

Economic Contribution of the Healthcare Industry to the City of Seattle

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Executive Summary

The City of Seattle's Office of Economic Development with the Health Work Force Institute commissioned this report to analyze the healthcare industry in Seattle. Healthcare was selected for its job-generating capacity, directly tied to the explosive growth in demand for healthcare services.

The City of Seattle has become one of these leading health care clusters, with considerable concentration in health care delivery, biomedical research and applications, and training for doctors and other medical staff. This healthcare industry cluster has propelled the Seattle economy forward by attracting substantial human and financial resources to the City, from which patients, research and development, the educational system, and the community all derive significant benefits. Healthcare institutions are too often viewed as simply providers of services—since patient care is their most visible contribution. Less well recognized are the significant connections and contributions that healthcare institutions make within the broader regional economy.

Seattle has the largest concentration of medical facilities and personnel in the Pacific Northwest with over 74,600 medical workers with \$3.0 billion in labor income. In 2002, the healthcare industry produced \$6.37 billion in output value and contributed \$10.85 million in tax revenues to the City. Annual wages and salaries for medical workers in Seattle average \$40,470, slightly above the City's average for all workers.

Healthcare delivery in Seattle, though prominent and central, is only a part of the extensive healthcare cluster that exists in the city. With linked biotechnology, medical device manufacturers, and medical service industries, and supportive training and research institutions, the Seattle healthcare industry cluster totals 96,400 workers with an annual payroll of \$4.2 billion. Annual wages and salaries for all workers in the Seattle healthcare cluster average \$43,330; about eight percent above the Citywide average for all workers.

One in five jobs in Seattle is tied to this healthcare industry cluster. When economic multiplier effects are considered, the total job generation attributable to healthcare providers is 115,600 workers with \$4.1 billion in wages and salaries and output valued at \$10.3 billion. In terms of total tax impact, healthcare providers generated \$29.6 million for the City treasury.

Workforce-related issues are of preeminent concern for the healthcare services industry in Seattle. In particular, industry leaders and policy-makers are concerned about how to meet the current and future employment demand of the healthcare services sector. The immediate problem in Seattle—as elsewhere—is the inadequate supply of nurses and other support occupations.

Other key areas of concern for industry leaders include streamlining regulatory processes, increased costs from city-owned utilities, and need for greater City support.

Table of Contents

EXECUTIVE SUMMARY	2
INTRODUCTION	5
Purpose of report	7
HEALTHCARE INDUSTRY CLUSTER IN SEATTLE	8
Seattle’s Healthcare Industry Cluster: Under the Scope	9
Export Orientation—Employment Specialization	11
Interdependence—Cluster Dependency	14
Economic Prosperity	16
RECENT CLUSTER PERFORMANCE OF HEALTHCARE IN SEATTLE	18
Trends in Seattle Healthcare Industry	20
ECONOMIC IMPACT OF HEALTHCARE IN SEATTLE	23
LOOKING AHEAD: HEALTHCARE EMPLOYMENT AND OCCUPATIONAL PROJECTIONS FOR SEATTLE	25
Healthcare Employment Growth by Occupation	27
HEALTHCARE JOB VITALITY IN SEATTLE: ISSUES FOR WORKFORCE DEVELOPMENT	30
FUTURE PROGNOSIS FOR HEALTHCARE IN SEATTLE	33
REFERENCES	35
APPENDIX A: KEY SECTORS WITHIN THE HEALTHCARE INDUSTRY CLUSTER	37
APPENDIX B: MEMBERS OF THE SEATTLE HEALTHCARE INDUSTRY PANEL	41

Economic Contribution of Healthcare Industry to the City of Seattle

I. Introduction

The healthcare sector has been among the fastest growing sectors within the U.S. economy. The industries that constitute the broadly encompassing healthcare industry are of great importance to national and regional prosperity. During the late 1980s and early 1990s, the healthcare sector was called the “job-making machine,” leading all sectors in the national economy in new jobs. One in every new five jobs during this time period was created in healthcare. Although growth in healthcare services has slowed somewhat in recent years, the sector still accounts for one in every six new jobs created in the national economy over the last five years. Nurturing expansion in healthcare is increasingly vital to national and regional economic development.

This industry ranges from the direct provision of health services, including health practitioners and hospitals to the wide expanse of connective healthcare products (including drugs and pharmaceuticals, medical devices and supplies) and medical services (including health insurance and research and testing laboratories) where much of the burgeoning biotechnology sector is recorded. Healthcare is comprised of more than delivery of patient care within clinics, long-term care facilities, and hospitals. Scientific discoveries and commercial innovations within the closely related pharmaceutical and biotechnology and medical devices segments have improved the quality of life and extended the lifespan of many individuals. Significant investments in research and development will continue to lead to dramatic advances in medical science and healthcare. The fusing of these activities of healthcare provision and biomedical research will help determine which locations will be the dominant healthcare centers.

Industry growth is directly tied to the explosive demand for healthcare services. In slightly over three decades, health care expenditures have doubled, from 7 percent of U.S. gross domestic product (GDP) in 1970 to over 15 percent share in 2003. Health expenditures have now reached a level of \$1.6 trillion or \$5,600 per person. The growth in health spending has advanced much faster than the rest of the economy—indeed twice the rate of growth of gross domestic product in 2002. Private spending—private health insurance, out-of-pocket spending, and other private funding—accounts for more than half of the growth in health spending. Public spending, primarily Medicaid, accounted for 46 percent of the overall health spending growth. By 2013, health care expenditures in the U.S. are projected to reach \$3.4 trillion or more than 18 percent of GDP (Centers for Medicare & Medicaid Services).

Healthcare’s escalating costs pose financial challenges for governments, businesses, and individuals alike. Growth in health spending pressures employers to cut other spending increases, possibly through reducing jobs, wage gains or health benefits (by shifting more costs to employees). State and federal governments face the same dilemma of costs rising more rapidly than revenues, leading every state (including Washington) to

scrutinize discretionary Medicaid benefits as the number eligible for coverage continues to grow. Such changes have produced a shift of economic risk from the traditional buyers of healthcare (namely governments, employers and insurance companies) to the providers (hospitals and healthcare practitioners) and individual consumers of healthcare services.

At the same time, changing demographics are stimulating demand and opportunities in healthcare fields. Population growth and increased longevity of people are due in part to the dramatic advances in medical science. Increased prosperity and the aging of the baby boom generation are fueling healthcare spending. Senior citizens—will account for 30 percent of the population within 10 years; currently, the elderly represent 15 percent of the population and account for one-third of all prescription medications dispensed in the United States.

While healthcare's growing role in the national economy and its increased demand for services is well-documented, the healthcare industry is often overlooked as a major contributor to the local economy. For many communities, both small and large, healthcare (as typified by the presence of a general hospital) is quite often the largest employer. Healthcare today, however, is more than just patient care; it extends well beyond the beds and hospital facilities normally associated with this segment of the economy. Patient care; medical education, training and research; medical device and instrument manufacturing; biomedical research and development; nursing homes and long-term care facilities; and physicians and other health practitioners together play a significant contribution to the local economy.

This broad extent of healthcare activity—medical research and training, biotechnology, and delivery has coalesced within a number of centers throughout the nation. The City of Seattle has become one of these leading health care clusters, with considerable concentration in health care delivery, biomedical research and applications, and training for doctors and other medical staff. This healthcare industry cluster has propelled the Seattle economy forward by attracting substantial human and financial resources to the City, from which patients, research and development, the educational system, and the community all derive significant benefits. Healthcare institutions are too often viewed as simply providers of services—since patient care is their most visible contribution. Less well recognized are the significant connections and contributions that healthcare institutions make within the broader regional economy.

Seattle has the largest concentration of medical facilities and personnel in the Pacific Northwest with 74,600 medical workers with \$3.0 billion in labor income. Healthcare delivery in Seattle, though prominent and central, is only a part of the extensive healthcare cluster that exists in the city. With linked biotechnology, medical device manufacturers, and medical service industries, and supportive training and research institutions, the Seattle healthcare industry cluster totals 96,400 workers with an annual payroll of \$4.2 billion. One in five jobs in Seattle is tied to this healthcare industry cluster.

Purpose of report

Healthcare with its related industries and institutions has become a significant engine to the City of Seattle's economy. This report draws on the analytical methods of cluster analysis and impact analysis to assess the scope and scale, contribution, economic vitality, and future competitiveness of the healthcare industry cluster in Seattle.

The purpose of this study is five-fold:

- What is the healthcare services industry cluster in Seattle?
- What are overall economic trends of healthcare services cluster in Seattle?
- What is the economic impact of the healthcare services cluster in Seattle?
- What are the salient workforce development issues faced by the Seattle healthcare services cluster?
- What is the prognosis for the healthcare services cluster in Seattle given its current "character assessment?"

II. Healthcare Industry Cluster in Seattle

An industry cluster is defined as a concentration of companies and industries within a geographic region which are interconnected by both the markets they serve and the products they produce, as well as sharing similar suppliers and supported by trade/industry associations and educational institutions. Concentration, connection, and localization are typical of several types of industries, including healthcare. A number of industries have been founded through particular circumstances and these initial events have had large and long-lasting regional effects through the cumulative growth process of that industry. These localized features may be a new process or specialized set of inputs, a skilled labor pool related to that process, or more recently, technology and knowledge spillovers from high-technology industry sectors.

This phenomenon of concentration of industries—which in regional economic development policy circles is now referred to as clusters—is certainly not a recent one. Clustering includes both the phenomenon of a critical mass of one industry sector developing in one place such that other firms within that same sector are attracted to that location, and the force of attraction that a core sector has on auxiliary sectors of that same industry to that location. Clusters are generally composed of three “layers:” a core of leading export companies and related-industries; a layer of myriad businesses that provide supplies, specialized services, investment capital, and research to these core companies and industries; and a layer of essential economic foundations—advanced infrastructure, specialized workforce training, research & development capability, and other directed public support programs.

These clusters of inter-related competitive companies and industries are what drive wealth creation within the region, primarily through the export of goods and services. Given that clusters are the source of jobs, income, and export growth, they hold the greatest potential benefit for the regional economic growth.¹ As such, clusters are receiving increased attention as an organizing theme, particularly in assisting states, regions and cities in developing economic development strategies for global competitiveness.²

¹ Cluster analysis within economic development organizations can be traced back to Michael Porter’s seminal work *The Competitive Advantage of Nations* (1990). Porter identifies the “diamond of advantage,” four key determinants of industry competitiveness: factor conditions; home demand conditions; related and supporting industries; and industry strategy, structure, and competitiveness. For further information on the cluster approach, see Rosenfeld (2002a); Waits (2000); Bergman and Fester (1998); and Information Design Associates, with ICF Kaiser (1997).

² Cluster analysis as an organizing principle has been widely applied in economic development policy-making in cities, regions, and states. For further information, especially a review of best practices in cluster-oriented economic development, see Stewart and Luger (2003), Porter (2004); Rosenfeld (2002b); and Turner (2003).

Seattle's Healthcare Industry Cluster: Under the Scope

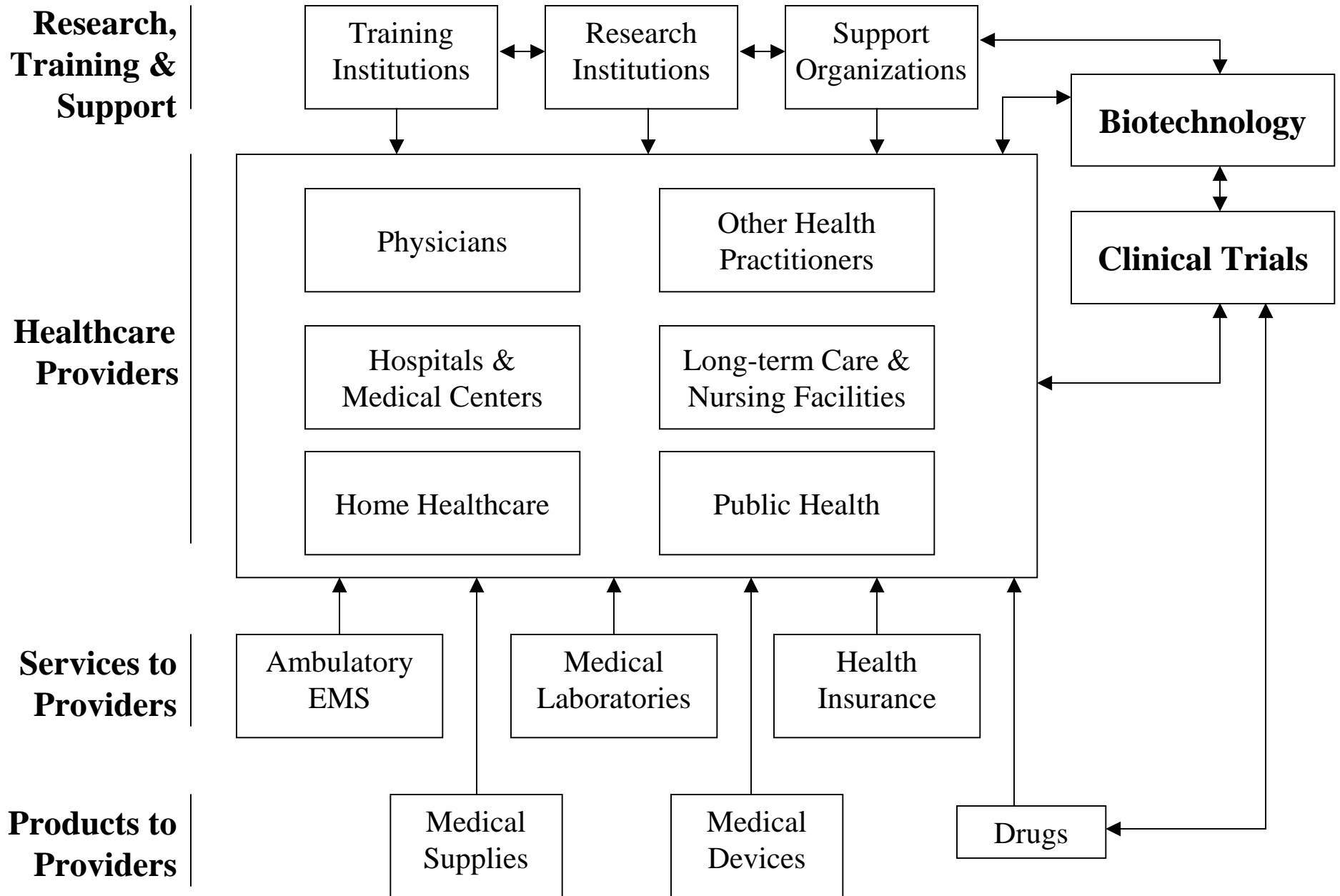
Seattle's healthcare industry has clustered geographically in and around regional hospitals and academic medical centers and research institutes of excellence. As a consequence, Seattle has become one of the leading healthcare clusters in the nation.

Healthcare focuses on the production of healthcare-related goods and the provision of services that promote the health and well-being of residents. The healthcare cluster includes a full-spectrum of health services from mental health and long-term care to acute care and outpatient services. The healthcare cluster, however, involves more than merely the critical mass of hospitals and clinics of healthcare providers; in addition are various institutions and firms from auxiliary sectors—research and development laboratories, manufacturers and suppliers, specialized services—that are attracted to these core providers. Besides the mutual locational attributes between healthcare providers and supportive services and institutions, there are important linkages with wholesalers, pharmaceutical manufacturers, healthcare insurers, professional associations, and government agencies (Figure 1).

The healthcare industry cluster is primarily composed of industries classified under the broad services category. Combined, Seattle's healthcare industry cluster employed 96,400 workers in 2002 (Figure 2). Within the core of the healthcare industry are health care providers. These providers include places and personnel engaged in providing healthcare, from settings of hospitals and medical centers, outpatient clinics and offices, long-term care and nursing facilities and home-based healthcare; to such personnel as doctors and dentists, nurses and therapists, chiropractors and nutritionists, physician assistants and laboratory technicians, and public health administrators. Surrounding these healthcare providers are those sectors that provide the necessary supply and support for healthcare provision. These include the various services and products supplied to healthcare providers from pharmaceuticals, medical devices, and medical supplies to medical and dental laboratories, emergency medical services, and health insurance. Broad institutional support in medical and life sciences are also included within the healthcare cluster. These institutions and organizations include medical schools, healthcare vocational training schools (e.g., nursing, therapists, medical technicians); medical and life sciences research institutions and professional membership associations.

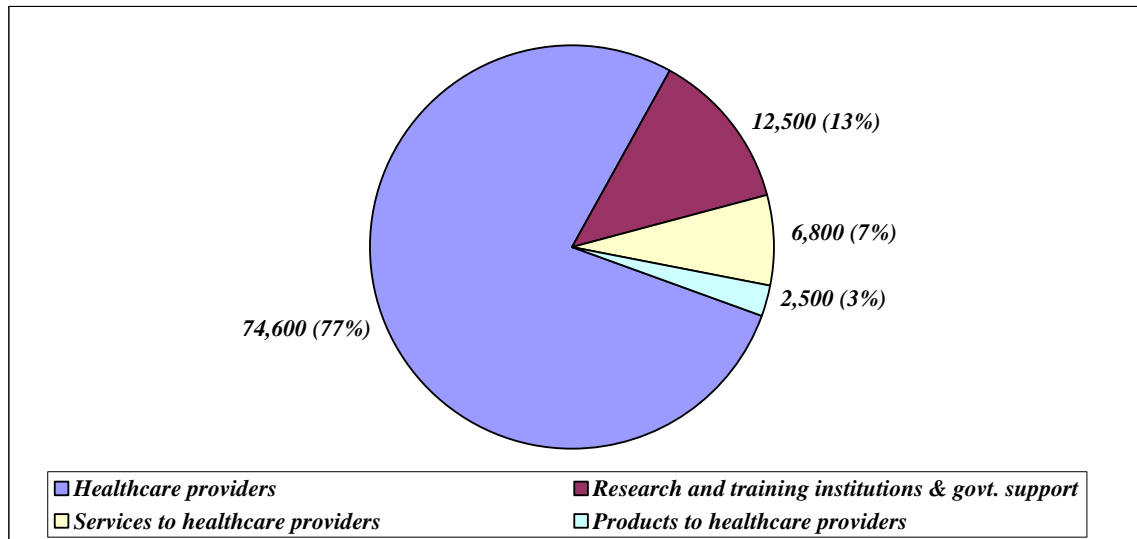
This broad definition of the healthcare industry cluster includes significant overlap with the Seattle biotechnology cluster, in function, setting, and personnel (Chase, 2002). For instance, both biotechnology research institutions and medical centers are engaged in managing clinical trials for pharmaceutical products and medical devices. Medical personnel often wear multiple hats—medical doctors with joint teaching and research appointments at the University of Washington School of Medicine—adding to the dynamic nature of the healthcare industry cluster.

Figure 1. Healthcare Industry Cluster in Seattle



Although there are no standardized approaches in defining or identifying clusters, there are some accepted procedures. The methods used here in determining which industries constitute Seattle’s healthcare cluster involve focusing on three common cluster characteristics, namely its export-orientation, its extent of interdependence, and the degree of its wealth-generation.

Figure 2. Healthcare Industry Cluster in Seattle: 2002 Employment



Export-Orientation--employment specialization. A salient characteristic of a regional cluster is the export orientation of its constituent industries. Industries drive wealth creation in the region by exporting goods and services and attracting wealth from beyond the region (i.e., both domestic and international markets). Each industry will to an extent service both local and export markets; however, it is important to distinguish between those sectors that primarily serve the local economy and those that sell their products and services nationally³ and internationally. Those cluster industries that compete nationally and internationally have a far greater potential for growth; they are not constrained by merely serving the local market but can expand far beyond to serve non-local markets.

Ideally, constituent industries of regional clusters could easily be identified as those which export goods and services out of the region and bring wealth back into the region. Unfortunately, many regions lack accurate data about goods shipments and services sales out of the area. In order to overcome this hurdle, a proxy calculation is often used. The standard approach is to use a measure of local employment specialization. The basis for this measure is that by employing more workers than the national average the industry is producing more goods and/or services than the regional population can consume; thus, these industries export the excess product and/or service out of the region. The

³ Within this particular regional context, an export is the sale of a good or service beyond Seattle. For instance, a non-resident patient—whether residing elsewhere in Puget Sound or in Japan, coming to Seattle for healthcare services constitutes an export.

employment specialization index⁴ is determined by first calculating the percentage of employment in a regional cluster industry by total regional employment. This ratio is then compared to the percentage of total national employment in that same industry divided by total national employment. If the employment specialization index is greater than 1.0 (i.e., the national average), that industry has a greater concentration locally than in the U.S. on average and it is assumed that some portion of its production is exported out of the region.⁵ In sum, the employment specialization index is a measure of export-strength.

Regional industries within healthcare (NAICS 62)⁶ were analyzed to determine their extent of export-orientation. The employment specialization of healthcare industries in Seattle is presented in Table 1.

Table 1. Employment Specialization of Healthcare Industries in Seattle, 2002

<i>NAICS</i>	<i>Industry</i>	<i>2002 Employment</i>	<i>Index of Specialization</i>	<i>Estimated Export Employment</i>	<i>Export Share of Total Employment</i>
621	<i>Ambulatory healthcare services</i>	32,100	1.93	16,400	51.1%
6211	Offices of physicians	10,500	1.40	3,000	28.8%
6212	Offices of dentists	3,500	1.30	800	23.1%
6213	Offices of other health practitioners	1,900	1.02	30	1.7%
6214	Outpatient care centers	12,900	7.47	11,200	86.6%
6216	Home health care centers	1,800	0.71	NA	NA
6219	Other ambulatory healthcare services	1,500	1.96	700	49.1%
622	<i>Hospitals</i>	35,200	1.78	15,400	43.9%
6221	General medical & surgical hospitals	35,100	1.926	16,900	48.1%
6222	Other specialty hospitals	100	0.09	NA	NA
623	<i>Nursing & residential care facilities</i>	7,300	0.71	NA	NA
6231	Nursing care facilities	5,600	0.41	NA	NA
6232-9	Other care facilities	1,700	0.62	NA	NA
62	Total, Healthcare	74,600	1.604	28,900	37.7%

Source: Washington State Employment Security Department, Labor Market & Economic Analysis Branch.

The size of Seattle’s economy is determined by its residents/businesses ability to sell goods and services to individuals and firms outside the region and to efficiently meet the needs of residents through internal resources. The popular notion focuses on firms that

⁴ This employment specialization index is also called a location quotient measure.

⁵ The degree of concentration or local specialization is derived from the location quotient (LQ) concept, which is simply a calculated ratio between a regional economy with that of some reference base. In this instance, the LQ measures the proportion of people employed in Seattle’ healthcare industries versus those employed by healthcare industries in the nation. In contrast, a LQ of less than 1.0 implies that the region imports a portion of that industry’s goods or services.

⁶ NAICS refers to the North American Industrial Classification System is simply a classification or taxonomy of industries. This framework replaces the older SIC (Standard Industrial Classification) system.

export products outside the region, particularly manufacturing companies. When planes, instruments, and software are shipped to Asia or Europe or New York in exchange for money, the local economy expands. The essential characteristic of these exports is the flow of funds, not the physical movement of those products. Economic activities that bring income into the region are vital to the economic base of the area. Firms that sell only to residents of the region are important, but such firms do not increase the size of the regional economy and are not considered “basic” industries or “traded” sectors.

Healthcare is often viewed as merely providing services to residents within the local area. The above table, however, indicates that healthcare firms and organizations in Seattle provide services to a significant population residing outside the region. Such services constitute an export as they bring income into the City from another part of Puget Sound, Washington State, the nation, and beyond. In this most important sense, healthcare is a significant part of the economic base. As a whole, the healthcare sector in Seattle has a substantial export component; more than a third of its 2002 labor force of 74,600 workers is engaged in providing healthcare services for patients residing outside of Seattle. Seven of the ten healthcare industry segments have some level of export-oriented employment. Within these healthcare segments, employment specialization ranges from a high of 7.5 for outpatient care centers⁷ to a low of 1.02 for offices of other health practitioners. The workforce for Seattle healthcare’s two largest segments—ambulatory healthcare services and hospitals—have a substantial export-orientation. In contrast, nursing care facilities and home healthcare services have specialization indexes below 1.0 indicating that Seattle is underserved in these two segments.

Beyond using this employment specialization proxy, another source—patient census—was utilized to highlight the export orientation of one segment of the Seattle healthcare cluster, namely hospitals. Patient discharge data records for Seattle hospitals were analyzed, with a particular focus on in-city versus out-of-city resident patients. In 2003, about half of the 127,381 discharged patients from Seattle hospitals came from outside of the city. About one-fifth of discharged patients reside in other parts of King County with almost 30 percent of discharged patients coming from beyond King County—other locations in Puget Sound region, Washington State, and other states and foreign nations (Table 2). In terms of charges, discharged patients residing outside Seattle represent nearly 62 percent share of Seattle hospitals’ 2003 total billings of \$2.7 billion, a significant amount of export income.

⁷ Outpatient care centers includes family planning centers, outpatient mental health and substance abuse centers, kidney dialysis centers, freestanding ambulatory surgical and emergency centers, and health maintenance organization (HMO) medical centers. Over 10,000 physicians and other medical staff in Seattle are engaged in providing a range of outpatient medical services to HMO subscribers. Under the earlier SIC system, these health personnel would be classified under offices of physicians.

Table 2. Patient Census for Seattle Hospitals, 2001-2003

Year	Total Discharged Patients	Origin of Patient, Share		Total Charges (\$millions)	Share of Charges, Patient Origin	
		Seattle	Outside Seattle		Seattle	Outside Seattle
2001	127,851	50.7%	49.3%	\$2,458	39.0%	61.0%
2002	126,384	49.3%	50.7%	\$2,678	39.2%	60.8%
2003*	127,381	49.4%	50.6%	\$2,758	38.1%	61.9%

Note: * 2003 totals are estimated based on hospital discharge data from 2003 half-year and other full-years. Source: Washington State Department of Health, Center for Health Statistics, Comprehensive Hospital Abstract Reporting System (CHARS).

In sum, Seattle’s healthcare cluster is export oriented. Proxy employment data and information on discharged patients from Seattle hospitals underscore the important role played by Seattle healthcare firms in providing health services to non-local residents.

Interdependence--cluster dependency. Using the employment concentration index has produced only a set of export-oriented healthcare sectors without any information about how they are related. Cluster analysis of the healthcare industry found significant strength in industry linkages as well as impacts on the citywide economy. Such healthcare linkages provide a measure of relative strength in stimulating expansion within the Seattle economy, as both a driver of the local economy as well as key supplier to goods and services to other industries within the broader city and region. These linkages are both internal (intra-cluster) as well as external to the overall healthcare industry.

An economic input-output model was used in order to determine the buyer-seller relationships among the region’s industries. Constructed from recent data for the greater Seattle region⁸, the input-output model represents the flow of goods and services between industries; and illustrating by derivation one industry’s relationship with another. Clusters can be formed based on the production process, grouping together the suppliers and demanders of goods and services. The analysis here is focused on the healthcare cluster’s overall demand on other regional industries, particularly that portion of each industry’s sales sold to regional healthcare.⁹

Besides having strong relationships internally, Seattle healthcare sectors have forged significant linkages with such supplier and service industries as pharmaceuticals, instruments, testing laboratories, and research and development. In general, the support relationship analysis confirms previous discussions with healthcare industry members in mapping the healthcare industry cluster and its internal structure.

⁸ The level of detail required for this study, namely the City of Seattle, was simply not available for analyzing the Seattle healthcare cluster dependency. Consequently, an input-output model of King County was utilized. Given the differing regions, this cluster dependency analysis approximates the Seattle region.

⁹ The other cluster dependency orientation is assessing the healthcare cluster’s supply to various industries. This aspect was not utilized in this study, since much of healthcare’s production (service delivery) is to final markets—consumption, government, and export.

The healthcare industry in Seattle purchases a substantial amount of their needed supplies, equipment, pharmaceutical products, and services from local companies. In 2002, local expenditures amounted to an estimated \$1.2 billion for supplies, goods, and services. Table 3 shows healthcare expenditures for approximately one-half of total expenditures for regionally produced supplies, products, and services. These sales to the healthcare cluster represent the bulk of total regional sales for a number of sectors such as dental equipment and supplies, surgical and medical instruments, X-ray apparatus, and surgical appliances and supplies.

Table 3. Seattle-King County Healthcare Cluster Dependency Analysis

Industry	Total Regional Sales (\$millions)	Estimated Sales to Healthcare (\$millions)	Share of Industry's Regional Sales to Healthcare
Dental equipment & supplies	\$6.9	\$6.9	99.9%
Surgical & medical instruments	\$30.2	\$29.0	96.0%
X-ray apparatus	\$2.5	\$2.0	78.2%
Surgical appliances & supplies	\$12.9	\$9.2	71.5%
Electromedical apparatus	\$22.9	\$9.4	41.0%
Drugs	\$376.4	\$124.2	33.0%
Optical instruments & lenses	\$2.0	\$0.5	26.7%
Management & consulting services	\$904.9	\$65.8	7.3%
Laundry, cleaning services	\$48.8	\$3.5	7.2%
Other nonprofit organizations	\$14.8	\$0.9	6.3%
Personnel supply services	\$679.6	\$31.7	4.7%
Services to buildings	\$296.2	\$13.4	4.5%
Equipment rental & leasing	\$220.4	\$9.9	4.5%
Computer & data processing services	\$2,192.6	\$96.5	4.4%
Sanitary services	\$370.3	\$15.0	4.0%
Other business services	\$1,082.2	\$41.0	3.8%
Research, development & testing	\$381.2	\$13.9	3.7%
Accounting, auditing & bookkeeping	\$904.0	\$33.0	3.6%
Insurance carriers	\$154.2	\$5.3	3.4%
Other educational services	\$41.3	\$1.3	3.1%
Miscellaneous repair shops	\$120.6	\$3.5	2.9%
Colleges, universities & schools (private)	\$29.2	\$0.8	2.7%
Communications	\$1,469.5	\$32.6	2.2%
Wholesale trade	\$4,333.0	\$79.4	1.8%

Note: Most of these sectors are classified in three-digit or two-digit SIC industries.

Source: IMPLAN

These related and supporting industries help illustrate the overall supply-chain of medical supplies, equipment, pharmaceutical products, and services within a healthcare industry

cluster framework. Graphically, the Seattle healthcare industry cluster is shown in Figure 1. Healthcare providers represent the core of the cluster in Seattle, linked with various services, supplies, and products produced regionally, and undergirded by prominent biomedical research and training institutions and government/industry association support. (see also Appendix A—Key sectors within the healthcare industry cluster).

Economic Prosperity. The final step in defining the Seattle healthcare cluster is to determine which of these healthcare export-oriented industries contain high-paying jobs. The measure used here compares the annual payroll per employee with the Seattle average payroll per employee. If the ratio is greater than one, that industry's significance in the region is above the regional average.

The sectors that form Seattle's healthcare core are, in general, not high-wage industries (Table 4). For most sectors of the core providers of healthcare, the 2002 economic prosperity ratio is less than one, meaning that average annual wages are below the estimated city average of \$40,100. With the exception of offices of physicians, ambulatory health care services fell slightly below 1.0. Although these sectors include many highly trained professionals, a substantial share of workers are in lower-skilled occupations.

In contrast to those healthcare workers employed in offices and clinics and nursing and residential care facilities, hospital workers on average enjoy wages well above the city average. Within the Seattle healthcare cluster, high wage industries reside in linked sectors providing products and services, engaged in medical research and development, training, and support. With the exception of medical and dental laboratories and technical and trade schools, wages in these sectors are well-above the citywide average.

Table 4. Economic Prosperity Index of Seattle Healthcare Industry Cluster, 2002

<i>Sector</i>	<i>Employment</i>	<i>Average Annual Wages</i>	<i>Economic Prosperity Index</i>
Core, Providers of Healthcare			
<i>Ambulatory health care services</i>	32,100	\$38,000	0.95
Offices of physicians	10,500	\$44,140	1.10
Offices of dentists	3,500	\$31,300	0.78
Offices of other health practitioners	1,900	\$29,250	0.73
Outpatient care centers	12,900	\$38,800	0.97
Home health care centers	1,800	\$24,940	0.62
Other ambulatory health care services	1,500	\$37,280	0.93
<i>Hospitals</i>	35,200	\$46,150	1.15
General medical & surgical hospitals	35,100	\$46,210	1.15
Specialty hospitals	100	\$31,920	0.80
<i>Nursing & residential care facilities</i>	7,300	\$24,660	0.62
Nursing care facilities	5,600	\$24,920	0.62
Community care facilities for the elderly	1,70	\$23,830	0.59
<i>Total, Core Providers of Healthcare</i>	74,600	\$40,470	1.01
Products & Services, Support Institutions			
Pharmaceutical & medicine manufacturing	1,100	NA	NA
Medical equipment & supplies manufacturing	200	\$54,740	1.36
Medical equipment and supplies wholesalers	1,200	\$50,280	1.25
Direct health & medical insurance carriers	4,800	\$51,230	1.28
Medical & dental laboratories	2,000	\$33,230	0.83
Research & development in life sciences	4,200	\$54,110	1.45
Administration of public health programs	2,700	\$40,490	1.01
Colleges, universities & professional schools	5,300	\$58,170	1.45
Technical & trade schools	300	\$27,440	0.68
<i>Total, Products & services to Providers, Support Institutions</i>	21,800	\$53,180	1.33
Total, Healthcare industry cluster	96,400	\$43,330	1.08

Source: Washington State Employment Security Department.

III. Recent Cluster Performance of Healthcare in Seattle

In 2002, Seattle had 96,400 workers in the healthcare cluster. More than three-fourths of Seattle's healthcare cluster employment base work for the healthcare provider core. This core includes several sectors that service different areas of healthcare needs; with the common attribute being delivery of healthcare services. These providers include the offices and clinics of healthcare practitioners (physicians, surgeons, dentists, physical therapists, etc.), outpatient care centers, home healthcare services, hospitals, and nursing and residential care facilities.

The second largest component of the healthcare cluster is composed of the research and training institutions, government support, and medical professional organizations that support the core healthcare providers. With nearly 12,500 workers engaged in research, training and support organizations, this component is largely associated with the burgeoning biotechnology sector in Seattle. The remainder of the healthcare cluster workforce (i.e., 9,312 workers) is involved in the product and/or service support for the core healthcare providers. Such products and services include pharmaceuticals, medical devices, medical supplies, emergency medical service, medical laboratories, and health insurance.

Hospitals are the dominant component of Seattle's healthcare core. In delivering patient care, hospitals provide jobs for physicians, nurses, medical technicians, and other hospital workers. This hospital segment can be viewed as a microcosm of the greater healthcare cluster; delivery of healthcare services are combined with the significant presence of linked activities—including teaching and training, biomedical research, clinical trials development, and a wide array of medical services, products, and supplies—all at one location.

Seattle's strength in healthcare come from the size and service quality of its hospital facilities. As mentioned previously, hospitals primarily serve the communities in which they are located (Table 5).

However, because of the specialized healthcare services offered by hospitals in Seattle, these facilities also treat a significant number of patients from outside the city.¹⁰ This mixture of traded and nontraded services at hospitals is seen beyond mere healthcare delivery. Hospitals' revenue also emanates from teaching, research, and other services directly beyond the City of Seattle. For instance, personnel from a number of Seattle hospitals are engaged in National Institutes of Health (NIH)-funded biomedical research;

¹⁰ Harborview Medical Center, for instance, is a Level I adult and pediatric trauma center as well as a regional burn center with its service area extending into the five-state Pacific Northwest region of Washington, Oregon, Idaho, Montana, and Alaska. Children's Hospital & Regional Medical Center also serves as a pediatric referral center for Washington, Alaska, Montana, and Idaho. This "export-orientation" of Seattle hospitals on the healthcare delivery side tend to make such measures as beds per 1,000 local population problematic for comparative analysis.

such export revenues amounted to \$12.6 million during FY2003. Children’s Hospital & Regional Medical Center received funding from NIH for \$6.1 million in FY2003. The University of Washington Medical Center (or UW Medicine, includes UW Hospital, Harborview, and the UW School of Medicine) represents one of the leading medical centers in the nation with NIH awards amounting to \$368.4 million in FY2003.¹¹ Fred Hutchinson Cancer Research Institute, aligned with the Seattle Cancer Care Alliance, is the nation’s leading research institute in receiving NIH grants, totaling \$207.4 million in FY2004.

Table 5. Hospitals in Seattle

<i>Hospital</i>	<i>Type</i>	<i>Beds</i>
Children's Hospital & Regional Medical Center*	Childrens/pediatrics	250
Group Health Cooperative, Central Hospital	General	300
Harborview Medical Center	Teaching & research/psychiatric	366/61
Kindred Hospital Seattle	Long-term/acute care	80
Northwest Hospital	General, acute care	345
Regional Hospital for Respiratory & Complex Care	Long-term/acute care	27
Seattle Cancer Care Alliance**	General	20
Swedish Medical Center/Ballard Campus	General	163
Swedish Medical Center/First Hill Campus	General	697
Swedish Medical Center/Providence Campus	General	436
University of Washington Medical Center	Teaching & research	450
VA Puget Sound Health Care System	Veterans	536
Virginia Mason Medical Center	General	371
West Seattle Psychiatric Hospital	Psychiatric	40
Total		4,142

Note: *Children’s will add another 42 beds in Fall of 2004 for a total of 250 beds;** Seattle Cancer Care Alliance is jointly operated by the Fred Hutchinson Cancer Research Center, UW Medicine, and Children’s Hospital and Regional Medical Center.

Source: Puget Sound Business Journal, *2004 Book of Lists*; individual hospitals.

Specialized healthcare services for other providers—ambulatory healthcare services (clinics, offices, and centers) and nursing and residential care facilities—deliver healthcare for a substantial number of patients outside Seattle.

Finally, supporting industries, from collaborative research and development in biomedical science institutes and medical training institutions to pharmaceutical and medical device manufacturers, medical suppliers, and medical laboratories, are linked with these providers of healthcare. These supportive and linked industries bring substantial revenues—whether outside sales from products and services or federally-funded research grants—into the local economy from their export activity. This export

¹¹ For FY2003, the University of Washington Medical School was ranked 3rd among all medical centers in the nation in NIH grants. In terms of public universities, the University of Washington is ranked number one in NIH funding with \$440.9 million during FY2003.

orientation is clearly evident in the leadership of symbiotic biomedical research institutes. Combined, these research institutes were awarded \$678.7 million in NIH grants during FY2003, making Seattle one of the nation's leading centers in biomedical research. Led by the University of Washington and Fred Hutchinson Cancer Research Institute, Seattle has in place a modern research infrastructure capable of supporting world-class research and attracting world-class researchers (Chase, 2002).

Trends in Seattle Healthcare Industry

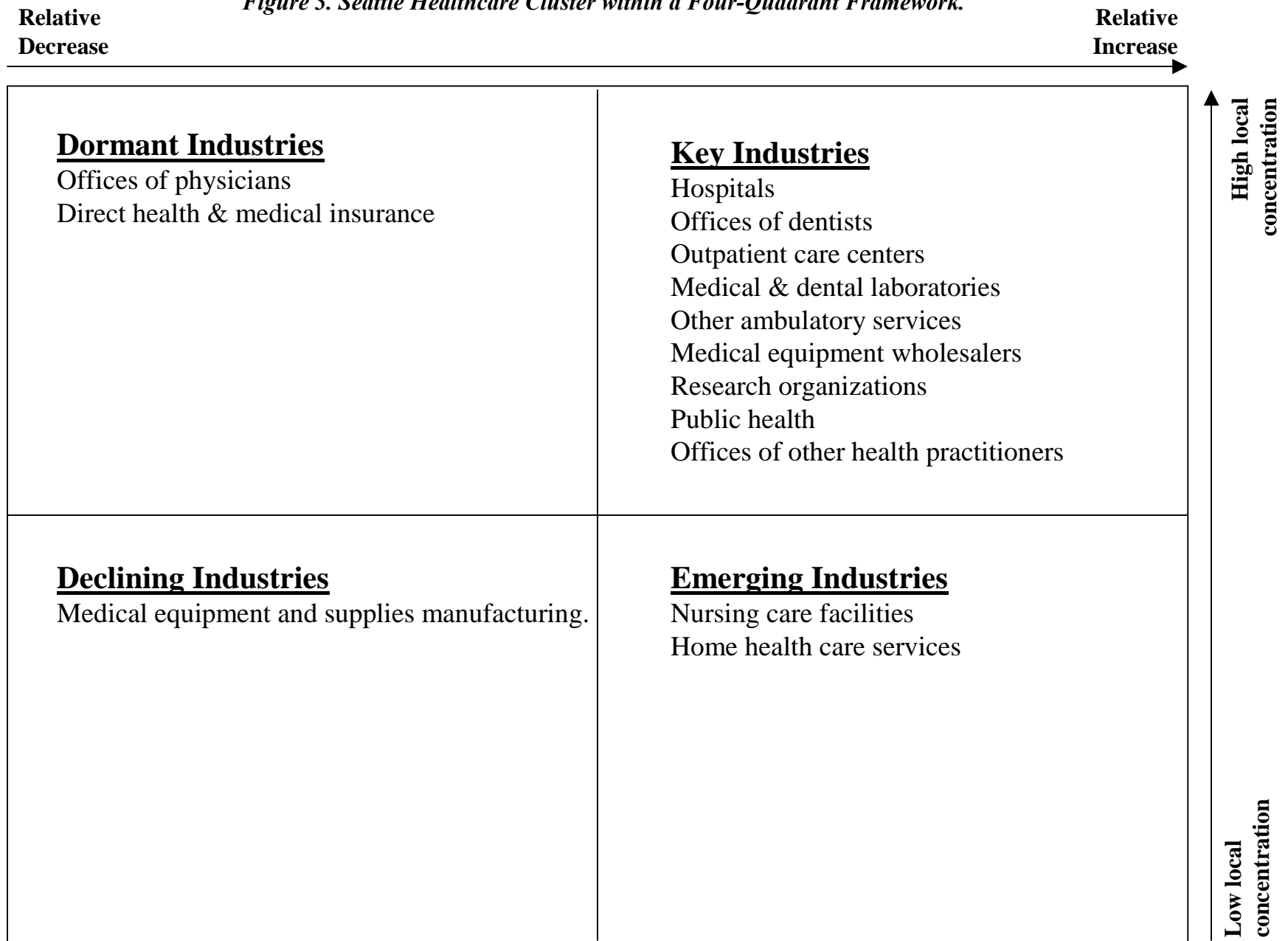
Over the 1990-2002 period, Seattle's healthcare cluster enjoyed strong employment growth of 2.3 percent per year. Growth in the overall cluster has been led by increased employment in the supportive sectors of biomedical research and development and pharmaceutical and medical device manufacturing. Employment in these high-wage sectors grew on average by 4.0 percent per year.

Analysis of the healthcare industry trends in this report uses measures of local specialization and relative growth as indicators of orientation and competitiveness. Seattle has a relatively high concentration of employment in healthcare, with nearly one in every six city workers employed within this core of healthcare providers. Such a concentration is more than 55 percent above the U.S. average.

Relative employment growth is an indicator of competitiveness of the healthcare industry compared to the state and nation. If, for example, the local industry is growing at a faster rate than the statewide (or national) industry, it testifies to the drawing power of the local area in healthcare delivery and supportive industries.

Local concentration and employment growth of the various healthcare cluster segments were calculated based on a quadrant analytical framework (Figure 3). The key industries are located within the growing economic base quadrant, with positive growth rates and high employment concentration indices. Such industry segments—hospitals, ambulatory services, public health, and research organizations—are viewed as the major source of healthcare employment in the near future. These industries include both large establishments (hospitals, research institutes) and smaller businesses (such as clinics, dental offices, and kidney dialysis centers) with many individual firms employing small numbers of workers. Assuming that these industries are creating quality jobs, firms and

Figure 3. Seattle Healthcare Cluster within a Four-Quadrant Framework.



institutes merit attention from local policy makers to help maintain and improve their comparative economic advantages.¹²

Dormant industries are those sectors with a high local employment concentration but have a negative or low growth rate relative to state and national industry sector growth. Such sectors—offices of physicians and health and medical insurance—have added jobs but have generally lagged behind the state and national average. These segments represent in part the past economic base for the local area, but are now declining due to industry-wide technological, market, or regulatory changes or because of the erosion in local comparative advantages.

The emerging industries refer to those that are growing, but whose local employment concentration is small relative to the state and national economy. Firms in these sectors—nursing care facilities and home health services—sectors deserve some attention because some trend indicators suggest they may be larger employment generators in the future due to emerging comparative advantages.

The fourth category is made up from businesses that have both a small share of the current local economy and are declining in employment. Medical equipment and supplies manufacturing represents the lone segment within this quadrant. Does this indicate that this industry lacks some fundamentals for long-term viability and growth in Seattle? Perhaps; but given that this sector is growing within the greater Seattle region as well as statewide, other factors (e.g., space requirements at lower cost locations) may be more important.

¹² Using a cluster analytical approach, such comparative advantages include local conditions stemming from trained labor force, specialized marketing, and the existence of supportive and complementary industries.

IV. Economic Impact of Healthcare in Seattle

The analysis thus far has found that healthcare is a significant component of the Seattle economy and represents a net exporter. Looking at recent trends is one method of assessing the overall importance of the healthcare cluster to the City of Seattle. However, to better understand the importance of healthcare, it is important to analyze its impact on the overall city economy. The labor income that the healthcare generates, for instance, provides a significant stimulus to the local economy.

By using an input-output model, an estimate of the total impact that healthcare has on Seattle's economy can be provided. The total economic impact of the healthcare services industry is comprised of three components: *direct*, *indirect*, and *induced* impacts. The *direct* impacts are those directly attributable to healthcare services companies—their employees, revenues, and wages. Here, the core of the healthcare industry cluster (i.e., providers of healthcare) is considered as the directly affected segment for the impact analysis. The other linked segments within the cluster—namely, those providing healthcare-related products and services as well as research and training institutions and government support are considered as those indirect sectors. In 2002, the providers of healthcare in Seattle employed about 74,600 workers with estimated salaries and wages of \$3.02 billion, produced output (revenues) estimated at \$6.37 billion, and generated city taxes amounting to \$10.8 million.¹³

In addition to the *direct* impacts of healthcare, the industry generated jobs, wages and salaries, and revenues through a number of *indirect* and *induced* impacts. Indirect impacts are the result of purchases made by the providers of healthcare sector from other industries. To operate, healthcare providers create economic activity in other companies, such as pharmaceutical and medical device manufacturers, health and medical insurance carriers, and medical and diagnostic laboratories. The revenues and associated employment and wage and salaries of these industries generated by the activities of these healthcare providers are called the *indirect* impacts. The induced impact of healthcare providers is generated by the purchases of workers and owners in the healthcare industry as well as supporting industries. These employees and their owners purchase goods and services in the general economy with the salaries and capital gains they earn. The revenues and associated employment and wage and salaries generated by these purchases are called the *induced* impacts. The sum of these direct, indirect, and induced impacts represents the total economic impact of healthcare industry.

As shown in Table 6, providers of healthcare in Seattle directly employed 74,600 workers, but their purchases from other companies and the spending of their employees generated another 41,000 jobs, so that the total job generation attributable to healthcare providers is 115,600. In other words, there is an employment multiplier of 1.55, so that

¹³ Only the City applied portion of the Business & Occupation tax was used in this study. Other local taxes—local sales & use tax, and property tax—paid by the Seattle healthcare industry were not incorporated in this study.

each job within the healthcare providers segment generates another 0.55 jobs within the city economy.

Table 6. Economic Impact of Healthcare Providers in Seattle, 2002

<i>Measure</i>	<i>Direct Impact</i>	<i>Total Impact</i>	<i>Implied Multiplier</i>
Employment	74,600	115,600	1.55
Labor income* (\$billions)	\$3.02	\$4.14	1.37
Tax revenues (\$millions)	\$10.85	\$29.61	2.73
Output (\$billions)	\$6.37	\$10.29	1.62

Note: * Labor income includes both wages and salaries and proprietor income.

Source: Washington State Employment Security Department, City of Seattle; IMPLAN; Huckell/Weinman Associates.

Similarly, labor income of workers with healthcare providers totaling \$3.02 billion generated another \$1.12 billion throughout the Washington economy. In terms of tax revenues, healthcare providers generated a total of \$29.6 million for City coffers. Healthcare providers generated a total of \$10.3 billion in output or sales throughout the Seattle economy in 2002.¹⁴

¹⁴ The results from this economic impact assessment differ from other recent impact studies (Beyers, 2003; Washington State Hospital Association, 2003). Much of the differences between these studies lie in the choice of geographic area and industry sector for analysis. For instance, the geographic focus of the Beyers/Washington State Hospital Association studies are more broad (i.e., county- and state-level) than this city-based analysis; and more narrow in terms of sector analysis (hospitals) than this broad analysis of health care. Despite these differences, both analyses underscore the important role of healthcare in the region, namely as a significant engine for the local economy.

V. Looking Ahead: Healthcare Employment and Occupational Projections for Seattle

Nationwide, healthcare is projected to be the dominant source of employment growth, accounting for one out of every six new jobs created by 2012. The resulting 3.5 million additional workers will be spread throughout this large and diverse sector from health practitioners offices, outpatient clinics, and hospitals to nursing and residential care facilities (Berman, 2004). Fueling this growth are the oft-mentioned factors of gradual aging of the population and advances in medical technologies increasing life expectancies.

The reality of an aging population will increase employment in nursing care and residential mental health facilities, which include hospices, and nursing and convalescent homes. This trend could well be eclipsed by Federal government budget constraints, a continued shift towards less expensive home health care and assisted living, and a healthier elderly population. Reflecting the desire for many elderly to maintain an independent lifestyle, community care and residential care facilities—which provide assisted living services, is expected to grow rapidly at 4.5 percent annually (third fastest of all sectors in the national economy). For the elderly, maintaining independence and avoidance of nursing homes are the reasons behind the robust growth projected for ambulatory health care services, particularly health care provided for the elderly at home. This sector is expected to grow at an annual rate of 3.9 percent over the 2002 to 2012 forecast period.

Employment growth in hospitals will be the slowest within the healthcare industry; but given their overall size, hospitals represent the largest source of growth. Although facing cost pressures and increased utilization of outpatient clinics and other alternative care sites, hospitals are still projected to be a major source of job growth. Even hospitals are increasingly providing services on an outpatient or ambulatory basis, limiting unnecessary or low priority services and stressing more preventative care. Such trends will provide the impetus for vigorous growth for offices of health practitioners and outpatient care centers. Offices of health practitioners—providing medical, surgical and dental services outside the traditional hospital setting are expected to grow on average 3.3 percent annually.

These outpatient services and specialty clinics (e.g., freestanding ambulatory surgical centers, dialysis clinics, and community health centers) will likely expand in response to the dramatic growth in demand; while inpatient admissions have moderated, the number of patients treated on an outpatient basis have surged. The cost and convenience advantages of outpatient treatment benefit patients and health insurers alike. The growth of these procedures is the combined outcome of new treatment technologies, increased managed care penetration, and capital investment by outpatient care providers.

Healthcare employment for both Washington State and King County are forecast to grow at a somewhat reduced rate compared with that of the nation.¹⁵ According to the Washington State Employment Security Department, healthcare services in Washington State will grow by 2.0 percent annually between 2002 and 2012. In Seattle-King County, healthcare services are projected to grow by 1.8 percent annually (Table 7). Still, an estimated 10,100 new jobs—or about 1,000 jobs each year—are projected for the local area healthcare services cluster.

Table 7. Healthcare Services Employment Growth in Seattle, Washington State, and Nation: 2002-2012 (thousands of jobs)

	2002	2012	Average Annual Growth
City of Seattle			
Ambulatory Health Care Services	32.1	37.2	1.6%
Hospitals	35.2	39.0	1.1%
Nursing and Residential Care Facilities	7.3	8.5	1.6%
Washington State			
Health Services and Social Assistance	266.2	319.3	2.0%
Ambulatory Health Care Services	106.8	128.0	2.0%
Hospitals	62.0	74.3	2.0%
United States			
Health Services and Social Assistance	4,634.0	6,532.0	4.1%
Ambulatory Health Care Services	4,153.0	4,785.0	1.5%
Hospitals	2,743.0	3,685.0	3.4%

Note: City of Seattle 2002 data based on combined records; 2012 data is estimated based on projection of King County.

Sources: Washington State Employment Security Department; U.S. Bureau of Labor Statistics

For the City of Seattle healthcare industry, the growth of healthcare services will be somewhat muted by the conflicting effects of demographic changes. Seattle’s population in general continues to age, but the rate of population growth, particularly for people aged 65 years and over, is slowing. With growth in resident population slowing, the local healthcare sector will increasingly market its services beyond Seattle for patients.

Cost containment, particularly facing hospitals, will increase as shown by the growing emphasis on providing services on an outpatient, ambulatory basis, limiting unnecessary or low priority services, and stressing preventative care that reduces the eventual cost of undiagnosed untreatable medical conditions. No industry is under more pressure than the healthcare industry to contain costs; and no segment more than hospitals. One of the most efficient ways to contain costs is to increase productivity through the application of labor-saving processes, procedures, and technologies. A potential result is a relative (or

¹⁵ The Washington State Employment Security Department only forecasts industry-wide employment for the state and selected counties. The agency does not forecast industry employment for sub-county jurisdictions. Estimates for the City of Seattle

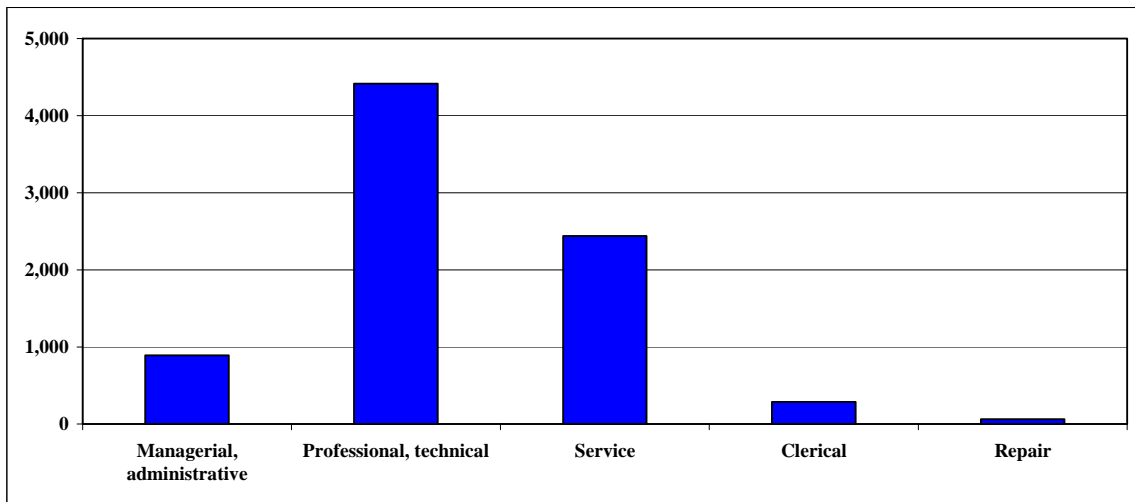
absolute) decline in employment or further slowing or a slowing in the rate of employment growth.

Conversely, all types of outpatient services and specialty clinics (e.g., freestanding ambulatory surgical centers, dialysis clinics, and community health centers) will likely expand in the future. These services are expanding in response to the dramatic growth in demand; while inpatient admissions have moderated, the number of patients treated on an outpatient basis have surged. Home health workers and other occupational categories related to at-home care will also expand as outpatient services become a larger part of the local health services portfolio. Related, health diagnostic centers—medical imaging centers and diagnostic laboratories—are expected to grow due to escalating demand.

In addition, the increased application of information technology within healthcare services has implications for future workforce requirements. Firms within the healthcare cluster are one of the major customers for the information technology industry. In the future, hospitals in Seattle will be in direct competition with high technology firms for workers with the same skills that are increasingly in short supply.

Healthcare Employment Growth by Occupation. Of the 10,100 new jobs projected for the Seattle healthcare industry, more than half are in the broad category of professional, paraprofessional, and technical occupations (Figure 4). Included within this broad occupational category are medical scientists, physicians and surgeons, dentists, therapists, diagnostic medical technologists, registered nurses, and emergency medical technicians.

Figure 4. Projected New Healthcare Services Jobs in Seattle, 2002-2012 by Major Occupational Division



Notes: Occupational projections are made only for King County; hence, occupational projections are estimated for City of Seattle; Healthcare sector includes providers of healthcare—ambulatory healthcare services, hospitals, and nursing and residential care facilities.

Source: Washington State Employment Security Department

Medical and dental assistants, orderlies, and attendants are broadly classified as service workers and represent another quarter of the projected jobs. Managerial and clerical positions constitute another 22 percent share of the projected jobs.

Growth rates vary by major occupational grouping of healthcare in Seattle. By and large, however, all of these major groups are projected to contribute at around the same proportion of jobs to future growth as currently.

Table 8 shows the percentage distribution of healthcare jobs by major occupational category in 2002 and as projected for 2012.

Table 8. Occupational Distribution within Seattle Healthcare Core, 2002 & 2012

<i>Occupational Division</i>	<i>Employment 2002</i>	<i>Percent of Total</i>	<i>Employment 2012</i>	<i>Percent of Total</i>	<i>New Jobs 2002-2012</i>	<i>Percent of Total Growth</i>
Managerial/admin.	6,495	8.7%	7,561	8.9%	1,066	10.6%
Professional/technical	44,490	59.6%	50,099	59.1%	5,609	55.5%
Service	20,496	27.5%	23,484	27.7%	2,988	29.6%
Clerical	2,469	3.3%	2,824	3.3%	355	3.5%
Repair	650	0.9%	732	0.9%	82	0.8%
Total	74,600	100.0%	84,700	100.0%	10,100	100.0%

Table 9 provides more detail, showing growth rates and estimated net jobs and annual openings between 2002 and 2012. Registered nurses account for 23 percent of total growth and will contribute the greatest number of total jobs to the healthcare core for the foreseeable future. The increasing demand for registered nurses reflects both changes in the ways healthcare is provided as well as demographic shifts in the population.

Other occupations with the greatest growth tend to be auxiliary or support positions. Nursing aids, orderlies and attendants; home health aides; dental assistants; medical assistants; and licensed practical nurses are support positions within the healthcare core. These positions are expected to contribute significantly to the sector's growth in the City of Seattle.

Table 9. Occupations with the Greatest Growth in Healthcare Core, Seattle: 2002-2012

Occupation title	2002	2012	Growth rate	New Jobs 2002-12	Percent change	Annual openings
Medical scientists	816	990	1.8%	175	21.4%	64
Biological technicians	1,649	1,909	1.3%	260	15.8%	106
Medical transcriptionists	1,025	1,177	1.2%	151	14.8%	68
Licensed practical nurses	2,153	2,437	1.1%	284	13.2%	130
Nursing aides, orderlies & attendants	6,274	7,044	1.0%	771	12.3%	257
Medical & clinical laboratory technicians	1,067	1,197	1.0%	131	12.2%	58
Registered nurses	15,075	16,898	1.0%	1,823	12.1%	751
Dental hygienists	1,174	1,314	1.0%	141	12.0%	50
Dental assistants	2,780	3,108	1.0%	328	11.8%	128
Medical & health services managers	1,036	1,156	1.0%	120	11.5%	46
Medical secretaries	2,535	2,824	0.9%	289	11.4%	111
Physical therapists	1,303	1,446	0.9%	144	11.0%	69
Medical & public health social workers	1,190	1,320	0.9%	130	10.9%	42
Pharmacy technicians	1,329	1,474	0.9%	145	10.9%	71
Medical & clinical laboratory technologists	1,303	1,444	0.9%	141	10.9%	65
All other diagnosing & treating practitioners	1,829	2,026	0.9%	197	10.8%	96
Home health aides	4,002	4,415	0.9%	412	10.3%	143
Pharmacists	1,557	1,717	0.9%	159	10.2%	87
Medical records & health info technicians	1,147	1,262	0.8%	116	10.1%	53
Medical assistants	2,990	3,287	0.8%	297	9.9%	152
Mental health counselors	1,184	1,297	0.8%	113	9.5%	50
Health diagnosing & treating practitioners	963	1,052	0.8%	89	9.3%	41
All other healthcare support workers	1,387	1,487	0.6%	101	7.3%	57
Physicians & surgeons	6,611	6,695	0.1%	84	1.3%	45

Note: Occupations are ranked by greatest percent change between 2002 and 2012.

Source: Washington State Employment Security Department

VI. Healthcare Job Vitality in Seattle: Issues for Workforce Development

The perpetual shortage in healthcare workers has many hospitals, nursing homes, and allied medical services crying out for more nursing aides, registered nurses (RNs), and technicians. According to the *Journal of American Medical Association*, the nation will have 20 percent fewer registered nurses than it will need (Buerhaus, et. al., 2000). The healthcare personnel crisis is occurring just about everywhere in the nation (Valentino, 2002). In Seattle-King County, the healthcare personnel shortages mirror that of the nation and the state. Shortages of RNs seem persistent and growing, an aging population and increasing retirements are contributing to the severity of the shortage. Result of understaffing is closure of wings and turning away of patients. As baby boomers age and demand more health services, the shortages of healthcare workers will become more serious.

How does one measure worker shortage? Worker shortages can be measured in a variety of ways: job vacancy rates; the tightness of the labor market; and employers' level of difficulty in filling positions. A number of healthcare occupations in Seattle-King County have job vacancy rates as high as 7.5 percent, well above the 1.8 percent vacancy rate for all occupations. As of May 2004 (most current month available), healthcare occupations accounted for over 16 percent of an estimated 22,200 job vacancies within Seattle-King County. Registered nurses, licensed practical nurses, and nursing aides and orderlies combined account for about 7 percent of the total available positions.

There are many factors to consider when evaluating the cause of a worker shortage. In the case of healthcare occupations, both supply and demand issues appear to be creating the deficiency. Demand for such workers is partly driven by an aging population, a growing emphasis on disease management, and technological advances in the healthcare field. Supply, on the other hand, is influenced by a multitude of factors, including: aging of the healthcare workforce, with more workers retiring than can be replaced; lack of capacity at educational and training institutions, resulting in significant numbers of applicants languishing on waiting lists; lack of progression for career advancement in health care occupations; relatively high turnover of healthcare personnel, especially nurses; increased occupational requirements, such as licensing, etc.; and expansion of job opportunities in other (related and non-related) industries. As a result of such factors, supply is simply not keeping up with demand (Workforce Development Council of Seattle-King County, 2003; Briley and Hutson, 2002; Strachota, et. al., 2003).

The increased demand for healthcare personnel are reflected in increased wages. Between 1998 and 2003, real wages for RNs increased 5.1 percent, compared with region-wide average of 3 percent for all occupations. Similarly, real wages for licensed practical nurses (LPNs) have risen by 11.9 percent in the last five years.

While real wages have increased for a number of healthcare occupations, wages for some healthcare occupations in Seattle are not significantly higher than other areas in the state

(Table 10). As expected, entry wages for dentists, pharmacists, occupational therapists, physical therapists, medical lab technicians, registered nurses, and medical secretaries in Seattle are above those of other Washington areas. Cost of living differences between Seattle, Tacoma, and Spokane, however, are not factored into these average healthcare wages. In general, these data suggest that recruiters in Seattle need to be cognizant of comparative wages for healthcare occupations, particularly in recruiting nationwide for qualified workers.

Table 10. Average Wages in Comparative Areas for High Growth Healthcare Occupations, 2003

Occ Code	Occupation	Seattle-King County		Spokane		Tacoma-Pierce County		Washington State	
		Mean Wages	Entry Wages	Mean Wages	Entry Wages	Mean Wages	Entry Wages	Mean Wages	Entry Wages
119111	Medical & Health managers	\$117,441	\$69,072	\$107,233	\$65,853	\$90,092	\$59,396	\$102,483	\$61,547
291011	Chiropractors	\$78,865	\$67,166	\$68,208	\$51,003	\$68,344	\$52,530	\$71,392	\$45,455
291020	Dentists	\$94,603	NA	\$182,458	NA	\$155,509	\$98,926	\$128,525	\$62,142
291051	Pharmacists	\$74,774	\$53,925	\$77,731	\$64,920	\$79,983	\$68,625	\$76,604	\$59,807
291062	Family & general doctors	\$171,868	\$106,592	\$113,080	\$46,912	\$119,619	\$85,094	\$151,835	\$88,933
291071	Physician assistants	\$72,926	\$63,298	\$62,107	\$52,947	\$65,937	\$59,005	\$72,126	\$61,251
291111	Registered nurses	\$60,276	\$47,337	\$49,309	\$39,371	\$57,168	\$46,131	\$55,540	\$42,689
291122	Occupational therapists	\$52,012	\$40,158	\$50,835	\$40,979	\$49,667	\$40,384	\$51,802	\$40,807
291123	Physical therapists	\$57,955	\$48,929	\$58,221	\$45,393	\$55,379	\$47,738	\$57,939	\$48,550
292012	Medical & clinical lab tech	\$32,794	\$24,828	\$29,953	\$23,140	\$33,308	\$25,694	\$31,617	\$24,230
292021	Dental hygienists	\$68,992	\$67,233	\$66,627	\$64,813	\$68,662	\$65,340	\$73,121	\$66,072
292061	Licensed practical nurses	\$39,088	\$31,886	\$35,887	\$30,109	\$35,652	\$30,672	\$35,650	\$29,765
311011	Home health aides	\$19,563	\$16,592	\$18,379	\$16,500	\$17,858	\$15,429	\$18,799	\$16,371
311012	Nursing aides & orderlies	\$25,254	\$21,080	\$21,845	\$18,123	\$22,883	\$18,783	\$22,765	\$18,464
312021	Physical therapist assistants	\$37,159	\$31,409	\$32,583	\$26,576	\$36,088	\$31,286	\$35,257	\$30,172
312022	Physical therapist aides	\$23,519	\$20,227	\$21,098	\$19,525	\$22,959	\$18,913	\$22,066	\$18,448
319091	Dental assistants	\$36,511	\$31,335	\$37,439	\$30,016	\$30,138	\$26,156	\$33,280	\$24,915
319092	Medical assistants	\$29,575	\$23,590	\$25,675	\$20,366	\$25,993	\$20,615	\$27,674	\$21,846
436013	Medical secretaries	\$29,646	\$23,273	\$27,378	\$21,122	\$32,451	\$24,741	\$29,599	\$23,163
499062	Medical equip. repairers	\$43,458	\$26,156	\$32,007	\$21,623	\$39,434	\$28,894	\$42,945	\$26,393
519081	Dental lab technicians	\$43,050	\$26,087	\$32,526	\$22,264	\$42,866	\$23,119	\$39,268	\$25,020

Source: Washington State Employment Security Department

In sum, the supply and demand for trained healthcare services workers in Seattle can be analyzed in three separate labor markets. At the top of the occupational hierarchy, the physicians, dentists, and to some extent, physician assistants and hygienists are part of a state or national labor market. Seattle cannot expect that all the people that it trains to remain in the region after their training; nevertheless, it can try to retain their best graduates while helping to recruit top professionals into the area.

For some of the more specialized and technical healthcare fields, such as physical therapy, medical diagnostics, and nursing, there already are severe shortages at training programs. Again, shortages for a number of these specialized and technical occupations

are forcing healthcare employers to recruit nationwide for qualified personnel. Capacity needs to be expanded state-wide and region-wide for these programs.

Finally, at the lower-skill occupations and entry level positions, healthcare organizations are reporting shortages due to increased demand and high rates of employee turnover. To address such retention problems, healthcare employers in collaboration with public agencies, are encouraging healthcare workers to move up the career ladder with innovative initiatives (Workforce Development Council of Seattle-King County, 2003).

VII. Future Prognosis for Healthcare in Seattle

The healthcare services cluster in Seattle is composed of a variety of interdependent sectors delivering services and goods that are vital to the city's quality of life. Healthcare also represents a vital sector for the city's economy. With one in every five workers employed within the cluster, Seattle has become one of the nation's leading centers in healthcare services.

Local healthcare services have seen growing employment in recent years. Anticipated population growth and technological advances will further increase demand for medical services, particularly within the burgeoning elderly group. This demand growth will, in turn, accelerate employment well into the future.

The core sectors of healthcare delivery will continue to be the dominant employers within the Seattle cluster. The most dramatic employment growth is projected to be in other ambulatory healthcare services; although relatively small, these sectors underscore the growing segmentation within the cluster.

By far, the highest rate of occupational growth in the healthcare services cluster will be for registered nurses. This occupational category represents 15 percent of the employment in all sectors of the healthcare cluster and is projected to account for a significant share (18 percent) of the healthcare services cluster. Other occupations with the greatest percent of growth include medical scientists, technicians, and aides. More than half of the 10,100 projected new jobs in the cluster are in the broad category of professional and technical occupations.

Seattle will need to plan carefully in order to meet the current and upcoming demand for workers within the healthcare services cluster. There is a particularly acute shortage for nurses, medical diagnostic personnel (e.g., radiology technicians), and orderly and aides. Reports have called for significantly increasing the capacity of local educational and training institutions.

Such workforce-related concerns resonated with healthcare industry leaders. Local healthcare industry leaders recognized the endemic problems in attracting and retaining healthcare workers. Given that the average age of registered nurses is 47 years, there is particular need for attracting entrants into the healthcare profession. State and local policy leaders have called out for a number of policy changes including expansion of current programs, new outreach programs (even at the K-12 level), support of education and practice partnership, and student financial aid. Such actions may provide some relief, but this does not ensure that the shortfall for various healthcare occupations (namely nurses) in Seattle will be entirely met. The competition for nurses will undoubtedly remain strong and Seattle must make sure that its competitive position is not only maintained but improved.

Issues of concern for healthcare industry leaders underscore the important role that the City of Seattle should consider in the future. Like other industries, healthcare leaders articulated the need for the City to streamline its regulatory processes and permitting requirements. Hospital master plans are currently subject to the City's Major Institution Land Use Code and provides a significant venue for partnership between the City and its major healthcare employers.

Major hospitals face enormous cost pressures, some of which the City of Seattle could provide some assistance. City utility costs on a per unit basis are increasing markedly affecting the already razor-thin profit margins of hospitals. Related concerns were articulated toward the City business & occupation tax.

Overall, leaders suggested that healthcare industry conditions could be improved by increased collaboration and enhanced partnership with the City of Seattle. Suggestions included:

- Serve role as facilitator/convener for issues
- Transportation focus on getting employees in to work
- Have the Mayor use his "bully pulpit" to press for liability reform
- Provide a point of contact to help move permits through City departments
- Help create awareness about the health care industry
- Help build capacity to provide for uncompensated care, education gaps, and workforce shortage

Without exception, the leading healthcare cities in the nation point to private sector initiative and vision along with public institutional support for continued expansion and concentration of healthcare. Over a number of decades, the healthcare services sector in Houston, Raleigh-Durham-Chapel Hill, Pittsburgh, and Cleveland have made strategic decisions that have propelled healthcare services in turn prospering growth in the rest of their economies. With proper nurture, the healthcare services industry will continue to transform the economy within the City of Seattle.

References

Bergman, Edward M. and Edward J. Feser. *Industrial and Regional Clusters: Concepts and Comparative Advantages*. Morgantown, WV: Regional Science Institute, West Virginia University, 1999. The Web Book of Regional Science.

<http://www.rri.wvu.edu/WebBook/Bergman-Feser/contents.htm>

Berman, Jay M. "Employment outlook: 2002-2012. Industry output and employment projections to 2012," *Monthly Labor Review* February 2004: 58-79.

Beyers, William B. *The Economic Impact of Hospitals in Washington State in the Year 2001*. Prepared for the Washington State Hospital Association, Seattle, Washington, July 2003.

Briley, Taya and Troy Hutson. *Who Will Care for You? Washington Hospitals Face a Personnel Crisis*. Washington State Hospital Association and Association of Washington Public Hospital Districts, Seattle Washington, 2002.

Buerhaus, Peter I., Douglas O. Staiger, and David I. Auerbach. "Implications of an Aging Registered Nurse Workforce," *Journal of American Medical Association* 2000 Vol. 283, No. 22 (June 14): 2948-2954.

Chase, Robert A. *The Biotechnology and Medical Device Industry in Washington State: An Economic Analysis*. Prepared for the Washington Biotechnology and Biomedical Association. Kirkland, WA: Huckell/Weinman Associates, December 2002.

Chase, Robert A. *Puget Sound Economic Impact Model, 2003*. unpublished report. Kirkland, WA: Huckell/Weinman Associates, 2004.

Engel, Cynthia. "Health services industry: still a job machine?" *Monthly Labor Review* March 1999: 3-14.

Information Design Associates, with ICF Kaiser. *Cluster-Based Economic Development: A Key to Regional Competitiveness*. Washington, DC: Economic Development Administration, 1997.

Levit, Katherine, Cynthia Smith, Cathy Cowan, Art Sensenig, and Aaron Catlin. "Health Spending Rebound Continues in 2002," *Health Affairs* Vol. 23, Number 1 (January/February, 2004): 147-154.

Minnesota IMPLAN Group, Inc. *IMPLAN*. Stillwater, MN: 2002.

National Institutes of Health. *NIH Extramural Awards by State and Foreign Site*. 2004. website: <http://grants.nih.gov/grants/award/state/state.htm>

Porter, Michael. *The Competitive Advantage of Nations*. New York: The Free Press, 1990.

Porter, Michael. *The Competitive Advantage of Regions*. Prepared for The Columbus Partnership Retreat. Institute for Strategy and Competitiveness, Harvard Business School, 2004.

Rosenfeld, Stuart. *A Governor's Guide to Cluster-Based Economic Development*. Washington, DC: National Governors Association, 2002.

Rosenfeld, Stuart. *Just Clusters: Economic Development Strategies that Reach More People and Places*. Regional Technology Strategies, Carrboro, NC, 2002.

Seligman, Philip M. "Healthcare: Facilities Industry Survey." *Standard & Poor's Industry Surveys*, Volume 171, Number 25 (June 2003): Section 1:1-37.

Steward, Leslie S. and Michael I. Luger. *Best Practices in the Implementation of Cluster-Focused Strategy*. Prepared for the Research Triangle Regional Partnership Future Clusters Competitiveness Initiative. Office of Economic Development, University of North Carolina, 2003.

Streachota, Ellen, Pamela Normandin, Nancy O'Brien, Mary Clary, and Belva Krukow. "Reasons Registered Nurses Leave or Change Employment Status," *American Journal of Nursing*. Vol. 33, Number 2 (February 2003): 111-117.

Turner, Robert C. A *Framework for Cluster-Based Economic Development Policies*. Prepared for the New York State Network for Economic Research. Government Department, Skidmore College, Saratoga Spring, New York, 2001.

Valentino, Linda M. "Future Employment Trends in Nursing: The nursing shortage has struck just about everywhere in the United States and there's no relief in sight—but its effects vary by region and specialty," *American Journal of Nursing* Vol.32, supplement (2002): 24-28.

Waits, Mary Jo. "The Added Value of the Industry Cluster Approach to Economic Analysis, Strategy Development, and Service Delivery," *Economic Development Quarterly* Vol. 14, Number 1 (February 2000): 35-50.

Washington State Hospital Association. *The Business of Caring: The Economic Impact of Hospitals in Washington State*. Seattle, Washington. October 2003.

Washington State Employment Security Department, Labor Market & Economic Analysis Branch. *Washington State Job Vacancy Survey*. October 2003.

Workforce Development Council of Seattle-King County. *In Critical Condition: Seattle-King County's Hospital Staffing Crisis*. February 2003.

Appendix A

Key sectors within the Healthcare Industry Cluster

Provision of Care: Healthcare Providers

- 1. Hospitals (NAICS 622; SIC 806):** Provide medical, diagnostic and treatment 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 hospital subsector 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. Offices of physicians (NAICS 6211; SIC 801 and 803):** Establishments of health practitioners having the degree of MD (Doctor of medicine) or DO (Doctor of osteopathy) primarily engaged in the independent practice of general and specialized medicine (e.g., anesthesiology, oncology, ophthalmology, psychiatry) or surgery. These practitioners operate both private and group practices in their own offices (or clinics or centers) or in the facilities of others, such as hospitals or HMO medical centers.
- 3. Offices of dentists (NAICS 6212; SIC 802):** Establishments of health practitioners having the degree of DMD (Doctor of dental medicine), DDS (Doctor of dental surgery), or DDSc (Doctor of dental science) primarily engaged in the independent practice of general or specialized dentistry or dental surgery. These practitioners operate both private and group practices in their own offices (or clinics or centers) 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.
- 4. Offices of other health care practitioners (NAICS 6213; SIC 804):** Establishments of independent health practitioners, except physicians and dentists. Offices include those engaged in the independent practice of chiropractic; optometry; mental health; physical, occupational and speech therapy, and audiology; and all other health practitioners (including acupuncturists, dental hygienists, denturists, dieticians, homeopaths, respiratory therapists, midwives, naturopaths, podiatrists, and registered or licensed practical nurses' offices).
- 5. Nursing care facilities (NAICS 6231; SIC 805):** Establishments primarily engaged in providing inpatient nursing and rehabilitative services. The care is generally provided for an extended period of time to individuals requiring nursing care. These establishments have a permanent core staff of registered or licensed practical nurses who, along with other staff, provide nursing and continuous personal care services. Such establishments include convalescent homes or convalescent hospitals, home for the elderly with nursing care, inpatient care hospices, nursing homes, and rest homes with nursing care.
- 6. Home health care services (NAICS 6216; SIC 808):** 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.

- 7. Outpatient care centers (NAICS 6214; SIC 809):** Establishments with medical staff primarily engaged in providing outpatient services related to family planning (birth control clinics; childbirth preparation classes; fertility clinics; pregnancy counseling centers); mental health and substance abuse (alcoholism treatment centers, detoxification centers, drug addiction treatment clinics, mental health centers and clinics, and substance abuse clinics); and other establishments providing general or specialized outpatient care (ambulatory surgical centers, emergency medical centers, health maintenance organization (HMO) medical centers, dialysis centers, biofeedback centers, community health clinics, and sleep disorder centers).

Research, training institutions & government support

- 1. Community & technical colleges (NAICS 6112; SIC 8222):** Establishments primarily engaged in furnishing academic or technical courses (relating to healthcare, medical and/or dental fields) and granting associate degrees, certificates or diplomas below the baccalaureate level.
- 2. Colleges, universities & professional schools (NAICS 6113; SIC 8221):** Establishments primarily engaged in furnishing academic or technical courses (relating to healthcare, medical and/or dental fields) and granting degrees at the baccalaureate or graduate level. Medical, nursing, and dental professional schools are included within this group.
- 3. Technical & trade schools (NAICS 6115; SIC 8249):** Establishments primarily engaged in offering vocational and technical training in a variety of healthcare trades, leading to job-specific certification such as licensed practical nurse (LPN).
- 4. Commercial & noncommercial research organizations (NAICS 54171; SIC 8731 and 8733):** Establishments primarily engaged in conducting research and experimental development in the physical or life sciences such as biology, biotechnology, and medicine.
- 5. Administration of public health programs (NAICS 92312; SIC 9431):** Government establishments engaged in planning, administration, and coordination of public health programs and services, including environmental health activities, mental health, categorical health programs, health statistics, and immunization services. Included here are communicable disease program administration, coroners' offices, health program administration, mental health program administration, and health-related inspection.

Services to healthcare providers

- 1. Medical & diagnostic laboratories (NAICS 6215; SIC 807):** 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. Included here are diagnostic imaging centers, dental or medical X-ray laboratories, medical forensic laboratories, medical pathology laboratories, and medical testing laboratories.
- 2. Other ambulatory health care services (NAICS 6219; SIC 809):** Establishments primarily engaged in providing ambulatory health care services (except offices of physicians, dentists and other health care practitioners; outpatient care centers; medical laboratories and diagnostic imaging centers; and home health care providers). Included here are ambulance services; blood or body organ banks; blood donor stations; health screening services; hearing testing services; pacemaker monitoring services; physical fitness evaluation services; and smoking cessation programs.
 - 3. Direct health & medical insurance carriers (NAICS 52114; SIC 6324):** 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 health care services are included here.

Products to healthcare providers

- 1. Medical equipment and supplies manufacturing (NAICS 3391; SIC 384):** Establishments primarily engaged in manufacturing medical equipment and supplies. Included here are laboratory apparatus and furniture (e.g., hospital beds, operating room tables, laboratory balances, centrifuges, tables, and stools); surgical and medical instruments (e.g., syringes, hypodermic needles, anesthesia apparatus, blood transfusion equipment, catheters, surgical clamps, and medical thermometers); surgical appliances and supplies (e.g., orthopedic devices, prosthetic appliances, surgical dressings, crutches, surgical sutures, and personal industrial safety devices, except protective eyewear); dental equipment and supplies (e.g., dental chairs, dental instrument delivery systems, dental hand instruments, and dental impression material); orthodontic goods (e.g., prescription eyeglasses, contact lenses, eyeglass frames, and reading glasses); and dental laboratories (e.g., dentures, crowns, bridges, and orthodontic appliances).
- 2. Pharmaceutical and medicine manufacturing (NAICS 3254; SIC 283):** Establishments primarily engaged in one or more of the following: manufacturing biological and medicinal products; processing botanical drugs and herbs; isolating active medicinal principals from botanical drugs and herbs; and manufacturing pharmaceutical products intended for internal and external consumption in such forms as ampoules, tablets, capsules, vials, ointments, powders, solutions, and suspensions.
- 3. Medical, dental & hospital equipment and supplies wholesalers (NAICS 42145; SIC 5047):** Establishments primarily engaged in wholesaling medical professional equipment, instruments, and supplies. Included here are wholesalers in dental equipment and supplies, electromedical equipment, hospital beds, hospital furniture, medical and dental X-ray machines, medical dressing, patient

monitoring equipment, prosthetic appliance and supplies, and surgical instrument and apparatus.

Appendix B

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