

The Economic Impact of Arizona's Hospitals on the State & Its Counties

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INVESTING IN A HEALTHY ARIZONA

Executive Summary

The demand for healthcare, both nationally and in Arizona, has grown rapidly in recent decades. Since 1990, the dollar value of medical services delivered in the United States has risen at an average annual rate of 6.8 percent, which is 1.6 percentage points faster than the growth in U.S. gross domestic product. The growth experienced by the healthcare industry is apparent in employment statistics. U.S. healthcare employment has increased at a rate of 2.7 percent per year since 1990. This is more than twice as fast as the growth in total national employment. In Arizona, healthcare employment has increased at an average annual rate of 4.1 percent, outpacing the extremely rapid growth in total state employment, which has risen at a rate of 3.4 percent per year. In government statistics, healthcare establishments include the offices of physicians and dentists, outpatient care centers, hospitals, and nursing and residential care facilities.

Hospital employment, which now accounts for 35 percent of total U.S. healthcare employment, has been rising nationwide at a rate of 1.4 percent per year, slightly faster than total national employment. In Arizona, hospital employment has increased at an average annual rate of 2.6 percent. This is much faster than the rate of growth in U.S. hospital employment. But in contrast to national trends, Arizona hospital employment has not kept pace with the growth in total state employment.

Hospitals now employ approximately 73,300 workers in Arizona. When measured by employment, the hospital industry is 63 percent larger than the hotel industry, 37 percent larger than the electronics and aerospace industries combined, and comparable in size to the banking and credit industry. Hospitals together with ambulatory healthcare facilities (which include physician's offices and outpatient care centers) employ 38 percent more workers than do primary and secondary schools.

Statewide, hospitals employ 2.8 percent of all wage and salary workers. Hospitals account for more than 5 percent of total employment in Gila and Graham counties, and for at least 4 percent of total employment in eight Arizona counties. In Maricopa County, on the other hand, hospitals account for 2.3 percent of total employment. This may reflect a general tendency in large cities for industries to divide into niche areas in which independent establishments provide specialized services. In the healthcare industry, hospitals in small and medium-sized cities may provide a variety of services which can be delivered more efficiently in large cities through physician's offices or outpatient clinics.

The total compensation paid by Arizona hospitals to their employees in 2005 was \$4.0 billion. This amounts to an average of \$54,400 per hospital employee. In comparison, average employee compensation in Arizona is \$46,200 per worker. The compensation premium paid by hospitals reflects the relatively high level of skills required to perform hospital jobs. Hospitals directly contribute \$4.2 billion to the Arizona gross state product. Gross state product consists of employee compensation plus other classifications of income such as proprietor and property income.

Hospitals directly affect the economy through the jobs they provide and the incomes they pay to employees. Less obvious but no less important are the indirect or so-called multiplier effects of a business' operations. One type of indirect impact that hospitals have on the economy involves the jobs and productive activities required to produce goods and services that hospitals routinely purchase to carry out their operations. Estimates from IMPLAN, an input-output model used widely in studies of regional economics, indicate that an additional 37,400 Arizona jobs are generated from hospital purchases. Industries with the largest of these indirect gains are administrative services (including employment services, services to buildings, and other business support services), real estate, professional and technical services (including management consulting, legal services, and accounting), and food services.

Another type of economic impact that can be indirectly traced to hospital operations involves the goods and services produced to satisfy the consumer demands of hospital employees and employees of hospital suppliers. Estimates from IMPLAN indicate that hospitals are responsible for an additional 81,400 jobs in the state through these consumer effects. Industries most affected in this way are government services, retail trade, healthcare, lodging and food.

In total, including both the direct effects and the multiplier effects of hospital operations, hospitals can account for 192,100 Arizona jobs. The total compensation paid to these employees is estimated to be \$7.9 billion. The total contribution hospitals make to the gross state product is estimated to be \$11.5 billion. When expressed as a percent of totals across all industries in the state, the impacts from hospital operations add up to 7.3 percent of total Arizona wage and salary employment, 6.5 percent of Arizona employee compensation, and 5.3 percent of gross state product.

Hospitals affect the economy not only through their operations but also through the irregular but significant expenditures they make to build new hospitals or to expand existing ones. The Arizona Hospital and Healthcare Association recently conducted a survey of hospitals in the state to determine the extent of recent and planned construction activity. The survey results indicate that a total of \$1.3 billion has been spent over the past seven years on hospital construction. Even more impressive are the plans the industry has for construction over the next five years. Arizona hospitals plan to spend \$3.3 billion on new construction through 2011. The projects currently planned are expected to add 2,900 beds, which represents a 20-percent increase in the industry's current capacity.

When multiplier effects are included, the hospital construction activity that is planned through 2011 is large enough to generate a total of 74,400 jobs, employee compensation of \$2.6 billion, and gross state product of \$4.1 billion. On an annualized basis, these impacts amount to 14,900 jobs per year, an annual payroll of \$520 million, and an annual contribution to the gross state product in the amount of \$820 million.

The Economic Impact of Arizona's Hospitals

Section 1: Purpose and Methodology

This report provides estimates of the economic impact of hospitals on the state of Arizona. Impacts are estimated for both individual counties and the state. The purpose of economic impact analysis is to measure the full impact, direct and indirect, of a business on jobs and incomes in a local economy. A business contributes to the economy by hiring workers, purchasing goods and services from other businesses, and using its own capital to produce something that is of value to its customers (medical services, in the case of hospitals). The direct value added of the business is measured by the income it generates—income which is distributed to workers in the form of wages and salaries and to owners of property and capital assets used by the firm. In economic impact analysis, estimates also are made of the indirect or so-called multiplier effects that arise from the production of goods and services purchased by the company itself, by the company's suppliers when they place upstream demands on other producers, and by workers who are directly or indirectly associated with company operations.

Estimates of economic impacts are made using an Arizona-specific version of IMPLAN, an input-output model used widely by researchers throughout the United States. Economic impacts are measured in terms of three variables: employment, employee compensation, and value added (gross state product). Employment is a count of both full- and part-time jobs. Employee compensation consists of wages, salaries, and benefits. Value added is a broad measure of income and is synonymous with gross state product. Value added consists of employee compensation, proprietor income, property income, and indirect business taxes.

The primary data used in the analysis consist of estimates of hospital employment and employee compensation at the county level for the year 2005. These data are estimated by combining information from a variety of sources including the U.S. Bureau of Labor Statistics' *Quarterly Census of Employment and Wages*, the U.S. Census Bureau's *County Business Patterns*, and the Uniform Accounting Reports of Arizona hospitals.

The report is organized as follows:

Section 2—Presents background information on recent growth in the hospital industry in both the nation and the state of Arizona. The hospital industry is compared with other prominent Arizona industries in terms of its overall size, as measured by employment, and in terms of average wages per worker.

Section 3—Reports estimates of the direct impacts of hospital operations on Arizona employment, employee compensation, and gross state product. These impacts are estimated at the individual county level.

Section 4—Provides estimates of the multiplier effects associated with hospital operations. These impacts measure how hospitals affect the economy through their purchases of goods and

services from other Arizona businesses and through the consumer spending of employees of hospitals and hospital suppliers.

Section 5—Summarizes the total economic impacts of operations at Arizona’s hospitals for both individual counties and the state.

Section 6—Contains estimates of how recent and planned construction spending by Arizona’s hospitals has and will affect jobs and incomes in the state.

Glossary of Terms—Provides definitions of the terms used in economic impact analysis.

Section 2: Industry Background

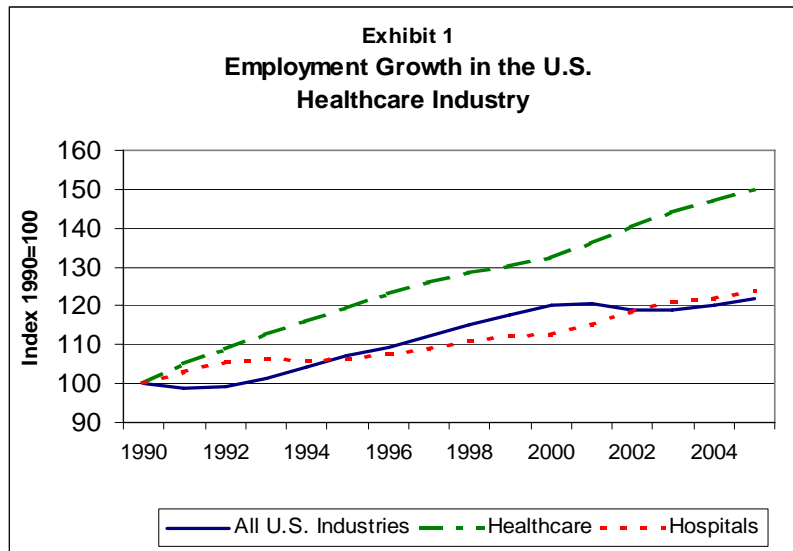
The demand for healthcare has been growing rapidly, driven by advances in medical technology and rising affluence, especially among the elderly. Since 1990, the dollar value of medical services delivered in the United States has risen at an average annual rate of 6.8 percent. This compares with a 5.2 percent rate of growth in the dollar value of the gross domestic product (GDP).

Some of the growth in healthcare expenditures is due to rising prices. Estimates from the Bureau of Economic Analysis (BEA) indicate that real output of medical care has grown at an annual rate of 3.1 percent since 1990, slightly faster than real gross domestic product which has increased at a rate of 3.0 percent. The difference between the growth rates of dollar expenditures and real output is due to higher prices. The BEA numbers imply that prices of healthcare services have been rising at a rate of 3.7 percent per year, as compared with an average annual increase of 2.2 percent in the prices of all goods and services that figure into the economy’s GDP.

While some of the rise in healthcare prices may reflect higher costs of providing standardized services, it is also clear that the quality of healthcare has been rising. Harvey S. Rosen, Chairman of the Council of Economic Advisers, noted in a March 2005 address some of the important advances in healthcare.¹ Surgical procedures have been refined, and diagnostic techniques have been improved as well. Many health conditions are treated more effectively today. For example, 30 years ago, most heart attacks were fatal. Today, many heart attacks can be prevented or their damage to the patient limited with the council of physicians and the aid of pharmaceuticals and technologies now available in hospitals. Technological innovations in the healthcare industry have contributed to both increased life expectancy and an improved quality of life (i.e., hip and knee replacement, arthroscopic surgery).

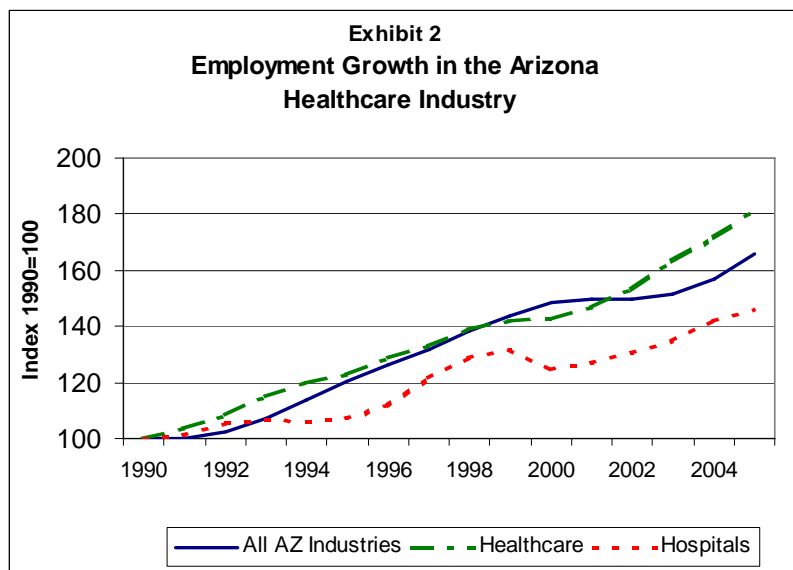
The growth experienced by the healthcare industry is apparent in employment statistics (see Exhibit 1). U.S. healthcare employment has increased at a rate of 2.7 percent per year since 1990. This is more than twice as fast as growth in total national employment which has averaged 1.3 percent per year. Employment in ambulatory care facilities (defined to include the offices of physicians and dentists, outpatient care centers, medical laboratories, and ambulance services) has grown especially rapidly. Employment in ambulatory healthcare has grown at a rate of 4.0 percent per year, and this segment of the industry now accounts for 42 percent of total healthcare

employment. Hospital employment, which accounts for 35 percent of total healthcare employment, has been rising nationwide at a rate of 1.4 percent per year, slightly faster than total national employment.



Note: Exhibit 1 shows, for various industries, U.S. employment in a given year as a percent of employment in 1990. The height of the line shows how fast employment has grown since 1990. For example, the value for hospital employment in 2005 is 124, indicating that hospital employment has increased by 24 percent since 1990.

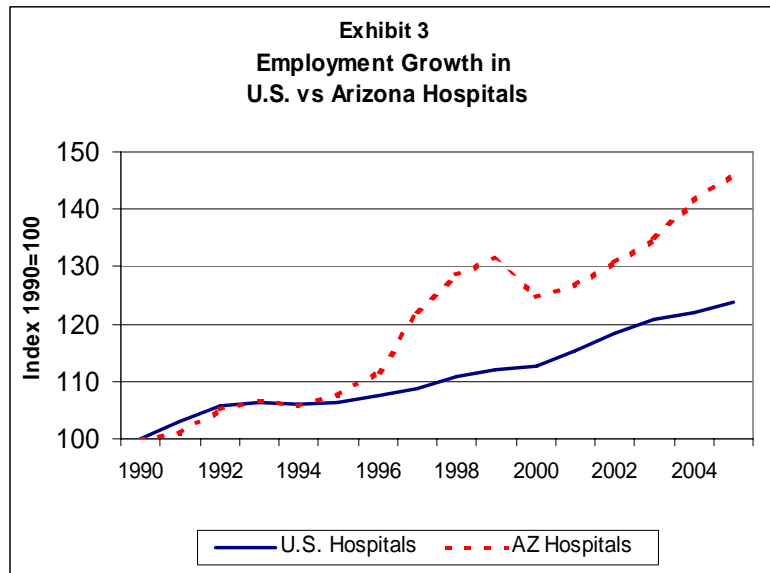
In Arizona, healthcare employment has more than kept pace with the extremely rapid growth in overall employment (see Exhibit 2). Total employment in the state has risen at a rate of 3.4 percent per year, more than 2½ times the national rate. But Arizona healthcare



Note: For assistance in interpreting this exhibit, see the explanatory note at the bottom of Exhibit 1.

employment has increased at an even faster rate of 4.1 percent per year. While healthcare employment in Arizona has been rising faster than total state employment, the margin of difference in the two growth rates is lower in Arizona than it is in the nation.

Hospital employment in Arizona has increased at an average annual rate of 2.6 percent since 1990. This is much faster than the national rate for hospitals (see Exhibit 3). But in contrast to national trends, Arizona hospital employment has not kept pace with total state employment.



Note: For assistance in interpreting this exhibit, see the explanatory note at the bottom of Exhibit 1.

Exhibit 4 compares employment and average wages in the Arizona hospital industry with other industries that are prominent in the state’s economy. Hospitals employ approximately 73,300 workers in Arizona, or 2.9 percent of all workers covered by unemployment insurance. When measured by employment, the hospital industry is 63 percent larger than the hotel industry, 37 percent larger than electronics and aerospace, and comparable in size to the banking and credit industry. Hospital employment in Arizona is 57 percent as large as the total number of employees in the state’s public elementary and secondary schools. Hospitals together with ambulatory healthcare facilities, however, employ 38 percent more workers than do primary and secondary schools.

Average wages in the Arizona hospital industry are \$46,400 per worker, which is 21 percent higher than the statewide average. This wage premium reflects the relatively high level of skills required to perform hospital jobs. Average annual wages in hospitals are 39 percent higher than the wages of employees in primary and secondary education and more than twice the level of wages in the hotel industry. Hospital workers earn 93 percent as much as workers in the ambulatory segment of the healthcare industry, 83 percent as much as workers in the banking and credit industry, and 58 percent as much as electronics and aerospace workers.

Exhibit 4
Comparing Employment and Wages Across
Major Arizona Industries, 2005

Industry	Employment	Average Wages per Worker
Electronics & aerospace (NAICS 3344, 3364)	53,550	\$80,300
Banking and credit (NAICS 522)	76,952	\$55,600
Ambulatory healthcare (NAICS 621)	105,071	\$50,000
Hospitals (NAICS 622)	73,278	\$46,400
Elementary & secondary schools (NAICS 6111)	129,672	\$33,300
Hotels & lodging places (NAICS 721)	45,079	\$22,600
All industries	2,489,462	\$38,200

Source: U.S. Bureau of Labor Statistics, *Quarterly Census of Employment and Wages*, 2005

Note: Industries are identified by codes used in the North American Industry Classification System (NAICS)

Section 3: Direct Economic Impact of Hospital Operations

The direct economic impact of hospitals is alternatively measured by the number of hospital employees, the total compensation received by these employees, and the contribution of hospitals to gross state product. Estimates of hospital employment and employee compensation were made using information from both government sources and the Uniform Accounting Reports (UAR) submitted to the state of Arizona. Estimates of direct gross state product were made using relationships between employee compensation and gross state product available in IMPLAN data files.

The preferred method of measuring employment and employee compensation was to use data from the Bureau of Labor Statistics' *Quarterly Census of Employment and Wages* (ES-202). These data are fully disclosed and available for 2005 for Maricopa County, Mohave County, Pima County, and the state of Arizona. ES-202 data on wages include bonuses, stock options, and profit distributions, but they do not include other forms of compensation such as employer contributions to health and retirement plans. To estimate total employee compensation, ES-202 wages were scaled upward using the ratio of employee compensation, as reported in the IMPLAN 2003 data files, to ES-202 wages in 2003. For the state of Arizona, employee compensation was 17 percent higher than ES-202 wages.

In cases where ES-202 data were unreported due to disclosure restrictions, the next best alternative was to use 2004 data from the Census Bureau's *County Business Patterns*. Counties for which employment and payroll estimates were made in this way include Cochise, Coconino, Navajo, and Yavapai. For counties subject to disclosure restrictions in both the ES-202 data and the *County Business Patterns* data, employment and payroll were estimated with the assistance of information from the UARs of Arizona hospitals. Finally, for all counties where primary data could not be estimated with ES-202 data, estimates of employment and employee compensation were scaled so that the sum of all county totals would tie to state ES-202 totals.

Hospitals covered in the data include Federal government hospitals as well as private hospitals. Across the entire state, Federal hospitals account for 12 percent of total hospital employment. Hospitals operated by the Indian Health Service are especially important in Apache County and Navajo County.

Estimates of the direct economic impacts of Arizona's hospitals are shown in Exhibit 5.

Exhibit 5

Direct Economic Impact of Operations at Arizona Hospitals

Estimates for 2005

County	Employment	Employee Compensation (thous of \$s)	Gross State Product* (thous of \$s)
Apache County (b,#)	878	\$46,889	\$48,506
Cochise County (b,#)	1,674	77,435	80,421
Coconino County (b,#)	2,615	146,640	151,934
Gila County (b,#)	745	33,869	34,900
Graham County (c,#)	442	20,432	21,047
La Paz County (a,c,#)	232	13,169	15,690
Maricopa County (a)	41,383	2,320,986	2,426,924
Mohave County (a)	2,210	101,623	107,488
Navajo County (b,#)	1,277	68,106	70,407
Pima County (a)	15,333	783,241	813,389
Pinal County (a,#)	1,199	72,306	75,795
Santa Cruz County (c,#)	187	9,315	9,661
Yavapai County (b,#)	2,662	159,526	164,748
Yuma County (a,c,#)	2,441	131,182	136,903
Statewide Totals (a)	73,278	\$3,984,719	\$4,157,813

Sources of primary data on employment and employee compensation:

(a) U.S. Bureau of Labor Statistics, *Quarterly Census of Employment and Wages*, 2005

(b) U.S. Census Bureau, *County Business Patterns*, 2004

(c) Uniform Accounting Reports for Arizona Hospitals, 2005

Scaled so that county totals sum to state totals.

* Estimates of gross state product derived from IMPLAN

Hospitals employ approximately 73,300 workers in the state of Arizona. Not surprisingly, most of the state's hospital employment is in counties with large populations. Maricopa County accounts for 56 percent of all hospital workers, and Pima County accounts for 21 percent (see Exhibit 6).

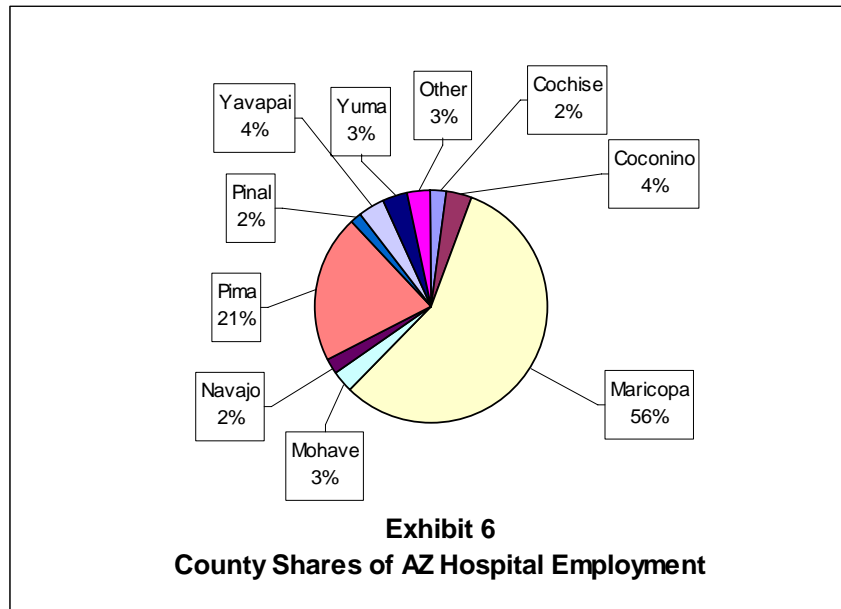


Exhibit 7 shows hospital employment as a percent of total employment for individual counties and the state. Statewide, hospitals employ 2.8 percent of all wage and salary workers. Hospitals account for more than 5 percent of total employment in Gila and Graham counties, and for at least 4 percent of total employment in eight Arizona counties. In Maricopa County, on the other hand, hospitals account for 2.3 percent of total employment. The relatively low employment share for Maricopa County may reflect a general tendency in large cities for industries to divide into niche areas in which independent establishments provide specialized services. In the healthcare industry, hospitals in small and medium-sized cities may provide a variety of services which can be delivered more efficiently in large cities through physician's offices or outpatient clinics.

The total compensation paid by Arizona hospitals to their employees in 2005 was \$4.0 billion. This amounts to an average of \$54,400 per hospital employee. By way of comparison, average employee compensation is \$46,200 across all industries in the state (see Exhibit 8). County estimates of the average rate of compensation paid to hospital workers range from a low of \$46,000 in Cochise, Gila, Graham, and Mohave counties to a high of \$60,000 per worker in Pinal and Yavapai counties. The average compensation paid to hospital workers is \$56,000 in the heavily populated counties of Maricopa and Coconino, and it is \$51,000 in Pima County. Differences in annual rates of compensation across counties may reflect differences in the cost of living, the particular services offered by hospitals and the skills required of their employees, and differences in average hours worked.

Exhibit 7
Hospital Employment as a Percent of Total Employment
 Estimates for 2005

County	Percent
Apache County	4.3
Cochise County	3.7
Coconino County	4.3
Gila County	5.1
Graham County	5.5
La Paz County	3.6
Maricopa County	2.3
Mohave County	4.0
Navajo County	4.3
Pima County	4.0
Pinal County	2.5
Santa Cruz County	1.4
Yavapai County	4.2
Yuma County	3.4
State of Arizona	2.8

Sources: Exhibit 5 for estimates of hospital employment;
 Bureau of Economic Analysis for total county and state employment

Exhibit 8
Average Compensation for Hospital Employees
 Estimates for 2005

County	Hospital Employees	All Wage & Salary Employees
Apache County	\$53,400	\$37,273
Cochise County	46,300	43,726
Coconino County	56,100	36,999
Gila County	45,500	35,842
Graham County	46,200	32,545
La Paz County	56,800	30,158
Maricopa County	56,100	49,051
Mohave County	46,000	34,656
Navajo County	53,300	37,191
Pima County	51,100	43,016
Pinal County	60,300	39,835
Santa Cruz County	49,800	38,617
Yavapai County	59,900	35,483
Yuma County	53,700	34,652
State of Arizona	\$54,400	\$46,165

Sources: Exhibit 5 for compensation of hospital workers, BEA Regional Economic Accountants for compensation of all wage & salary employees

Section 4: Multiplier Effects

The direct impacts reported in the previous section understate the full impacts of hospitals on the Arizona economy for two reasons. First, the direct impacts do not include the economic activity that is necessary to produce goods and services routinely purchased by hospitals as a part of their normal operations. Hospitals may outsource functions such as building maintenance, housekeeping, and IT services. The people who provide these services may not be directly employed by hospitals, but they nevertheless owe their livelihood to hospital operations. The local jobs and incomes supported when hospitals purchase goods and services from local suppliers are referred to in the language of economic impact analysis as “indirect” impacts. Using a mathematical model to track all of the transactions between businesses from different industries, these indirect effects can be calculated to include not only the economic activity stimulated within the organizations of hospital suppliers, but also the upstream activity that arises when hospital suppliers themselves purchase goods and services from other local producers.

The second type of economic impact that is not included in the estimates from the previous section relates to impacts that arise when hospital employees—and even the employees of businesses that are indirectly connected to hospitals—spend a portion of their incomes on goods and services produced in the local economy. These effects are referred to as “induced” impacts. When economists speak of multiplier effects that arise from the economic activity of a business, they are referring to both the indirect and induced effects of a company’s operations.

The multiplier effects associated with Arizona hospital operations were estimated using an Arizona-specific version of IMPLAN.² The specific model used was based on IMPLAN’s 2003 national economic database. In building the model, trade flows were calculated using location quotients. Type II multipliers were used with the amount of recycled spending limited to households. The multipliers in this type of model are similar in size to those in RIMS II (Bureau of Economic Analysis).

Impacts were calculated for individual counties using IMPLAN’s county models and for the state of Arizona using IMPLAN’s state model. Multiplier effects estimated for the state are greater than the sum of the county effects. There are two reasons for this. First, county models do not distinguish economic spillovers that accrue to other counties in the state from spillovers received by other states. Impacts calculated for a given county are simply the jobs and incomes that local hospitals generate, both directly and indirectly, within that county. Consider, for example, a case where hospitals in Pima County purchase items that are actually produced in Maricopa County. These impacts do occur within the state, but they will not be counted in either the Pima or Maricopa county models. The statewide analysis we conduct using the state model, on the other hand, will in principle pick up spillovers that occur between Arizona counties.

The second reason the state impacts are greater than the sum of the county impacts is because when estimating multiplier effects for the state, we added to the results from IMPLAN’s Type II multipliers estimates of impacts that arise when state and local governments spend tax revenues that are generated, directly or indirectly, by hospital operations.³ Because of the

complex nature of state-county fiscal interactions, it was not practical to estimate tax effects at the county level.

Detailed results of our economic impact analysis, with separate reporting of indirect and induced effects, are available in Exhibits A1-A3. Exhibit 9 provides a summary of the multiplier effects estimated for each county in Arizona that has a hospital and for the state as a whole. The results are presented in the form of economic impact multipliers, one for each of three economic variables: employment, employee compensation, and gross state product. An economic impact multiplier is the ratio of total economic impact, including multiplier effects, to direct economic impact. For example, the multiplier pertaining to employee compensation estimated for the state is 1.97. This means that for every \$1 million paid in compensation to hospital employees, an additional \$970,000 in employee compensation will arise because of multiplier effects, i.e., compensation earned by other employees in the state because of the work they do in helping to produce goods and services purchased by hospitals or hospital employees.

Exhibit 9
Economic Impact Multipliers for Operations at Arizona Hospitals

County	Employment	Employee Compensation	Gross State Product
Apache County	1.40	1.21	1.47
Cochise County	1.63	1.33	1.71
Coconino County	1.86	1.41	1.79
Gila County	1.36	1.19	1.38
Graham County	1.51	1.24	1.47
La Paz County	1.59	1.22	1.46
Maricopa County	2.30	1.76	2.44
Mohave County	1.90	1.48	1.94
Navajo County	1.72	1.33	1.66
Pima County	2.17	1.66	2.25
Pinal County	1.52	1.20	1.47
Santa Cruz County	1.68	1.33	1.71
Yavapai County	2.14	1.48	1.95
Yuma County	1.74	1.35	1.63
Statewide Impacts*	2.62	1.97	2.75

Note: Economic impact multipliers are ratios of total impacts, including multiplier effects, to direct impacts.

Source: Center for Competitiveness and Prosperity Research, using IMPLAN

*Using the state of Arizona as an IMPLAN study area.

Economic impact multipliers are larger for counties with more diverse economies. In counties with a large urban area, a large percentage of business and consumer demands can be met by local-area firms. In rural counties, on the other hand, a higher percentage of local

purchases are of items produced by businesses outside of the county. Not surprisingly, Maricopa is the county with the largest multipliers. Second in terms of the size of its multipliers is Pima County. Counties with the smallest multipliers, and therefore the least diverse economies, are Apache, Gila, Graham, La Paz, and Pinal. The multipliers for the state of Arizona are larger than the multipliers for any individual county. As explained above, the multiplier effects estimated in the statewide model include both county spillovers that are not accounted for in the county analysis and the effects of government spending of new state and local tax revenues.

Exhibit 10
Industry Composition of Multiplier Effects of Hospital Operations
on Arizona Employment*
(in number of jobs)

Industry	Indirect Effects	Induced Effects	Total Multiplier Effects
Agriculture, forestry & fishing	225	634	859
Mining	29	35	64
Utilities	155	274	429
Construction	605	396	1,001
Manufacturing	1,932	1,968	3,900
Wholesale trade	1,388	2,635	4,023
Transportation & warehousing	2,722	2,026	4,748
Retail trade	845	12,737	13,582
Information	879	1,514	2,393
Finance & insurance	2,555	4,056	6,611
Real estate & rental	5,508	3,568	9,076
Professional & technical services	4,483	2,935	7,418
Management of companies	789	414	1,203
Administrative services	10,061	3,655	13,716
Educational services	107	1,694	1,801
Health & social services	48	12,023	12,071
Arts, entertainment & recreation	308	2,141	2,449
Accommodation & food services	3,095	8,955	12,050
Other services	1,334	7,240	8,574
Government	325	12,500	12,825
Total	37,393	81,400	118,793

* Based on results from statewide model. Induced effects include estimates of impacts from the spending of new state and local tax revenues.

Source: Center for Competitiveness and Prosperity Research, using IMPLAN

Exhibit 10 shows, for the statewide analysis of employment impacts, the particular industries affected by multiplier effects from hospital operations. The exhibit reports separately indirect effects and induced effects. The indirect effects refer to jobs needed to produce goods and services purchased by hospitals. A total of 37,400 Arizona jobs are generated from hospital

purchases. Industries with the largest gains are administrative services (including employment services, services to buildings, and other business support services), real estate, professional and technical services (including management consulting, legal services, and accounting), and food services. The induced effects refer to jobs supported by the consumer spending of employees of hospitals and their suppliers. A total of 81,400 jobs may be traced to the induced effects of hospital operations. Industries most affected are government services (including public education), retail trade, healthcare, lodging and food. The total of all multiplier effects associated with hospital operations is 118,800 Arizona jobs.

Section 5: Total Economic Impact of Hospital Operations

The total economic impact of Arizona's hospitals is the sum of the direct effects and the multiplier effects. Total impacts can be expressed as the product of the direct impacts, as reported in Exhibit 5, and the impact multipliers reported in Exhibit 9. The total impacts are shown in Exhibit 11 for individual counties and the state. As previously noted, the estimated statewide impacts exceed county totals because the statewide impacts include both inter-county spillovers and impacts that arise from the spending of state and local tax revenues generated by hospitals.

Exhibit 11

Total Economic Impact of Operations at Arizona Hospitals

Estimates for 2005

County	Employment	Employee Compensation (thous of \$s)	Gross State Product (thous of \$s)
Apache County	1,232	\$56,685	\$71,389
Cochise County	2,735	102,977	137,502
Coconino County	4,874	207,405	271,541
Gila County	1,013	40,202	48,243
Graham County	667	25,288	30,880
La Paz County	368	16,008	22,936
Maricopa County	95,385	4,086,649	5,923,544
Mohave County	4,192	149,924	208,094
Navajo County	2,193	90,507	116,900
Pima County	33,249	1,299,321	1,832,848
Pinal County	1,817	86,725	111,304
Santa Cruz County	315	12,384	16,518
Yavapai County	5,696	235,608	321,671
Yuma County	4,253	177,093	223,229
County Totals	157,989	\$6,586,776	\$9,336,599
Statewide Impacts*	192,071	\$7,854,442	\$11,451,738

Note: Total economic impacts include multiplier effects as well as direct impacts.

Source: Center for Competitiveness and Prosperity Research, using IMPLAN

*Using the state of Arizona as an IMPLAN study area. Multiplier effects include estimates of impacts from the spending of new state and local tax revenues.

The economic impacts of Arizona's hospitals are, of course, heavily concentrated in Maricopa and Pima counties. These two counties alone account for more than 80 percent of the sum of all county impacts.

From the statewide analysis, the total contribution of hospitals to the Arizona economy is estimated to be 192,100 jobs, employee compensation of \$7.9 billion, and gross state product of \$11.5 billion. When expressed as a percent of totals across all industries in the state, the impacts from hospital operations add up to 7.3 percent of total Arizona wage and salary employment, 6.5 percent of Arizona employee compensation, and 5.3 percent of gross state product (see Exhibit 12). At the county level, hospitals can account, both directly and indirectly, for at least 8 percent of total employment in Coconino, Graham, Pima, and Yavapai counties. In Maricopa County, the total impacts from hospitals represent 5.3 percent of total employment.

Exhibit 12

Total Impacts of Hospital Operations as a Percent of Total Economy

Estimates for 2005, in percent

County	Employment	Employee Compensation	Gross State Product
Apache County	6.1	7.5	--
Cochise County	6.1	5.2	--
Coconino County	8.0	9.2	--
Gila County	6.9	7.7	--
Graham County	8.3	9.7	--
La Paz County	5.7	8.3	--
Maricopa County	5.3	4.6	--
Mohave County	7.6	7.9	--
Navajo County	7.3	8.1	--
Pima County	8.6	7.8	--
Pinal County	3.7	4.5	--
Santa Cruz County	2.3	2.3	--
Yavapai County	9.1	10.6	--
Yuma County	5.8	7.0	--
Statewide Impacts	7.3	6.5	5.3

Note: Total economic impacts include multiplier effects as well as direct impacts.

Source: Center for Competitiveness and Prosperity Research, using IMPLAN

Section 6: Impacts from Recent and Planned Construction

The impacts presented thus far in the report refer to the annual and ongoing effects of hospital operations on jobs and incomes in the state. Another type of economic impact arises from irregular but significant expenditures made to construct new hospitals or to expand existing ones. The Arizona Hospital and Healthcare Association recently conducted a survey of hospitals

in the state to determine the extent of recent and planned construction activity. The results of the survey are summarized in Exhibit 13.

Exhibit 13
Summary of Results from Hospital Construction Survey, 2006

New Construction completed since 2000		Expansion Projects completed since 2000		New Construction planned through 2011		Expansion Projects planned through 2011	
# beds	mill of \$s	# beds	mill of \$s	# beds	mill of \$s	# beds	mill of \$s
374	\$575	936	\$702	1,149	\$1,290	1,724	\$2,043

Source: From a survey of Arizona hospitals administered by the Arizona Hospital and Healthcare Association, Nov. 2006.

The first two columns of Exhibit 13 present information on completed construction of new hospitals and expansion projects since 2000. The survey results indicate that a total of \$1.3 billion has been spent over the past seven years on hospital construction. These projects have resulted in an increase of 1,300 hospital beds in the state, which is 9 percent of total capacity in 2006.

Even more impressive are the industry’s construction plans over the next five years. As indicated in the last two columns of Exhibit 13, Arizona hospitals plan to spend \$3.3 billion on new construction through 2011. Projects currently in planning are expected to add 2,900 beds, which represents a 20-percent increase in the industry’s current capacity.

Exhibit 14 shows the economic impact of the hospital construction activity measured in the recent survey. The figures shown in the exhibit are total impacts, including both direct effects and multiplier effects. The figures are not annualized. Rather they represent impacts realized over the entire two construction periods—the period of completed projects (from 2000-2006) and the period of planned projects (from 2007-2011).

Hospital construction activity since 2000 can account for a total of 30,900 Arizona jobs, payroll of \$1.1 billion, and gross state product of \$1.7 billion. On an annualized basis (obtained by dividing the figures in the first row of Exhibit 14 by seven), recent hospital construction has generated an average of 4,400 jobs per year, with average annual employee compensation of \$154 million and a gross state product of \$244 million.

Construction activity that is currently planned through 2011 is enough to generate a total of 74,400 jobs, employee compensation of \$2.6 billion, and gross state product of \$4.1 billion. When these figures are annualized (dividing the cumulative impacts by five), the impacts amount to 14,900 jobs per year, with an average annual payroll of \$520 million and an annual contribution to gross state product in the amount of \$822 million. The annualized impacts from planned future hospital construction are 7-8 percent as large as the annual impacts from hospital operations, as reported in Exhibit 11.

Exhibit 14

Economic Impact of Recent and Planned Hospital Construction

Total impacts, including multiplier effects; in 2005 dollars

	Employment	Employee Compensation (thous of \$s)	Gross State Product (thous of \$s)
Completed projects:			
New hospitals & expansions (2000-2006)	30,913	\$1,079,145	\$1,706,666
Planned projects:			
New hospitals & expansions (2007-2011)	74,413	2,597,658	4,108,192

Note: Results are not annualized. Impacts from completed construction, for example, were realized over a seven-year period.

Source: Center for Competitiveness and Prosperity Research, using IMPLAN

Glossary of Terms Used in Economic Impact Analysis

The following are the economic impact variables measured in this study. Definitions accord with those in IMPLAN.

<i>Employment:</i>	The sum of the number of part- and full-time paid employees.
<i>Employee Compensation:</i>	Synonymous with payroll costs. Includes not only wages and salaries but benefits such as non-cash compensation and employer contributions to health insurance and retirement plans.
<i>Gross State Product:</i>	Synonymous with value added. It is the difference between an industry's revenue and the cost of goods and services it purchases from other industries. Valued added is the total income generated by an industry, and it can be measured as the sum of employee compensation, proprietors' income, property income, and indirect business taxes.

The following are terms used to classify the type of economic impacts that arise from an industry's production.

<i>Direct Impacts:</i>	Refer to the industry's own employment, payroll, and other income directly generated by its operations.
<i>Indirect Impacts:</i>	Impacts that arise from interindustry relationships. These are the jobs and incomes that are generated when an industry purchases goods and services from other businesses in the local economy.
<i>Induced Impacts:</i>	Effects on jobs and incomes that arise when workers who are directly or indirectly connected to the industry spend money on consumer goods and services.
<i>Total Impacts:</i>	The sum of the direct, indirect, and induced impacts.
<i>Economic Impact Multiplier:</i>	The ratio of total impacts to direct impacts. Economic impact multipliers are calculated separately for employment, employee compensation, and gross state product.

Endnotes

¹ Comments made at the Conference of the National Association of Business Economics by Harvey S. Rosen, Chairman, Council of Economic Advisers, March 21, 2005.

² IMPLAN is maintained and licensed by the Minnesota IMPLAN Group, Inc. (MIG). IMPLAN was originally developed by the USDA Forest Service to assist the Forest Service in land and resource management planning. MIG began work on IMPLAN databases in 1987 at the University of Minnesota. In 1993, Minnesota IMPLAN Group, Inc. was formed to privatize the development of IMPLAN data and software. IMPLAN data and accounts closely follow the conventions used in the “Input-Output Study of the U.S. Economy” by the Bureau of Economic Analysis (1980).

³ Hospital employees pay taxes, and so do the suppliers of goods and services purchased by hospitals. State and local taxes paid by Arizona households in the form of income, sales, and property taxes are 6.1 percent of Arizona personal income. To estimate the household tax revenues generated by hospital operations, we multiplied by .061 the total estimated economic impact, including multiplier effects, of hospitals on employee compensation in the state. State and local taxes paid by businesses in Arizona are 2.5 percent of gross state product. To estimate the indirect effect of hospitals on business taxes, we multiplied by .025 the sum of the indirect and induced effects of hospitals on gross state product. Economic impacts stemming from the spending of these tax revenues were calculated using IMPLAN assuming that one-half of the revenues were spent on education and the remaining half were spent on non-education government services.

Exhibit A1
Economic Impact of Operations at Arizona Hospitals:
Employment

Estimates for 2005, in number of jobs

County	Direct	Indirect	Induced	Total Economic Impact
Apache County	878	157	197	1,232
Cochise County	1,674	422	639	2,735
Coconino County	2,615	792	1,467	4,874
Gila County	745	91	177	1,013
Graham County	442	80	145	667
La Paz County	232	56	80	368
Maricopa County	41,383	20,005	33,997	95,385
Mohave County	2,210	754	1,228	4,192
Navajo County	1,277	372	544	2,193
Pima County	15,333	7,476	10,440	33,249
Pinal County	1,199	225	393	1,817
Santa Cruz County	187	51	77	315
Yavapai County	2,662	1,217	1,817	5,696
Yuma County	2,441	737	1,075	4,253
County Totals	73,278	32,435	52,276	157,989
Statewide Impacts*	73,278	37,393	81,400	192,071

*Multiplier effects estimated using the state of Arizona as the study area. Induced effects include estimates of impacts from the spending of new state and local tax revenues.

Source: Center for Competitiveness and Prosperity Research, using IMPLAN

Exhibit A2**Economic Impact of Operations at Arizona Hospitals:
Employee Compensation**

Estimates for 2005, in thous of \$\$s

County	Direct	Indirect	Induced	Total Economic Impact
Apache County	\$46,889	\$4,997	\$4,799	\$56,685
Cochise County	77,435	11,194	14,348	102,977
Coconino County	146,640	21,443	39,322	207,405
Gila County	33,869	1,960	4,373	40,202
Graham County	20,432	1,757	3,099	25,288
La Paz County	13,169	1,068	1,771	16,008
Maricopa County	2,320,986	663,279	1,102,384	4,086,649
Mohave County	101,623	18,133	30,168	149,924
Navajo County	68,106	9,207	13,194	90,507
Pima County	783,241	218,969	297,111	1,299,321
Pinal County	72,306	4,763	9,656	86,725
Santa Cruz County	9,315	1,345	1,724	12,384
Yavapai County	159,526	29,977	46,105	235,608
Yuma County	131,182	18,169	27,742	177,093
County Totals	\$3,984,719	\$1,006,261	\$1,595,796	\$6,586,776
Statewide Impacts*	\$3,984,719	\$1,201,530	\$2,668,193	\$7,854,442

*Multiplier effects estimated using the state of Arizona as the study area. Induced effects include estimates of impacts from the spending of new state and local tax revenues.

Source: Center for Competitiveness and Prosperity Research, using IMPLAN

Exhibit A3**Economic Impact of Operations at Arizona Hospitals:****Gross State Product**

Estimates for 2005, in thous of \$s

County	Direct	Indirect	Induced	Total Economic Impact
Apache County	\$48,506	\$10,576	\$12,307	\$71,389
Cochise County	80,421	24,307	32,774	137,502
Coconino County	151,934	41,769	77,838	271,541
Gila County	34,900	4,058	9,285	48,243
Graham County	21,047	3,073	6,760	30,880
La Paz County	15,690	2,658	4,588	22,936
Maricopa County	2,426,924	1,322,673	2,173,947	5,923,544
Mohave County	107,488	36,668	63,938	208,094
Navajo County	70,407	18,539	27,954	116,900
Pima County	813,389	431,465	587,994	1,832,848
Pinal County	75,795	11,845	23,664	111,304
Santa Cruz County	9,661	2,920	3,937	16,518
Yavapai County	164,748	62,025	94,898	321,671
Yuma County	136,903	31,219	55,107	223,229
County Totals	\$4,157,813	\$2,003,795	\$3,174,991	\$9,336,599
Statewide Impacts*	\$4,157,813	\$2,403,492	\$4,890,433	\$11,451,738

*Multiplier effects estimated using the state of Arizona as the study area. Induced effects include estimates of impacts from the spending of new state and local tax revenues.

Source: Center for Competitiveness and Prosperity Research, using IMPLAN



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