The Economic Impact of Tioga Medical Center on Williams County, North Dakota

Prepared by:

National Center for Rural Health Works
Oklahoma State University

August 2015

The Economic Impact of Tioga Medical Center on Williams County, North Dakota

Prepared for:

Tioga Medical Center

and

Center for Rural Health
The University of North Dakota School of Medicine and Health Sciences
www.ruralhealth.und.edu

Prepared by:

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

Gerald A. Doeksen, Director and Regents Professor/Extension Economist
Email: gad@okstate.edu

Brady Wilson, Student Assistant

National Center for Rural Health Works
Oklahoma Cooperative Extension Service
Oklahoma State University
(405) 744-6083 or 6081

August 2015

The Economic Impact of Tioga Medical Center
on Williams County, North Dakota

Medical facilities have a tremendous medical and economic impact on the community or county 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 or county 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 Tioga Medical Center on Williams County in North Dakota. The specific objectives of this report are to:

1. Discuss the importance of health care services to rural development, including national health trend data;

2. Review demographic and economic data for Williams County;

3. Summarize the direct economic activities of Tioga Medical Center from operations and construction in Williams County;

4. Present concepts of community economics and multipliers; and

5. Estimate the economic impact of Tioga Medical Center from operating activities and construction activities in Williams County.

No recommendations will be made in this report.

Health Services and Rural Development

The nexus between health care services and rural development is often overlooked. At least three primary areas of commonality exist. A strong health care system can help attract and maintain business and industry growth, and attract and retain retirees (**Table 1**). A strong health care system can also create jobs in the local area.

Table 1
Services that Impact Rural Development

Type of Growth	Services Important to Attract Growth
Industrial and Business	Health and Education
Retirees	Health and Safety

Studies have found that quality-of-life (QOL) factors are playing a dramatic role in business and industry location decisions. Among the most significant of the QOL variables are health care services, which are important for at least three reasons.

Business and Industry Growth

First, as noted by a member of the Board of Directors of a community economic development corporation, the presence of good health and education services is imperative to industrial and business leaders as they select a community for location. Employees and participating management may offer strong resistance if they are asked to move into a community with substandard or inconveniently located health services.

Secondly, when a business or industry makes a location decision, it wants to ensure that the local labor force will be productive, and a key factor in productivity is good health. Thus, investments in health care services can be expected to yield dividends in the form of increased labor productivity.

The cost of health care services is the third factor that is considered by business and industry in development decisions. Research shows that corporations take a serious look at health care costs in determining site locations. Sites that provide health care services at a lower cost are given higher consideration for new industry than sites with much higher health care costs.

Health Services and Attracting Retirees

A strong and convenient health care system is important to retirees, a special group of residents whose spending and purchasing can be a significant source of income for the local economy. Many rural areas have environments (e.g., moderate climate and outdoor activities) that enable them to be in a good position to attract and retain retirees. The amount of spending embodied in this population, including the purchasing power associated with Social Security, Medicare, and other transfer payments, is substantial. Additionally, middle and upper income retirees often have substantial net worth. Although the data are limited, several studies suggest health services may be a critical variable that influences the location decision of retirees. For example, one study found that four items were the best predictors of retirement locations: safety, recreational facilities, dwelling units, and health care. Another study found that nearly 60 percent of potential retirees said health services were in the "must have" category when considering a retirement community. Only protective services were mentioned more often than health services as a "must have" service.

Health Services and Job Growth

A factor important to the success of rural economic development is job creation. ***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 2** provide selected

Table 2
United States Health Expenditures and Employment Data
1970-2013; Projected for 2015-2023

Year	Total Health Expenditures ($Billions)	Per Capita Health Expenditures ($)	Health as % of GDP (%)	Health Sector Employment (000)	Avg Annual Increase in Employment (%)
Historical					
1970	$74.9	$356	7.0%	3,052 [a]	
1980	255.8	1,110	8.9%	5,278 [a]	7.3%
1990	724.3	2,855	12.1%	8,211 [a]	5.6%
2000	1,378.0	4,881	13.4%	10,858 [a]	3.2%
2010	2,604.1	8,428	17.4%	13,777 [b]	2.7%
2011	2,705.3	8,698	17.4%	14,026 [b]	1.8%
2012	2,817.3	8,996	17.4%	14,282 [b]	1.8%
2013	2,919.1	9,255	17.4%	14,511 [b]	1.8%
				Avg Yrly Increase 2000 to 2013	2.6%
Projections					
2015	3,207.3	9,983	17.6%		
2019	4,042.5	12,131	18.1%		
2023	5,158.8	14,944	19.3%		

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics (www.bls.gov [July 2015]); U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, National Health Expenditures 1960-2013 and National Health Expenditure Projections 2013-2023 (http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html [July 2015]).

[a] Based on Standard Industrial Classification (SIC) codes for health sector employment.

[b] Based on North American Industrial Classification System (NAICS) for health sector employment.

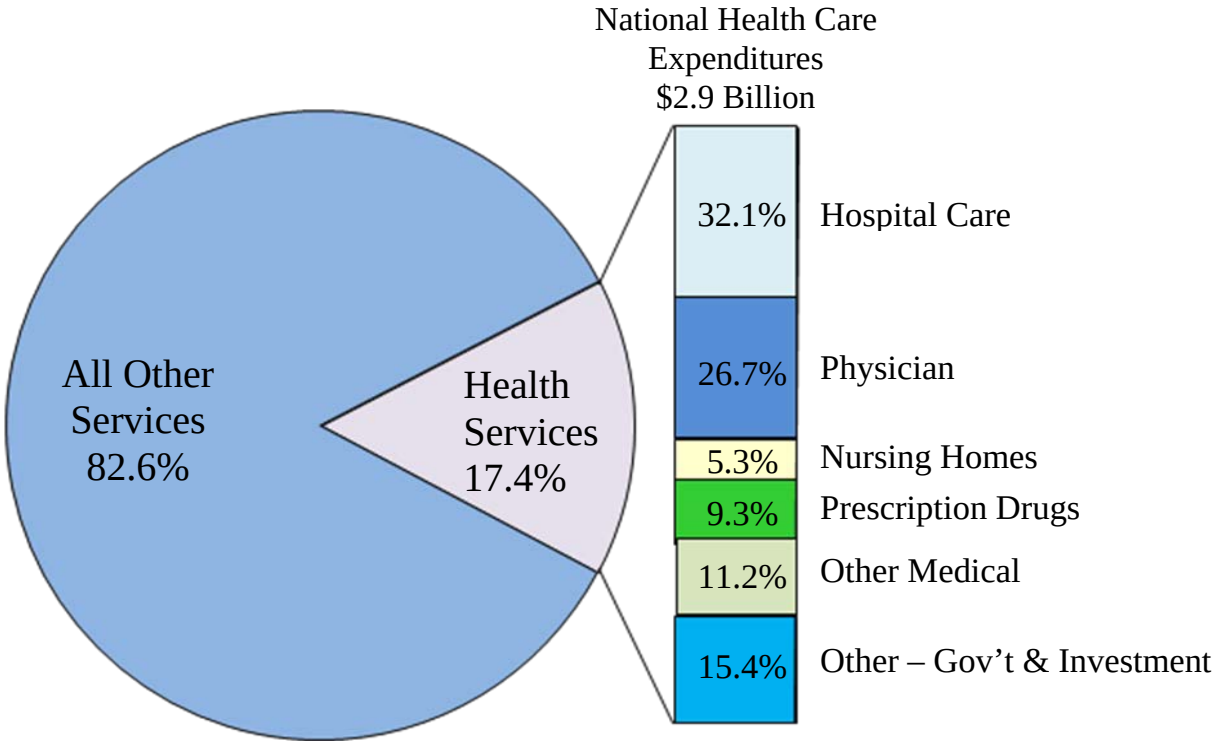
expenditure and employment data for the United States. Some highlights from the U.S. data are:

- In 1970, health care services as a share of the national gross domestic product (GDP) were 7.0 percent and increased to 17.4 percent in 2013;
- Per capita health expenditures increased from $356 in 1970 to $9,255 in 2013;
- Employment in the health sector increased 375.5 percent from 1970 to 2013; and
- Annual increases in employment from 2000 to 2013 ranged from 1.8 percent to 3.2 percent, with an average of 2.6 percent.

The U. S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, projects that health care expenditures will account for 18.1 percent of GDP by 2019 and increase to 19.3 percent of GDP in 2023. Per capita health care expenditures are projected to increase to $12,131 in 2019 and to $14,944 in 2023. Total health expenditures are projected to increase to over $5.1 trillion in 2023.

Figure 1 illustrates 2013 health expenditures by percent of GDP and by type of health service. Health services represented 17.4 percent of national GDP in 2013. The largest category of health services was hospital care, representing 32.1 percent of the total and the second largest category was physician services with 26.7 percent of the total.

Figure 1
National Health Expenditures as a Percent of Gross Domestic Product and by Health Service Type, 2013



SOURCE: U. S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, National Health Expenditures 2013 (http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html [July 2015]).

Williams County Demographic and Economic Data

Tioga Medical Center (TMC) is located in Tioga in Williams County, North Dakota. The medical service area is Williams County, North Dakota. **Table 3** illustrates the last two Census populations for Williams County cities, towns and surrounding rural area, for Williams County and North Dakota. Data are from the U.S. Census Bureau. The most current population estimates are provided for the county and state.

The data in **Table 3** show Williston, the county seat, had population of 12,512 in 2000 and 14,716 in 2010, which represents an increase of 17.6 percent. All cities and towns and the rural area are showing an increase in population from 2000 to 2010 except Wildrose. This

Table 3
Population and Percent Change for Williams County Cities, Towns and Rural Area, Williams County, and the State of North Dakota

	2000 Population	2010 Population	2014 Estimat	% Change '00 to '10	% Change '10 to '14
Alamo	51	57	na	**11.8%**	na
Epping	79	100	na	**26.6%**	na
Grenora	202	244	na	**20.8%**	na
Ray	534	592	na	**10.9%**	na
Springbrook	26	27	na	**3.8%**	na
Tioga	1,125	1,230	na	**9.3%**	na
Wildrose	129	110	na	**-14.7%**	na
Williston (county seat)	12,512	14,716	na	**17.6%**	na
Rural Area	5,103	5,322	na	**4.3%**	na
Williams Co. Totals	**19,761**	**22,398**	**32,130**	**13.3%**	**43.5%**
North Dakota Totals	**642,200**	**672,591**	**739,482**	**4.7%**	**9.9%**

SOURCE: U. S. Census Bureau (www.census.gov [August 2015]).

compares to Williams County increasing 13.3 percent and North Dakota increasing 4.7 percent. U.S. Census Bureau data also provided 2014 population estimates that show the county and the

state are continuing to increase with the county increasing 43.5 percent from 2010 to 2014 and the state 9.9 percent.

The 2010 Census populations and population projections for Williams County and North Dakota are illustrated in **Table 4**. The 2010 Census populations are from the U. S. Census Bureau and the population projections are from the North Dakota Housing Finance Agency, 2012 Statewide Housing Assessment Resource Project. The population projections are shown for 2020 and 2025 for Williams County and North Dakota. The populations are projected to increase for both the county and the state, with the county projected to increase at a much higher percentage each time period than the state.

Table 4
2010 Census Population and Population Projections
for Williams County, North Dakota

	Williams County	North Dakota
2010 Census	22,398	672,591
2020 Projected	47,075	806,541
2025 Projected	51,106	841,820
% change 2010-2020	110.2%	19.9%
% change 2010-2025	128.2%	25.2%

SOURCE: Census populations, U.S. Census Bureau (www.census.gov [August 2015]); County and state projections, North Dakota Housing Finance Agency, 2012 North Dakota Statewide Housing Assessment Resource Project (www.ndhfa.org [August 2015]).

Table 5 shows the populations of Williams County and North Dakota by age group and gender for the 2000 and 2010 Census years. From 2000 to 2010, all the age groups in Williams County increased in total population except for the 15-19 age group; North Dakota showed decreases in all age groups except the 20-24, 45-64, and the 65+ age groups. The total percent change in population from 2000 to 2010 for Williams County was an increase of 13.3 percent while North Dakota showed an increase of 4.7 percent. The male population for the county increased 19.2 percent, which was considerably more than the female at 7.7 percent.

Table 6 provides the populations of Williams County and North Dakota by race groups and Hispanic origin. Williams County and North Dakota both show an increase in all race groups and Hispanic origin from 2000 to 2010, with the county increasing at larger percentages than the state. The race group with the largest percent change was “some other race” for Williams County and was the “black” race group for the state.

Data from County Business Patterns and Bureau of Economic Analysis show trends in the health services employment and payroll (income) over time; the two data sources have different definitions but the trends show how health services and industries, in general, change over time.

Data from U.S. Census Bureau, County Business Patterns, are illustrated in **Table 7**, showing employment and payroll for health services compared to the total employment and payroll for the county and the state. The data show that the county health services employment decreased 1.1 percent from 2003 to 2013 while the total county employment increased 234.5 percent. County health services employment as a percent of total county employment was 20.9 percent in 2003 and decreased to 6.2 percent in 2013; the state health services employment was 19.8 percent of total state employment in 2003 and decreased to 17.3 percent in 2013.

Table 5
U.S Census Bureau Population by Age Groups and Gender
for Williams County and the State of North Dakota, 2000 and 2010

Area	Age Groups							Gender	
	0-14	15-19	20-24	25-44	45-64	65+	Totals	Male	Female
2000 Census									
Williams County Total	4,031	1,767	919	5,045	4,738	3,261	19,761	9,687	10,074
2000 % of Total	**20.4%**	**8.9%**	**4.7%**	**25.5%**	**24.0%**	**16.5%**	**100.0%**	**49.0%**	**51.0%**
North Dakota Totals	129,846	53,618	50,503	174,891	138,864	94,478	642,200	320,524	321,676
2000 % of Total	**20.2%**	**8.3%**	**7.9%**	**27.2%**	**21.6%**	**14.7%**	**100.0%**	**49.9%**	**50.1%**
2010 Census									
Williams County Total	4,280	1,435	1,429	5,539	6,387	3,328	22,398	11,548	10,850
2010 % of Total	**19.1%**	**6.4%**	**6.4%**	**24.7%**	**28.5%**	**14.9%**	**100.0%**	**51.6%**	**48.4%**
North Dakota Totals	124,461	47,474	58,956	165,747	178,476	97,477	672,591	339,864	332,727
2010 % of Total	**18.5%**	**7.1%**	**8.8%**	**24.6%**	**26.5%**	**14.5%**	**100.0%**	**50.5%**	**49.5%**
Percent Change '00-'10									
Williams County	**6.2%**	**-18.8%**	**55.5%**	**9.8%**	**34.8%**	**2.1%**	**13.3%**	**19.2%**	**7.7%**
North Dakota	**-4.1%**	**-11.5%**	**16.7%**	**-5.2%**	**28.5%**	**3.2%**	**4.7%**	**6.0%**	**3.4%**

SOURCE: U. S. Census Bureau (www.census.gov [August 2015]).

Table 6
U.S Census Bureau Population by Race and Hispanic Origin
for Williams County and the State of North Dakota, 2000 and 2010

Area	White	Black	American Indian	Asian	Native HI/Other Pacific Isldr	Some Other Race	Two or More Races	Totals[1]	Hispanic Origin
2000 Census									
Williams County Total	18,367	24	869	36	2	27	436	19,761	185
2000 % of Total	**92.9%**	**0.1%**	**4.4%**	**0.2%**	**0.0%**	**0.1%**	**2.2%**	**100.0%**	**0.9%**
State of North Dakota	593,18	3,916	31,329	3,606	230	2,540	7,398	642,200	7,786
2000 % of Total	**92.4%**	**0.6%**	**4.9%**	**0.6%**	**0.0%**	**0.4%**	**1.2%**	**100.0%**	**1.2%**
2010 Census									
Williams County Total	20,639	63	899	79	5	69	644	22,398	436
2010 % of Total	**92.1%**	**0.3%**	**4.0%**	**0.4%**	**0.0%**	**0.3%**	**2.9%**	**100.0%**	**1.9%**
State of North Dakota	605,44	7,960	36,591	6,909	320	3,509	11,853	672,591	13,467
2010 % of Total	**90.0%**	**1.2%**	**5.4%**	**1.0%**	**0.0%**	**0.5%**	**1.8%**	**100.0%**	**2.0%**
Percent Change '00-'10									
Williams County	**12.4%**	**162.5%**	**3.5%**	**119.4%**	**0.0%**	**155.6%**	**47.7%**	**13.3%**	**135.7%**
North Dakota	**2.1%**	**103.3%**	**16.8%**	**91.6%**	**39.1%**	**38.1%**	**60.2%**	**4.7%**	**73.0%**

SOURCE: U. S. Census Bureau (www.census.gov [August 2015]).

Table 7
Health Services for Employment and Payroll in Williams County and North Dakota

	Employment			
	Health Services	Total County	Hlth Svcs as a % of Total County Emp.	Hlth Svcs as a % of Total State Employment
2003	1,410	6,740	20.9%	19.8%
2004	1,385	6,806	20.3%	19.4%
2005	1,402	7,335	19.1%	18.6%
2006	1,500	7,785	19.3%	18.4%
2007	1,393	8,224	16.9%	17.5%
2008	1,416	8,964	15.8%	17.0%
2009	1,434	9,308	15.4%	18.0%
2010	1,471	10,623	13.8%	18.6%
2011	1,432	14,113	10.1%	18.4%
2012	1,722	20,020	8.6%	17.4%
2013	1,395	22,543	6.2%	17.3%
% Chg '03 to '13	**-1.1%**	**234.5%**		
	Payroll ($1,000s)			
	Health Services	Total County	Hlth Svcs as a % of Total County Payroll	Hlth Svcs as a % of Total State Payroll
2003	35,617	158,843	22.4%	21.0%
2004	40,773	174,302	23.4%	20.9%
2005	43,771	208,035	21.0%	20.7%
2006	41,043	236,116	17.4%	19.9%
2007	39,581	296,572	13.3%	18.6%
2008	41,930	378,458	11.1%	18.4%
2009	45,158	402,048	11.2%	19.5%
2010	47,475	556,709	8.5%	19.5%
2011	51,317	941,715	5.4%	18.7%
2012	67,657	1,418,771	4.8%	17.0%
2013	58,412	1,588,022	3.7%	16.6%
% Chg '03 to '13	**64.0%**	**899.7%**		

SOURCE: U.S. Census Bureau, County Business Patterns; 2002-2012 based upon NAICS (www.census.gov [August 2015]).

[1] The Health Care and Social Assistance NAICS sector comprises establishments providing health care and social assistance for individuals. The sector includes both health care and social assistance because it is sometimes difficult to distinguish between the boundaries of these two activities. Industries in this sector are arranged on a continuum starting with those establishments providing medical care exclusively, continuing with those providing health care and social assistance, and finally finishing with those providing only social assistance. The services provided by establishments in this sector are delivered by trained professionals. All industries in the sector shared this commonality of process, namely, labor inputs of health practitioners or social workers with the requisite expertise. Many of the industries in the sector are defined based on the educational degree held by the practitioners included in the industry.

[2] Data are excluded for self-employed persons, employees of private households, railroad employees, agricultural production workers, and for most government employees (except for those working in wholesale liquor establishments, retail liquor stores, Federally-chartered savings institutions, Federally-chartered credit unions, and hospitals).

County health services payroll increased 64.0 percent from 2003 to 2013, while total county payroll increased 899.7 percent. County health services payroll as a percent of total county payroll was 22.4 percent in 2003 and decreased to 3.7 percent in 2013. This compares to the state health services payroll as a percent of total state payroll of 21.0 percent in 2003 and decreasing to 16.6 percent in 2013.

Data from U.S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (BEA) are illustrated in **Tables 8** and **9**. Table 8 shows employment by type and by industry. Total county employment increased 8.5 percent from 2012 to 2013, with wage and salary employment and nonfarm employment both increasing. The health care and social assistance sector decreased by 2.5 percent from 2012 to 2013 and in 2013 represented 4.2 percent of all nonfarm, private employment. The sector with the largest percent change was the educational services with an increase of 29.4 percent with second largest increase

in the real estate rental and leasing sector at 21.1% and the third largest increase in the construction sector at 20.3 percent.

Table 9 shows personal income by source and by industry. Total county income increased 7.9 percent from 2012 to 2013, with wage and salary disbursements and nonfarm earnings both increasing. The health care and social assistance sector increased by 4.2 percent from 2012 to 2013 and in 2013 represented 2.5 percent of all nonfarm, private employment. The sector with the largest percent change was the professional and technical services sector with an increase of 32.4 percent with second largest increase in the educational services sector at 29.6% and the third largest increase in the construction sector at 27.6 percent.

Table 8

Full- and Part-Time Employment by Type of Employment and by Major Industry[1] for Williams County and North Dakota, 2012 and 2013

	2012			2013			'12 to '13
	Williams Co.		ND	Williams Co.		ND	County
Employment Categories	No. of Jobs	% of Total	% of Total	No. of Jobs	% of Total	% of Total	% Change
Total FT & PT	39,895	100.0%	100.0%	43,289	100.0%	100.0%	**8.5%**
Wage & Salary	35,363	88.6%	79.8%	38,646	89.3%	80.0%	**9.3%**
Proprietors	4,532	11.4%	20.2%	4,643	10.7%	20.0%	2.4%
Farm proprietors'	707	15.6%	23.1%	703	15.1%	22.6%	-0.6%
Nonfarm proprietors'[2]	3,825	84.4%	76.9%	3,940	84.9%	77.4%	3.0%
By Industry:							
Farm employment	817	2.0%	6.0%	794	1.8%	5.6%	-2.8%
Nonfarm employment	39,078	98.0%	94.0%	42,495	98.2%	94.4%	**8.7%**
Private	36,960	94.6%	83.9%	40,246	94.7%	84.2%	**8.9%**
Forestry/fshng	155	0.4%	1.0%	(D)	**	1.0%	**
Mining	13,300	36.0%	6.4%	13,632	33.9%	6.7%	2.5%
Utilities	196	0.5%	0.8%	227	0.6%	0.8%	15.8%
Construction	4,287	11.6%	8.9%	5,159	12.8%	9.3%	**20.3%**
Manufacturing	639	1.7%	6.0%	573	1.4%	5.8%	-10.3%
Wholesale trade	3,242	8.8%	5.9%	3,336	8.3%	6.0%	2.9%
Retail trade	2,551	6.9%	13.0%	2,866	7.1%	13.0%	12.3%
Transp & wrehsng	3,073	8.3%	5.8%	3,618	9.0%	5.9%	17.7%
Information	193	0.5%	1.7%	208	0.5%	1.6%	7.8%
Finance & ins	559	1.5%	5.8%	583	1.4%	5.7%	4.3%
RE rental & leasing	1,407	3.8%	3.6%	1,704	4.2%	3.6%	**21.1%**
Prof & techn svcs	1,119	3.0%	4.7%	1,297	3.2%	4.8%	15.9%
Mgmt of cos/enterp	(L)	**	1.1%	(D)	**	1.2%	**
Admin & waste svcs	997	2.7%	4.1%	1,187	2.9%	4.0%	19.1%
Educational svcs	109	0.3%	1.3%	141	0.4%	1.3%	**29.4%**
Hlth care & soc asst	**1,750**	**4.7%**	**13.9%**	**1,706**	**4.2%**	**13.7%**	**-2.5%**
Arts/entert/rec	202	0.5%	1.7%	198	0.5%	1.7%	-2.0%
Accom & food svcs	2,005	5.4%	8.2%	2,359	5.9%	8.1%	17.7%
Other/not pub adm	1,170	3.2%	6.0%	1,259	3.1%	5.9%	7.6%
Sum of (D)&(L)[3]	6	0.0%		193	0.5%		
Govt & govt enterpr	2,118	5.4%	16.1%	2,249	5.3%	15.8%	6.2%

SOURCE: U. S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (www.bea.gov [August 2015]).

(L) Less than 10 jobs, but the estimates for this item are included in the totals.

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

** Due to non-disclosure of confidential data, no percentages are available.

[1] The estimates are based on the 2012 North American Industry Classification System (NAICS).

[2] Excludes limited partners.

[3] All (D) & (L) categories have been totaled to show the amount of missing data from employment.

Table 9
Personal Income ($1,000s) by Major Source and Industry[1]
for Williams County and North Dakota, 2012 and 2013

	2012			2013			'12 to '13
	Williams Co.		ND	Williams Co.		ND	County
Income or Earnings Categories	Income ($1000s)	% of Total	% of Total	Income ($1000s)	% of Total	% of Total	% Change
Total Personal Income							
Total earnings by place of wk	3,284,209	100.0%	100.0%	3,542,187	100.0%	100.0%	**7.9%**
Wage & salary disbrsmnts	2,724,678	83.0%	64.7%	2,978,539	84.1%	71.0%	9.3%
Proprietors' income[2]	164,830	5.0%	21.7%	131,238	3.7%	14.3%	-20.4%
Other	394,701	12.0%	13.5%	432,410	12.2%	14.7%	9.6%
Earnings by Industry							
Farm	54,439	1.7%	13.9%	9,555	0.3%	5.2%	-82.4%
Nonfarm	3,229,770	98.3%	86.1%	3,532,632	99.7%	94.8%	**9.4%**
Private	3,127,518	96.8%	83.0%	3,417,508	96.7%	83.6%	**9.3%**
Forestry/fshng/rel	5,837	0.2%	0.7%	(D)	**	0.7%	**
Mining	1,424,108	45.5%	12.5%	1,465,085	42.9%	12.6%	2.9%
Utilities	18,710	0.6%	1.8%	21,607	0.6%	1.8%	15.5%
Construction	373,327	11.9%	11.5%	476,202	13.9%	12.3%	**27.6%**
Manufacturing	42,469	1.4%	6.7%	38,463	1.1%	6.4%	-9.4%
Wholesale trade	343,952	11.0%	9.1%	362,569	10.6%	9.2%	5.4%
Retail trade	102,264	3.3%	7.6%	121,818	3.6%	7.6%	19.1%
Transp & warehsng	290,250	9.3%	8.1%	320,428	9.4%	8.1%	10.4%
Information	10,796	0.3%	2.2%	12,323	0.4%	2.0%	14.1%
Finance & ins	27,051	0.9%	5.2%	29,623	0.9%	5.1%	9.5%
RE rental & leasing	125,313	4.0%	3.6%	152,027	4.4%	3.8%	21.3%
Prof & techn svcs	92,373	3.0%	5.5%	122,319	3.6%	5.8%	**32.4%**
Mgmt of cos & enterp	638	0.0%	1.8%	(D)	**	1.8%	**
Admin/waste svcs	65,332	2.1%	2.5%	55,003	1.6%	2.4%	-15.8%
Educ svcs	1,913	0.1%	0.5%	2,480	0.1%	0.5%	**29.6%**
Hlth care & soc asst	**81,387**	**2.6%**	**13.2%**	**84,839**	**2.5%**	**12.8%**	**4.2%**
Arts, entert, & rec	2,735	0.1%	0.4%	2,778	0.1%	0.4%	1.6%
Accom & food svcs	70,939	2.3%	3.3%	86,344	2.5%	3.2%	21.7%
Other svcs/not pub adm	48,124	1.5%	3.8%	55,266	1.6%	3.7%	14.8%
Sum of (D) Categories[3]	0	0.0%		8,334	0.2%		
Govt & govt enterprises	102,252	3.2%	17.0%	115,124	3.3%	16.4%	12.6%

SOURCE: U. S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (www.bea.gov [August 2015]).
(D) Not shown to avoid disclosure of confidential information, but estimates are included in totals.
** Due to non-disclosure of confidential data, no percentages are available.
[1] The estimates are based on the 2012 North American Industry Classification System (NAICS).
[2] Proprietors' income includes the inventory valuation adjustment and capital consumption adjustment.
[3] All (D) categories have been totaled to show the amount of missing data from private earnings.

Basic economic indicators for Williams County, North Dakota, and the United States are illustrated in **Table 10**. BEA data for 2012 show per capita income in Williams County at $115,897, with the state ($53,182) and the nation ($44,765) much less. The employment and labor force data are from the U.S. Department of Labor, Bureau of Labor Statistics. For 2014, the annual unemployment rate was 1.2 percent for Williams County, compared to 2.8 percent for the state and 6.2 percent for the U.S. For the preliminary year-to-date June 2015 employment and labor force data, the unemployment rate for Williams County was 2.4 percent; this compared to 3.2 percent for the state and 5.5 percent for the U.S.

Based on 2013 U. S. Census poverty data, Williams County had 9.0 percent of the population under age 18 below poverty level; this compared to 12.4 percent for the state and 22.2 percent for the U.S. From BEA 2013 data, transfer receipts as a percentage for total personal income for Williams County were much lower than the state and national percentages. Williams County showed transfer receipts as 4.5 percent of total personal income, with North Dakota at 12.4 percent and the U.S. at 17.1 percent. This indicator shows the entity's percent of total personal income that comes from federal and state funds.

Table 10
Economic Indicators for Williams County,
North Dakota and the United States

Indicator	Williams County	North Dakota	United States
Total Personal Income (2013)	3,429,967,000	38,471,723,000	14,151,427,000,000
Per Capita Income (2013)	115,897	53,182	44,765
Employment (2014)	31,924	404,864	146,305,000
Unemployment (2014)	384	11,503	9,617,000
Unemployment Rate (2014)	1.2%	2.8%	6.2%
Employment (Jun 2015)	33,132	409094	149,645,000
Unemployment (Jun 2015)	811	13491	8,638,000
Unemployment Rate (Jun 2015)	2.4%	3.2%	5.5%
% of People in Poverty (2013)	7.8%	11.6%	15.8%
% of Under 18 in Poverty (2013)	9.0%	12.4%	22.2%
Transfer Receipts (2013)	154,460,000	4,764,330,000	2,414,501,000,000
Transfer Receipts as Percentage of Total Personal Income (2013)	4.5%	12.4%	17.1%

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics; U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Census Bureau [August 2015]

Direct Economic Activities of Tioga Medical Center

Tioga Medical Center (TMC) consists of a 25-bed critical access hospital, a 30-bed long term care facility, three clinics (one in Tioga and two satellite clinics in Ray and Powers Lake), and a 22-apartment independent living facility in Tioga. The hospital at TMC provides the following services

- Physical Therapy
- Outpatient Surgery
- Emergency Room
- Speech Therapy
- Occupational Therapy
- Cardiac Rehab
- EKG
- Stress Testing
- Laboratory
- Radiology
- CT-Scan
- Ultrasound

The direct economic activities of TMC include the employees and their wages, salaries, and benefits to provide the health care services. From **Table 11**, the operations activities of TMC include 82 employees with wages, salaries, and benefits (labor income) of $2,545,376 from the hospital, 32 employees with labor income of $1,823,990 from the medical clinics, and 36 employees with labor income of $1,279,866 from the long term care facility. The total direct employment of TMC includes 150 employees and the total direct labor income is $5,649,232.

The direct economic activities of TMC also include construction activities (**Table 11**). TMC provided the construction data of $1,807,378 for 2014, $6,126,195 for 2015, and $1,566,000 for 2016. IMPLAN data were utilized to estimate the number of construction employees directly working on the construction activities and their resulting labor income. The construction in 2014 resulted in approximately seven employees with labor income of $892,046.

Table 11
Direct Economic Activities of Tioga Medical Center
in Williams County, North Dakota

DIRECT ACTIVITIES FROM OPERATIONS

Categories	Number of Employees	Labor Income (Wages, Salaries, and Benefits)
Operations, 2015		
From Hospital	82	$2,545,376
From Medical Clinics	32	$1,823,990
From Long Term Care	36	$1,279,866
Tioga Medical Center Totals	150	$5,649,232

DIRECT ACTIVITIES FROM CONSTRUCTION

Categories	Estimated Construction	Number of Employees	Labor Income (Wages, Salaries, Benefits, &/or Proprietor Income)
2014 Construction	$1,807,378	7	$892,046
2015 Construction	$6,126,195	24	$3,023,634
2016 Construction	$1,566,000	6	$772,910
3-Year Totals	$9,499,573	37	$4,688,590
Average Per Year	$3,166,524	12	$1,562,863

SOURCE: Local data from Tioga Medical Center, 2015; Construction ratios and average construction compensation from IMPLAN Group, LLC [www.implan.com (August 2015)].

Construction activities in 2015 resulted in 24 employees with labor income of $3,023,634 and in 2016 resulted in six employees with labor income of $772,910. Total construction over the three-year period was estimated at $9,499,573, resulting in an average per year of $3,166,524 in construction expenditures, generating an average of twelve employees and $1,562,863 in labor income each year.

The Impact of Tioga Medical Center

The direct impacts of TMC, measured by employment and labor income, are only a portion of the total impact. There are additional economic impacts created as TMC and its employees spend money. These are known as secondary impacts and are measured by multipliers using an input-output model and data from IMPLAN (the model and data are further discussed in **Appendix A**). This model is widely used by economists and other academics across the U. S.

A brief description of the input-output model and the multiplier effect is included and illustrated in **Figure 2**. **Figure 2** illustrates the major flows of goods, services, and dollars of any economy. The businesses which sell some or all of their goods and services to buyers outside of the county are the foundation of a county's economy. Such a business is a basic industry. The flow of products out of, and dollars into, a county are represented by the two arrows in the upper right portion of **Figure 2**. To produce these goods and services for "export" outside of the county, the basic industry purchases inputs from outside of the county (upper left portion of **Figure 2**), labor from the residents or "households" of the county (left side of **Figure 2**), and inputs from service industries located within the county (right side of **Figure 2**). The flow of labor, goods, and services in the county is completed by households using their earnings to purchase goods and services from the county's service industries (bottom of **Figure 2**). It is evident from the interrelationships shown in **Figure 2** that a change in any one segment of a county's economy will have reverberations throughout the entire economic system of the county.

Consider, for instance, the closing of a hospital. The services sector will no longer pay employees and the dollars going to households will stop. Likewise, the hospital will not purchase goods from other businesses, and the dollar flow to other businesses will stop. This decreases

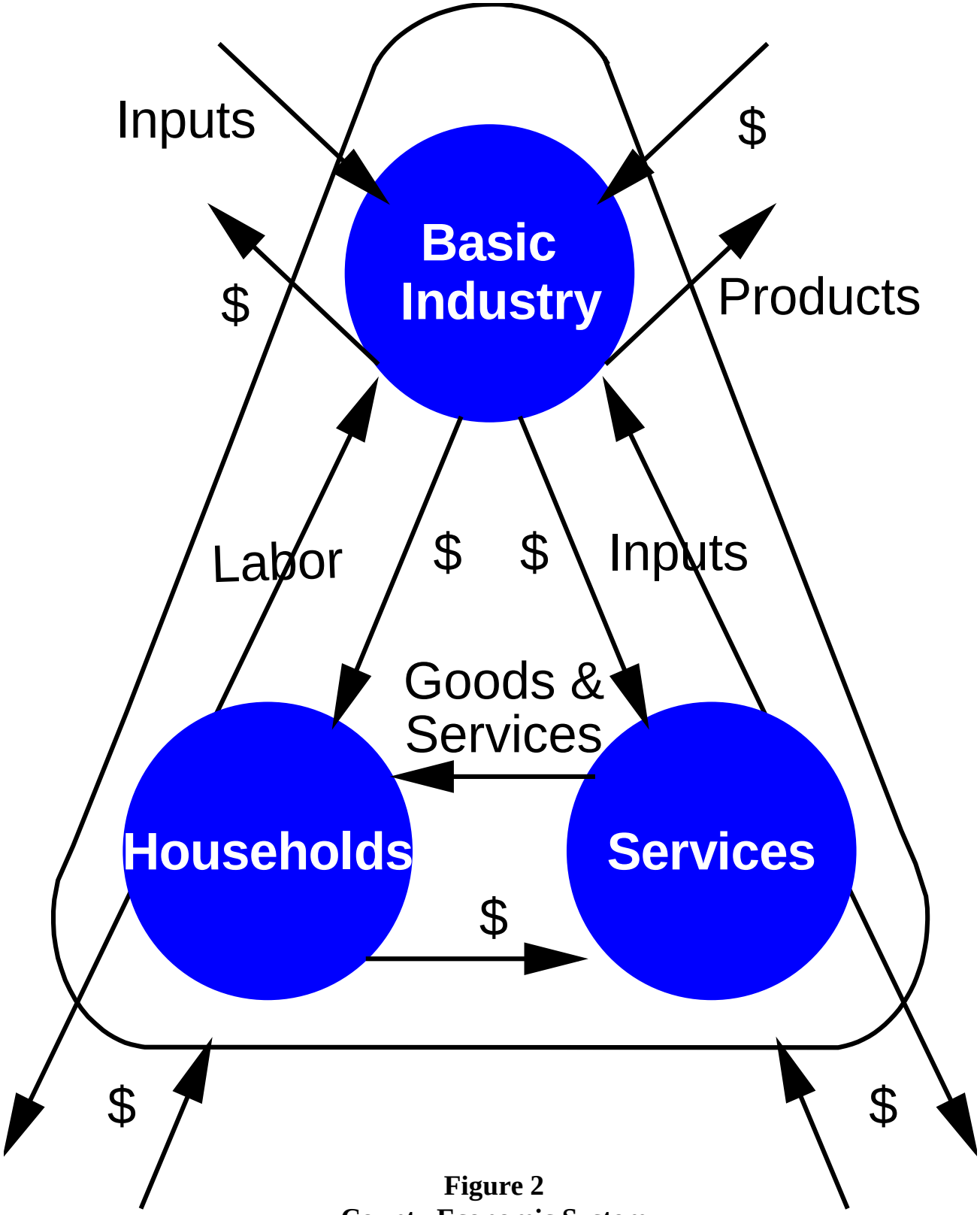


Figure 2
County Economic System

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 also produces an indirect impact in the business sectors. Both the direct and indirect impacts change the flow of dollars to the county's households. The households alter their consumption accordingly. The effect of this change in household consumption upon businesses in a county 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 same concept applies to labor income and output multipliers.

The Impact from Operating Activities

The employment and labor income impacts of TMC from operating activities are presented in **Table 12**. Direct employment and labor income from operating activities were obtained from TMC for the categories of hospital, medical clinics, and long term care. Each of these sectors has a unique multiplier derived from IMPLAN.

Table 12
Economic Impacts from Operations
of Tioga Medical Center, 2015

EMPLOYMENT IMPACT FROM OPERATIONS

Categories	Direct Employment	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
From Hospital	82	1.37	30	112
From Medical Clinics	32	1.26	8	40
From Long Term Care	36	1.16	6	42
Totals	150		44	194

LABOR INCOME IMPACT FROM OPERATIONS

Categories	Direct Labor Income	Labor Income Multiplier	Secondary Labor Income Impact	Total Labor Income Impact
From Hospital	$2,545,376	1.19	$483,621	$3,028,997
From Medical Clinics	$1,823,990	1.17	$310,078	$2,134,068
From Long Term Care	$1,279,866	1.17	$217,578	$1,497,444
Totals	$5,649,232		$1,011,277	$6,660,509

SOURCE: Direct employment and labor income data from operations provided by Tioga Medical Center, 2015; Multipliers from IMPLAN Group, LLC [www.implan.com (August 2015)].

The hospital employs 82 employees. The hospital employment multiplier is 1.37; this means for every job in the hospital sector, another 0.37 job is created in other sectors (businesses) in Williams County. The secondary employment generated in Williams County from the hospital sector is estimated to be 30 jobs. The hospital has a total impact of 112 jobs on the local economy of Williams County. The clinics have 32 direct employees and based on the clinics employment multiplier of 1.26, the clinics have secondary employment impact of eight employees and total employment impact of 40 employees. The nursing home has 36 direct employees; based on the nursing home employment multiplier of 1.16, the nursing home has secondary employment impact of six employees and total employment impact of 42 employees. ***The total employment impact of TMC is 194 full- and part-time and contractual employees in Williams County; this includes the total direct employment impact of 150 employees and total secondary employment impact of 44 employees.***

Data obtained from TMC indicate that direct labor income for the hospital is $2.5 million. Using the hospital labor income multiplier of 1.19 derived from IMPLAN, TMC generates secondary labor income impact of $483,621 and total labor income impact of $3.0 million. The clinics have $1.8 million in direct labor income; based on the clinics labor income multiplier of 1.17, the clinics have secondary labor income impact of $310,078 and total labor income impact of $2.1 million. The long term care facility has $1.3 million in direct labor income; based on the nursing home labor income multiplier of 1.17, the nursing home has secondary labor income impact of $217,578 and total labor income impact of $1.5 million. ***The total labor income impact of TMC is $6.7 million on the Williams County economy; this includes the total direct labor income impact of $5.6 million and total secondary labor income impact of $1.0 million.***

The Impact from Construction Activities

The construction activities of TMC will have an impact on the economy of Williams County. This impact is often overlooked. TMC has construction activities for 2014, 2015, and 2016. Data in **Table 13** show estimated employment and labor income generated from the construction, as well as the impacts.

Table 13
Economic Impacts from Construction Activities
of Tioga Medical Center, 2015

EMPLOYMENT IMPACT FROM CONSTRUCTION				
Categories	Direct Employment	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
2014 Construction	7	1.46	3	10
2015 Construction	24	1.46	11	35
2016 Construction	6	1.46	3	9
Totals	37		17	54
3-Year Average Impacts	12		6	18

LABOR INCOME IMPACT FROM CONSTRUCTION				
Categories	Direct Labor Income	Labor Income Multiplier	Secondary Labor Income Impact	Total Labor Income Impact
2014 Construction	$892,046	1.22	$196,250	$1,088,296
2015 Construction	$3,023,634	1.22	$665,199	$3,688,833
2016 Construction	$772,910	1.22	$170,040	$942,950
Totals	$4,688,590		$1,031,489	$5,720,079
3-Year Average Impacts	$1,562,863		$343,830	$1,906,693

SOURCE: Total construction costs provided by Tioga Medical Center, 2015; Construction direct employment and income derived from IMPLAN data; Multipliers from IMPLAN Group, LLC [www.implan.com (August 2015)].

Data from the IMPLAN model were utilized in estimating employment and labor income

for construction. The data were checked against industry standard and appear to be accurate estimates. The construction or capital impacts only occur during the year the expenditures are incurred***. The $9.5 million in construction costs for TMC during 2014, 2015, and 2016 are estimated to create 37 direct construction job over the three years with an estimated direct construction labor income of $4.7 million*** over the three years (**Table 13**). During 2015, the $6.1 million in construction costs are estimated to create 24 jobs with estimated labor income of $3.0 million. These are the estimated direct employment and labor income impacts from the construction activities and not the total construction impacts which will be estimated with multipliers.

During 2015, the construction employment multiplier was 1.46; the 24 direct construction jobs generated secondary employment impact of 11 jobs and total employment impact of 35 jobs. During 2015, the construction labor income multiplier was 1.22; the $3.0 million in direct construction labor income generated secondary labor income impact of $0.7 million and total labor income impact of $3.7 million. The other two construction years were also provided. Construction impacts only occur during the year of construction. T***he average direct employment impact from construction activities for the three years is estimated to be 12 jobs, resulting in estimated average secondary employment impact of six jobs and average total employment impact of 18 jobs over the three years. The average direct labor income impact of TMC from construction activities for the three years is estimated to be $1.6 million, resulting in average secondary labor income impact estimated at $0.3 million and average total income impact estimated at $1.9 million over the three years.***

Summary

Both the operating activities and construction activities of a hospital impact the economy of Williams County. Often overlooked can be the economic impact created from construction activities. This report measures the impact that Tioga Medical Center will have on the economy due to its normal operating activities and its construction activities. The operating impact occurs every year; whereas, the construction impact occurs only during the construction year.

In 2015, Tioga Medical Center employed 150 full-time and part-time and contractual employees and generated $5.6 million in labor income (wages, salaries, and benefits). When the secondary impacts are included, the total employment impact is 194 jobs and the total labor income impact is $6.7 million. The employment and labor income impacts from operating activities are annual and will continue each and every year that Tioga Medical Center operates in the future. These are long term economic benefits of Tioga Medical Center.

The impact from construction activities on the economy of Williams County is estimated for the three years of construction activities. Tioga Medical Center has indicated that $9.5 million in construction will occur or have occurred during 2014, 2015, and 2016. This construction resulted in annual averages of 12 direct employees, average annual six secondary employees, and 18 total annual average employment impact over the three years. The annual average direct labor income impact is $1.6 million, the average secondary labor income impact was $0.3 million, and the average annual total labor income impact was $1.9 million each year. For the year 2015, the total construction was $6.1 million; this resulted in 24 direct employees, 11 secondary employees and 35 total employees. The direct labor income impact was $3.0 million, the secondary labor income impact was $0.7 million, and the total labor income impact was $3.7 million. Construction impact occurs only during the construction period.

The impacts generated by Tioga Medical Center contribute to the local economy of Williams County. The hospital employs local residents. The hospital and its employees spend money in Williams County and generate a secondary impact. If the hospital increases or decreases in size, the medical health of Williams County as well as the economic health of Williams County can be affected. For the attraction of industrial firms, businesses, and retirees, the local area should have quality hospital and health services. A quality hospital and health sector can contribute to the overall economic health of Williams County, as well as the overall medical health of the William County residents. Given this, not only does Tioga Medical Center contribute to the health and wellness of the local residents but Tioga Medical Center also contributes to the overall economic strength of Williams County.

References

Alward, G., Sivertz, E., Olson, D., Wagnor, J., Serf, D., and Lindall, S. Micro IMPLAN Software Manual. Stillwater, MN, University of Minnesota Press. 1989.

Chirilos, Thomas N. and Gilbert Nostel (1985). "Further Evidence on the Economic Effects of Poor Health." Review of Economics and Statistics. 67(1), 61-69.

Doeksen, Gerald A., Tom Johnson, Diane Biard-Holmes and Val Schott (1988). "A Healthy Health Sector is Crucial for Community Economic Development." Journal of Rural Health. Vol. 14, No. 1, pp. 66-72.

Doeksen, Gerald A., Johnson, Tom, and Willoughby, Chuck. Measuring the Economic Importance of the Health Sector on a Local Economy: A Brief Literature Review and Procedures to Measure Local Impacts. Southern Rural Development Center. SRDC Pub. No. 202. 1997.

Lyne, Jack (1988). "Quality-of-Life Factors Dominate Many Facility Location Decision." Site Selection Handbook. (33) 868-870.

Lyne, Jack (1990). "Health Care and Education: Important QOL Factors, But Who's Accurately Measuring Them?" Site Selection Handbook. 35(5), 832-838.

McGuire T. (1986). On the Relationship Between Infrastructure and Economic Development. Stoney Brook: State University of New York.

Miernyk, W.H. The Element of Input-Output Analysis. New York, NY; Random House. 1965.

Minnesota IMPLAN Group, Inc. User's Guide, Analysis Guide, Data Guide: IMPLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition. June 2000.

Reginer, V. and L.E. Gelwicks (1981). "Preferred Supportive Services for Middle to Higher Income Retirement Housing." The Gerontologist. 21(1), 54-58.

Scott, Loren C., Lewis H. Smith, and Brian Rungeling (1997). "Labor Force Participation in Southern Rural Labor Markets." American Journal of Agricultural Economics. 59(2), 266-274.

Siverts, Eric, Charles Palmer, Ken Walters, and Greg Alward. IMPLAN USER'S GUIDE. U.S. Department of Agriculture, Forest Service, Systems Application Unit, Land Management Planning, Fort Collins, Colorado. 1983.

Toseland, R., and J. Rasch (1978). "Factors Contributing to Older Persons' Satisfaction with Their Communities." The Gerontologist. 18(4), 395-402.

Appendix A

IMPLAN Software and Data from IMPLAN Group, LLC:

Model and Data Used to Derive Multipliers

APPENDIX A
IMPLAN Software and Data from IMPLAN Group, LLC:
Model and Data Used to Derive Multipliers

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 an area, 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, an area 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.

The basis of IMPLAN was developed by the U. S. Forest Service to construct input/output accounts and models. The complexity of this type of modeling had hindered practitioners from constructing models specific to a community requesting an analysis. The University of Minnesota utilized the U.S. Forest Service model to further develop the methodology and expand the data sources to form the model known as IMPLAN. The founders of IMPLAN, Scott Lindall and Doug Olson, joined the University of Minnesota in 1984 and, as an outgrowth of their work with the University of Minnesota, entered into a technology transfer agreement with the University of Minnesota that allowed them to form Minnesota IMPLAN Group, Inc. (MIG).

In 2013 Minnesota IMPLAN Group, Inc. was purchased by IMPLAN Group, LLC and relocated to:

IMPLAN Group, LLC
16740 Birkdale Commons Parkway Suite 206
Huntersville, NC 28078

Support hours are 8 am – 7 pm Eastern time and can be reached by email at info@implan.com or by phone at 651-439-4421 or 704-727-4141

IMPLAN Software and Data

At first, IMPLAN focused on database development and provided data that could be used in the Forest Service version of the software. In 1995, IMPLAN took on the task of writing a new version of the IMPLAN software from scratch that extended the previous Forest Service version by creating an entirely new modeling system – an extension of input-output accounts and resulting Social Accounting Matrices (SAM) multipliers. Version 2 of the new IMPLAN software became available in May of 1999. The latest development of the software is now available, IMPLAN Version 3 Software System, the new economic impact assessment software system.

With IMPLAN Version 3 software, the packaging of products has changed. Version 3 utilizes 2007 or later data. When data are ordered, the data cost plus shipping are the only costs. Version 3.0 software and the new IMPLAN appliance are included in the cost of the data. There are no additional fees to upgrade to IMPLAN Version 3.0. Data files are licensed to an individual user. Version 2 is no longer compatible with 2008 and later data sets.

Version 3 allows the user to do much more detailed analyses. Users can continue to create detailed economic impact estimates. Version 3.0 takes the analysis further, providing a new method for estimating regional imports and exports is being implemented - a trade model. IMPLAN can construct a model for any state, region, area, county, or zip code area in the United States by using available national, state, county, and zip code level data. Impact analysis can be performed once a regional input/output model is constructed.

IMPLAN Multipliers

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 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 (or Type SAM) 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 References

Alward, G., Sivertz, E., Olson, D., Wagnor, J., Serf, D., and Lindall, S. Micro IMPLAN Software Manual. Stillwater, MN, University of Minnesota Press. 1989.

Doeksen, Gerald A., Johnson, Tom, and Willoughby, Chuck. Measuring the Economic Importance of the Health Sector on a Local Economy: A Brief Literature Review and Procedures to Measure Local Impacts. Southern Rural Development Center. SRDC Pub. No. 202. 1997.

Miernyk, W.H. The Element of Input-Output Analysis. New York, NY; Random House. 1965.

Minnesota IMPLAN Group, Inc. MIG Inc Version 3.0 User's Guide. March 2010.