employment impact of aircraft manufacturing in Spokane is nearly twice that of health care while in King County and at the State level employment effects are even larger. For example, an increase in health employment in Spokane County of 1,000 new jobs would support 820 other jobs while the same increase in aircraft manufacturing employment would support 2,390 new jobs. At the state level, 1,000 new health care jobs would support 740 other new jobs while the same increase in software publishing would create 3,240 new jobs. Consequently, while growth in the three industries has similar output or income effects, the employment impacts of software publishing or aircraft manufacturing are much larger than those of health care.

4.2 Comparisons with Other Regions

Health care accounts for about 12 percent of direct output and employment and 14 percent of direct income in Spokane County. In terms of total impacts, these shares rise to 20 percent or more. These percentages, representing the relative role of health care related activities in the county's economy, are far greater than those found in other counties in Western United States similar to Spokane. This conclusion is based on comparing the county, designated a Metropolitan Statistical Area (MSA) by the Bureau of Census (2004) because of its urbanized area (Spokane) and population (428,000 in 2003) with four similar Western MSAs (major urbanized area and population in parenthesis):

- Sacramento County CA (Sacramento, 1,305,000)
- Pima County AZ (Tucson, 881,000)
- Ada County ID (Boise, 320,000)
- Washoe County NV (Reno, 362,000)

Table 11 shows the leading industries in each of the four counties, with their share of output, employment or income in parenthesis. As in Spokane County, health care is the leading or second leading industry in all of these other counties. In Sacramento County, the sector substantially trails State & Local Government, as might be expected since Sacramento is the state capital of California. Health care is the leading industry in Pima County in terms of output and income and within a percentage point of being the largest employer. In Washoe County it leads wholesale trade in output and income and closely follows hotels and casino hotels in employment. Finally, in Ada County it leads semiconductors in output and income and food and drinking places in employment. Overall, health care output accounted for the greatest share of output or income in three of the four counties and the greatest share of employment in one. In all other instances, it was the second leading county industry.

Table 11
Leading Industries in Four Western Counties
(shares in parentheses)

Rank	Output	Employment	Income
Sacramento County CA			
1	State & Local Non-Ed. (12)	State & Local Non-Ed. (17)	State & Local Non-Ed. (23)
2	Health care (7)	Health care (7)	Health care (8)
3	Real estate (4)	Food & drinking places (6)	State & Local Ed. (5)
4	Owner-occupied dwell.(4)	State & Local Ed. (5)	**Physicians, dentists (3)
Pima County AZ			
1	Health care (9)	State & Local Ed. (9)	Health care (11)
2	Guided missile mfg (8)	Health care (9)	State & Local Ed. (10)
3	Real estate (5)	Food & drinking places (7)	Guided missile mfg (7)
4	Owner-occupied dwell. (5)	State & Local Non-Ed. (5)	State & Local Non-Ed. (5)
Washoe County NV			
1	Health care (8)	Hotels, casino hotels (7)	Health care (9)
2	Wholesale trade (7)	Health care (7)	Wholesale trade (6)
3	Hotels, casino hotels (5)	Food & drinking places (5)	State & Local Ed. (6)
4	Real estate (4)	Wholesale trade (5)	Hotels, casino hotels (5)
Ada County ID			
1	Health care (8)	Health care (8)	Health care (9)
2	Semiconductors (7)	Food & drinking places (6)	Semiconductors (7)
3	Wholesale trade (5)	State & Local Non-Ed. (5)	Mgt companies (5)
4	Real estate (5)	Semiconductors (5)	State & Local Non-Ed. (5)

Source: MIG (2001 data).

**Included in Health care

With the columns ordered by county population, Table 12 shows the direct and total impacts of the health care sector in terms of dollars or jobs while Table 13 contains the direct and total shares of output, employment or income. While magnitudes vary in Table 12 because of population size, in none of the other counties studied do the relative impacts of health care shown in Table 13 and Figure 3 approach those found for Spokane County. In Sacramento County the direct impact was about 40 percent less, in Pima County about 20 percent less and in Washoe and Ada Counties about 35 percent less for all

three measures. These findings carry over to total impacts which were 20 to 40 percent less than those found for Spokane County.

Finally, Table 13 also contains the impact multipliers for each county. It is important to note that the multipliers for Spokane County are similar to those for the others. This similarity suggests that the reason health care has such a significantly larger impact in Spokane is that the industry is significantly larger. That is, since proportionally more resources are already devoted to health-related activities in Spokane County, the sector has a proportionally greater impact on economic activity than in the other counties.

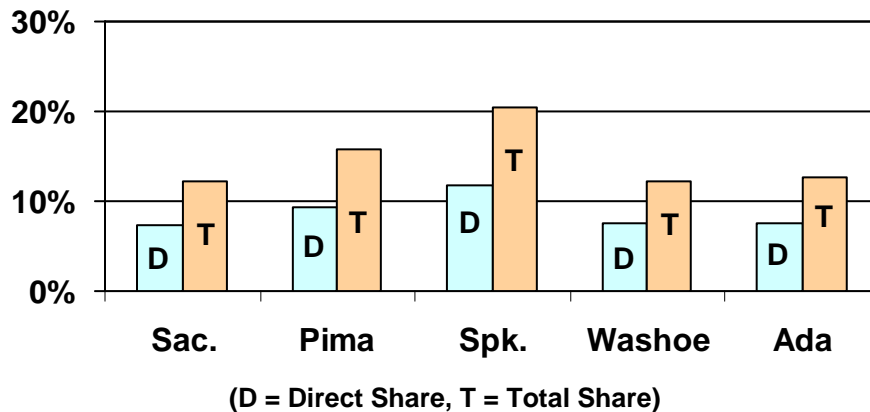
Table 12					
Direct Impact of Health Care by Selected County					
Industry	Sac.	Pima	Spk.	Washoe	Ada
Output (\$M)					
Direct Impact	5,055	3,376	2,559	1,774	1,690
Total Impact	8,569	5,735	4,401	2,871	2,792
All Industries	69,712	36,219	21,621	23,560	22,193
Employment (Jobs)					
Direct Impact	52,647	38,544	29,386	17,317	18,952
Total Impact	91,987	71,175	53,467	29,820	33,017
All Industries	751,891	450,671	252,485	240,180	242,498
Income (\$M)					
Direct Impact	2,471	1,507	1,162	838	794
Total Impact	3,811	2,369	1,834	1,256	1,202
All Industries	31,005	14,357	8,263	9,520	9,033

Source: MIG (2001 data).

Table 13					
Impact of Health Care by Selected County					
Item	Sac.	Pima	Spk.	Washoe	Ada
Share of Output (%)					
Direct Impact	7.3	9.3	11.8	7.5	7.6
Total Impact	12.3	15.8	20.4	12.2	12.6
Multiplier	1.69	1.70	1.72	1.62	1.65
Share of Employment (%)					
Direct Impact	7.0	8.6	11.6	7.2	7.8
Total Impact	12.2	15.8	21.2	12.4	13.6
Multiplier	1.75	1.85	1.82	1.72	1.74
Share of Income (%)					
Direct Impact	8.0	10.5	14.1	8.8	8.8
Total Impact	12.3	16.5	22.2	13.2	13.3
Multiplier	1.54	1.57	1.58	1.50	1.51

Source: MIG (2001 data).

**Figure 3
Health Care's Share of Output by Selected County**



4.3 Comparisons with Other Studies

The economic impact of health care has been studied hundreds of times in a variety of contexts. Impacts have been estimated for counties in Nevada and Iowa; for states like North Dakota or regions like New England; for hospitals in Vermont, Michigan, Georgia, and Florida; for cities like Cincinnati and Seattle; for medical and teaching colleges in New York or in the United States generally. The medical device industry has been investigated. These studies consistently find that the provision of health care has significant economic impacts and have resulted in articles like “Health Care is Good Business” or “Can Health Care Cure Ohio’s Economic Ills?”

A sampling of these studies illustrates both their range and consistency. A Louisiana study found that “the healthcare industry employs ... almost 11 percent of the total workforce and approximately 14 percent of the state’s total private payroll ([Louisiana Hospital Association](#)).” A consortium of rural counties in Kentucky, Missouri, Nevada, Oklahoma and Pennsylvania concluded that

The health care sector plays a vital role in the economy of rural communities. . . . (It) is an employer, a catalyst for industrial and business growth, and an inducement for retirement growth. As an employer, the health care sector is often the largest employer in rural communities. Research shows that the health sector provides 10 to 15 percent of the jobs in many rural counties, and that if the secondary benefits of those jobs are included, the health care sector accounts for 15 to 20 percent of all jobs. On an individual employer basis, hospitals are often second only to school systems as the largest employer in rural counties. (Operation Rural Health Works)

Health care is the largest employer in New York City:

The health care industry employs approximately 375,000 people in New York City, making it the city’s number one sector in terms of employment, as well as the number one sector in every borough except Manhattan (where it is third, behind Business Services and Security/Commodity Brokers Dealers Exchanges). Further, the industry overall has exhibited a growth pattern that persists through the ups and down of the wider economy. (Fiscal Policy Institute)

Recently the Milken Institute examined the “Economic Contributions of Health Care to New England” and found that “since 11.4 percent of total employment in New England is health care employment, the industry ultimately accounts for nearly 25 percent of total employment in New England when including the multiplier effect” (Milken, p. 5). Using BEA state employment data, shares of state employment were derived from the direct and total employment impacts of health care as reported by the study. These shares are found in Table 14 which also contains the employment shares for Washington State. When compared to New England states, the direct employment effect of health care in Washington is about 15 percent lower while the total impact is about 30 percent less.

State	Direct	Total
Massachusetts	9.5	20.6
Connecticut	9.2	19.9
New Hampshire	7.5	16.4
Rhode Island	9.7	20.1
Vermont	7.8	15.8
Maine	8.4	18.0
Washington	7.8	13.5

Source: Milken, MIG.

Finally, in a study examining many of the same topics considered here, the Washington State Hospital Association recently sponsored the “Economic Impact of Hospitals in Washington State in 2001” (WSHA). This investigation utilized hospital survey responses to supplement and expand BEA and BLS data. Rather than using a regionalization of the BEA National I-O model, the study derived impact multipliers from a state input-output model initially developed by the University of Washington and State agencies (Beyers).

Table 15 shows the direct and total output, employment and income impacts and impact multipliers of hospitals in Spokane County, King County and the State. The WSHA estimates for hospital output and employment in Spokane County are about 25 percent lower than those reported here while those for income are comparable. Reasons for differences in output between the two studies can be explained by the coverage of the WSHA survey while employment differences are definitional. The present study defines employment in terms of jobs while WSHA used a full time equivalent (FTE) definition. Differences found by the studies for total impacts in Spokane County are much smaller than direct ones because the WSHA study used larger output and employment multipliers. Results for King County and the State are the reverse of those for Spokane County because the EWU study always found smaller direct and total impacts and IMPLAN estimated lower multipliers for these regions.

Table 15						
Different Measures of the Impact of Hospitals						
Measure	EWU			WSHA		
	Direct	Mult.	Total	Direct	Mult.	Total
Spokane						
Output (\$M)	899	1.77	1,593	675	1.92	1,294
Employment (Jobs)	8,133	2.13	17,360	6,200	2.31	14,345
Income (\$M)	364	1.70	618	351	1.66	584
King						
Output (\$M)	3,042	1.73	5,261	3,222	2.10	6,780
Employment (FTE)	25,577	1.80	46,151	26,432	2.96	78,289
Income (\$M)	1,357	1.62	2,196	1,663	1.86	3,088
State						
Output (\$M)	7,037	1.82	12,830	7,305	2.40	17,521
Employment (FTE)	61,327	2.02	124,028	65,048	3.13	203,598
Income (\$M)	3,001	1.70	5,102	3,848	2.00	7,702

Source: MIG, WSHA.

Table 16					
Different Direct and Total Impact Hospitals: Share of Employment (%)					
Region	EWU		WSHA		Population
	Direct	Total	Direct	Total	
Spokane	3.22	6.86	2.46	5.67	252,485
King	1.75	3.16	1.81	5.37	3,584,811
State	1.71	3.46	1.81	5.68	3,584,811

Source: MIG, WSHA.

Findings from these two studies provide a range of estimates for the direct and total impact of hospital employment. As shown in Table 16, hospitals in Spokane County directly accounted for between 2.5 and 3.2 percent of county employment and in terms of total impacts, between 5.7 and 6.9 percent. In King County and the State the direct shares of employment were nearly identical. But, because of higher WSHA multipliers, total shares ranged between 3.2 and 5.4 percent for King County and 3.5 and 5.7 percent for the State.

Most of these differences are probably explained by different data and industry definitions as well as by technical I-O considerations. Specifically, the WSHA study relied on survey data while the study here used data derived by MIG from national and state statistical sources. To examine impacts of health care beyond that of hospitals, the WSHA study expanded its data by including Other Health Services from SIC Industry 80. To create comparable data, health care as defined for this study was modified by excluding the composite industry, Other Health Services, which is largely composed of non SIC 80 industries. With these adjustments and ignoring King County which was excluded by WSHA, differences between the two studies sharply decline as Table 17 shows. Revised direct and total impacts for Spokane County are similar while impacts at the State level differ only because WSHA used larger multipliers.

Measure	EWU			WSHA		
	Direct	Mult.	Total	Direct	Mult.	Total
Spokane						
Output (\$M)	1,717	1.73	2,963	1,781	1.61	2,863
Employment (Jobs)	21,460	1.77	38,055	21,935	1.66	36,448
Income (\$M)	872	1.52	1,328	854	1.45	1,235
State						
Output (\$M)	16,317	1.75	28,505	17,887	1.89	33,922
Employment (FTE)	205,185	1.66	340,144	216,280	2.06	445,866
Income (\$M)	8,786	1.50	13,210	9,265	1.62	15,048

Source: MIG, WSHA.

Region	EWU		WSHA		Population
	Direct	Total	Direct	Total	
Spokane	8.50	15.07	8.69	14.44	252,485
State	5.72	9.49	6.03	12.44	3,584,811

Source: MIG, WSHA.

As indicated by Table 18, the revised range of employment shares becomes much narrower, with the health services direct share of Spokane County employment falling between 8.5 and 8.7 percent and between 14.4 and 15.1 percent for total impacts where again differences are explained by the larger WSHA multipliers. Overall, despite using different data and models, these two studies of the impact of health care in the same geographic regions come to essentially the same conclusions.

5. Future Prospects of the Health Care Sector

Detailed forecasts of the future growth of health care and the expected continued role of the sector in the economies of Spokane County, King County or the State have not been undertaken. However, the Labor Market & Economic Analysis Branch (LMEA) of the Washington State Employment Security Department has estimated job growth or “occupational outlook” by industry for the years between 2000 and 2010. Because job growth is synonymous with industrial growth, these estimates are in fact forecasts of future industrial growth.

The estimates, [Spokane County Occupational Outlook 2010](#), [Seattle-King County Occupational Outlook 2010](#) and [Washington State Occupational Outlook 2010](#), are based on employment and occupational labor market data compiled by the LMEA in conjunction with the U.S. Bureau of Labor Statistics. According to LMEA, “the number of new job openings for an occupation represents openings

due to growth as well as openings due to replacement needs. It does not include the large number of openings that result when workers change jobs but stay in the same occupation.”

Table 19
Industries with Most New Jobs, 2000 - 2010

Industry	Number of Jobs			Percent of New Jobs		
	Spk.	King	State	Spk.	King	State
Hospitals	2,464	6,005	17,335	7.7	4.8	4.9
Other Health Services	2,735	12,113	32,843	8.5	9.7	9.4
Nursing Care	1,063	--	11,230	3.3	--	3.2
Health Care	6,262	18,118	61,408	19.6	14.5	17.5
Eating & Drinking Places	2,335	11,046	25,071	7.3	8.8	7.1
Social Services	1,752	5,157	18,197	5.5	4.1	5.2
Local Gov. Education.	1,731	4,892	22,225	5.4	3.9	6.3
State Gov. Education.	867	6,391	11,150	2.7	5.1	3.2
Misc. Bus. Services	1,229	5,196	--	3.8	4.2	--
Amuse & Rec. Services	902	4,718	--	2.8	3.8	--
Educational Services	1,514	--	--	4.7	--	--
Computer & DP Services	--	9,894	11,411	--	7.9	3.3
Spec Trade Contractors	--	--	9,993	--	--	2.8
Local Gov, Non-ed. other	--	--	9,602	--	--	2.7
Research & Test. Serv.	--	4,570	--	--	3.7	--
Subtotal	16,592	69,982	169,057	51.9	56.0	48.2
Other	15,408	55,018	181,943	48.2	44.0	51.8
Total	32,000	125,000	351,000	100.0	100.0	100.0

Source: WA ESD.

Figure 4
Industries with the Most Forecasted New Jobs through 2010

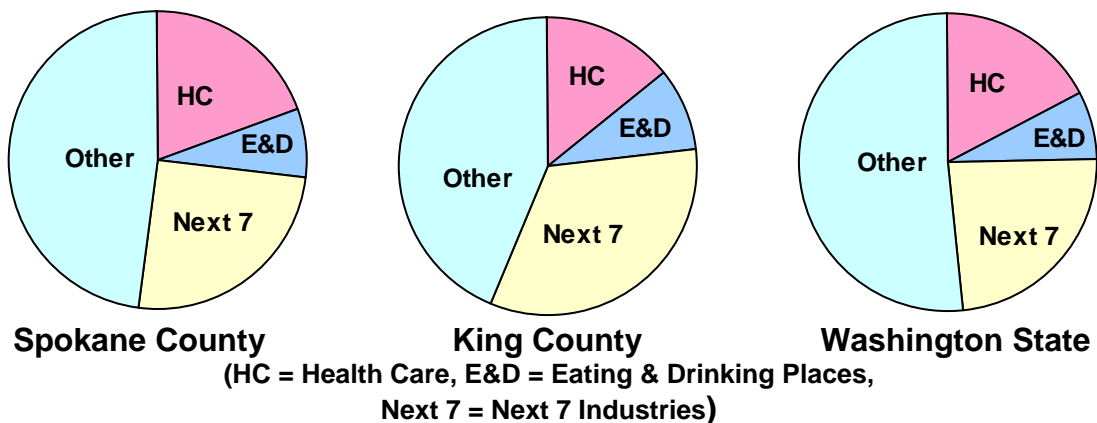


Table 19 and Figure 4 show the ten industries with the most projected new jobs for Spokane County, King County and the State and the percentage distributions of these jobs. Between 2000 and

2010, Spokane County is expected to add about 32,000 new jobs. Of these, 6,300 or 20 percent are health sector occupations. The next largest occupational growth comes from eating and drinking places with 2,335 new jobs or 7 percent of the total. Job growth size and percentages are similar for King County and the State. King County is expected to add 125,000 new jobs by 2010. About 15 percent of these will be in the health sector while the State is expected to add 351,000 new jobs with about 18 percent in health occupations. For both these, the second fastest growing industry is eating and drinking places with 9 and 7 percent of new jobs, respectively. In Spokane County and the State, health sector job growth is twice that of the next fastest growing industry and 40 percent faster in King County.

Overall, Washington State employment forecasts indicate the health care sector will provide more new jobs than any other industry either regionally or in the state. This suggests that future prospects of the sector are bright and implies similar output and income growth.

6. Conclusions

Since health care is an important industry nationally, it has to be important locally. However, the extent of this local importance has not been appreciated or documented. In every county, health care is usually the leading or second industry as measured by common economic indicators. In Spokane County the industry is especially important, leading all other industries in output, employment or income. When compared to other, comparable counties in Western United States, health care shares of output, employment or income in Spokane County are larger by a factor of two or more. The reason for this absolute and relative importance is not difficult to identify: relatively more resources are devoted to health care in Spokane County than in other places. This specialization seems to have come about unnoticed. While members of the community speak of the past influence of mining, railroads, agriculture, aluminum, and so on, few have, until recently, acknowledged the importance of the health care sector.

Future prospects of the health care sector are bright. Employment forecasts indicate the sector will provide more new jobs than any other industry either regionally or in the state. It remains to be determined exactly how these prospects are realized.

7. Appendix

7.1 Industry Definitions

Source: "Description with link to definition" 1997 Economic Census: Summary Statistics for United States 1997 NAICS Basis. <http://www.census.gov/epcd/ec97/us/US000.HTM> and "2001 IMPLAN Data Sectoring Scheme – Replacement for Appendix A in IMPLAN User's Manual" MIG, Inc, <http://www.implan.com>

Below is a concordance that links Bureau of Census health related industries identified by their NAICS (North American Industrial Classification System) industry number with those formed for the IMPLAN model, identified by their IMPLAN industry number. As shown, some of these NAICS/IMPLAN industries were combined to form a larger industry for purposes of this study.

Five basic health related industries were identified to examine the impact of the health sector on the Spokane economy. These include, with a short title,

1. Hospitals

IMPLAN 467 Hospitals, composed of NAICS 622: Hospitals: industries that provide medical, diagnostic, and treatment services that include physician, nursing, and other health services to inpatients and the specialized accommodation services required by inpatients. Hospitals may also provide outpatient services as a secondary activity. Establishments in the Hospitals sub-sector provide inpatient health services, many of which can only be provided using the specialized facilities and equipment that form a significant and integral part of the production process.

2. Physicians, Dentists

IMPLAN 465 Offices of physicians, dentists, and other health, composed of NAICS 6211 Offices of Physicians: establishments of health practitioners having the degree of M.D. (Doctor of medicine) or D.O. (Doctor of osteopathy) primarily engaged in the independent practice of general or specialized medicine (e.g., anesthesiology, oncology, ophthalmology, psychiatry) or surgery. These practitioners operate private or group practices in their own offices (e.g., centers, clinics) or in the facilities of others, such as hospitals or HMO medical centers; NAICS 6212 Offices of Dentists: establishments of health practitioners having the degree of D.M.D. (Doctor of dental medicine), D.D.S. (Doctor of dental surgery), or D.D.Sc. (Doctor of dental science) primarily engaged in the independent practice of general or specialized dentistry or dental surgery. These practitioners operate private or group practices in their own offices (e.g., centers, clinics) or in the facilities of others, such as hospitals or HMO medical centers. They can provide either comprehensive preventive, cosmetic, or emergency care, or specialize in a single field of dentistry; and NAICS 6213 Offices of Other Health Practitioners: establishments of independent health practitioners (except physicians and dentists).

3. Nursing Care, Facilities

IMPLAN 468 Nursing and residential care facilities, composed of NAICS 623: Nursing and Residential Care Facilities: Industries that provide residential care combined with either nursing, supervisory, or other types of care as required by the residents. In this subsector, the facilities are a significant part of the production process and the care provided is a mix of health and social services with the health services being largely some level of nursing services.

4. Other Health Care

IMPLAN 466 Other ambulatory health care services, composed of NAICS 6214 Outpatient Care Centers: establishments classified in NAICS industries 62141 Family Planning Centers, 62142 Outpatient Mental Health and Substance Abuse Centers; and 62149 Other Outpatient Care Centers; NAICS 6215 Medical and Diagnostic Laboratories: establishments known as medical and diagnostic laboratories primarily engaged in providing analytic or diagnostic services, including body fluid analysis and diagnostic imaging, generally to the medical profession or to the patient on referral from a health practitioner; and NAICS 6219 Other Ambulatory Health Care Services: establishments primarily engaged in providing ambulatory health care services (except offices of physicians, dentists, and other health practitioners;

outpatient care centers; medical laboratories and diagnostic imaging centers; and home health care providers).

5. Other Health Services

Industries of lesser relative impact were collected in this composite industry and include:

a. Home Health Care

IMPLAN 464 Home health care services, composed of NAICS 6216 Home Health Care Services: establishments primarily engaged in providing skilled nursing services in the home, along with a range of the following: personal care services; homemaker and companion services; physical therapy; medical social services; medications; medical equipment and supplies; counseling; 24-hour home care; occupation and vocational therapy; dietary and nutritional services; speech therapy; audiology; and high-tech care, such as intravenous therapy.

b. Pharmacies, Drug Stores

82.4 percent (based on revenues) of IMPLAN 406 Health and personal care stores, composed of NAICS 4461101: Pharmacies and Drug Stores: establishments primarily engaged in retailing prescription drugs. Drug stores are classified here if any prescriptions are sold or if there is an indication that a pharmacist is employed. These establishments frequently sell other items, such as proprietary drugs, medicines, and health and first-aid products; cosmetics; toiletries; greeting cards; magazines; tobacco; and candy.

c. Health Insurance Carriers

20.41 percent (based on revenues) of IMPLAN 427 Insurance carriers, composed of NAICS 524114: Direct Health and Medical Insurance Carriers: establishments primarily engaged in initially underwriting (i.e., assuming the risk and assigning premiums) health and medical insurance policies. Group hospitalization plans and HMO establishments (except those providing health care services) that provide health and medical insurance policies without providing health care services are included in this industry; includes SIC industries 6321 (pt) Offices of direct health insurance carriers and 6324 (pt) Offices of hospital & medical service plans (direct).

d. Medical Technology, Equipment

Combines the following IMPLAN industries:

IMPLAN 160 Pharmaceutical and medicine manufacturing, composed of NAICS 3254: Pharmaceutical and Medicine Manufacturing: establishments classified in Industry 32541, Pharmaceutical and Medicine Manufacturing; NAICS 325411: Medicinal and Botanical Manufacturing: establishments primarily engaged in (1) manufacturing uncompounded medicinal chemicals and their derivatives (i.e., generally for use by pharmaceutical preparation manufacturers) and/or (2) grading, grinding, and milling uncompounded botanicals; includes SIC industry 2833 Medicinals and botanicals; NAICS 325413: In-Vitro Diagnostic Substance Manufacturing: establishments primarily engaged in manufacturing in-vitro (i.e., not taken internally) diagnostic substances, such as chemical, biological, or radioactive substances. The substances are used for diagnostic tests that are performed in test tubes, petri dishes, machines, and other diagnostic test-type devices; includes SIC industry 2835 Diagnostic substances (pt); and NAICS 325414: Biological Product (except Diagnostic) Manufacturing: establishments primarily engaged in manufacturing vaccines, toxoids, blood fractions, and culture media of plant or animal origin (except diagnostic); includes SIC industry 2836 Biological products, except diagnostic

IMPLAN 313 Electromedical apparatus manufacturing, composed of NAICS 334510: Electromedical and Electrotherapeutic Apparatus Manufacturing: establishments primarily engaged in manufacturing electromedical and electrotherapeutic apparatus, such as magnetic resonance imaging equipment, medical ultrasound equipment, pacemakers, hearing aids, electrocardiographs, and electromedical endoscopic equipment; includes SIC industries 3699 Electrical equipment and supplies, n.e.c. (pt), 3842 Surgical appliances and supplies (pt) and 3845 Electromedical equipment; also includes establishments primarily engaged in the manufacture of electro medical laser products.

IMPLAN 320 Irradiation apparatus manufacturing, composed of NAICS 334517: Irradiation Apparatus Manufacturing: establishments primarily engaged in manufacturing irradiation apparatus and tubes for applications, such as medical diagnostic, medical therapeutic, industrial, research and scientific evaluation. Irradiation can take the form of beta-rays, gamma-rays, X-rays, or other ionizing radiation; includes SIC industry 3844 X-ray apparatus and tubes

IMPLAN 374 Laboratory apparatus and furniture manufacturing, composed of NAICS 339111: Laboratory Apparatus and Furniture Manufacturing: establishments primarily engaged in manufacturing laboratory apparatus and laboratory and hospital furniture (except dental). Examples of products made by these establishments are hospital beds, operating room tables, laboratory balances and scales, furnaces, ovens, centrifuges, cabinets, cases, benches, tables, and stools; includes SIC industry 3821 Laboratory apparatus and furniture.

IMPLAN 375 Surgical and medical instrument manufacturing, composed of NAICS 339112: Surgical and Medical Instrument Manufacturing: establishments primarily engaged in manufacturing medical, surgical, ophthalmic, and veterinary instruments and apparatus (except electrotherapeutic, electromedical and irradiation apparatus). Examples of products made by these establishments are syringes, hypodermic needles, anesthesia apparatus, blood transfusion equipment, catheters, surgical clamps, and medical thermometers; includes SIC industries 3829 Measuring and controlling devices, n.e.c. (pt) and 3841 Surgical and medical instruments

IMPLAN 376 Surgical appliance and supplies manufacturing, composed of NAICS 339113: Surgical Appliance and Supplies Manufacturing: establishments primarily engaged in manufacturing surgical appliances and supplies. Examples of products made by these establishments are orthopedic devices, prosthetic appliances, surgical dressings, crutches, surgical sutures, and personal industrial safety devices (except protective eyewear); includes SIC industries 2599 Furniture and fixtures, n.e.c. (pt) and 3842 Surgical appliances and supplies (pt).

IMPLAN 377 Dental equipment and supplies manufacturing, composed of NAICS 339114: Dental Equipment and Supplies Manufacturing: establishments primarily engaged in manufacturing dental equipment and supplies used by dental laboratories and offices of dentists, such as dental chairs, dental instrument delivery systems, dental hand instruments, and dental impression material; includes SIC industries 3699 Electrical equipment and supplies, n.e.c. (pt) and 3843 Dental equipment and supplies.

IMPLAN 378 Ophthalmic goods manufacturing, composed of NAICS 339115: Ophthalmic Goods Manufacturing: establishments primarily engaged in manufacturing ophthalmic goods. Examples of products made by these establishments are prescription eyeglasses (except manufactured in a retail setting), contact lenses, sunglasses, eyeglass frames, and reading glasses made to standard powers; includes SIC industry 3851 Ophthalmic goods

IMPLAN 379 Dental laboratories, composed of NAICS 339116: Dental Laboratories: establishments primarily engaged in manufacturing dentures, crowns, bridges, and orthodontic appliances customized for individual application; includes SIC industry 8072 Dental laboratories

7.2 Spokane County Leading Industries

Rank	Industry	Value	Share
Ranked by Output (\$M)			
--	Health care	2,559	11.8
1	Wholesale trade	1,167	5.4
2	**Hospitals	899	4.2
3	Owner-occupied dwellings	830	3.8
4	State & Local Education	781	3.6
5	Real estate	673	3.1
6	Monetary. depository interme	633	2.9
7	Food & drinking places	606	2.8
8	**Physicians, dentists	600	2.8
9	Automotive repair, maintenance	569	2.6
10	**Other ambulatory care serv	492	2.3
All Industries		21,621	
Ranked by Employment (Jobs)			
	Health care	29,386	11.6
1	State & Local Education	18,357	7.3
2	Food & drinking places	15,276	6.1
3	Wholesale trade	10,838	4.3
4	State & Local Non-Education	8,788	3.5
5	**Hospitals	8,133	3.2
6	**Physicians, dentists	8,011	3.2
7	Real estate	7,488	3.0
8	Federal Military	5,478	2.2
9	Food & beverage stores	5,329	2.1
10	**Nursing & res. care facilities	5,316	2.1
All Industries		252,485	
Ranked by Income (\$M)			
	Health care	1,162	14.1
1	State & Local Education	682	8.3
2	Wholesale trade	443	5.4
3	State & Local Non-Education	411	5.0
4	**Physicians, dentists	372	4.5
5	**Hospitals	364	4.4
6	Food & drinking places	264	3.2
7	Federal Military	250	3.0
8	Federal Non-Military	179	2.2
9	Motor vehicle & parts dealers	176	2.1
10	Management of companies	158	1.9
All Industries		8,263	

Source: MIG (2001 data).

**Included in Health Industry

7.3 King County Leading Industries

Rank	Industry	Value	Share
Ranked by Output (\$M)			
1	Software publishing	20,672	10.9
2	Aircraft manufacturing	13,832	7.3
3	Wholesale trade	11,423	6.0
--	Health care	11,111	5.9
4	Real estate	10,199	5.4
5	Telecommunications	6,420	3.4
6	Owner-occupied dwellings	5,699	3.0
7	Monetary, depository interme	4,081	2.1
8	Food & drinking places	3,998	2.1
9	Custom computer prog.	3,100	1.6
10	State & Local Non-Education	3,075	1.6
All Industries		189,885	
Ranked by Employment (Jobs)			
	Health care	100,917	6.9
1	Food & drinking places	86,392	5.9
2	Wholesale trade	69,075	4.7
3	State & Local Education	65,165	4.5
4	State & Local Non-Education	53,311	3.7
5	Aircraft manufacturing	46,913	3.2
6	Real estate	46,208	3.2
7	Custom computer prog.	37,652	2.6
8	Software publishing	35,699	2.4
9	Employment services	35,552	2.4
10	Nonstore retailers	32,404	2.2
All Industries		1,459,132	
Ranked by Income (\$M)			
1	Software publishing	9,133	12.1
	Health care	4,984	6.6
2	Wholesale trade	4,401	5.8
3	Aircraft manufacturing	4,016	5.3
4	Custom computer prog.	2,927	3.9
5	State & Local Non-Education	2,621	3.5
6	State & Local Education	2,557	3.4
7	Food & drinking places	1,920	2.5
8	Telecommunications	1,874	2.5
9	Management of companies	1,803	2.4
10	**Physicians, dentists	1,566	2.1
All Industries		75,625	

Source: MIG (2001 data).

**Included in Health Industry

7.4 Washington State Leading Industries

Rank	Industry	Value	Share
Ranked by Output (\$M)			
--	Health care	26,106	6.9
1	Aircraft manufacturing	21,693	5.7
2	Software publishing	20,828	5.5
3	Wholesale trade	18,250	4.8
4	Real estate	15,865	4.2
5	Owner-occupied dwellings	13,930	3.7
6	State & Local Education	9,990	2.6
7	State & Local Non-Education	9,037	2.4
8	Food & drinking places	8,899	2.4
9	Telecommunications	8,864	2.3
10	Monetary, depository interme	7,526	2.0
All Industries		377,975	
Ranked by Employment (Jobs)			
	Health care	278,062	7.8
1	State & Local Education	234,686	6.5
2	Food & drinking places	217,098	6.1
3	State & Local Non-Education	166,528	4.6
4	Wholesale trade	130,217	3.6
5	Real estate	111,605	3.1
6	**Physicians, dentists	89,480	2.5
7	Federal Military	81,048	2.3
8	Aircraft manufacturing	74,274	2.1
9	Food & beverage stores	68,148	1.9
10	**Hospitals	61,327	1.7
All Industries		3,584,811	
Ranked by Income (\$M)			
	Health care	11,974	8.2
1	Software publishing	9,202	6.3
2	State & Local Education	8,724	6.0
3	State & Local Non-Education	7,705	5.3
4	Wholesale trade	6,994	4.8
5	Aircraft manufacturing	6,158	4.2
6	**Physicians, dentists	4,304	3.0
7	Food & drinking places	3,976	2.7
8	Federal Military	3,814	2.6
9	Custom computer prog.	3,382	2.3
10	**Hospitals	3,001	2.1
All Industries		145,504	

Source: MIG (2001).

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