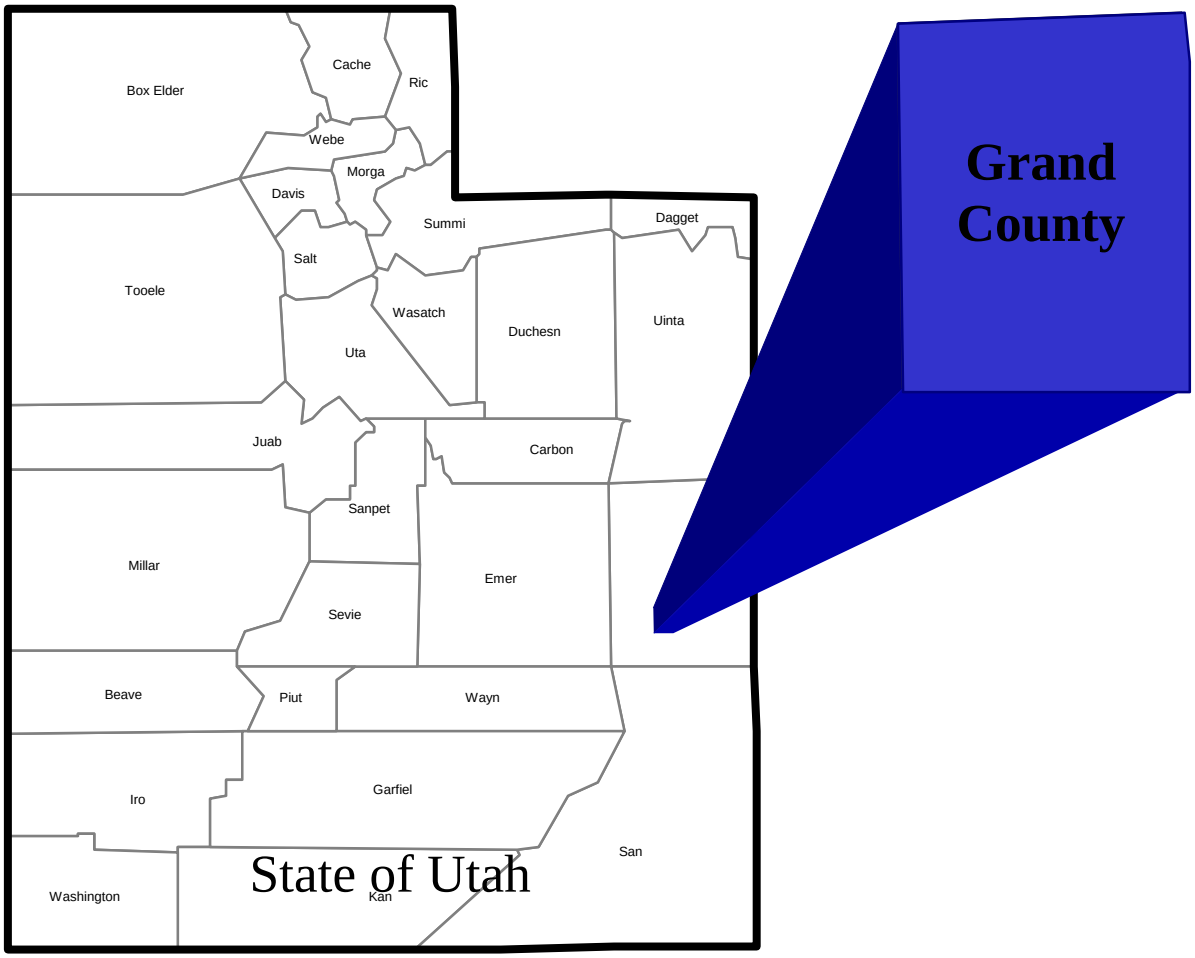
Grand County, Utah - Economic Impact of the Health Sector



Prepared by:

Oklahoma Cooperative Extension Service
Oklahoma State University

Oklahoma Office of Rural Health
Rural Health Policy & Research Center
Oklahoma State University

National Association of Counties Project
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The Economic Impact of the Health Sector on the Economy of Grand County, Utah

Prepared for:

Grand County, Utah

through
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Prepared by:

Gerald A. Doeksen, Extension Economist
Email: gad@okstate.edu

Cheryl F. St. Clair, Associate State Extension Specialist
Email: cheryl@okstate.edu

Pamela S. Hartman, Extension Associate
Email: pamela.hartman@okstate.edu

Rural Development
Oklahoma Cooperative Extension Service
Oklahoma State University
(405) 744-6083

and

Val Schott, Director
Oklahoma Office of Rural Health
Email: val.schott@okstate.edu

Oklahoma Osteopathic School of Medicine
Oklahoma State University
(405) 945-9197

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Medical facilities have a tremendous medical and economic impact on the community in which they are located. This is especially true with health care facilities, such as hospitals and nursing homes. These facilities not only employ a number of people and have a large payroll, but they also draw into the community a large number of people from rural areas that need medical services. The overall objective of this study is to measure the economic impact of the health sector on the economy of Grand County. The specific objectives of this report are to:

1. discuss national trends in health care;
2. review economic and demographic data for Grand County and the State of Utah;
3. summarize the direct economic activities of the health sector in Grand County;
4. review concepts of community economics and multipliers; and
5. estimate the secondary impacts of the health sector on the economy of Grand County.

No recommendations will be made in this report.

National Trends in the Health Care Industry

The health care sector is an extremely fast growing sector, and based on the current demographics, there is every reason to expect this trend to continue. Data in **Table 1** provide selected health expenditure and employment data for the United States; highlights include:

- Health expenditures increased from $75 billion in 1970 to almost $2 trillion in 2005;
- Health care services as a share of the national gross domestic product (GDP) were 7.2 percent in 1970 and increased to 16.0 percent in 2005;
- Per capita health expenditures increased from $356 in 1970 to $6,697 in 2005;
- Employment in the health sector increased 250 percent from 1970 to 2002;

Table 1
United States Health Expenditures and Employment Data
for 1970-2005; Projected for 2008, 2012 & 2016

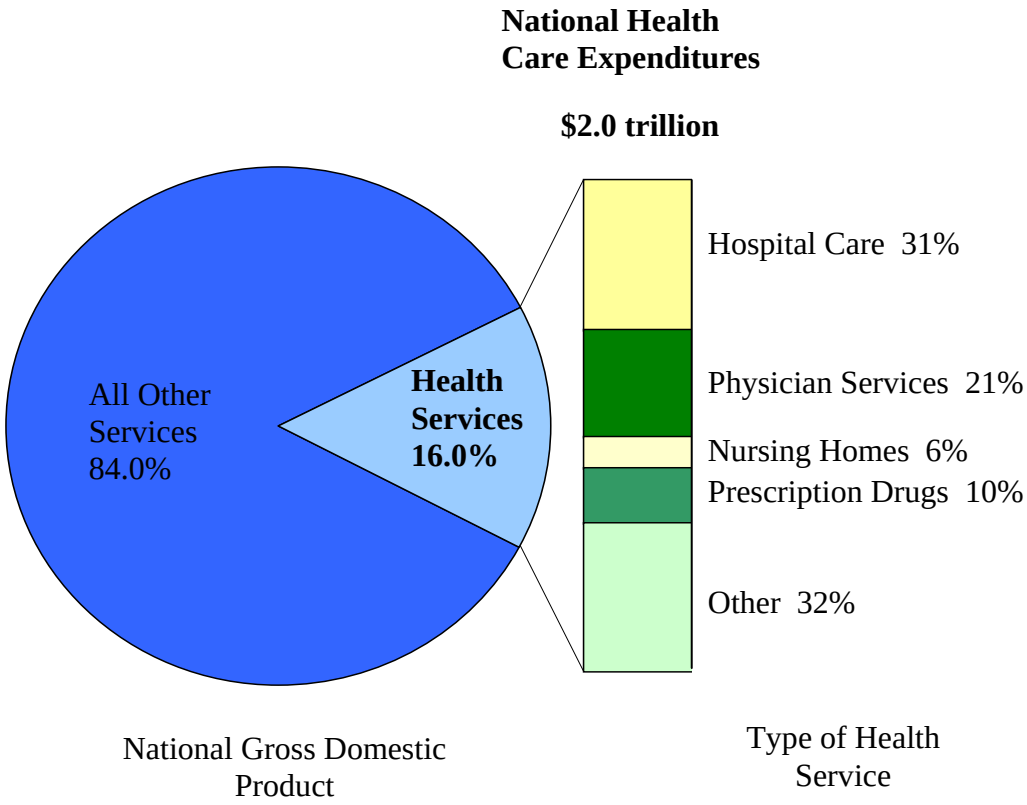
Year	United States Data: Total Health Expenditures ($$ Billions)	Per Capita Health Expenditures ($$)	Health as % of GDP (%)	Health Sector Employment (000)	Ave. Annual Increase in Employment (%)	
1970	$74.9	$356	7.2%	3,052		
1980	253.9	1,102	9.1%	5,278	7.3%	Employment
1990	714.0	2,813	12.3%	7,814	4.8%	Based
2000	1,353.3	4,790	13.8%	10,103	2.9%	on
2001	1,469.6	5,148	14.5%	10,381	2.8%	SIC[1]
2002	1,602.8	5,559	15.3%	10,673	2.8%	
2003	1,733.4	5,952	15.8%	11,817	N/A	Employment
2004	1,858.9	6,322	15.9%	12,055	2.0%	Based
2005	1,987.7	6,697	16.0%	12,314	2.1%	on
						NAICS[2]
Projections						
2008	2,420.0	6,683	16.5%			
2012	3,173.4	9,148	17.9%			
2016	4,136.9	12,320	19.6%			

SOURCES: Bureau of Labor Statistics; Bureau of Economic Analysis; Centers for Medicare & Medicaid Services, National Health Expenditures 1970-2005 and National Health Expenditure Projections 2006-2016, website: http://www.cms.hhs.gov/NationalHealthExpendData, data as of March 2007.
N/A - Not Available
[1] Based on Standard Industrial Classification (SIC) codes for health sector employment.
[2] Based on North American Industrial Classification System (NAICS) for health sector employment.

- Health expenditures are projected to double from $2 trillion in 2005 to $4.1 trillion in 2016;
- Health care services as a share of the national GDP are projected to increase from 16.0 percent in 2005 to 19.6% in 2016; and
- Per capital health expenditures will increase from $6,697 in 2005 to $12,320 in 2016.

Figure 1 illustrates 2005 national health expenditures by percent of gross domestic product and by type of health service. The largest health service type was hospitals, representing 31.0 percent of the total. The next largest type of health services was physician services with 21.0 percent of the total.

Figure 1.
National Health Expenditures
as a Percent of Gross Domestic Product and by Health Service Type, 2005



Economic and Demographic Data

The population and employment for Grand County will be illustrated in this section. The study is based on the medical service area that includes all of Grand County, Utah. Grand County is located on the eastern border of Utah. The populations for Grand County are presented in **Table 2**. The population of Grand County was 6,620 according to the 1990 census

and increased to 8,485 in the 2000 census, an increase of 28.2 percent. The U. S. Census Bureau has estimated that the population has increased to 8,743 in 2005, an increase of 3.0 percent from 2000 to 2005.

Table 2
Population of Cities and Towns,
Grand County, Utah, and State of Utah
1990 and 2000 Census, 2005 Census Estimates

Cities & Towns	1990 Census	2000 Census	2005 Estimates	1990-2000 % change	2000-2005 % change
Castle Valley	211	349	356	65.4%	2.0%
Moab City	3,971	4,779	4,807	20.3%	0.6%
Balance of Grand County	2,438	3,357	3,580	37.7%	6.6%
Grand County Total	6,620	8,485	8,743	28.2%	3.0%
State of Utah	1,722,850	2,233,169	2,490,334	29.6%	11.5%

Source: U. S. Census Bureau, 1990 and 2000 census population, 2005 estimated populations.

Moab is the county seat of Grand County and the largest population center in the county, followed by Castle Valley (**Table 2**). Moab had a population of 3,971 in 1990 and increased to 4,779 in the 2000 census, representing an increase of 20.3%. The 2005 estimated population for Moab is 4,807, representing an increase of 0.6% from the 2000 census. Castle Valley had a population of 211 in 1990 and increased 65.4% to 349 in the 2000 census. The 2005 estimated population of Castle Valley was 356, an increase of 2.0 percent from the 2000 census. In summary, Grand County is estimated to increase in population from the 2000 census to the 2005 Census Estimates. The State of Utah is following the same increasing population trend.

Table 3 shows the breakdown by age group for the Grand County population from the census years 1990 and 2000 and the 2005 census estimates. The lowest age group is decreasing in population over time while the 75+ age group is increasing in population over time.

Table 3
Population by Age Groups for Grand County, Utah
1990 and 2000 Census and 2005 Census Estimates

Age Groups	1990 Census	% of Total	2000 Census	% of Total	2005 Estimated	% of Total
<14 years	1,776	26.8%	1,845	21.7%	1,638	18.7%
15-34 years	1,640	24.8%	2,176	25.6%	2,471	28.3%
35-54 years	1,687	25.5%	2,637	31.1%	2,553	29.2%
55-74 years	1,235	18.7%	1,375	16.2%	1,591	18.2%
75+ years	282	4.3%	452	5.3%	490	5.6%
Totals	6,620	100.0%	8,485	100.0%	8,743	100.0%

Source: U. S. Census Bureau, 1990 and 2000 census populations and 2005 estimated population.

Data in **Tables 4** and **5** are from the U.S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis, for the year 2004 and are based on the North American Industry Classification System (NAICS). The purpose of these two tables is to demonstrate the importance of the health sector as compared to the entire economy. In 2004, the health care and social assistance sector (which includes hospitals) accounted for 320 full-time and part-time employees or 6.5 percent of the private employment in Grand County (**Table 4**). This compared to 9.5 percent for the State of Utah. For Grand County, health care and social assistance was the fourth largest sector of private employment, behind accommodations and food services with 27.4 percent, retail trade with 16.8 percent, and construction with 8.4 percent.

Table 4
Full-Time and Part-Time Employment by Type of Employment and by Major Industry 1/ for Grand County and the State of Utah, 2004

Employment Categories	Grand County No. of Jobs	Grand County % of Total	Grand County % of Private	State of Utah No. of Jobs	State of Utah % of Total	State of Utah % of Private
Total FT & PT	5,862	100.0%		1,445,507	100.0%	
Wage & salary	4,398	75.0%		1,165,695	80.6%	
Proprietors'	1,464	25.0%		279,812	19.4%	
Farm proprietors'	80	5.5%		15,354	5.5%	
Nonfarm proprietors' 2/	1,384	94.5%		264,458	94.5%	
By Industry:						
Farm	102	1.7%		19,835	1.4%	
Nonfarm	5,760	98.3%		1,425,672	98.6%	
Private	4,892	84.9%	100.0%	1,210,449	84.9%	100.0%
For, fshng, rel 3/	(D)		**	2,947		0.2%
Mining	117		2.4%	9,118		0.8%
Utilities	(D)		**	4,047		0.3%
Construction	410		8.4%	97,840		8.1%
Manufacturing	100		2.0%	120,814		10.0%
Wholesale trade	77		1.6%	46,028		3.8%
Retail trade	821		16.8%	168,618		13.9%
Transp & wrhsng	(D)		**	46,687		3.9%
Information	85		1.7%	33,445		2.8%
Finance & ins	77		1.6%	82,870		6.8%
RE rental & leasing	279		5.7%	56,908		4.7%
Prof & techn svcs	230		4.7%	85,442		7.1%
Mgmt of cos & enterp	(D)		**	20,505		1.7%
Admin & waste svcs	(D)		**	83,845		6.9%
Educational svcs	97		2.0%	35,870		3.0%
Hlth care & soc assist	**320**		**6.5%**	**115,014**		**9.5%**
Arts, entert, & rec	328		6.7%	29,002		2.4%
Accomm & food svcs	1,341		27.4%	92,449		7.6%
Other svcs, not pub admin	263		5.4%	79,000		6.5%
Govt & govt enterprises	868	15.1%		215,223	15.1%	

SOURCE: 2007 U. S. Dept. of Commerce, Regional Economic Information System, Bureau of Economic Analysis, 2004 data.

1/ The estimates are based on the North American Industry Classification System (NAICS).

2/ Excludes limited partners.

3/ "Other" consists of the number of jobs held by U.S. residents employed by international organizations and foreign embassies and consulates in the U.S.

(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

** Due to nondisclosure of confidential data, no percentages are available.

Table 5
Personal Income by Major Source and Industry 1/
for Grand County and the State of Utah, 2004

	Grand County			State of Utah		
	Income $1,000s	% of Total	% of Private	Income $1,000s	% of Total	% of Private
Total Personal Income	199,357	100.0%		64,398,905	100.0%	
Earnings by place of work						
Total earnings by place of work	143,230	100.0%		53,256,554	100.0%	
Wage and salary disbursements	100,518	70.2%		37,268,728	70.0%	
Proprietors' income	17,231	12.0%		6,710,263	12.6%	
Other	25,481	17.8%		9,277,563	17.4%	
Earnings by industry						
Total earnings by industry	143,230	100.0%		53,256,554	100.0%	
Farm earnings	-1,075	-0.8%		266,641	0.5%	
Nonfarm earnings	144,305	100.8%		52,989,913	99.5%	
Private earnings	104,399	72.3%	100.0%	42,963,598	81.1%	100.0%
For, fshng, related, and other 2/	(D)		**	50,491		0.1%
Mining	4,960		4.8%	664,562		1.5%
Utilities	(D)		**	386,829		0.9%
Construction	13,676		13.1%	4,180,618		9.7%
Manufacturing	1,632		1.6%	6,319,436		14.7%
Wholesale trade	2,751		2.6%	2,331,480		5.4%
Retail trade	15,734		15.1%	4,056,948		9.4%
Transp and warehousing	(D)		**	2,284,301		5.3%
Information	1,398		1.3%	1,652,464		3.8%
Finance and insurance	1,965		1.9%	3,056,510		7.1%
Real estate & rental & leasing	3,623		3.5%	1,386,153		3.2%
Prof and technical services	8,916		8.5%	4,695,058		10.9%
Mgmt of cos and enterprises	(D)		**	1,154,212		2.7%
Administrative & waste services	(D)		**	1,820,656		4.2%
Educ services	1,410		1.4%	786,834		1.8%
Health care & social asst	**8,287**		**7.9%**	**4,044,105**		**9.4%**
Arts, entertainment, & rec	4,718		4.5%	457,217		1.1%
Accommodation & food svcs	20,254		19.4%	1,339,524		3.1%
Other services, except pub	6,972		6.7%	2,296,200		5.3%
Govt & govt enterp	39,906	27.7%		10,026,315	18.9%	

SOURCE: 2007 U. S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis, 2004 data.

1/ The estimates of earnings for 2001-2004 are based on the 2002 North American Industry Classification System (NAICS).

2/ "Other" consists of wage and salary disbursements to U.S. residents employed by international organizations and foreign embassies and consulates in the United States.

** Due to nondisclosure of confidential data, no percentages are available.

(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Personal income data are presented in **Table 5**. Health care and social assistance accounted for 7.9 percent of the private earnings in Grand County and was the fifth largest industry based on private earnings. This compared to 9.4 percent of private earnings from health care and social assistance for the State of Utah.

The Direct Economic Activities

Employment and payroll are the important direct economic activities created in Grand County from the health sector. The health sector is divided into the following components:

- Hospitals
- Offices of Physicians, Dentists, and Other Health Practitioners
- Nursing and Protective Services
- Home Health
- Pharmacies
- Other Ambulatory Health Care Services

The total health sector in Grand County employs 348 full-time and part-time employees and has an estimated payroll including benefits of $15,226,929 (**Table 6**). The hospital component employs 141 people with an annual payroll of $7,802,452. The hospital sector includes Moab Valley Health Care, Inc., a full-service primary care hospital, providing inpatient and outpatient care with eleven medical-surgical (acute care) beds and fourteen long-term care beds, a 24/7 emergency room, a visiting specialty physicians' outpatient clinic, hospice, a full-service imaging department, and a full-service clinical laboratory. The hospital employs four physicians in general surgery, orthopedics, radiology, and emergency medicine. The hospital also contracts for physician services including one anesthesiologist, two emergency medicine physicians, physicians for on-call emergency C-section coverage, and other physicians on an "as

needed" basis. The visiting specialty physicians' outpatient clinic currently includes the following specialists:

- Cardiologist 2 visits/month
- OB/GYN 1 visit/month
- Ophthalmologist 2 visits/month
- Pathologist 2 visits/month
- Podiatrist 1 visit/month

The offices of physicians, dentists, and other health practitioners' component employs 78 full-time and part-time employees, with an annual payroll of $4,569,339 (**Table 6**). This component includes six primary care physicians, one physician assistant and one nurse

Table 6
Direct Impact of Health Services
in Grand County, Utah, 2007

Health Care Entity	Number of Employees	Income (Wages, Salaries, & Proprietors' Income, + Benefits)
Hospitals	141	$7,802,452
Offices of Physicians, Dentists, & Other Health Practitioners	78	$4,569,339
Other Medical & Health Services	129	$2,855,138
TOTALS	**348**	**$15,226,929**

SOURCE: Local data for hospital; local employment data for all other health services; income data for all services but the hospital were estimated utilizing average incomes from the U. S. Bureau of Labor Statistics online (www.bls.gov [4/20/07]).

practitioner in four primary care clinics/offices, four dental practices with dental hygienists, one chiropractor office, one outpatient rehabilitation facility, and one optometry practice.

The next four health sectors, nursing and protective services, home health, pharmacies, and other ambulatory health care services, have all been combined into “Other Medical and Health Services” to ensure the privacy of individual health care providers. The other medical and health services employ 129 people with an annual payroll of $2,855,138. This component includes one residential care facility, two home health agencies, one emergency medical services, one search and rescue service, the Southeastern Utah Public Health Department, the Four Corners Behavioral Health Agency, two pharmacies, and one gas/durable medical equipment company.

In summary, the health sector is vitally important as a community employer and important to the community's economy. The health sector definitely employs a large number of residents. The health sector and the employees in the health sector purchase a large amount of goods and services from businesses in Grand County. These impacts are referred to as secondary impacts or benefits to the economy. Before the secondary impacts of the health sector are discussed, basic concepts of community economics will be discussed.

Some Basic Concepts of Community Economics and Income and Employment Multipliers

Figure 2 illustrates the major flows of goods, services, and dollars of any economy. The foundation of a community's economy are those businesses which sell some or all of their goods and services to buyers outside of the community. Such a business is a basic industry. The flow of products out of, and dollars into, a community is represented by the two arrows in the upper right portion of **Figure 2**. To produce these goods and services for "export" outside the community, the basic industry purchases inputs from outside of the community (upper left

portion of **Figure 2**), labor from the residents or "households" of the community (left side of **Figure 2**), and inputs from service industries located within the community (right side of **Figure 2**). The flow of labor, goods, and services in the community is completed by households using their earnings to purchase goods and services from the community's service industries (bottom of **Figure 2**). It is evident from the interrelationships illustrated in **Figure 2** that a change in any one segment of a community's economy will have reverberations throughout the entire economic system of the community.

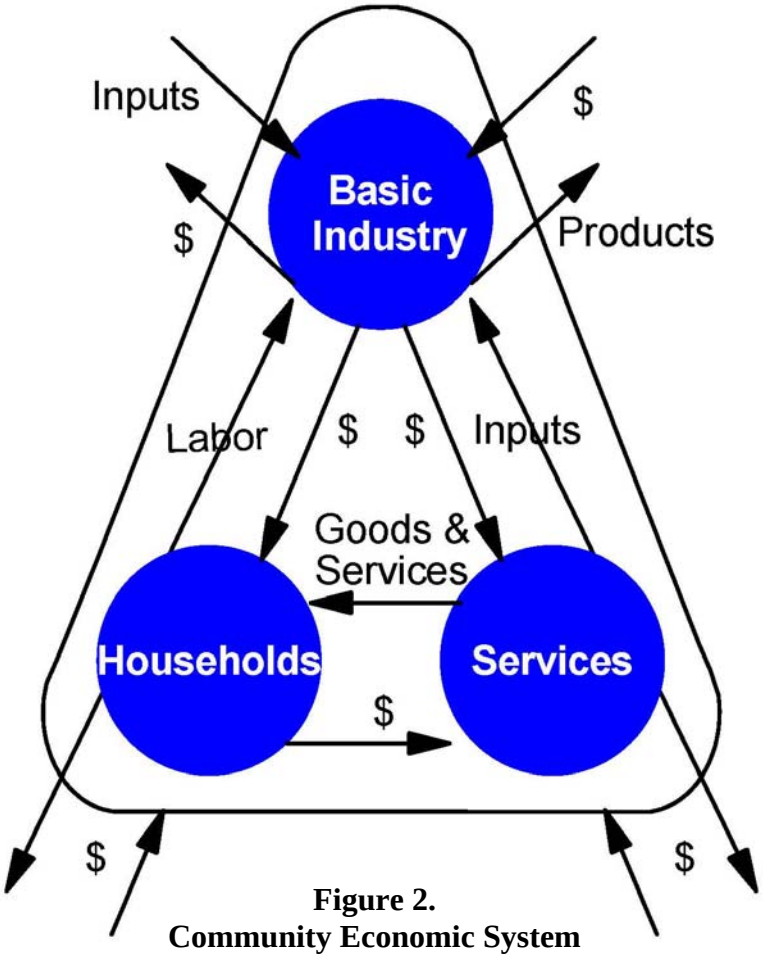


Figure 2.
Community Economic System

Consider, for instance, the closing of a hospital. The services section will no longer pay employees and dollars going to households will stop. Likewise, the hospital will not purchase goods from other businesses and dollar flow to other businesses will stop. This decreases income in the "households" segment of the economy. Since earnings would decrease, households decrease their purchases of goods and services from businesses within the "services" segment of the economy. This, in turn, decreases these

businesses' purchases of labor and inputs. Thus, the change in the economic base works its way throughout the entire local economy.

The total impact of a change in the economy consists of direct, indirect, and induced impacts. Direct impacts are the changes in the activities of the impacting industry, such as the closing of a hospital. The impacting business, such as the hospital, changes its purchases of inputs as a result of the direct impact. This produces an indirect impact in the business sectors. Both the direct and indirect impacts change the flow of dollars to the community's households. The households alter their consumption accordingly. The effect of this change in household consumption upon businesses in a community is referred to as an induced impact.

A measure is needed that yields the effects created by an increase or decrease in economic activity. In economics, this measure is called the multiplier effect. Multipliers are used in this report. An employment multiplier is defined as:

> *the ratio between direct employment, or that employment used by the industry initially experiencing a change in final demand and the direct, indirect, and induced employment.*

An employment multiplier of 3.0 indicates that if one job is created by a new industry, 2.0 jobs are created in other sectors due to business (indirect) and household (induced) spending.

Secondary Impacts of the Health Sector on the Economy of Grand County, Utah

Employment and income multipliers for the area have been calculated by use of the IMPLAN model. The model was developed by the U.S. Forest Service and allows for development of county multipliers. Additional information on IMPLAN is included in **Appendix A**.

The employment multipliers for the components of the health sector are shown in **Table 7**. The employment multiplier for the hospital component is 1.46. This indicates that for each

job created in that sector, a 0.46 job is created throughout the area due to business (indirect) and household (induced) spending. The employment multipliers for the other health sector components are also shown in **Table 7**.

Table 7
Employment Impact of Health Services
in Grand County, Utah, 2007

Health Care Entity	Number of Employees	Employment Multiplier	Secondary Impact	Total Impact
Hospital	141	1.46	65	206
Offices of Physicians, Dentists, & Other Health Practitioners	78	1.40	31	109
Other Medical & Health Services	129	1.18	23	152
Totals	**348**		**119**	**467**

SOURCE: Health care employment data provided from local sources; multipliers from Minnesota IMPLAN Group, Inc., 2004 IMPLAN Data.

Applying the employment multipliers to the employment for each of the health sector components yields an estimate of each component's employment impact on Grand County (**Table 7**). For example, the hospital has employment of 141 employees; applying the employment multiplier of 1.46 to the employment number of 141 brings the total employment impact of the hospital to 206 employees (141 x 1.46 = 206). The secondary impact of the hospital is 65 employees (141 x 0.46 = 65); these are the jobs created in other industry sectors in the Grand County economy as a result of the spending of the hospital and the spending of the 141 hospital employees. The offices of physicians, dentists and other health practitioners have a

direct impact of 78 employees and after the application of the multiplier of 1.40, the secondary impact is 31 employees and the total impact comes to 109 employees. All the employment multipliers are applied in **Table 7**, resulting in a total employment impact of the health sector in Grand County estimated at 467 employees and a secondary employment impact of 119 employees.

The income multiplier for the hospital component is 1.33 (**Table 8**). This indicates that for each dollar created in that component, $0.33 are created throughout the area due to business (indirect) and household (induced) spending. The income multipliers for the other health sector components are also given in **Table 8**.

Applying the income multipliers to the income (wages, salaries, and proprietor income plus benefits) for each of the health sector components yields an estimate of each component's income impact on Grand County (**Table 8**). The hospital component has a total payroll of $7,802,452; applying the income multiplier of 1.33 brings the total hospital income impact to 10,377,261 ($7,802,452 x 1.33 = $10,377,261). The secondary income impact from the hospital component is $2,574,809, which is the income generated in the other industry sectors in the Grand County economy due to the hospital spending and the hospital employees' spending. All the income multipliers are applied to the income for each component and the resulting secondary and total income impacts are shown for each component. The total secondary income impact of the health sector in Grand County is estimated to be $4,282,439, with the total income impact of the health sector in Grand County estimated to be $19,509,368 (**Table 8**).

Table 8
Income Impact of Health Services
in Grand County, Utah, 2007

Health Care Component	Income ($$)	Income Multiplier	Secondary Impact	Total Impact	Retail Sales	1¼% Sales Tax
Hospitals	$7,802,452	1.33	$2,574,809	$10,377,261	$1,985,543	$24,819
Offices of Physicians, Dentists, & Other Health Practitioners	$4,569,339	1.23	$1,050,948	$5,620,287	$1,075,363	$13,442
Other Medical & Health Services	$2,855,138	1.23	$656,682	$3,511,820	$671,937	$8,399
Totals	$15,226,929		$4,282,439	$19,509,368	$3,732,843	$46,660

SOURCE: Hospital, Health Department, and Mental Health income provided by local sources; income data for all other health services were estimated utilizing average incomes from the U. S. Bureau of Labor Statistics online (www.bls.gov [4/20/07]); multipliers from Minnesota IMPLAN Group, Inc., 2004 IMPLAN Data; local retail sales capture ratio computed from 2004 total personal income from Bureau of Economic Analysis; Grand County total retail sales from Utah State Tax Commission website: http://tax.utah.gov/esu/sales/sales044.htm (accessed 04/20/07); and Grand County retail sales percent from Utah State Tax Commission website: http://tax.utah.gov/sales/rates.html (accessed 04/20/07).

Income also has an impact on retail sales. If the county ratio between retail sales and income continues as in the past several years, then direct and secondary retail sales generated by the health sector and its employees equals $3,732,843 (**Table 8**). The health sector components' income impacts are utilized to determine the retail sales and a 1.25 percent sales tax collection. Then the health sector components are totaled to determine the direct and secondary retail sales generated by the health sector. A 1.25 percent sales tax collection is estimated to generate

$46,660 in Grand County as a result of the total health sector impact (**Table 8**). This estimate is probably low, as many health care employees will spend a larger proportion of their income in local establishments that collect sales tax. The bottom line is that the health sector not only contributes greatly to the medical health of the community, but also to the economic health of the community.

Summary

The economic impact of the health sector upon the economy of Grand County is tremendous. The health sector employs a large number of residents, similar to a large industrial firm. The secondary impact occurring in the community is extremely large and measures the total impact of the health sector. If the health sector increases or decreases in size, the medical health of the community as well as the economic health of the community are greatly affected. For the attraction of industrial firms, businesses, and retirees, it is crucial that the area have a quality health sector. Often overlooked is the fact that a prosperous health sector contributes to the economic health of the community.

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APPENDIX A

Model and Data Used to Estimate Employment and Income Multipliers

Appendix A
Model and Data Used to Estimate Employment and Income Multipliers

A computer spreadsheet that uses state IMPLAN multipliers was developed to enable community development specialists to easily measure the secondary benefits of the health sector on a state, regional or county economy. The complete methodology, which includes an aggregate version, a disaggregate version, and a dynamic version, is presented in Measuring the Economic Importance of the Health Sector on a Local Economy: A Brief Literature Review and Procedures to Measure Local Impacts (Doeksen, et al., 1997). A brief review of input-output analysis and IMPLAN are presented here.

A Review of Input-Output Analysis

Input-output (I/O) (Miernyk, 1965) was designed to analyze the transactions among the industries in an economy. These models are largely based on the work of Wassily Leontief (1936). Detailed I/O analysis captures the indirect and induced interrelated circular behavior of the economy. For example, an increase in the demand for health services requires more equipment, more labor, and more supplies, which, in turn, requires more labor to produce the supplies, etc. By simultaneously accounting for structural interaction between sectors and industries, I/O analysis gives expression to the general economic equilibrium system. The analysis utilizes assumptions based on linear and fixed coefficients and limited substitutions among inputs and outputs. The analysis also assumes that average and marginal I/O coefficients are equal.

Nonetheless, the framework has been widely accepted and used. I/O analysis is useful when carefully executed and interpreted in defining the structure of a region, the interdependencies among industries, and forecasting economic outcomes.

The I/O model coefficients describe the structural interdependence of an economy. From the coefficients, various predictive devices can be computed, which can be useful in analyzing economic changes in a state, a region or a county. Multipliers indicate the relationship between some observed change in the economy and the total change in economic activity created throughout the economy.

MicroIMPLAN

MicroIMPLAN is a computer program developed by the United States Forest Service (Alward, et al., 1989) to construct I/O accounts and models. Typically, the complexity of I/O modeling has hindered practitioners from constructing models specific to a community requesting an analysis. Too often, inappropriate U.S. multipliers have been used to estimate local economic impacts. In contrast, IMPLAN can construct a model for any county, region, state, or zip code area in the United States by using available state, county, and zip code level data. Impact analysis can be performed once a regional I/O model is constructed.

Five different sets of multipliers are estimated by IMPLAN, corresponding to five measures of regional economic activity. These are: total industry output, personal income, total income, value added, and employment. Two types of multipliers are generated. Type I multipliers measure the impact in terms of direct and indirect effects. Direct impacts are the changes in the activities of the focus industry or firm, such as the closing of a hospital. The focus business changes its purchases of inputs as a result of the direct impacts. This produces indirect impacts in other business sectors. However, the total impact of a change in the economy consists of direct, indirect, and induced changes. Both the direct and indirect impacts change the flow of dollars to the state, region, or county's households. Subsequently, the households alter their consumption accordingly. The effect of the changes in household consumption on

businesses in a community is referred to as an induced effect. To measure the total impact, a Type II multiplier is used. The Type II multiplier compares direct, indirect, and induced effects with the direct effects generated by a change in final demand (the sum of direct, indirect, and induced divided by direct). IMPLAN also estimates a modified Type II multiplier, called a Type III multiplier that also includes the direct, indirect, and induced effects. The Type III multiplier further modifies the induced effect to include spending patterns of households based on a breakdown of households by nine difference income groups.

Minnesota IMPLAN Group, Inc. (MIG)

Dr. Wilbur Maki at the University of Minnesota utilized the input/output model and database work from the U. S. Forest Service's Land Management Planning Unit in Fort Collins to further develop the methodology and to expand the data sources. Scott Lindall and Doug Olson joined the University of Minnesota in 1984 and worked with Maki and the model.

As an outgrowth of their work with the University of Minnesota, Lindall and Olson entered into a technology transfer agreement with the University of Minnesota that allowed them to form MIG. At first, MIG focused on database development and provided data that could be used in the Forest Service version of the software. In 1995, MIG took on the task of writing a new version of the IMPLAN software from scratch. This new version extended the previous Forest Service version by creating an entirely new modeling system that included creating Social Accounting Matrices (SAMs) – an extension of input-output accounts, and resulting SAM multipliers. Version 2 of the new IMPLAN software became available in May of 1999. For more information about Minnesota IMPLAN Group, Inc., please contact Scott Lindall or Doug Olson by phone at 651-439-4421 or by email at info@implan.com or review their website at www.implan.com.