

The Economic Impact of Hospital Systems in New Hampshire



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Foundation *for*
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[Table of Contents](#)

Executive Summary	1
The Economic Impact of Hospital Systems in New Hampshire	6
The Importance of Health Care to Economic Development	6
Health Care Trends	7
Acute Care Hospital Systems in New Hampshire	13
Some Basic Concepts of Community Economics	20
State Economic Impact of Acute Care Hospital Systems	23
County Impact of Acute Care Hospital Systems	25
Appendix	28

The Economic Impact of Hospital Systems in New Hampshire

Executive Summary

Every year acute care hospitals provide vital health services to thousands of people across New Hampshire. Traditionally, acute care hospitals have been thought of as places with only hospital beds and emergency rooms. In response to diverse health care needs and better ways to deliver services, hospitals have adapted and emerged as hospital systems with a variety of health care services in multiple settings (e.g. medical practices, home care, etc.) available under the same system. In addition, hospital systems are a vital component of our economy. This study documents the economic impact of acute care hospital systems to the economy in New Hampshire.

Hospital systems play a role in local economic development. The ability of a community to attract new industry or retain private businesses is influenced by the availability of health care services among other variables. Businesses and industries must compete for skilled workers and these workers need health care services nearby for themselves and their families. Retirees are another key component to successful economic development. New Hampshire is attractive to many people as a place to retire for its quality of life and many natural resources. The availability of health care services is an important factor for older adults seeking suitable retirement locations.

In addition, we recognize that the overall health of the population in a community or the state of New Hampshire is determined by multiple factors, beyond access to quality health care services. Other important determinants of health include: education, housing, employment, the built and natural environments, genetics, etc. .

Trends in Health Care. The national health care sector is fast-growing in the U.S. Based on historical and projected data, the trend is expected to continue. Per capita health expenditures increased from \$2,855 in 1990 to \$9,255 in 2013. For New Hampshire, the personal per capita health expenditures increased from \$2,481 in 1991 to \$7,839 in 2009, more than tripling during this 18-year period.

Utilizing New Hampshire Department of Employment Security data, average annual health care employment increased by 18,122 or 33.4 percent and average annual health care wages increased \$2.1 billion or 111.0 percent from 2000 to 2013. Based on size of private industries, health care ranked second in average annual employment with 13.5% of the total and ranked second in average annual wages with 14.9 percent.

Population Data. In New Hampshire, the population increased by 6.5 percent from 2000 to 2010 (2010 – 1.32 million); the age group 45 to 64 increased 37.7 percent (2010 – 404,204), and the age group age 65 and older increased 20.5 percent (2010 – 178,268) during the same time.

Acute Care Hospital Systems in New Hampshire. Acute care hospital systems are more than just inpatient and emergency room services. They have evolved into hospital systems that may include medical practices, ambulatory surgery centers, health centers or clinics, assisted living or skilled nursing care facilities, home care and hospice services, etc. Hospital systems have resulted in the hospital sector having higher employment and income.

New Hampshire has 26 acute care hospital systems; 13 of these are designated as critical access hospital (CAH) systems which have 25 beds or less and are the smaller, rural hospital systems. The other 13 are the non-rural acute care hospital systems. The Foundation for Healthy Communities utilized the 2013 audited financial statements for each hospital system for the study data. The 13 CAH hospital systems have total employment of 5,526 and total payroll (wages, salaries, and benefits) of \$369.5 million. The other 13 non-rural acute care hospital systems have employment of 31,637 and total payroll of \$2.5 billion. The total for all 26 acute care hospital systems was 37,163 employees and \$2.9 billion in payroll plus benefits. The average employment per hospital system was 1,429 and the average payroll with benefits was \$110 million. The average salary and benefits per employee for all acute care hospital systems was \$76,847.

Economic Impact of Acute Care Hospital Systems. The economic impact of New Hampshire acute care hospital systems, measured by employment of 37,163 and payroll of \$2.9 billion, is significant. However, this does not tell the complete story of the impact of hospital systems because secondary economic impacts are created when hospital systems and their employees spend money. These secondary benefits are measured by multipliers using an input-output model and data from IMPLAN. This model is widely used and nationally-recognized by economists and other policy analysts across the U.S.

For all acute care hospital systems in New Hampshire in 2013, the total employment impact was 66,577 and the total income (payroll plus benefits) impact was \$4.4 billion. This is based on the state hospital employment multiplier of 1.79 and the state hospital income multiplier of 1.53. The state hospital employment multiplier of 1.79 indicates that for each employee in the hospital sector, 0.79 employees are generated in other businesses and industries in the state. The employees in the other businesses and industries are referred to as secondary employment. The secondary employment was 29,414. The same concept applies to the income. The secondary income was \$1.5 billion.

**Economic Impact of All Acute Hospital Systems
on Employment and Income in New Hampshire, 2013**

Employment Impact			
Direct Impact	Employment Multiplier	Secondary Impact	Total Impact
37,163	1.79	29,414	66,577
Income Impact			
Direct Impact	Income Multiplier	Secondary Impact	Total Impact
\$2,855,849,119	1.53	\$1,519,270,607	\$4,375,119,726

Sources: 2013 Audited Financial Statements, New Hampshire Hospital Association;
Multipliers from IMPLAN, Minnesota IMPLAN Group, Inc., 2012

A few examples of the secondary economic impact when hospital systems purchase services or products include:

- Wentworth-Douglass Hospital in Dover purchased over \$735,000 worth of laundry and linen services from local firms, more than \$140,000 in contracted cleaning services, and nearly \$80,000 in HVAC services.
- Concord Hospital uses local firms like Milestone Engineering, Sacco Construction, Nobis Engineering, Richard Bartlett & Associates, and Warren Street Architects to support its varied renovation and construction projects. In 2014, over \$2.5 million was spent for these services.
- Alice Peck Day Memorial Hospital in Lebanon spent more than \$500,000 for energy products from Rymes Propane & Oil in Pembroke in 2014.
- Cheshire Medical Center in Keene purchased \$9.8 million worth of products and services from New Hampshire businesses and vendors in 2014.

Examples of secondary impact when hospital system employees spend their wages locally or in New Hampshire are too numerous to list, but housing, food and transportation expenses are generally local purchases.

State Impact of Critical Access Hospital Systems. Based on direct employment of 5,526 and direct income of \$369.5 million, the state multipliers were applied to result in the secondary and total impacts. The secondary employment impact was 4,374, for a total employment impact of 9,900. The secondary income impact was \$196.6 million, for a total income impact of \$566.2 million.

State Impact of Non-Rural Acute Care Hospital Systems. Based on direct employment of 31,637 and direct income of \$2.5 billion, the state multipliers were applied to result in the secondary and total impacts. The secondary employment impact was 25,041, for a total employment impact of 56,678. The secondary income impact was \$1.3 billion, for a total income impact of \$3.8 billion.

County Impact of Acute Care Hospital Systems. The hospital systems in each county have an impact on the economy of the county. The employment and income data for acute care hospital systems by county are available. Each county has a multiplier derived specifically for the county. To illustrate employment impact for a county, Grafton County, with the largest hospital system employment of 10,728, generates secondary employment impact of 6,111 and total employment impact of 16,839. To illustrate income impact for a county, Coos County, with the smallest county multiplier, had direct income of \$67.6 million resulting in secondary income impact of \$17.2 million and total income impact of \$84.8 million.

County Employment Impact of New Hampshire Hospital Systems on County Economies

County	Direct Impact	Multiplier	Secondary Impact	Total Impact
Belknap County	1,507	1.64	959	2,466
Carroll County	803	1.56	449	1,252
Cheshire County	1,328	1.77	1,028	2,356
Coos County	819	1.46	376	1,195
Grafton County	10,728	1.57	6,111	16,839
Hillsborough County	10,980	1.67	7,323	18,303
Merrimack County	3,866	1.60	2,312	6,178
Rockingham County	3,837	1.62	2,369	6,206
Strafford County	2,935	1.63	1,861	4,796
Sullivan County	360	1.48	173	533

Sources: 2013 Audited Financial Statements, New Hampshire Hospital Association; Multipliers from IMPLAN, Minnesota IMPLAN Group, Inc., 2012

County Income Impact of New Hampshire Hospital Systems on County Economies

County	Direct Impact (\$ millions)	Multiplier	Secondary Impact (\$ millions)	Total Impact
Belknap County	\$101,544,766	1.38	\$38,654,640	\$140,199,406
Carroll County	\$72,501,761	1.33	\$23,807,041	\$96,308,802
Cheshire County	\$73,044,037	1.32	\$23,581,756	\$96,625,793
Coos County	\$67,577,202	1.25	\$17,219,414	\$84,796,616
Grafton County	\$954,258,482	1.35	\$337,799,869	\$1,292,058,351
Hillsborough County	\$772,569,617	1.49	\$381,533,505	\$1,154,103,122
Merrimack County	\$277,839,112	1.41	\$114,089,630	\$391,928,743
Rockingham County	\$294,115,314	1.48	\$140,251,829	\$434,367,143
Strafford County	\$221,575,054	1.38	\$83,896,735	\$305,471,789
Sullivan County	\$20,823,774	1.28	\$5,791,529	\$26,615,303

Sources: 2013 Audited Financial Statements, New Hampshire Hospital Association; Multipliers from IMPLAN, Minnesota IMPLAN Group, Inc., 2012

Changes since the 2009 ‘The Economic Impact of Hospital Systems’ Report. Direct employment between 2008 and 2013 increased by 352 employees to 37,515 employees statewide in 2013 among the 26 hospital systems. The secondary impact employment increased by 1,278 people 29,414 employees statewide between 2008 and 2013. Total employment impact increased by 926 over the five year period. Direct income impact increased by \$4.3 billion and the secondary impact income increased by \$2.1 billion for a total income impact increase of \$6.4 billion statewide. This statewide report was done for the first time in December 2009 using audited hospital data from 2008 and the IMPLAN (2008) analytic tool. This report is based on audited hospital data from 2013 and the IMPLAN (2012) analytic tool.

In summary, the analysis presented in this report reveals that the acute care hospital systems in New Hampshire have a substantial impact on both the state and county economies. This contribution may be relevant in public policy discussions of access to care, the clinical and economic value of health care services, and social determinants of health in a community.

[The Economic Impact of Hospital Systems in New Hampshire](#)

Every year acute care hospitals provide vital health services to thousands of people across New Hampshire. Traditionally, acute care hospitals have been thought of as places with only hospital beds and emergency rooms. In response to diverse health care needs, hospitals have adapted and emerged as hospital systems with a variety of health care services available under the same system. Hospital systems provide much more than health care services; hospital systems are vital to the economy of a community and in the state.

The Economic Impact of Hospital Systems in New Hampshire documents the economic influence of hospital systems in the economy. This report provides estimates of the direct and secondary impacts of employment and income (payroll including wages, salaries and benefits) of the hospital systems in New Hampshire. Impacts are estimated at the state and county levels utilizing hospital system data for the year 2013. This report focuses exclusively on acute care hospital systems. Although the six specialty care hospitals are not examined in this study, these hospitals are extremely critical to providing specialty care to New Hampshire residents and their importance should not be overlooked.

Specifically, this report describes the role of health care to economic development, as well as show trends in health care at the national, regional, and state levels. A discussion of New Hampshire acute care hospital systems will be presented, as well as the estimates of the economic impacts of the acute care hospital systems on the county and state economies.

[The Importance of Health Care to Economic Development](#)

The importance of health care to economic development is often overlooked. A strong health care system can help attract and maintain business and industry growth and attract and retain retirees. A strong health care system can also create jobs in the local area.

To attract and maintain business and industry, health services and education are two of the most important services needed. Studies have found that quality-of-life (QOL) factors are playing a dramatic role in business and industry location decisions. First, good health and education services are imperative to industry and business leaders in site location; employees and management will not locate in a community with inadequate or inconveniently-located health services. Second, business and industry want to ensure that the local labor force will be productive and a key factor in productivity is good health; investments in health care services are expected to yield dividends in the form of increased labor productivity. The third business and industry consideration is cost of health care services; corporations are taking a serious look at health care costs, giving location priority to sites with lower health care costs.

Retirees are a special group of residents whose spending and purchasing can be a significant source of income for the local economy. The amount of spending embodied in the retirement population is substantial, including the purchasing power associated with Social Security, Medicare, and other transfer payments. Additionally, middle and upper income retirees often have substantial net worth. To attract and retain retirees, a strong and convenient health care system is important.

Many rural areas have environments (e.g., moderate climate and outdoor activities) that attract and retain retirees. Although the data are limited, studies suggest availability of health services influences retirement location. One study found the best predictors of retirement locations were safety, recreational facilities, dwelling units, and health care. Another study found that health services were in the “must have” category when considering a retirement community.

Health Care Trends

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

- Employment in the health sector increased by nearly five times from 1980 to 2010; and
- Annual increases in employment from 1980 to 2010 ranged from 2.7 percent to 7.3 percent.

Figure 1 illustrates 2010 health expenditures by percent of gross domestic product and by type of health service. The largest health service type was hospital care, representing 31.0 percent of the total. The next largest category was physician services with 21.0 percent of the total. This figure reflects the traditional hospital not a hospital system that may have physician components and nursing care facilities within their hospital system.

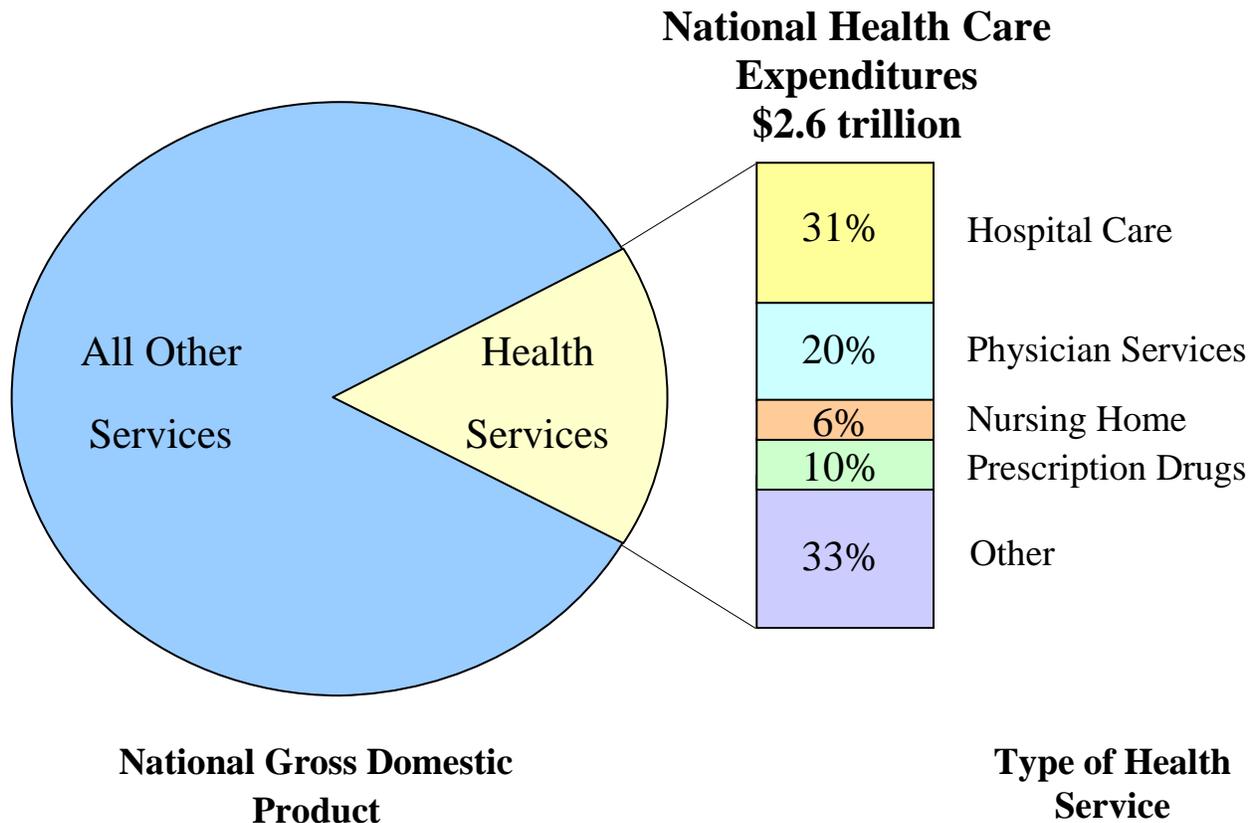
Table 1 and **Figure 1** are comprehensive and are based on the total national health care expenditures which include all categories of personal health care expenditures as well as amounts invested in medical sector structures and equipment and in non-commercial research in the U.S.

Table 1
United States Health Expenditures and Employment Data
1980-2010

Year	Total Health Expenditures (\$Billions)	Per Capita Health Expenditures (\$)	Health as % of GDP (%)	Health Sector Employment 0	Ave. Annual Increase in Employment (%)
1980	\$256	\$1,100	8.90%	5,278	7.30%
1990	\$724	\$2,855	12.10%	7,814	4.80%
2000	\$1,378	\$4,881	13.40%	10,858	3.90%
2010	\$2,604	\$8,428	17.40%	13,777	2.70%

Sources: National Health Expenditures 1960-2013, U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services (www.cms.gov) December 2014; U.S. Department of Labor, Bureau of Labor Statistics. (www.bls.gov) December 2014; U.S. Department of Commerce, Bureau of Economic Analysis

Figure 1
National Health Expenditures as a Percent of Gross Domestic Product
and by Health Service Type, 2010



A February 2012 report by the NH Center for Public Policy Studies “New Hampshire’s Healthcare Dashboard 2012” identified New Hampshire’s healthcare expenditures as a percentage of GSP at 19.1%. Maine (26.9%), Vermont (23.7%) and Rhode Island (22.5%) were all higher in the New England region while Connecticut (15.7%) and Massachusetts (18.9%) were lower. The national average was 17.6%. Healthcare expenditures per capita were \$8,848 for New Hampshire. New Hampshire was lowest among all the other New England states (MA-\$10,853, ME-\$10,668, RI-\$10,489, CT-\$10,247 and VT-\$9,948). This is higher than the national average (\$8,301).

The next three tables include data from the New Hampshire Department of Employment Security and demonstrate the importance of the health sector as compared to the entire economy. These data are for comparative and growth purposes only. Data from different sources utilize different definitions and industry sectors determine their reporting industry category; therefore, comparisons between data sources are not definitive.

Table 2 shows an increase of 18,122 employees or 33.4 percent in the average employment in total health care in New Hampshire over the thirteen year period from 2000 and 2013. For

average wages in health care, the thirteen year increase was 111.0 percent or an increase of \$2.1 billion. The data show health care broken into three segments, ambulatory health care services (e.g., physician practices, health centers, home health care, hospice programs, all health services that are not in the other two categories, etc.), hospitals, and nursing and residential care. The ambulatory health care services accounted for the largest increase in both employment and wages. Hospitals were the second largest category. Hospitals represented 37.5 percent of total average annual health care employment in 2000 and increased to 38.2 percent in 2013. For annual average wages, hospitals represented 36.3 percent of the total in 2000 and increased to 37.0 percent in 2013. Hospitals have evolved into hospital systems and this change is not reflected in the traditional categories of health care in Table 2.

Table 2
Employment and Payroll for Health Services in New Hampshire, 2000 and 2013

	Avg Annual Employment	% of Total	Avg Annual Wages	% of Total
2000 Data				
Ambulatory Health Care Services	22,881	42.20%	\$947,411,601	50.80%
Hospitals	20,326	37.50%	\$676,480,989	36.30%
Nursing & Residential Care Facilities	<u>10,993</u>	<u>20.80%</u>	<u>\$242,242,188</u>	<u>13.00%</u>
<i>Total Health Care</i>	54,200	100.00%	\$1,866,134,778	100.00%
2013 Data				
Ambulatory Health Care Services	29,500	40.80%	\$2,017,900,300	51.20%
Hospitals	27,619	38.20%	\$1,459,123,922	37.00%
Nursing & Residential Care Facilities	<u>15,203</u>	<u>21.00%</u>	<u>\$461,313,143</u>	<u>11.70%</u>
<i>Total Health Care</i>	72,322	100.00%	\$3,938,337,365	100.00%
Increase from 2000 to 2013	18,122	33.40%	\$2,072,202,587	111.00%

Source: New Hampshire Employment Security, Economic and Labor Market Information Bureau – NH Covered Employment and Wages for 2000 and 2013.

Table 3 illustrates that health care ranked second in average annual employment and second in average annual wages among private sector industries in New Hampshire in 2013. Retail trade had the largest number of employees with 94,724, representing 17.7 percent of total private industry employment in the state. Health care had 72,322 employees which represented 13.5 percent of the total, for the second largest private industry sector. Manufacturing had the largest amount of average annual wages with \$4.3 billion, representing 16.1 percent of the total private industry average annual wages. Health care had the second largest amount of average annual wages with \$3.9 billion which was 14.9 percent of the total.

Table 3
Average Annual Employment and Wages and Salaries (Income)
by Top Five Private Industries for New Hampshire, 2013

Industry Category	Avg Annual Employment	% of Total Private
Total Private	<u>534,106</u>	<u>100.00%</u>
Retail Trade	94,724	17.70%
Health Care	72,322	13.50%
Manufacturing	65,942	12.30%
Accommodation & Food Services	54,923	10.30%
Professional & Technical Services	<u>31,751</u>	<u>5.90%</u>

Industry Category	Avg Annual Wages (\$1,000s)	% of Total Private
Total Private	<u>\$24,406,777</u>	<u>100.00%</u>
Manufacturing	\$4,262,159	16.10%
Health Care	\$3,938,337	14.90%
Retail Trade	\$2,694,526	10.20%
Professional and Technical Services	\$2,548,151	9.60%
Finance and Insurance	<u>\$2,396,781</u>	<u>9.10%</u>

Source: Economic and Labor Market Information Bureau, New Hampshire
Employment Security, 2000 and 2013.

Data are also available to illustrate the private industries with highest percent growth from 2000 to 2013. In **Table 4**, health care ranks first in growth over the thirteen year period for average annual employment and second for average annual wages. Health care increased employment by 33.4 percent. For average annual wages, educational services grew the most with a 114.6 percent increase from 2000 to 2013. Health care was the second largest category in terms of growth in private industry, with a 111.0 percent increase from 2000 to 2013. This is an average of nearly 9 percent per year.

Table 4
Top Five Private Industries based on Percent Growth in New Hampshire
from 2000 – 2013

Industry Category	2000 Avg Annual Employment	2013 Avg Annual Employment	2000 – 2013 Percent Change
Total Private	<u>529,504</u>	<u>534,106</u>	0.90%
Health Care	54,200	72,322	33.40%
Educational Services	14,633	18,295	25.00%
Administrative & Waste Services	24,849	30,480	22.70%
Professional & Technical Services	26,358	31,751	20.50%
Mining	462	531	14.90%

Industry Category	2000 Avg Annual Wages (\$1,000s)	2013 Avg Annual Wages (\$1,000s)	2000 – 2013 Percent Change
Total Private	<u>\$18,664,638</u>	<u>\$26,406,777</u>	41.50%
Educational Services	430,169	923,057	114.60%
Health Care	1,866,135	3,938,337	111.00%
Administrative & Waste Services	638,851	1,290,744	102.00%
Finance & Insurance	1,345,259	2,396,781	78.20%
Professional & Technical Services	1,488,626	2,548,151	71.20%

Source: Economic and Labor Market Information Bureau, New Hampshire Employment Security, 2000 and 2013.

The population of New Hampshire for 2000 and 2010 is presented in **Table 5** with age group breakdowns. The age group 45 to 64 years of age had the largest increase, 37.7 percent, from 2000 to 2010. The next largest group was age 65 and older with 20.5 percent. The age distribution of the population greatly impacts the type of health care services needed.

Table 5
Population by Age Group for New Hampshire, 2000 and 2010

Population by Age Groups	Census 2000	Census 2010	Percent Change
Age 19 and under	344,165	325,802	-5.30%
Age 20 thru 44	450,006	408,196	-9.30%
Age 45 to 64	293,645	404,204	37.70%
Age 65 and older	<u>147,970</u>	<u>178,268</u>	20.50%
Totals	<u>1,235,786</u>	<u>1,316,470</u>	6.50%

Source: U.S. Census Bureau; 2010 Census (www.census.gov [December 2014]).

[Acute Care Hospital Systems in New Hampshire](#)

Traditionally, acute care hospitals have included inpatient care and emergency room services, 24/7. However, it is important to understand that acute care hospitals have changed. In response to diverse health care needs and to adapt to a changing, complex environment, acute care hospitals in New Hampshire are now systems of local health services that may include: primary care and specialty care physician practices; ambulatory surgery centers; health centers or clinics; assisted living or skilled nursing care facilities; home care or hospice services; rehabilitation therapy centers, etc. For example, primary care physician practices are more often becoming part of a “hospital system” because independent practices are not as financially viable. Assisted living facilities within a hospital system are often in response to an aging population. **Figure 2** illustrates the concept of the hospital systems; however, each “hospital system” may vary based on the needs and resources of the medical service area or community. Hospital systems have resulted in the hospital sector having higher employment and income and including services that have not traditionally been included in the hospital sector. The importance of hospital systems, however, extends beyond health care.

Figure 2. Concept of a Hospital System



The hospital systems in New Hampshire are presented in **Figure 3**. All hospital systems are shown including the specialty hospitals. A legend is provided in **Table 6** with the names of the hospital systems that relate to the numbers in the circles on the figure; the type of hospital system and the location of the hospital system (city/town) are also shown.

Data for the acute care hospital systems were from the 2013 audited financial statements submitted to the New Hampshire Hospital Association by each of the acute care hospital systems.

Figure 3.
Hospital Systems in New Hampshire

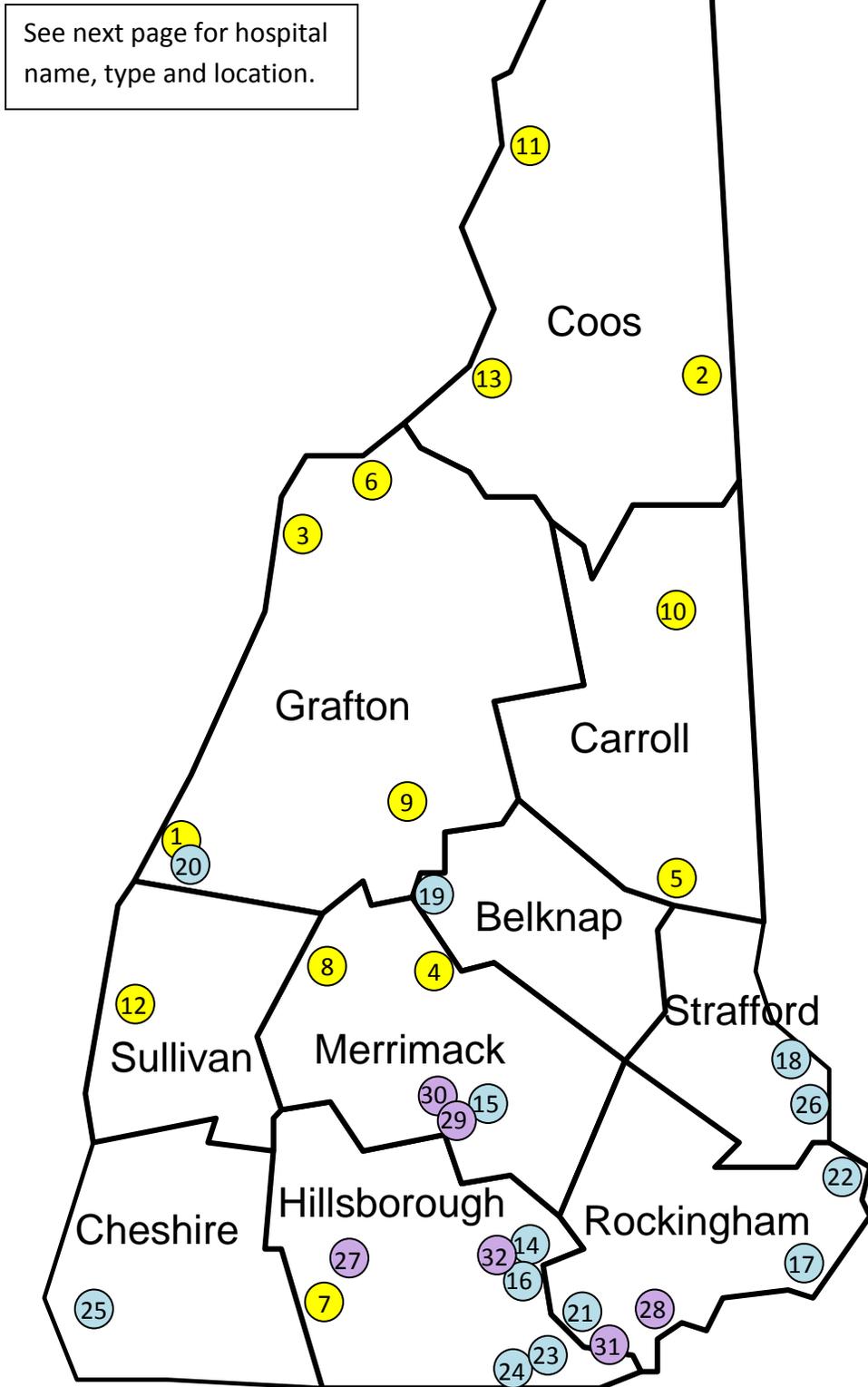


Table 6
All New Hampshire Hospital Systems by Type

Hospital Systems	City/Town	Type
1 Alice Peck Day Memorial Hospital	Lebanon	CAH*
2 Androscoggin Valley Hospital	Berlin	CAH*
3 Cottage Hospital	Woodsville	CAH*
4 Franklin Regional Hospital	Franklin	CAH*
5 Huggins Hospital	Wolfeboro	CAH*
6 Littleton Regional Hospital	Littleton	CAH*
7 Monadnock Community Hospital	Peterborough	CAH*
8 New London Hospital Assn Inc	New London	CAH*
9 Speare Memorial Hospital	Plymouth	CAH*
10 The Memorial Hospital	North Conway	CAH*
11 Upper Connecticut Valley Hospital	Colebrook	CAH*
12 Valley Regional Hospital	Claremont	CAH*
13 Weeks Medical Center	Lancaster	CAH*
14 Catholic Medical Center	Manchester	Acute Care
15 Concord Hospital	Concord	Acute Care
16 Elliot Hospital	Manchester	Acute Care
17 Exeter Hospital	Exeter	Acute Care
18 Frisbie Memorial Hospital	Rochester	Acute Care
19 Lakes Region General Hospital	Laconia	Acute Care
20 Mary Hitchcock Memorial Hospital	Lebanon	Acute Care
21 Parkland Medical Center	Derry	Acute Care
22 Portsmouth Regional Hospital	Portsmouth	Acute Care
23 Southern NH Medical Center	Nashua	Acute Care
24 St. Joseph Hospital	Nashua	Acute Care
25 The Cheshire Medical Center	Keene	Acute Care
26 Wentworth-Douglass Hospital	Dover	Acute Care
27 Crotched Mountain Rehab Center	Greenfield	Specialty
28 Hampstead Hospital	Hampstead	Specialty
29 Healthsouth Rehab Hospital	Concord	Specialty
30 New Hampshire Hospital	Concord	Specialty
31 Northeast Rehab Hospital	Salem	Specialty
32 Veterans Affairs Medical Center	Manchester	Specialty

* CAH - Critical Access Hospital (rural acute care hospital)

Table 7
Selected Statistics for New Hampshire Acute Care Hospital Systems
by Hospital Bed Size – 2013

	25 or Less Beds*	85 - 200 Beds	200+ Beds	All Hospitals
No. of Hospital Systems	13	7	6	26
Employment	5,526	10,700	20,937	37,163
Average Employment	425	1,529	3,490	1,429
Payroll & Benefits	\$369,564,174	\$767,298,912	\$1,718,986,033	\$2,855,849,119
Average Payroll	\$28,428,013	\$109,614,130	\$286,497,672	\$109,840,351
Average Salary	\$66,877	\$71,710	\$82,103	\$76,847

* Critical Access Hospitals

Source: 2013 Audited Financial Statements, New Hampshire Hospital Association.

The hospitals in New Hampshire have developed into hospital systems and these data are reflective of these total hospital systems and not just traditional hospitals with inpatient beds and emergency rooms. **Table 7** presents the data by hospital bed size to provide a framework to illustrate employment and payroll for the hospital systems. For the critical access hospital (CAH) systems with 25 beds or less, the table shows 13 CAH hospital systems, with total employment of 5,526 and average employment per hospital system of 425. For CAH systems, total payroll (wages, salaries, and benefits) was \$369.6 million with an average payroll per hospital system of \$28.4 million and an average salary per employee of \$66,877. The data are also available for hospital systems with 85 to 200 beds and for hospital systems with 200 or more beds.

The total for all 26 acute care hospital systems was 37,163 employees and \$2.9 billion in payroll plus benefits. The average employment per hospital system was 1,429 and the average payroll with benefits was \$110 million. The average salary per employee for all acute care hospital systems was \$76,847.

Table 8 illustrates the acute care hospital systems by counties with licensed beds, total employment and total annual payroll with benefits for 2013. These data are from the 2013 audited financial statements for each hospital system, received by the New Hampshire Hospital Association.

In summary, New Hampshire has 26 acute care hospital systems with 3,020 licensed beds. The acute care hospital systems had total employment of 37,163 and total annual payroll with benefits of \$2.9 billion.

**Table 8
Acute Care Hospital Systems by County in New Hampshire, 2013**

County, Hospital, Location	Licensed Beds	Total Employees	Annual Payroll with Benefits
BELKNAP COUNTY			
Lakes Region General Hospital - Laconia	137	1,507	\$101,544,766
CARROLL COUNTY			
Huggins Hospital - Wolfeboro	25	373	\$31,525,022
Memorial Hospital - North Conway	25	430	\$40,976,739
CHESHIRE COUNTY			
Cheshire Medical Center - Keene	169	1,328	\$73,044,037
COOS COUNTY			
Androscoggin Valley Hospital - Berlin	25	356	\$30,661,916
Upper Ct Valley Hospital - Colebrook	16	113	\$8,359,811
Weeks Medical Center - Lancaster	25	350	\$28,555,475
GRAFTON COUNTY			
Alice Peck Day Memorial Hospital - Lebanon	25	711	\$34,845,913
Dartmouth-Hitchcock Medical Center - Lebanon	396	8,857	\$837,834,000
Littleton Regional Hospital - Littleton	25	469	\$39,422,517
Speare Memorial Hospital - Plymouth	25	401	\$27,142,993
Cottage Hospital - Woodsville	25	290	\$15,013,059
HILLSBOROUGH COUNTY			
Catholic Medical Center - Manchester	330	2,322	\$163,268,889
Elliot Hospital - Manchester	296	3,763	\$278,688,215
Monadnock Community Hospital - Peterborough	25	675	\$39,235,788
Southern New Hampshire Medical Center - Nashua	188	2,396	\$173,585,725
St Joseph Hospital - Nashua	208	1,824	\$117,791,000
MERRIMACK COUNTY			
Concord Hospital - Concord	295	2,868	\$224,837,945
Franklin Regional Hospital - Franklin	25	283	\$16,757,545
New London Hospital - New London	25	715	\$36,243,622
ROCKINGHAM COUNTY			
Exeter Hospital - Exeter	100	2,059	\$162,923,757
Parkland Medical Center - Derry	86	475	\$34,625,573
Portsmouth Regional Hospital - Portsmouth	209	1,303	\$96,565,984
STRAFFORD COUNTY			
Frisbie Memorial Hospital - Rochester	112	922	\$66,219,004
Wentworth-Douglass Hospital - Dover	178	2,013	\$155,356,050
SULLIVAN COUNTY			
Valley Regional Hospital - Claremont	25	360	\$20,823,774
NEW HAMPSHIRE - Total	3,020	37,163	\$2,855,849,119

SOURCES: U.S. Census Bureau; 2010 Census (www.census.gov [December 2014]); 2013 Audited Financial Statements, New Hampshire Hospital Association.

* CAH - Critical Access Hospital (rural acute care hospital) systems.

¹ Employment and payroll data include the hospital systems. Hospital systems vary by community but may include physicians and staff in primary care and/or specialty care, long-term care facilities, home health care, etc.

Impact of Acute Care Hospital Systems in New Hampshire

Hospital systems are not only a major employer and source of income (wages, salaries, and benefits), hospital systems play a critical role in local, regional, and state economic development by generating employment and income in a wide range of other businesses and industries. The impact of the acute care hospital systems in New Hampshire will be presented in this section. The employment and income (wages, salaries, and benefits) of the acute care hospital systems in New Hampshire were derived from the 2008 audited financial statements collected by the New Hampshire Association.

The economic impact of New Hampshire acute care hospital systems, measured by employment of 37,163 and payroll of \$2.9 billion, is significant. However, this does not tell the complete story because secondary economic impacts are created when hospital systems and their employees spend money. These secondary benefits are measured by multipliers using an input-output model and data from IMPLAN (the model and data are further discussed in the **Appendix**). This model is widely used and nationally-recognized by economists and other policy analysts across the U.S.

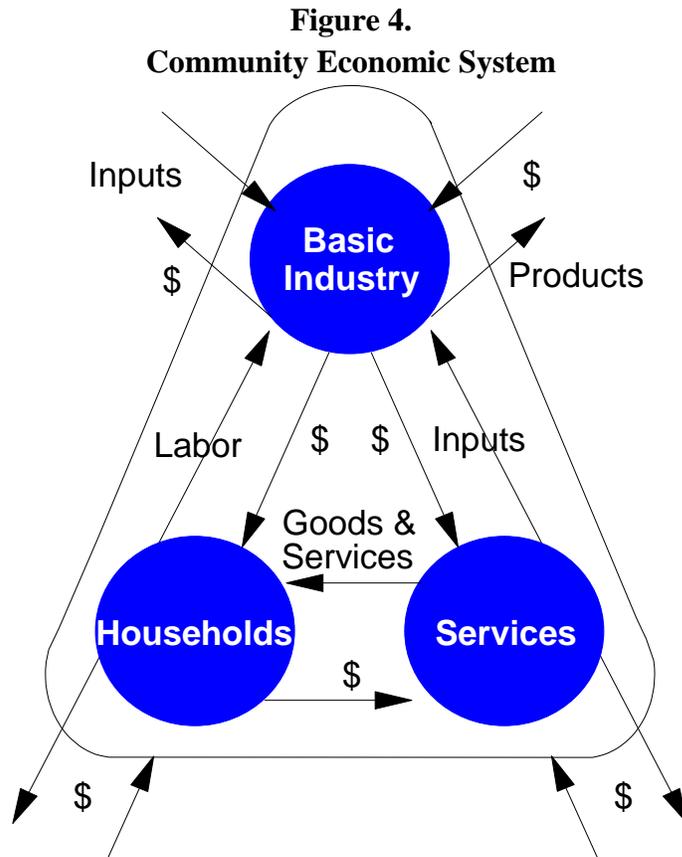
Utilizing the model and data, the direct and secondary economic impacts of hospital systems are estimated at the county and state level. Secondary impacts include the purchases that the hospital system makes to support hospital activities and those purchases made by their employees. The estimated impacts utilize employment and income multipliers specifically derived for New Hampshire. The next section will explain the concept of multipliers in a community economic system.

In addition, we recognize that the overall health of the population in a community or the state of New Hampshire is determined by multiple factors, beyond access to quality health care services. Other important determinants of health include: economic stability; education; the social/community context where people live, learn and work; and the built and natural environments. The economic information in this report on hospital systems links to key economic stability components such as employment, poverty, and housing.

Some Basic Concepts of Community Economics

Figure 4 illustrates the major flows of goods, services, and dollars of any economy. The foundation of a community's economy is 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 are represented by the two arrows in the upper right portion of **Figure 4**. 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 4**), labor from the residents or "households" of the community (left side of **Figure 4**), and inputs from service industries located within the community (right side of **Figure**

4). 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 4**). The figure illustrates the interrelationship between a change in any one segment of a community's economy, resulting in reverberations throughout the entire economic system of the community.



Consider, for instance, the closing of a retail store. The services sector will no longer pay employees and dollars going to households will stop. Likewise, the retail store 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.

An industry sector purchases goods from other businesses and then the dollars flow to other businesses and this multiplier effect is reflected in the indirect impacts of an industry sector. Some examples of the hospital sector purchasing goods from other business and industries in New Hampshire are illustrated below:

A few examples of the secondary economic impact when hospital systems purchase services or products include:

- Wentworth-Douglass Hospital in Dover purchased over \$735,000 worth of laundry and linen services from local firms, more than \$140,000 in contracted cleaning services, and nearly \$80,000 in HVAC services.
- Concord Hospital uses local firms like Milestone Engineering, Sacco Construction, Nobis Engineering, Richard Bartlett & Associates, and Warren Street Architects to support its varied renovation and construction projects. In 2014, over \$2.5 million was spent for these services.
- Alice Peck Day Memorial Hospital in Lebanon spent more than \$500,000 for energy products from Rymes Propane & Oil in Pembroke in 2014.
- Cheshire Medical Center in Keene purchased \$9.8 million worth of products and services from New Hampshire businesses and vendors in 2014.

Examples of secondary impact when hospital system employees spend their wages locally or in New Hampshire are too numerous to list, but housing, food and transportation expenses are generally local purchases.

The purchases of the hospital sector from all the other businesses and industries listed in the examples above will generate employment and income (wages, salaries, and benefits and proprietor income) in these other businesses and industries. The additional employment and income generated are part of the secondary employment and income impacts of the hospital sector.

Hospital employees purchase housing, food, clothing, cars, appliances, and services that spur local and regional economic development in numerous ways. Taxes paid by direct and secondary employment in the hospital sector support schools, community colleges, local police and fire departments, and other public services.

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 retail store. The impacting business, such as the retail store, 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. The indirect and induced impacts are also referred to as secondary impacts.

State Economic Impact of Acute Care Hospital Systems

In 2013, 37,163 people were employed by the 26 acute care hospital systems in New Hampshire (**Table 9**). The model derived the state employment multiplier of 1.79. This means that for every job in the hospital sector, another 0.79 jobs are created in other businesses and industries in the state. Applying the multiplier, these hospital systems generated an additional 29,414 jobs in secondary employment impact in other New Hampshire businesses and industries. The total employment impact from New Hampshire acute care hospital systems was 66,577.

Table 9
Economic Impact of All Acute Hospital Systems
on Employment and Income in New Hampshire, 2013

Employment Impact			
Direct Impact	Employment Multiplier	Secondary Impact	Total Impact
37,163	1.79	29,414	66,577
Income Impact			
Direct Impact	Income Multiplier	Secondary Impact	Total Impact
\$2,855,849,119	1.53	\$1,519,270,607	\$4,375,119,726

Sources: 2013 Audited Financial Statements, New Hampshire Hospital Association;
Multipliers from IMPLAN, Minnesota IMPLAN Group, Inc., 2012

Data on the impact of income from the acute care hospital systems in New Hampshire are presented in the second part of **Table 9**. Direct income from the 26 acute care hospital systems was estimated at \$2.9 billion. The income multiplier is 1.53, which indicates that for every \$1 in income from the hospital systems, an additional \$0.53 in income is generated in other businesses and industries throughout the state. The secondary income impact was estimated at \$1.5 billion. The total income impact of acute care hospital systems in New Hampshire was \$4.4 billion.

Thirteen of the 26 acute care hospital systems in New Hampshire are designated as Critical Access Hospitals (CAHs). CAH is a federal designation for hospital systems located in rural areas that meet specific service and size criteria (e.g.; number of licensed beds, average length of stay of 96 hours or less). A listing of the CAHs is available in **Table 6**. As indicated in **Table 7**, the CAHs have employment of 5,526 and income of \$369.6 million. Utilizing the state hospital employment and income multipliers will yield the estimated impact of CAHs on New Hampshire.

The secondary employment impact of CAHs, based on the state hospital employment multiplier of 1.79, was 4,374, for a total employment impact of 9,900. The income impact is based on the state hospital income multiplier of 1.53, resulting in secondary income impact of \$196.6 million and total income impact of \$566.2 million. These are the impacts of the 13 critical access hospital systems in New Hampshire: employment impact of 9,900 and income impact of \$566.2 million (**Table 10**).

Table 10
State Economic Impact
of Critical Access Hospital (CAH) Acute Care Hospital Systems
on Employment and Income in New Hampshire, 2013

Employment Impact			
Direct Impact	Employment Multiplier	Secondary Impact	Total Impact
5,526	1.79	4,374	9,900
Income Impact			
Direct Impact	Income Multiplier	Secondary Impact	Total Impact
\$369,564,174	1.53	\$196,602,819	\$566,166,993

Sources: 2013 Audited Financial Statements, New Hampshire Hospital Association;
Multipliers from IMPLAN, Minnesota IMPLAN Group, Inc., 2012

The remaining 13 acute care hospital systems in New Hampshire are the non-rural acute care hospital systems. A listing of these hospital systems is available in **Table 6**. These are the acute care hospital systems with over 25 beds (**Table 7**) with total direct employment of 31,637 and total direct income of \$2.5 billion. Applying the state hospital employment and income multipliers resulted in total employment impact of 56,678 and total income impact of \$3.8 billion (**Table 11**).

Table 11
State Economic Impact of Non-Rural Acute Care Hospital Systems
on Employment and Income in New Hampshire, 2013

Employment Impact			
Direct Impact	Employment Multiplier	Secondary Impact	Total Impact
31,637	1.79	25,041	56,678
Income Impact			
Direct Impact	Income Multiplier	Secondary Impact	Total Impact
\$2,486,284,945	1.53	\$1,322,667,788	\$3,808,952,733

Sources: 2013 Audited Financial Statements, New Hampshire Hospital Association;
Multipliers from IMPLAN, Minnesota IMPLAN Group, Inc., 2012

[County Impact of Acute Care Hospital Systems](#)

The impacts of the hospital systems in each county are illustrated in **Tables 12** and **13**. Each county has a multiplier based on the economic activity in the county. The hospital systems located in each county are shown in **Table 8**.

Grafton County has the largest hospital employment with 10,728 (**Table 12**). Applying the Grafton County hospital employment multiplier of 1.57, results in secondary hospital employment impact of 6,111 and total hospital employment impact of 16,839. Coos County has direct hospital employment of 819 and has the smallest hospital employment multiplier of 1.46, resulting in secondary hospital employment impact of 376 and total hospital employment impact of 1,195.

Table 12
County Employment Impact of New Hampshire Hospital Systems on County Economies

County	Direct Impact	Multiplier	Secondary Impact	Total Impact
Belknap County	1,507	1.64	959	2,466
Carroll County	803	1.56	449	1,252
Cheshire County	1,328	1.77	1,028	2,356
Coos County	819	1.46	376	1,195
Grafton County	10,728	1.57	6,111	16,839
Hillsborough County	10,980	1.67	7,323	18,303
Merrimack County	3,866	1.60	2,312	6,178
Rockingham County	3,837	1.62	2,369	6,206
Strafford County	2,935	1.63	1,861	4,796
Sullivan County	360	1.48	173	533

Sources: 2013 Audited Financial Statements, New Hampshire Hospital Association; Multipliers from IMPLAN, Minnesota IMPLAN Group, Inc., 2012

Table 13
County Income Impact of New Hampshire Hospital Systems on County Economies

County	Direct Impact (\$ millions)	Multiplier	Secondary Impact (\$ millions)	Total Impact
Belknap County	\$101,544,766	1.38	\$38,654,640	\$140,199,406
Carroll County	\$72,501,761	1.33	\$23,807,041	\$96,308,802
Cheshire County	\$73,044,037	1.32	\$23,581,756	\$96,625,793
Coos County	\$67,577,202	1.25	\$17,219,414	\$84,796,616
Grafton County	\$954,258,482	1.35	\$337,799,869	\$1,292,058,351
Hillsborough County	\$772,569,617	1.49	\$381,533,505	\$1,154,103,122
Merrimack County	\$277,839,112	1.41	\$114,089,630	\$391,928,743
Rockingham County	\$294,115,314	1.48	\$140,251,829	\$434,367,143
Strafford County	\$221,575,054	1.38	\$83,896,735	\$305,471,789
Sullivan County	\$20,823,774	1.28	\$5,791,529	\$26,615,303

Sources: 2013 Audited Financial Statements, New Hampshire Hospital Association; Multipliers from IMPLAN, Minnesota IMPLAN Group, Inc., 2012

Table 13 shows the income impact of the hospital systems in each county in New Hampshire for 2013. Again, each county has a multiplier derived specifically for the county based on the

economic activity of the county. Hillsborough County has direct hospital income of \$772.6 million. With the Hillsborough County hospital income multiplier of 1.49, the secondary hospital income impact was \$381.5 million and the total hospital income impact was \$1.2 billion. Coos County again had the smallest multiplier. Coos County had direct hospital income of \$67.6 million with a Coos County hospital income multiplier of 1.25. Coos County had secondary hospital income impact of \$17.2 million and total hospital income impact of \$84.8 million.

The impact of the hospital systems in each county in New Hampshire are also shown in **Tables 12 and 13**. The county multipliers are less than the state multipliers because the amount of economic activity in the county is less than the state.

Appendix
Model and Data Used to Estimate
Employment and Income Multipliers

A computer spreadsheet that uses 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).

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.