The Economic Impact of Towner County Medical Center on Towner County, North Dakota

Prepared by:

National Center for Rural Health Works
Oklahoma State University

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Prepared for:

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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 Towner County Medical Center on Towner 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 Towner County;
3. Summarize the direct economic activities of Towner County Medical Center from operations and construction in Towner County;
4. Present concepts of community economics and multipliers; and
5. Estimate the economic impact of Towner County Medical Center from operating activities and construction activities in Towner 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. A strong health care system can also create jobs in the local area.

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 1** provide selected expenditure and employment data for the United States. Several highlights from the national data are:

- In 1970, health care services as a share of the national gross domestic product (GDP) were 7.0 percent and increased to 17.2 percent in 2012;
- Per capita health expenditures increased from $356 in 1970 to $8,915 in 2012;

Table 1
United States Health Expenditures and Employment Data
1970-2012; Projected for 2012-2022

Year	Total Health Expenditures ($Billions)	Per Capita Health Expenditures ($)	Health as % of GDP (%)	Health Sector Employment (0)		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	1,377.2	4,878	13.4%	10,858	[a]	3.2%
2010	2,599.0	8,411	17.4%	13,777	[b]	2.7%
2001	1,493.4	5,238	14.1%	11,188	[b]	
2003	1,778.0	6,128	15.4%	11,817	[b]	2.8%
2005	2,035.4	6,889	15.5%	12,314	[b]	2.1%
2007	2,302.9	7,649	15.9%	12,947	[b]	2.6%
2009	2,504.2	8,170	17.4%	13,543	[b]	2.3%
2010	2,599.0	8,411	17.4%	13,777	[b]	1.7%
2011	2,692.8	8,658	17.3%	14,026	[b]	1.8%
2012	2,793.4	8,915	17.2%	14,302	[b]	2.0%
				Avg Yrly Increase 2001 to 2012		2.5%
Projections						
2014	3,093.0	9,697	18.3%			
2016	3,458.0	10,651	18.4%			
2018	3,889.0	11,771	18.5%			
2020	4,416.0	13,142	19.2%			
2022	5,009.0	14,664	19.9%			

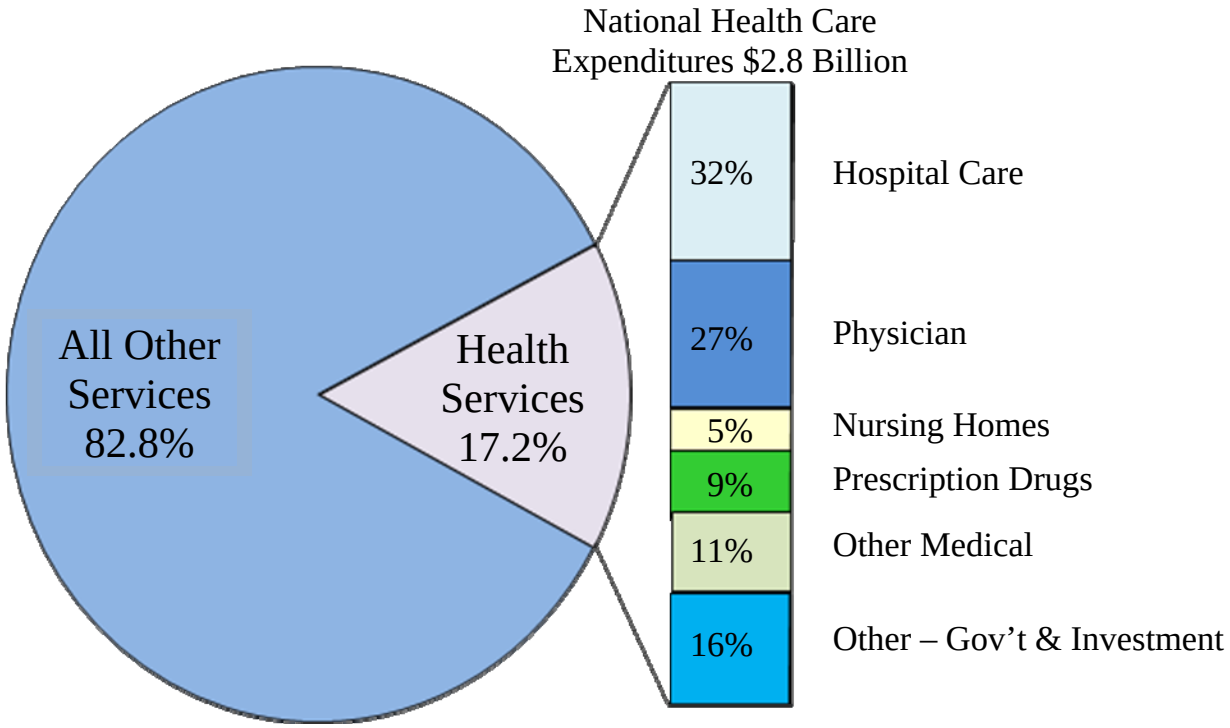
SOURCES: U.S. Department of Labor, Bureau of Labor Statistics (www.bls.gov [February 2014]); U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, National Health Expenditures 1960-2012 and National Health Expenditure Projections 2012-2022 (http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html [February 2014]).
[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.

- Employment in the health sector increased 368.6 percent from 1970 to 2012; and
- Annual increases in employment from 2001 to 2012 ranged from 1.7 percent to 2.8 percent.

The U. S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, also projects that health care expenditures will account for 18.5 percent of GDP by 2018 and increase to 19.9 percent of GDP in 2022. Per capita health care expenditures are projected to increase to $11,771 in 2018 and to $14,664 in 2022. Total health expenditures are projected to increase to over $5.0 trillion in 2022.

Figure 1 illustrates 2012 health expenditures by percent of GDP and by type of health service. Health services represented 17.2 percent of national GDP in 2012. The largest category

Figure 1
National Health Expenditures as a Percent of Gross Domestic Product and by Health Service Type, 2012



SOURCE: U. S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, National Health Expenditures 2012 (http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html [May 2014]).

of health services was hospital care, representing 32.0 percent of the total and the second largest

category was physician services with 27.0 percent of the total.

Towner County Demographic and Economic Data

Towner County Medical Center (TCMC) is located in Cando City in Towner County, North Dakota. The medical service area is Towner County, North Dakota. **Table 2** illustrates the last two Census populations and the most current year estimates for Towner County cities, towns and surrounding rural area and for Towner County in total. Data are from the U.S. Census Bureau.

Table 1
Population and Percent Change for Towner County Cities, Towns and Rural Area, Towner County, and North Dakota

	2000 Population	2010 Population	2013 Estimate	% Change '00 to '10	% Change '10 to '13
Bisbee City	167	126	130	-24.6%	3.2%
Cando City	1,342	1,115	1,149	-16.9%	3.0%
Egeland City	49	28	29	-42.9%	3.6%
Hansboro City	8	12	12	50.0%	0.0%
Perth City	13	9	9	-30.8%	0.0%
Rocklake City	194	101	105	-47.9%	4.0%
Sarles City (pt.)	3	4	4	33.3%	0.0%
Rural Area	1,100	851	879	-22.6%	3.3%
Towner County Totals	**2,876**	**2,246**	**2,317**	**-21.9%**	**3.2%**
North Dakota Totals	**642,200**	**672,591**	**723,393**	**4.7%**	**7.6%**

SOURCE: U. S. Census Bureau (www.census.gov [June 2014]).

The data in **Table 2** show Cando City had population of 1,342 in 2000 and 1,115 in 2010, which represents a decrease of 16.9 percent; this compares to Towner County decreasing 21.9

percent and North Dakota increasing 4.7 percent. U.S. Census Bureau data estimated a population of 1,149 for Cando City in 2013, an increase of 3.0 percent from 2010, compared to Towner County increasing 3.2 percent and North Dakota increasing 7.6 percent. All entities showed the same decreasing trend in population from 2000 to 2010, except Hansboro City and Sarles City, and all are estimated to increase or remain the same in population from 2010 to 2013.

The 2010 Census populations and population projections for Towner County and North Dakota are illustrated in **Table 3**. The 2010 Census populations are from the U. S. Census Bureau and the population projections are from the North Dakota Statewide Housing Assessment Resource Project.

Table 3
Population, Population Estimates, and Population Projections
for Towner County, North Dakota

	Towner County	North Dakota
2010 Census	2,246	672,591
2015 Projected	2,277	750,023
2020 Projected	2,301	806,541
2025 Projected	2,315	841,820
% change 2010-2015	1.4%	11.5%
% change 2010-2020	2.4%	19.9%
% change 2010-2025	3.1%	25.2%

SOURCE: Census populations, U.S. Census Bureau (www.census.gov [June 2014]); County and state projections, North Dakota Statewide Housing Assessment Resource Project (www.ndsu.nodak.edu [June 2014]).

The population projections are shown for 2015, 2020, and 2025 for Towner County and North Dakota. The populations are projected to increase for each time period for both the county

and the state, with the state projected to increase at a much higher percentage each time period than the county.

Table 4 shows the populations of Towner 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 Towner County decreased in percent change of total population except for the 20-24 and 45-64 age groups; North Dakota was similar an increase in the percent change for the 20-24, 45-64, and the 65+ age groups. The total percent change in population from 2000 to 2010 for Towner County was a decrease of 21.9 percent while North Dakota showed an increase of 4.7 percent.

Table 5 provides the populations of the cities and rural area, Towner County and North Dakota by race groups and Hispanic origin. Towner County shows a decrease of 22.4 percent in the white racial group from 2000 to 2010 data. U.S., while North Dakota increased by 2.1 percent. Towner showed some significant percent changes from 2000 to 2010; however, the absolute numbers are so low that the percent changes are misleading. For instance, the some other race group in Towner County increased from a population of one in 2000 to six in 2010, which represented a 500 percent increase.

The small scale population of Towner County has limited the availability of data from U.S. Census Bureau, County Business Patterns, and from U.S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (BEA). When the data fall below a specific threshold or a specific number of industries, data is withheld to ensure the privacy of the industries and to avoid disclosure of confidential information. However, these data sets for Towner County have been compiled and are available in **Appendix A.**

Basic economic indicators for Towner County, North Dakota, and the United States are illustrated in **Table 6**. BEA data for 2012 show per capita income higher in Towner County than

Table 4
U.S Census Bureau Population by Age Groups and Gender
for Towner County Cities, Towns, and Rural Area, Towner County and 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									
Bisbee city	29	13	5	36	44	40	167	81	86
Cando city	249	84	18	319	313	359	1,342	630	712
Egeland city	10	3	2	11	9	14	49	22	27
Hansboro city	3	0	1	1	2	1	8	3	5
Perth city	3	2	2	2	3	1	13	5	8
Rocklake city	38	16	3	52	28	57	194	93	101
Sarles city (pt.)	0	0	0	0	3	0	3	2	1
Rural Area	212	95	23	269	303	198	1,100	580	520
Towner County Total	544	213	54	690	705	670	2,876	1,416	1,460
2000 % of Total	**18.9%**	**7.4%**	**1.9%**	**24.0%**	**24.5%**	**23.3%**	**100.0%**	**49.2%**	**50.8%**
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									
Bisbee city	19	3	7	26	42	29	126	67	59
Cando city	180	73	41	188	346	287	1,115	535	580
Egeland city	3	0	0	2	14	9	28	16	12
Hansboro city	0	1	0	4	6	1	12	7	5
Perth city	1	1	0	1	5	1	9	5	4
Rocklake city	8	4	5	23	31	30	101	55	46
Sarles city (pt.)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rural Area	138	39	23	129	331	195	855	458	397
Towner County Totals	349	121	76	373	775	552	2,246	1,143	1,103
2010 % of Total	**15.5%**	**5.4%**	**3.4%**	**16.6%**	**34.5%**	**24.6%**	**100.0%**	**50.9%**	**49.1%**
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%**
County % Chg '00 – '10	**-35.8%**	**-43.2%**	**40.7%**	**-45.9%**	**9.9%**	**-17.6%**	**-21.9%**	**-19.3%**	**-24.5%**
State % Chg '00 to '10	**-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 [June 2014]).
NA: Not Available

Table 5
U.S Census Bureau Population by Race and Hispanic Origin
for Towner County Cities, Towns, and Rural Area, Towner County and the State of North Dakota, 2000 and 2010

Area	White	Black	American Indian	Asian	Native HI/Other Pacific Islander	Some Other Race	Two or More Races	Totals[1]	Hispanic Origin
2000 Census									
Bisbee City	162	1	2	0	0	0	2	167	0
Cando City	1,305	1	29	2	0	0	5	1,342	2
Egeland City	44	0	5	0	0	0	0	49	0
Hansboro City	8	0	0	0	0	0	0	8	0
Perth City	13	0	0	0	0	0	0	13	0
Rocklake City	186	0	7	0	0	0	1	194	0
Sarles City (pt.)	3	0	0	0	0	0	0	3	0
Rural Area	1,078	0	16	0	0	1	5	1,100	3
Towner County Total	2,799	2	59	2	0	1	13	2,876	5
2000 % of Total	**97.3%**	**0.1%**	**2.1%**	**0.1%**	**0.0%**	**0.0%**	**0.5%**	**100.0%**	**0.2%**
State of North Dakota	593,181	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									
Bisbee City	121	0	5	0	0	0	0	126	1
Cando City	1,071	2	26	0	0	2	14	1,115	6
Egeland City	25	0	3	0	0	0	0	28	0
Hansboro City	12	0	0	0	0	0	0	12	0
Perth City	9	0	0	0	0	0	0	9	0
Rocklake City	96	0	5	0	0	0	0	101	0
Sarles City (pt.)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rural Area	839	0	10	1	0	4	1	855	3
Towner County Total	2,173	2	49	1	0	6	15	2,246	10
2010 % of Total	**96.7%**	**0.1%**	**2.2%**	**0.0%**	**0.0%**	**0.3%**	**0.7%**	**100.0%**	**0.4%**
State of North Dakota	605,449	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%**
County % Chg '00 - '10	**-22.4%**	**0.0%**	**-16.9%**	**-50.0%**	**0.0%**	**500.0%**	**15.4%**	**-21.9%**	**100.0%**
State % Chg '00 - '10	**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 [June 2014]).
NA: Not Available

Table 6
Economic Indicators for Towner County,
North Dakota, and United States

Indicator	Towner County	North Dakota	United States
Total Personal Income (2012)	149,578,000	38,389,622,000	13,729,063,000,000
Per Capita Income (2012)	64,529	54,871	43,735
Employment (2013)	916	388,975	143,929,000
Unemployment (2013)	43	11,613	11,460,000
Unemployment Rate (2013)	4.5%	2.9%	7.4%
Employment (May 2014)	958	401,870	146,398,000
Unemployment (May 2014)	34	10,059	9,443,000
Unemployment Rate (May 2014)	3.4%	2.4%	6.1%
% of People in Poverty (2012)	9.9%	11.2%	15.9%
%of Under 18 in Poverty (2012)	16.1%	13.7%	22.6%
Transfer Receipts (2012)	23,779,000	4,652,610,000	2,358,236,000,000
Transfer Receipts as Percentage of Total Personal Income (2012)	15.9%	12.1%	17.2%

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics; U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Census Bureau [June 2014].

either the state or the nation. The employment and labor force data are from the U.S. Department of Labor, Bureau of Labor Statistics. For 2013, the unemployment rate was 4.5 percent for Towner County, compared to 2.9 percent for the state and 7.4 percent for the U.S. For the preliminary year-to-date data through May 2014, the unemployment rate for Towner County was 3.4 percent; this compared to 2.4 percent for the state and 6.1 percent for the U.S. Based on 2012 U. S. Census poverty data, Towner County had 16.1 percent of the population under age 18 below poverty level; this compared to 13.7 percent for the state and 22.6 percent for the U.S. From BEA 2012 data, transfer receipts as a percentage for total personal income for Towner County were higher than the state percentage, but lower than the national percentage. Towner County showed transfer receipts as 15.9 percent of total personal income, with North Dakota at

12.1 percent, and the U.S. at 17.2 percent. This indicator shows the entity's percent of total personal income that comes from federal and state funds.

Direct Economic Activities of Towner County Medical Center

TCMC provides services at the Towner County Medical Center and Emergency Room, Cando Clinic, Devils Lake Community Clinic, Prairie View Estates, St. Francis, and Living Center.

> TCMC and Emergency Room include the following direct services: 20-bed critical access hospital and Level V trauma center, 24-hour emergency services, on-call providers, operating room, nursing services, radiology services, laboratory services, pharmaceutical services, physical therapy, social services, dietary services, medical records, housekeeping and related services including laundry, and central supply services. TCMC also provides services through agreement for anesthesia services, mobile radiology, nuclear medicine – mobile, eye donor program, electroencephalogram interpretation, mobile ophthalmology surgery services, pathology consultant, radiology consultants, respiratory care, occupational therapy, and sleep studies.
>
> Cando Clinic includes the following services: family practice, pediatric, podiatry, lower extremity circulatory assessment, sleep apnea assessment, audiograms, pulmonary function assessment, colonoscope, colposcope, endoscopy, pediatric and adult immunizations, disability exams, FFA exams, chronic disease management, chiropractic, massage therapy, diabetic nutritional consultation, cardiac rehab, EKG, Holter monitors, laboratory, radiology, and physical therapy. Cando Clinic has mobile contracts to provide digital mammograms and CT scans. The Cando Clinic also has visiting physicians for cardiology, orthopedic, obstetrics, and gynecology.
>
> Devils Lake Community Clinic includes the following services: family practice, pediatric, podiatry, lower extremity circulatory assessment, sleep apnea assessment, audiograms, pulmonary function assessment, pediatric and adult immunizations, disability exams, FFA exams, chronic disease management, diabetic nutritional consultation, bone density scan, ultrasound, digital mammograms, CT scan, laboratory, and radiology. Devils Lake Community Clinic also has visiting physicians for cardiology, orthopedic, oncology, obstetrics, and gynecology.
>
> Prairie View Estates is an independent living facility including two-bedroom apartments, noon meal daily, 24-hour emergency call system, weekly housekeeping, weekly bed linen services, and exercise room. St. Francis is a basic care facility including private rooms, double rooms, dietary service, 24-hour

nursing staff, recreational activities, spiritual services, daily laundry, and daily housekeeping. Living Center is a skilled nursing facility including daily recreational activities, hospice, restorative care, physical therapy, occupational therapy, speech therapy, social services, spiritual services, dietary services, 45 beds, double rooms, and private rooms.

The economic impact of TCMC will be measured by employment (jobs) and labor income (wages and salaries plus benefits). The direct economic activities will include employment and labor income from operations activities and employment and labor income from construction activities.

The operating activities have been divided into three categories: hospital, clinics, and nursing home. TCMC provided the employment and wages, salaries, and benefits (labor income) for these three categories for 2013. The hospital had 55 full- and part-time and contractual employees with labor income of $3.0 million. The clinics had 19 full- and part-time and contractual employees with labor income of $1.5 million. The nursing home had 35 full- and part-time and contractual employees with labor income of $1.5 million. In 2013, TCMC had 109 employees with labor income of $6.1 million.

The direct economic activities of TCMC also include construction activities. TCMC provided the construction data of $27,300 for 2012, $10,300 for 2013, and $80,000 for 2014. 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 2012 resulted in approximately 0.23 employees with labor income of $11,513. Construction activities in 2013 resulted in .09 employees with labor income of $4,505 and resulted in 0.68 employees with labor income of $34,037 in 2014. Total construction over the three-year period was estimated at $50,055, resulting in an average per year of 0.33 employees and $16,685 in labor income.

Table 7
Direct Economic Activities of Towner County Medical Center
in Towner County, North Dakota, 2013

DIRECT ACTIVITIES FROM OPERATIONS		
Categories	Number of Employees	Labor Income (Wages, Salaries, and Benefits)
Hospital	55	$3,027,000
Clinics	19	$1,506,000
Nursing Home	35	$1,520,000
TOTALS	**109**	**$6,053,000**

DIRECT ACTIVITIES FROM CONSTRUCTION			
Categories	Estimated Construction	Number of Employees	Labor Income (Wages, Salaries, and Benefits, and/or Proprietor Income)
2012	$27,300	0.23	$11,513
2013	$10,300	0.09	$4,505
2014	$80,000	0.68	$34,037
TOTALS	$117,600	1.00	$50,055
Average Per Year	$39,200	0.33	$16,685

SOURCE: Local data from Towner County Medical Center, 2013; Construction ratios and average construction compensation from IMPLAN Group, LLC.

The Impact of Towner County Medical Center

The direct impacts of TCMC, measured by employment and labor income, are only a portion of the total impact. There are additional economic impacts created as TCMC 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 C**). 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 community are the foundation of a community's economy. 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 2**. To produce these goods and services for "export" outside of the community, the basic industry purchases inputs from outside of the community (upper left portion of **Figure 2**), labor from the residents or "households" of the community (left side of **Figure 2**), and inputs from service industries located within the community (right side of **Figure 2**). The flow of labor, goods, and services in the community is completed by households using their earnings to purchase goods and services from the community's service industries (bottom of **Figure 2**). It is evident from the interrelationships shown in **Figure 2** that a change in any one segment of a community's economy will have reverberations throughout the entire economic system of the community.

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 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

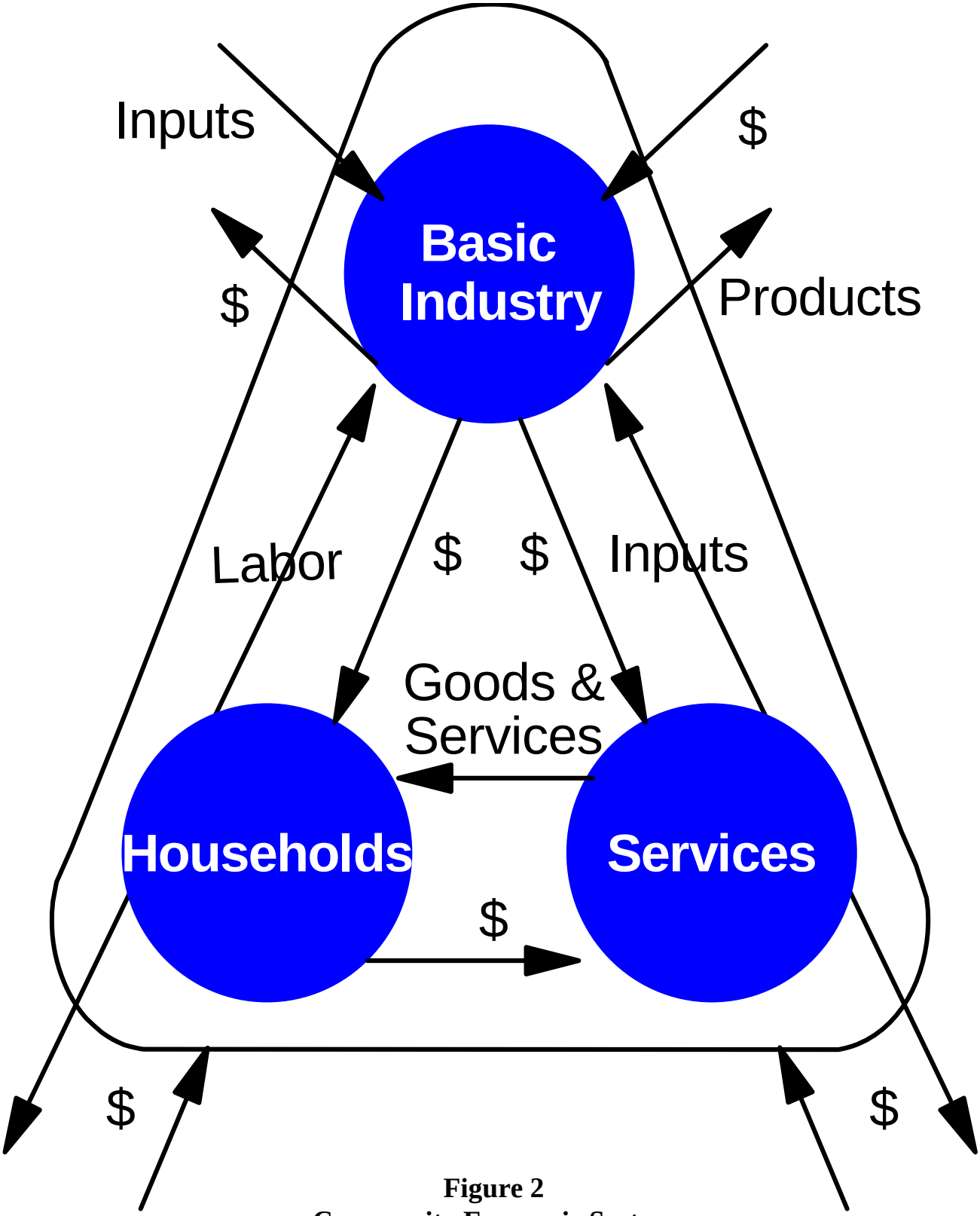


Figure 2
Community Economic System

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 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 same concept applies to labor income and output multipliers.

The Impact from Operating Activities

The employment and labor income impacts of TCMC from operating activities are presented in **Table 8**. Direct employment and labor income from operating activities were obtained from TCMC for the categories of hospital, clinics, and nursing home. Each of these sectors has a unique multiplier derived from IMPLAN.

The hospital employs 55 employees. The hospital employment multiplier is 1.23; this means for every job in the hospital sector, another 0.23 job is created in other sectors (businesses) in Towner County. The secondary employment generated in Towner County from the hospital sector is estimated to be 13 jobs. The hospital has a total impact of 68 jobs on the local economy of Towner County. The clinics have 19 direct employees and based on the clinics

employment multiplier of 1.21, the clinics have secondary employment impact of four employees and total employment impact of 23 employees. The nursing home has 35 direct employees; based on the nursing home employment multiplier of 1.10, the nursing home has secondary employment impact of four employees and total employment impact of 39 employees. ***The total employment impact of TCMC is 130 full- and part-time and contractual employees in Towner County; this includes the total direct employment impact of 109 employees and total secondary employment impact of 21 employees.***

Table 8
Economic Impacts from Operations Activities
of Towner County Medical Center, 2013

EMPLOYMENT IMPACT FROM OPERATIONS

Categories	Direct Employment	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
Hospital	55	1.23	13	68
Clinics	19	1.21	4	23
Nursing Home	35	1.10	4	39
TOTALS	**109**		**21**	**130**

LABOR INCOME IMPACT FROM OPERATIONS

Categories	Direct Labor Income	Labor Income Multiplier	Secondary Labor Income Impact	Total Labor Income Impact
Hospital	3,027,000	1.15	454,050	3,481,050
Clinics	1,506,000	1.13	195,780	1,701,780
Nursing Home	1,520,000	1.12	182,400	1,702,400
TOTALS	**6,053,000**		**832,230**	**6,885,230**

SOURCE: Direct employment and labor income data provided by Towner County Medical Center, 2013; multipliers from IMPLAN Group, LLC.

Data obtained from TCMC indicate that direct labor income for the hospital is $3.0

million. Using the hospital labor income multiplier of 1.15, TCMC generates secondary labor income impact of $454,050 and total labor income impact of $3.5 million. The clinics have $1.5 million in direct labor income; based on the clinics labor income multiplier of 1.13, the clinics have secondary labor income impact of $195,780 and total labor income impact of $1.7 million. The nursing home has $1.5 million in direct labor income; based on the nursing home labor income multiplier of 1.12, the nursing home has secondary labor income impact of $182,400 and total labor income impact of $1.7 million. ***The total labor income impact of TCMC is $6.9 million on the Towner County economy; this includes the total direct labor income impact of $6.1 million and total secondary labor income impact of $0.8 million.***

The Impact from Construction Activities

The construction activities of TCMC will have an impact on the economy of Towner County. This impact is often overlooked. TCMC has minimal construction activities for 2012, 2013, and 2014. Data in **Table 9** show estimated employment and labor income generated from the construction, as well as the impacts.

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 $117,600 in construction costs for TCMC during 2012, 2013, and 2014 are estimated to create one direct construction job over the three years with an estimated direct construction labor income of $50,055*** over the three years (**Table 9**). 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.

Table 9
Economic Impacts of Construction Activities
of Towner County Medical Center, 2013

EMPLOYMENT IMPACT FROM CONSTRUCTION

Categories	Direct Employment	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
2012	0.23	1.22	0.05	0.28
2013	0.09	1.22	0.02	0.11
2014	0.68	1.22	0.15	0.83
TOTALS	**1.00**		**0.22**	**1.22**
3-Year Average	0.33		0.07	0.41

LABOR INCOME IMPACT FROM CONSTRUCTION

Categories	Direct Labor Income	Labor Income Multiplier	Secondary Labor Income Impact	Total Labor Income Impact
2012	$11,513	1.21	$2,418	$13,931
2013	$4,505	1.21	$946	$5,451
2014	$34,037	1.21	$7,148	$41,185
TOTALS	**$50,055**		**$10,512**	**$60,567**
3-Year Average	$16,685		$3,504	$20,189

SOURCE: Direct employment and labor income data provided by Towner County Medical Center, 2013; multipliers from IMPLAN Group, LLC.

Since the construction numbers were low, the total of the three years was one direct construction worker, 0.22 in secondary employment impact and 1.22 in total employment impact. These numbers were derived utilizing the Towner County construction employment multiplier of 1.22. This construction employment multiplier of 1.22 indicates that a 0.22 job is created in other businesses in Towner County due to each job associated with construction activities. These jobs in other businesses are referred to as secondary jobs. ***The direct employment impact from construction activities of TCMC for 2012, 2013, and 2014, is***

estimated to be one job over the three years, resulting in estimated secondary employment impact of 0.22 jobs and total employment impact of 1.22 jobs over the three years.

The impact on labor income from construction is also presented in **Table 9**. The construction labor income multiplier is 1.21, which means that for each dollar of labor income paid to construction workers, another $0.21 of labor income is generated in other businesses in Towner County. ***The direct labor income impact of TCMC from construction activities for 2012, 2013, and 2014 is estimated to be $50,055 over the three years, resulting in secondary labor income impact estimated at $10,512 and total income impact estimated at $60,567 over the three years.***

The building of a new facility or a major renovation could result in significant construction costs and significant employment and labor income during the years of construction. **Appendix B** is provided to show the construction impacts from construction of a new facility or major renovation totaling $15,000,000 and built over a two-year period. This is only a hypothetical example of how much impact a large construction project could provide in economic impacts in Towner County. The results show that a $15.0 million new construction project in the future would generate 64 direct construction employees, with 14 secondary employees and 78 total employees each year of the two-year construction period. These, in turn, would generate $3.2 million in direct labor income, $0.7 million in secondary labor income, and $3.9 million in total labor income each year of the two-year construction period.

Summary

Both the operating activities and construction activities of a hospital impact the economy of Towner County. Often overlooked can be the economic impact created from construction activities. This report measures the impact that Towner County 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 2013, Towner County Medical Center employed 109 full-time and part-time and contractual employees and generated $6.0 million in labor income (wages, salaries, and benefits). When the secondary impacts are included, the total employment impact is 130 jobs and the total labor income impact is $6.9 million. The employment and labor income impacts from operating activities are annual and will continue each and every year that Towner County Medical Center operates in the future. These are long term economic benefits of Towner County Medical Center.

The impact from construction activities on the economy of Towner County is estimated for the three years of construction activities. Towner County Medical Center has indicated that $117,600 in construction will occur or have occurred during 2012, 2013, and 2014. This construction resulted in one direct employee, 0.22 secondary employees, and 1.22 total employees. Construction impact occurs only during the construction period.

Since the construction during this three-year period was minimal, a hypothetical example is provided in the appendix to show the impact of a $15.0 million construction project over two years. The results show that a $15.0 million new construction project in the future would generate 64 direct construction employees, with 14 secondary employees and 78 total employees each year of the two-year construction period. These, in turn, would generate $3.2 million in direct labor income, $0.7 million in secondary labor income, and $3.9 million in total labor income each year of the two-year construction period.

The impacts generated by Towner County Medical Center contribute to the local economy of Towner County. The hospital employs local residents. The hospital and its employees spend money in Towner County and generate a secondary impact. If the hospital increases or decreases in size, the medical health of Towner County as well as the economic health of Towner 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 Towner County, as well as the overall medical health of the Towner County residents. Given this, not only does Towner County Medical Center contribute to the health and wellness of the local residents but Towner County Medical Center also contributes to the overall economic strength of Towner County.

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Appendix A

Economic Data Tables for Towner County from U. S. Census Bureau, County Business Patterns and U. S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis

Appendix A, Table 1
Full- and Part-Time Employment by Type of Employment and by Major Industry[1]
for Towner County and North Dakota, 2011 and 2012

	2011			2012		
	Towner County		N. Dakota	Towner County		N. Dakota
Employment Categories	No. of Jobs	Percent	Percent	No. of Jobs	Percent	Percent
Total FT & PT	1,785	100.0%	100.0%	1,803	100.0%	100.0%
Wage & Salary	872	48.9%	78.8%	880	48.8%	79.8%
Proprietors	913	51.1%	21.2%	923	51.2%	20.2%
Farm proprietors'	395	22.1%	5.0%	393	21.8%	4.7%
Nonfarm proprietors'[2]	518	29.0%	16.2%	530	29.4%	15.5%
By Industry:						
Farm employment	493	27.6%	6.1%	520	28.8%	6.0%
Nonfarm employment	1,292	72.4%	93.9%	1,283	71.2%	94.0%
Private	1,120	86.7%	82.9%	1,124	87.6%	83.9%
Forestry, fishing, related	(D)	**	0.9%	(D)	**	0.9%
Mining	0	0.0%	4.7%	0	0.0%	6.1%
Utilities	(D)	**	0.9%	(D)	**	0.8%
Construction	(D)	**	8.2%	(D)	**	8.8%
Manufacturing	(D)	**	6.2%	(D)	**	6.0%
Wholesale trade	73	6.5%	5.9%	77	6.9%	6.0%
Retail trade	123	11.0%	13.6%	118	10.5%	13.0%
Transp & warehousing	(D)	**	5.1%	(D)	**	5.8%
Information	(D)	**	1.9%	(D)	**	1.8%
Finance & ins	87	7.8%	6.4%	90	8.0%	5.9%
RE rental & leasing	88	7.9%	3.6%	92	8.2%	3.5%
Prof & techn svcs	(D)	**	4.7%	(D)	**	4.7%
Mgmt of cos & enterp	0	0.0%	1.1%	0	0.0%	1.1%
Admin & waste svcs	(D)	**	4.3%	(D)	**	4.2%
Educational svcs	16	1.4%	1.4%	16	1.4%	1.3%
Health care & social assist	(D)	**	14.8%	(D)	**	14.1%
Arts, entert, & recreation	48	4.3%	1.7%	(D)	**	1.7%
Accom & food svcs	62	5.5%	8.4%	(D)	**	8.3%
Other svcs, not pub admin	74	6.6%	6.2%	76	6.8%	6.0%
Sum of (D) Categories[3]	549	49.0%	0.0%	655	58.3%	0.0%
Govt & govt enterprises	172	13.3%	17.1%	159	12.4%	16.1%

SOURCE: U. S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (www.bea.gov [July 2014]).
(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) categories have been totaled to show the amount of missing data from employment.

Appendix A, Table 2
Personal Income ($1,000s) by Major Source and Industry[1]
for Towner County and North Dakota, 2011 and 2012

	2011			2012		
	Towner County		N. Dakota	Towner County		N. Dakota
Income or Earnings Categories	Income	Percent	Percent	Income	Percent	Percent
Total Personal Income						
Total earnings by place of work	64,028	100.0%	100.0%	102,215	100.0%	100.0%
Wage & salary disbursements	25,639	40.0%	67.4%	27,475	26.9%	64.9%
Proprietors' income[2]	32,078	50.1%	16.9%	68,541	67.1%	21.1%
Other	6,311	9.9%	15.7%	6,199	6.1%	14.0%
Earnings by Industry						
Farm	27,942	43.6%	8.4%	64,901	63.5%	13.9%
Nonfarm	36,086	56.4%	91.6%	37,314	36.5%	86.1%
Private	28,548	79.1%	80.5%	30,346	81.3%	82.7%
Forestry, fishing, related	(D)	**	0.6%	(D)	**	0.5%
Mining	0	0.0%	9.8%	0	0.0%	12.6%
Utilities	(D)	**	2.3%	(D)	**	1.9%
Construction	(D)	**	10.8%	(D)	**	11.5%
Manufacturing	(D)	**	7.3%	(D)	**	6.8%
Wholesale trade	3,986	14.0%	9.2%	4,310	14.2%	9.3%
Retail trade	1,685	5.9%	8.3%	1,608	5.3%	7.7%
Transp & warehousing	(D)	**	7.1%	(D)	**	8.3%
Information	(D)	**	2.5%	(D)	**	2.2%
Finance & ins	2,371	8.3%	5.9%	2,795	9.2%	5.2%
RE rental & leasing	247	0.9%	3.0%	291	1.0%	2.8%
Prof & techn svcs	(D)	**	5.4%	(D)	**	5.5%
Mgmt of cos & enterp	0	0.0%	1.9%	0	0.0%	1.8%
Admin & waste svcs	(D)	**	2.6%	(D)	**	2.5%
Educational svcs	(L)	**	0.6%	(L)	**	0.5%
Health care & social assist	(D)	**	14.9%	(D)	**	13.4%
Arts, entert, & recreation	217	0.8%	0.4%	(D)	**	0.4%
Accom & food svcs	758	2.7%	3.3%	(D)	**	3.3%
Other svcs, not pub admin	2,887	10.1%	4.1%	3,062	10.1%	3.7%
Sum of (D)&(L) Categories[3]	16,397	57.4%	0.0%	18,280	60.2%	0.0%
Govt & govt enterprises	7,538	20.9%	19.5%	6,968	18.7%	17.3%

SOURCE: U. S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (www.bea.gov [July 2014]).
(D) Not shown to avoid disclosure of confidential information, but estimates are included in totals.
(L) Less than $50,000, but the estimates for this item are included in the 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) and (L) categories have been totaled to show the amount of missing data from private earnings.

Appendix A, Table 3
Employment and Payroll in Towner County and the State of North Dakota

	Employment			
	Health Services	Total County	Hlth Svcs as a % of Total County Employment	% of Total State Employment
2002	100-249	677	14.8% - 36.8%	19.3%
2003	100-249	730	13.7% - 34.1%	19.8%
2004	100-249	753	13.3% - 33.1%	19.4%
2005	100-249	784	12.8% - 31.8%	18.6%
2006	100-249	623	16.1% - 40.0%	18.4%
2007	100-249	567	17.6% - 43.9%	17.5%
2008	100-249	608	16.4% - 41.0%	17.0%
2009	100-249	577	17.3% - 43.2%	18.0%
2010	100-249	578	17.3% - 43.1%	18.6%
2011	100-249	539	18.6% - 43.2%	18.4%
2012	100-249	507	19.7% - 49.1%	17.4%
% Change from 2002 to 2012		**-33.5%**		

	Payroll ($1,000s)			
	Health Services	Total County	Hlth Svcs as a % of Total County Payroll	% of Total State Payroll
2002	(D)	12,697	**	20.8%
2003	(D)	12,849	**	21.0%
2004	(D)	13,500	**	20.9%
2005	(D)	13,595	**	20.7%
2006	(D)	12,898	**	19.9%
2007	(D)	11,695	**	18.6%
2008	(D)	14,193	**	18.4%
2009	(D)	14,804	**	19.5%
2010	(D)	14,873	**	19.5%
2011	(D)	14,484	**	18.7%
2012	(D)	15,568	**	17.0%
% Change from 2002 to 2012		**18.4%**		

SOURCE: U.S. Census Bureau, County Business Patterns; 2002-2012 based upon NAICS (www.census.gov [July 2014]).

[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).

(D) Withheld to avoid disclosing data for individual companies; data are included in higher level totals

Yellow highlighted cells are ranges in order to preserve the privacy of the health care services industry.

Appendix B

Hypothetical Example of Econmic Impact of $15,000,000 Construction Project over a Two-Year Period in Future

Appendix B Table

Example of a Large Construction Impact over a Two-Year Construction Period for Towner County Medical Center (Hypothetical ONLY)

EXAMPLE CONSTRUCTION COSTS	
2015	$7,500,000
2016	$7,500,000
Total Construction Costs	**$15,000,000**
Average Per Year	$7,500,000

EMPLOYMENT IMPACT FROM EXAMPLE CONSTRUCTION

Categories	Direct Employment	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
2015	64	1.22	14	78
2016	64	1.22	14	78
TOTALS	**128**		**28**	**156**
2-Year Average	64		14	78

LABOR INCOME IMPACT FROM EXAMPLE CONSTRUCTION

Categories	Direct Labor Income	Labor Income Multiplier	Secondary Labor Income Impact	Total Labor Income Impact
2015	$3,203,520	1.21	$672,739	$3,876,259
2016	$3,203,520	1.21	$672,739	$3,876,259
TOTALS	**$6,407,040**		**$1,345,478**	**$7,752,518**
2-Year Average	$3,203,520		$672,739	$3,876,259

SOURCE: Example only; multipliers from IMPLAN Group, LLC.

Appendix C

IMPLAN Software and Data from Minnesota IMPLAN Group, Inc. (MIG):

Model and Data Used to Derive Multipliers

IMPLAN Software and Data from Minnesota IMPLAN Group, Inc. (MIG): 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).

Minnesota IMPLAN Group, Inc. (MIG) – IMPLAN Software and Data

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 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. MIG has continued to develop the software and now has available IMPLAN Version 3 Software System, the new economic impact assessment software system.

With IMPLAN Version 3 software, MIG changed the packaging of products. Versions 3 utilizes 2007 or later data. When data are ordered, the data cost plus shipping are your 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.

For more information about Minnesota IMPLAN Group, Inc., contact MIG by phone at 651-439-4421, by email at info@implan.com, or review their website at www.implan.com.

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).