The Economic Impact of St. Aloisius Medical Center on Wells County, North Dakota

Prepared by:

National Center for Rural Health Works
Oklahoma State University

August 2016

The Economic Impact of St. Aloisius Medical Center on Wells County, North Dakota

Prepared for:

St. Aloisius 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

Brittany Krehbiel, Student Assistant

National Center for Rural Health Works
Oklahoma Cooperative Extension Service
Oklahoma State University
(405) 744-9823, 9824, or 9814

August 2016

The Economic Impact of St. Aloisius Medical Center on Wells 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 St. Aloisius Medical Center on Wells 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 Wells County;
3. Summarize the direct economic activities of St. Aloisius Medical Center from operations in Wells County;
4. Present concepts of community economics and multipliers; and
5. Estimate the economic impact of St. Aloisius Medical Center from operating activities in Wells 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., 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 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 17.5 percent in 2014;
- Per capita health expenditures increased from $356 in 1970 to $9,523 in 2014;

Table 2
United States Health Expenditures and Employment Data
1970-2014; Projected for 2018-2024

Year	Total Health Expenditures ($Billions)	Per Capita Health Expenditures ($)	Health as % of GDP (%)	Health Sector Employment (000)	Avg Annual Increase in Employment (%)
Historical					
1970	$74.6	$355	6.9%	3,052 [a]	
1980	255.3	1,108	8.9%	5,278 [a]	7.3%
1990	721.4	2,843	12.1%	8,211 [a]	5.6%
2000	1,369.7	4,857	13.3%	10,858 [a]	3.2%
2010	2,595.7	8,402	17.3%	13,894 [b]	2.7%
2011	2,696.6	8,666	17.4%	14,128 [b]	1.7%
2012	2,799.0	8,927	17.3%	14,397 [b]	1.9%
2013	2,879.9	9,115	17.3%	14,555 [b]	1.1%
2014	3,031.3	9,523	17.5%	14,831	1.9%
				Avg Yrly Increase 2000 to 2014	2.6%
Projections					
2018	3,785.5	11,499	18.1%		
2020	4,273.8	12,741	18.5%		
2022	4,825.4	14,129	19.1%		
2024	5,425.1	15,618	19.6%		

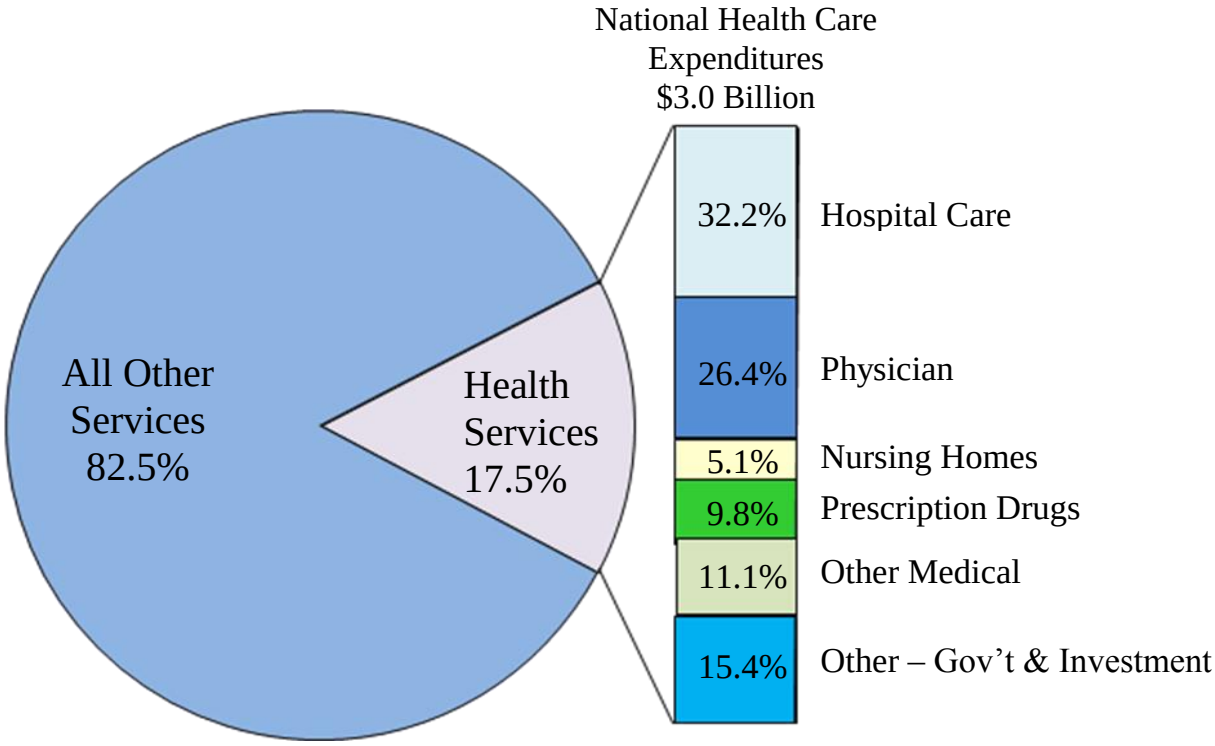
SOURCES: U.S. Department of Labor, Bureau of Labor Statistics (www.bls.gov [May 2016]); U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, National Health Expenditures 1960-2014 and National Health Expenditure Projections 2018-2024 (https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.html [May 2016]).
[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 385.9 percent from 1970 to 2014; and
- Annual increases in employment from 2000 to 2013 ranged from 1.7 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, also projects that health care expenditures will account for 18.5 percent of GDP by 2020 and increase to 19.6 percent of GDP in 2024. Per capita health care expenditures are projected to increase to $12,741 in 2020 and to $15,618 in 2024. Total health expenditures are projected to increase to over $5.4 trillion in 2024.

Figure 1 illustrates 2014 health expenditures by percent of GDP and by type of health service. Health services represented 17.5 percent of national GDP in 2013. The largest category of health services was hospital care, representing 32.2 percent of the total and the second largest category was physician services with 26.4 percent of the total.

Figure 1
National Health Expenditures as a Percent of Gross Domestic Product and by Health Service Type, 2014



SOURCE: U. S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, National Health Expenditures 2014 (http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html [August 2016]).

Wells County Demographic and Economic Data

St. Aloisius Medical Center is located in Harvey in Wells County, North Dakota. The medical service area is Wells County, North Dakota. **Table 3** illustrates the last two U. S. Census Bureau populations for Wells County cities and surrounding rural area, Wells County and North Dakota. The most current population estimates for 2014 and 2015 are also provided, if available.

The data in **Table 3** show Harvey to be the largest city in the county. Harvey had a population decrease of 10.4% from 2000 to 2010 and increased 2.6 percent from 2010 to 2014. All cities in Wells County show decreases in population from 2000 to 2010; only Cathay, Fessenden (county seat), and Harvey show increases from 2010 to 2014. From 2000 to 2010, the county population decreased 17.5 percent while North Dakota increased population 4.7 percent. The 2014 estimates show increasing population from the 2010 to 2014 for the county (0.1 percent) and the state (4.8 percent). Population estimates for 2015 are only available for the county and the state. From 2010 to 2015, the county shows a decrease in population (0.9 percent) while the state continues to show an increase in population (12.5 percent).

The 2010 Census populations and population projections for the county and state are illustrated in **Table 4**. The 2010 populations are from the U. S. Census Bureau and the projections from the North Dakota Housing Finance Agency, 2012 Statewide Housing Assessment Resource Project. The populations are projected to decrease for the county while increase for the state from 2010 through 2025.

Tables 5a-5d show the populations for the county and state by age group and gender for the 2000 and 2010 Census years and the 2014 and 2015 estimate years. From 2000 to 2015, the age 15-19 age group, the age 25-44 age group, and the 65+ age group in Wells County decreased in total population. The county age 20-24 and the 45-64 age groups increased from 2000 to 2010.

North Dakota showed increasing population trends with the two older age groups, 45-64 age group and 65+ age group, for all time periods. The state showed the largest increases in the 20-24 age group over all time periods. The county had large decreases in both male and female population from 2000 to 2010. The state had both male and female population increasing over all time periods.

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

	2000 Population	2010 Population	2014 Estimate	2015 Estimate	% Change '00 to '10	% Change '10-'14	% Change '10-'15
Bowdon	139	131	119	n/a	-5.8%	-9.2%	n/a
Cathay	56	43	46	n/a	-23.2%	7.0%	n/a
Fessenden (Co. Seat)	625	479	539	n/a	-23.4%	12.5%	n/a
Hamberg	28	21	13	n/a	-25.0%	-38.1%	n/a
Harvey	1,989	1,783	1,830	n/a	-10.4%	2.6%	n/a
Hurdsfield	91	84	57	n/a	-7.7%	-32.1%	n/a
Sykeston	153	117	102	n/a	-23.5%	-12.8%	n/a
Rural Area	2,021	1,549	1,504	n/a	-23.4%	-2.9%	n/a
Wells County	5,102	4,207	4,210	4,168	-17.5%	0.1%	-0.9%
North Dakota	642,200	672,591	704,925	756,927	4.7%	4.8%	12.5%

SOURCE: U.S. Census Bureau (www.census.gov [August 2016]).

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

	2010 Census	2020 Projection	2025 Projection	% Change '10-'20	% Change '10-'25
Wells County	4,207	4,071	4,044	-3.2%	-0.7%
North Dakota	672,591	806,541	841,820	19.9%	4.4%

SOURCE: U.S. Census Bureau (www.census.gov [August 2016]); North Dakota Housing and Finance Agency, Statewide Housing Needs Assessment, Detailed Tables (www.ndhfa.org [August 2016]).

Table 5a
U.S. Census Bureau Population by Age Groups and Gender
for Wells County and the State of North Dakota, 2000, 2010, 2014 and 2015 Estimates

	Age Groups							Gender	
	0-14	15-19	20-24	25-44	45-64	65+	Totals	Male	Female
2000 Census									
Bowdon	8	5	2	23	27	74	139	67	72
Cathay	10	8	0	11	17	10	56	24	32
Fessenden	127	47	10	142	143	156	625	301	324
Hamberg	1	5	2	6	8	6	28	18	10
Harvey	312	105	63	418	460	631	1,989	911	1,078
Hurdsfield	15	4	3	20	14	35	91	39	52
Sykeston	32	8	2	34	36	41	153	80	73
Rural Area	396	173	44	503	532	373	2,021	1,067	954
Wells County	901	355	126	1,157	1,237	1,326	5,102	2,507	2,595
Percent of Total	17.7%	7.0%	2.5%	22.7%	24.2%	26.0%	100.0%	49.1%	50.9%
North Dakota	129,846	53,618	50,503	174,891	138,864	94,478	642,200	320,524	321,676
Percent of Total	20.2%	8.3%	7.9%	27.2%	21.6%	14.7%	100.0%	49.9%	50.1%

Table 5b
U.S. Census Bureau Population by Age Groups and Gender
for Wells County and the State of North Dakota, 2000, 2010, 2014 and 2015 Estimates

	Age Groups							Gender	
	0-14	15-19	20-24	25-44	45-64	65+	Totals	Male	Female
2010 Census									
Bowdon	10	0	0	15	42	64	131	57	74
Cathay	7	6	1	6	14	9	43	24	19
Fessenden	64	22	18	75	155	145	479	240	239
Hamberg	1	1	1	3	8	7	21	15	6
Harvey	274	86	58	318	472	575	1,783	811	972
Hurdsfield	12	3	3	14	24	28	84	34	50
Sykeston	8	7	2	23	43	34	117	57	60
Rural Area	238	83	44	255	570	359	1,549	827	722
Wells County	614	208	127	709	1,328	1,221	4,207	2,065	2,142
Percent of Total	14.6%	4.9%	3.0%	16.9%	31.6%	29.0%	100.0%	49.1%	50.9%
North Dakota	124,461	47,474	58,956	165,747	178,476	97,477	672,591	339,864	332,727
Percent of Total	18.5%	7.1%	8.8%	24.6%	26.5%	14.5%	100.0%	50.5%	49.5%

Table 5c
U.S. Census Bureau Population by Age Groups and Gender
for Wells County and the State of North Dakota, 2000, 2010, 2014 and 2015 Estimates

	Age Groups							Gender	
	0-14	15-19	20-24	25-44	45-64	65+	Totals	Male	Female
2014 Census									
Bowdon	11	0	11	20	16	61	119	59	60
Cathay	9	3	7	3	12	12	46	28	18
Fessenden	101	23	4	122	156	133	539	245	294
Hamberg	0	0	0	0	8	5	13	10	3
Harvey	339	52	103	300	467	569	1,830	848	982
Hurdsfield	10	0	0	17	16	14	57	37	20
Sykeston	12	5	9	33	26	17	102	55	47
Rural Area	172	111	43	176	610	392	1,504	775	729
Wells County	654	194	177	671	1,311	1,203	4,210	2,057	2,153
Percent of Total	15.5%	4.6%	4.2%	15.9%	31.1%	28.6%	100.0%	48.9%	51.1%
North Dakota	132,664	48,403	65,331	176,711	180,914	100,902	704,925	358,862	346,063
Percent of Total	18.8%	6.9%	9.3%	25.1%	25.7%	14.3%	100.0%	50.9%	49.1%

Table 5d
U.S. Census Bureau Population by Age Groups and Gender
for Wells County and the State of North Dakota, 2000, 2010, 2014 and 2015 Estimates

	Age Groups							Gender	
	0-14	15-19	20-24	25-44	45-64	65+	Totals	Male	Female
2015 Estimate									
Wells County	670	193	204	697	1,246	1,158	4,168	2,094	2,074
Percent of Total	16.1%	4.6%	4.9%	16.7%	29.9%	27.8%	100.0%	50.2%	49.8%
North Dakota	147,666	49,444	72,293	197,791	182,452	107,281	756,927	388,853	368,074
Percent of Total	19.5%	6.5%	9.6%	26.1%	24.1%	14.2%	100.0%	51.4%	48.6%
% Change '00 to '10									
Wells County	-31.9%	-41.4%	0.8%	-38.7%	7.4%	-7.9%	-17.5%	-17.6%	-17.5%
North Dakota	-4.1%	-11.5%	16.7%	-5.2%	28.5%	3.2%	4.7%	6.0%	3.4%
% Change '10 to '14									
Wells County	6.5%	-6.7%	39.4%	-5.4%	-1.3%	-1.5%	0.1%	-0.4%	0.5%
North Dakota	6.6%	2.0%	10.8%	6.6%	1.4%	3.5%	4.8%	5.6%	4.0%
% Change '10 to '15									
Wells County	9.1%	-7.2%	60.6%	-1.7%	-6.2%	-5.2%	-0.9%	1.4%	-3.2%
North Dakota	18.6%	4.1%	22.6%	19.3%	2.2%	10.1%	12.5%	14.4%	10.6%

SOURCE: 2000 and 2010 Census population, 2014 and 2015 population estimates by age groups, ACS Demographic and Housing Estimates, U.S. Census Bureau (www.census.gov [August 2016]).

Tables 6a-6d provide the populations of Wells County and North Dakota by race groups and Hispanic origin. Although the white race group is decreasing over time, the county has over 98.0 percent of its population in this group. The state also has a very high percent of the population in the white race group with 89.0 percent. The county has a very low percent of Hispanic origin population, while the state is increasing in Hispanic origin over time.

Data from County Business Patterns (**Table 7**) and Bureau of Economic Analysis (**Tables 8-9**) 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 (**Table 7)** show 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 increased 4.0 percent from 2004 to 2014 while the total county employment decreased 1.3 percent. County health services employment as a percent of total county employment was 31.4 percent in 2004 and increased to 33.0 percent in 2014; the state health services employment was 19.4 percent of total state employment in 2004 and decreased to 16.5 percent in 2014.

County health services payroll increased from 2004 to 2014 by 47.2 percent, while total county payroll increased 61.0 percent from 2004 to 2014. County health services payroll as a percent of total county payroll was 28.0 percent in 2004 and decreased to 25.6 percent in 2014. This compares to the state health services payroll as a percent of total state payroll of 20.9 percent in 2004 and decreasing to 15.7 percent in 2014.

Data from U.S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (BEA) are shown in **Tables 8-9**. **Table 8** shows employment by

Table 6a
U.S. Census Bureau Population by Race and Hispanic Origin
Wells County and the State of North Dakota, 2000, 2010, 2014 and 2015 Estimates

	White	Black	Native American	Asian	Native Hawaiian Pacific Islndr	Some Other Race	Two or More Races	Totals	Hispanic Origin
2000 Census									
Bowdon	138	1	0	0	0	0	0	139	0
Cathay	55	0	0	0	0	0	1	56	1
Fessenden	620	0	2	0	0	0	3	625	1
Hamberg	28	0	0	0	0	0	0	28	0
Harvey	1973	0	10	3	0	1	2	1989	10
Hurdsfield	91	0	0	0	0	0	0	91	0
Sykeston	152	0	0	0	0	0	1	153	0
Rural Area	2,000	6	0	9	0	0	6	2,021	3
Wells County	5,057	7	12	12	0	1	13	5,102	15
% of Total	99.1%	0.1%	0.2%	0.2%	0.0%	0.0%	0.3%	100.0%	0.3%
North Dakota	593,181	3,916	31,329	3,606	230	2,540	7,398	642,200	7,786
% of Total	92.4%	0.6%	4.9%	0.6%	0.0%	0.4%	1.2%	100.0%	1.2%

Table 6b

U.S. Census Bureau Population by Race and Hispanic Origin

Wells County and the State of North Dakota, 2000, 2010, 2014 and 2015 Estimates

	White	Black	Native American	Asian	Native Hawaiian Pacific Islndr	Some Other Race	Two or More Races	Totals	Hispanic Origin
2010 Census									
Bowdon	130	0	1	0	0	0	0	131	2
Cathay	42	0	1	0	0	0	0	43	0
Fessenden	473	1	1	0	0	0	4	479	0
Hamberg	21	0	0	0	0	0	0	21	0
Harvey	1,756	1	10	0	1	2	13	1,783	18
Hurdsfield	84	0	0	0	0	0	0	84	0
Sykeston	115	0	0	1	0	0	1	117	0
Rural Area	1,539	1	0	3	0	0	6	1,549	1
Wells County	4,160	3	13	4	1	2	24	4,207	21
% of Total	98.9%	0.1%	0.3%	0.1%	0.0%	0.0%	0.6%	100.0%	0.5%
North Dakota	605,449	7,960	36,591	6,909	320	3,509	11,853	672,591	13,467
% of Total	90.0%	1.2%	5.4%	1.0%	0.0%	0.5%	1.8%	100.0%	2.0%

Table 6c

U.S. Census Bureau Population by Race and Hispanic Origin

Wells County and the State of North Dakota, 2000, 2010, 2014 and 2015 Estimates

	White	Black	Native American	Asian	Native Hawaiian Pacific Islndr	Some Other Race	Two or More Races	Totals	Hispanic Origin
2014 Census									
Bowdon	111	0	0	0	0	8	0	119	8
Cathay	33	0	0	0	0	0	13	46	0
Fessenden	497	0	0	0	0	0	42	539	0
Hamberg	13	0	0	0	0	0	0	13	0
Harvey	1817	0	5	0	0	0	8	1830	0
Hurdsfield	57	0	0	0	0	0	0	57	2
Sykeston	102	0	0	0	0	0	0	102	0
Rural Area	1,504	0	0	0	0	0	0	1504	5
Wells County	4,134	0	5	0	0	8	63	4,210	15
% of Total	98.2%	0.0%	0.1%	0.0%	0.0%	0.2%	1.5%	100.0%	0.4%
North Dakota	628,770	10,781	36,989	8,124	312	5,113	14,836	704,925	18,250
% of Total	89.2%	1.5%	5.2%	1.2%	0.0%	0.7%	2.1%	100.0%	2.6%

Table 6d

U.S. Census Bureau Population by Race and Hispanic Origin

Wells County and the State of North Dakota, 2000, 2010, 2014 and 2015 Estimates

	White	Black	Native American	Asian	Native Hawaiian Pacific Islndr	Some Other Race	Two or More Races	Totals	Hispanic Origin
2015 Estimates (N/A FOR WELLS COUNTY, SO THE STATE ARE NOT INCLUDED)									
% Change '00 to '10									
Wells County	-17.7%	-57.1%	8.3%	-66.7%	N/A	100.0%	84.6%	-17.5%	40.0%
North Dakota	2.1%	103.3%	16.8%	91.6%	39.1%	38.1%	60.2%	4.7%	73.0%
% Change '10 to '14									
Wells County	-0.6%	0.0%	-61.5%	0.0%	-100.0%	300.0%	162.5%	0.1%	-28.6%
North Dakota	3.9%	35.4%	1.1%	17.6%	-2.5%	45.7%	25.2%	4.8%	35.5%

SOURCE: 2000 and 2010 Census population and 2014 and 2015 population estimates by race and ethnic origin, U.S. Census Bureau (www.census.gov [August 2016]).

Table 7
Employment and Payroll for Health Services
in Wells County and North Dakota, 2004-2014

	Employment				
	Health Services		Total County	Health Services as a % of Total County Employment	Health Services as a % of Total State Employment
2004	428		1,365	31.4%	19.4%
2005	435		1,336	32.6%	18.6%
2006	436		1,320	33.0%	18.4%
2007	476	e	1,333	35.7%	17.5%
2008	487	e	1,279	38.1%	17.0%
2009	504	f	1,350	37.3%	18.0%
2010	456		1,333	34.2%	18.6%
2011	474	e	1,373	34.5%	18.4%
2012	465		1,342	34.6%	17.4%
2013	489		1,430	34.2%	17.3%
2014	445		1,347	33.0%	16.5%
% Chg '04-'14	4.0%		-1.3%		

	Payroll ($1000s)				
	Health Services		Total County	Health Services as a % of Total County Employment	Health Services as a % of Total State Employment
2004	7,467		26,672	28.0%	20.9%
2005	7,642		26,238	29.1%	20.7%
2006	8,082		27,800	29.1%	19.9%
2007	8,557	D	27,849	30.7%	18.6%
2008	8,904	D	30,009	29.7%	18.4%
2009	9,361	D	30,743	30.4%	19.5%
2010	9,872		33,488	29.5%	19.5%
2011	10,413		37,522	27.8%	18.7%
2012	11,346		39,202	28.9%	17.0%
2013	10,595		41,435	25.6%	16.6%
2014	10,992		42,950	25.6%	15.7%
% Chg '04-'14	47.2%		61.0%		

SOURCE: U.S. Census Bureau, County Business Patterns; 2004-2014 based on NAICS (www.census.gov [August 2016]).
"D" "e" and "f" indicates data withheld for nondisclosure for privacy; data are included in higher level totals.
"e" also indicates data are within the range of 250 to 499 employees
"f" also indicates data are within the range of 500 to 999 employees
Shaded cells are estimated.

Table 8
Full- & Part-Time Employment by NAICS[1] Industry
for Wells County and North Dakota, 2013 and 2014

Employment Categories	2013 Wells County No. of Jobs	2013 Wells County % of Total	2013 State % of Total	2014 Wells County No. of Jobs	2014 Wells County % of Total	2014 State % of Total	'13-'14 % Chg Co.	'13-'14 % Chg State
Total Employment	3,107	100.0%	100.0%	3,108	100.0%	100.0%	0.0%	3.3%
Wage & Salary	1,966	63.3%	79.8%	1,969	63.4%	80.4%	0.2%	4.0%
Proprietors'	1,141	36.7%	20.2%	1,139	36.6%	19.6%	-0.2%	0.6%
Proprietors'	1,141	100.0%	100.0%	1,139	100.0%	100.0%	-0.2%	0.6%
Farm proprs'	459	40.2%	23.0%	451	39.6%	22.5%	-1.7%	-1.6%
Nonfarm proprs'[2]	682	59.8%	77.0%	688	60.4%	77.5%	0.9%	1.3%
By Industry:	3,107	100.0%	100.0%	3,108	100.0%	100.0%	0.0%	3.3%
Farm employment	605	19.5%	5.8%	612	19.7%	5.6%	1.2%	0.7%
Nonfarm empl	2,502	80.5%	94.2%	2,496	80.3%	94.4%	-0.2%	3.5%
Nonfarm empl	2,502	100.0%	100.0%	2,496	100.0%	100.0%	-0.2%	3.5%
Prvt nnfrm empl	2,183	87.3%	84.1%	2,171	87.0%	84.6%	-0.5%	4.0%
Govt/govt enterpr	319	12.7%	15.9%	325	13.0%	15.4%	1.9%	0.7%
Prvt nnfrm empl	2,183	100.0%	100.0%	2,171	100.0%	100.0%	-0.5%	4.0%
For, fshng, & related	(D)	N/A	1.0%	(D)	N/A	1.0%	N/A	0.2%
Mining	(D)	N/A	6.6%	(D)	N/A	7.2%	N/A	13.1%
Utilities	(L)	N/A	0.8%	(L)	N/A	0.8%	N/A	3.2%
Construction	165	7.6%	9.2%	172	7.9%	9.4%	4.2%	6.2%
Manufacturing	69	3.2%	5.8%	66	3.0%	5.7%	-4.3%	2.4%
Wholesale trade	221	10.1%	6.0%	234	10.8%	6.0%	5.9%	3.3%
Retail trade	(D)	N/A	13.0%	(D)	N/A	12.9%	N/A	2.9%
Transp & wrhsng	(D)	N/A	5.9%	(D)	N/A	6.1%	N/A	8.0%
Information	26	1.2%	1.7%	25	1.2%	1.6%	-3.8%	0.4%
Finance & Ins	156	7.1%	5.7%	154	7.1%	5.6%	-1.3%	2.1%
RE/rental/leasing	48	2.2%	3.7%	49	2.3%	3.7%	2.1%	4.2%
Prof, sci, & techn svcs	44	2.0%	4.8%	43	2.0%	4.9%	-2.3%	5.6%
Mgmt of cos & enterpr	0	0.0%	1.2%	0	0.0%	1.2%	0.0%	3.1%
Admin/waste svcs	41	1.9%	4.0%	42	1.9%	4.0%	2.4%	4.5%
Educ services	(D)	N/A	1.3%	(D)	N/A	1.3%	N/A	3.5%
Hlth care & soc assist	**(D)**	**N/A**	**13.6%**	**(D)**	**N/A**	**13.2%**	**N/A**	**0.6%**
Arts/entrtnmnt/rec	40	1.8%	1.6%	43	2.0%	1.6%	7.5%	2.7%
Accommod/food svcs	156	7.1%	8.1%	153	7.0%	8.1%	-1.9%	3.1%
Other except pub admin	165	7.6%	5.7%	166	7.6%	5.7%	0.6%	3.2%
Sum (D)&(L)s[3]	1,052	48.2%		1,024	47.2%		-2.7%	

SOURCE: U.S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (www.bea.gov [August 2016]).

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

[2] Excludes limited partners.

[3] (D)s & (L)s summed to show the total amount of missing data from private nonfarm employment.

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

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

Table 9
Personal Income by Major Component and Earnings by Industry based on NAICS[1]
for Wells County and North Dakota, 2013 and 2014

Earnings (Income) Categories	2013 Wells County Income	2013 Wells County % of	2013 State % of	2014 Wells County Income	2014 Wells County % of	2014 State % of	'13-'14 Co. % Chg	'13-'14 State % Chg
Ttl Pers Inc	230,860	100.0%	100.0%	215,153	100.0%	100.0%	-6.8%	4.8%
Ttl plc wk	140,105	60.7%	79.7%	121,554	56.5%	80.5%	-	5.8%
Ttl plc wk	140,105	100.0%	100.0%	121,554	100.0%	100.0%	-	5.8%
Wage/salary	62,841	44.9%	69.2%	66,823	55.0%	72.3%	6.3%	10.7%
Proprs' inc [2]	61,686	44.0%	16.3%	38,306	31.5%	12.9%	-	-16.5%
Other	15,578	11.1%	14.5%	16,425	13.5%	14.8%	5.4%	7.8%
By Industry	140,105	100.0%	100.0%	121,554	100.0%	100.0%	-	5.8%
Farm	52,868	37.7%	7.4%	29,695	24.4%	4.1%	-	-41.8%
Nonfarm	87,237	62.3%	92.6%	91,859	75.6%	95.9%	5.3%	9.7%
Nonfarm	87,237	100.0%	100.0%	91,859	100.0%	100.0%	5.3%	9.7%
Prvt nonfarm	74,966	85.9%	83.7%	79,042	86.0%	84.6%	5.4%	10.8%
Govt/govt entrp	12,271	14.1%	16.3%	12,817	14.0%	15.4%	4.4%	3.6%
Prvt nonfarm	74,966	100.0%	100.0%	79,042	100.0%	100.0%	5.4%	10.8%
For/fshng/rel	D	N/A	0.6%	D	N/A	0.6%	N/A	7.5%
Mnng/Oil/Ga	D	N/A	12.9%	D	N/A	14.0%	N/A	20.4%
Utilities	76	0.1%	1.8%	99	0.1%	1.8%	30.3%	8.9%
Constr	5,920	7.9%	12.1%	6,510	8.2%	12.5%	10.0%	14.6%
Mfg	1,988	2.7%	6.5%	2,019	2.6%	6.2%	1.6%	6.2%
Whlsl trd	13,264	17.7%	9.0%	14,713	18.6%	8.8%	10.9%	7.9%
Rtl trade	D	N/A	7.5%	D	N/A	7.3%	N/A	7.8%
Trasp/wrhs	D	N/A	8.2%	D	N/A	8.4%	N/A	12.7%
Info	582	0.8%	2.0%	598	0.8%	1.9%	2.7%	6.4%
Fin/ins	4,281	5.7%	5.1%	4,750	6.0%	4.9%	11.0%	7.6%
RE/rntl/lsng	1,558	2.1%	3.7%	1,899	2.4%	3.7%	21.9%	12.2%
Prof/sci/techn	973	1.3%	5.7%	987	1.2%	5.9%	1.4%	13.2%
Mgmt/cos/ent	0	0.0%	1.8%	0	0.0%	1.8%	0.0%	10.5%
Adm/waste	892	1.2%	2.4%	907	1.1%	2.4%	1.7%	12.2%
Education	D	N/A	0.5%	D	N/A	0.5%	N/A	6.6%
Hlth/soc asst	D	N/A	**12.8%**	D	N/A	**12.1%**	N/A	4.8%
Arts/entert/rec	256	0.3%	0.4%	292	0.4%	0.4%	14.1%	5.7%
Accom/food	1,787	2.4%	3.3%	1,873	2.4%	3.3%	4.8%	9.5%
Other	6,162	8.2%	3.7%	6,379	8.1%	3.6%	3.5%	8.4%
Sum of (D)s [3]	37,227	49.7%		38,016	48.1%		2.1%	

SOURCE: U.S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (www.bea.gov [August 2016]).
[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 total amount of missing data from private earnings.
(D) Not shown to avoid disclosure of confidential information; estimates are included in the totals.

type and by industry. Data for 48.2 percent of the county industries are unavailable due to nondisclosure of confidential data; health care and social assistance is not available at the county level. The state health care and social assistance sector showed a 0.6 percent increase from 2013 to 2014. For the state for both 2013 and 2014, the largest industry was health care and social assistance and the second largest was retail trade. For the state, the industries with the largest percent increase from 2013 to 2014 were mining, oil, and gas and transportation and warehousing.

Table 9 shows personal income by source and by industry. Total personal income decreased by 6.8 percent from 2013 to 2014 for the county, while the state's total personal income increased by 4.8 percent. Again, county data are unavailable for 49.7 percent of the county due to nondisclosure of confidential information; again, health care and social assistance is one of these industries. The state had mining, oil and gas as the largest industry for both years; for 2013 for the state, the second largest was health care and social assistance and for 2014, construction. For the state, the largest increase from 2013 to 2014 was in the mining, oil and gas the second largest was construction.

Basic economic indicators for Wells County, North Dakota, and the United States are illustrated in **Table 10**. BEA data for 2014 show per capita income in Wells County at $51,325 with the state ($55,802) slightly higher and the nation ($46,049) slightly lower. The employment and labor force data are from the U.S. Department of Labor, Bureau of Labor Statistics. For 2015, the annual unemployment rate was 3.9 percent for Wells County, compared to 2.7 percent for the state and 5.3 percent for the U.S. For the preliminary year-to-date June 2016 employment and labor force data, the unemployment rate for Wells County was 3.3 percent; this compared to 3.4 percent for the state and 4.9 percent for the U.S.

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

Indicator	Wells County	North Dakota	United States
Total Personal Income (2014)	215,153,000	41,264,895,000	14,683,147,000,000
Per Capita Income (2014)	51,325	55,802	46,049
Employment (2015)	2,210	403,058	148,834,000
Unemployment (2015)	86	11,286	8,296,000
Unemployment Rate (2015)	3.9%	2.7%	5.3%
Employment (June 2016)	2,290	413,791	151,097,000
Unemployment (June 2016)	78	14,575	7,783,000
Unemployment Rate (June 2016)	3.3%	3.4%	4.9%
% of People in Poverty (2014)	7.9%	11.9%	15.6%
% Under 18 in Poverty (2014)	6.5%	14.5%	21.9%
Transfer Receipts (2014)	44,089,000	5,054,891,000	2,529,139,000,000
Transfer Receipts as a % of Total Personal Income	20.5%	12.2%	17.2%
Transfer Receipts -- Subcategories			
Medicare (2014)	9,906,000	1,056,455,000	611,100,000,000
% of Total	22.5%	20.9%	24.2%
Medicaid (2014)	9,978,000	900,119,000	513,500,000,000
% of Total	22.6%	17.8%	20.3%

SOURCE: Employment and unemployment data, U.S. Department of Labor, Bureau of Labor Statistics (www.bls.gov [August 2016]); Personal income, per capita income, and transfer receipts, U.S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis (www.bea.gov [August 2016]); Poverty data, U.S. Census Bureau (www.census.gov [August 2016]).

Based on 2014 U. S. Census poverty data, Wells County had lower poverty rates than the state and the nation. From BEA 2014 data, transfer receipts as a percentage for total personal income for Wells County (20.5 percent) were higher than the state (12.2 percent) and the nation (17.7 percent). This indicator shows the entity's percent of total personal income that comes from federal and state funds. For Wells County, Medicare represents 22.5 percent of the total transfer receipts and Medicaid represents 22.6 percent.

Direct Economic Activities of St. Aloisius Medical Center

St. Aloisius Medical Center, inspired by Jesus, in union with the Sisters of Mary of the Presentation, ministers health to all they serve. The Sisters of Mary of the Presentation have operated the hospital as a vital service to the area, embracing many towns in numerous counties with infallible faith, and devotion to the sick, without regard to race or creed. St. Aloisius Medical Center provides the following services directly:

Medical

- Licensed as a 25 bed critical access hospital
- Telemetry monitoring
- Staffed by licensed nursing personnel 24 hours per day
- Outpatient IV therapy
- Blood transfusions
- Cardiac rehabilitation
- Laboratory

Surgical

- - Elective general surgery

Swing Bed

- - Nursing care provided at skilled and non-skilled levels of care
- - Reimbursement by Medicare, Medicaid, private insurance, and self pay

CT scan
Mammography

Wellness center
Dakota Nursing Program Onsite
Mental Health Services through the Rural Mental Health Consortium
Long term care beds (95)

The following services are provided through contract or agreement:

- Ultrasound
- MRI
- Nuclear medicine
- Occupational therapy
- Speech therapy
- Sleep therapy
- Sleep disorder studies
- Ophthalmology

The direct economic activities of St. Aloisius Medical Center include the employees and their wages, salaries, and benefits to provide the health care services. The hospital includes the employment from operations of the hospital and from operations of the long term care facility. Construction impact will be provided for 2015 and 2016, the two most recent years' with construction activities. From **Table 11**, the total direct employment includes 149 jobs for the hospital and 116 jobs for the long term care facility, for a total of 265 jobs for St. Aloisius Medical Center. These jobs generate wages, salaries, and benefits and contractual compensation (labor income) in the amount of $3.2 million for the hospital and $5.6 million for the long term care facility, for a combined total of $8.8 million. These are the direct impacts from the operations of St. Aloisius Medical Center on the Wells County economy.

The economic impact of construction activities can also be measured for employment and labor income. These activities only occur during the year of construction, while operations occur each and every year that SAMC continues to operate. In 2015, construction activities were $2.5 million; the construction generated 18 jobs with labor income of $659,034 during 2015. In 2016, construction is estimated at $280,539; this construction will generate an estimated two jobs with

Table 11
Direct Economic Activities of St. Aloisius Medical Center
in Wells County, North Dakota

DIRECT ACTIVITIES FROM OPERATIONS		
Categories	Employees	Labor Income
Hospital, 2016	**149**	**$3,205,078**
Long Term Care Facility, 2016	**116**	**$5,615,762**
Operations Total	**265**	**$8,820,840**

DIRECT ACTIVITIES FROM CONSTRUCTION			
Categories	Construction	Employees	Labor Income
Construction Activities, 2015	**$2,474,865**	**18**	**$659,034**
Construction Activities, 2016	**$280,539**	**2**	**$73,226**

SOURCE: Local data from St. Aloisius Medical Center, 2016; Construction ratios and average construction compensation from IMPLAN Group, LLC.

an estimated $73,226 in labor income. These are direct impacts from construction activities of St. Aloisius Medical Center on the Wells County economy.

The Impact of St. Aloisius Medical Center

The direct impacts of St. Aloisius Medical Center, measured by employment and labor income, are only a portion of the total impact. There are additional economic impacts created as St. Aloisius Medical Center 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

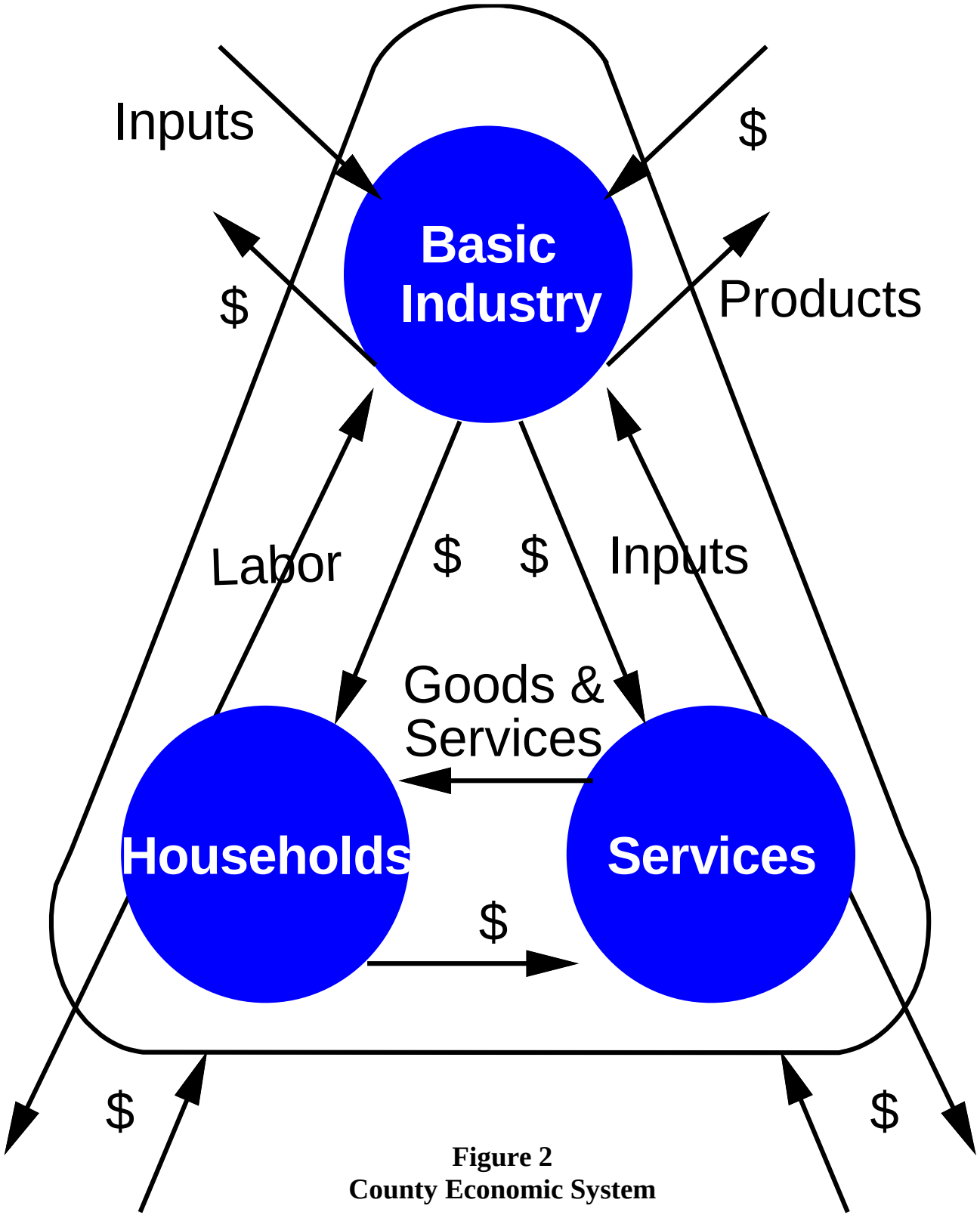


Figure 2
County Economic System

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 income iin 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 Operations Activities

The direct employment and labor income impacts of St. Aloisius Medical Center's operation activities were obtained from St. Aloisius Medical Center. The multipliers specific to Wells County, ND, are derived from IMPLAN data.

The hospital employs 149 employees (**Table 12**). The hospital employment multiplier is 1.40; this means for every job in the hospital sector, another 0.40 job is created in other sectors (businesses) in Wells County. The secondary employment generated in Wells County from the hospital sector is estimated to be 60 jobs. The hospital has a total impact of 209 jobs on the local economy of Wells County. With an employment multiplier of 1.25 for the long term care facility, the total employment impact is 145 jobs; this includes direct jobs of 116 and secondary jobs of 29. The total impact from operations is 354 jobs in Wells County, which includes 265 direct jobs and 89 secondary jobs.

Table 12
Economic Impact of Operations of St. Aloisius Medical Center on Wells County, 2016

EMPLOYMENT IMPACT FROM OPERATIONS

Categories	Direct Employment	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
Hospital, 2016	**149**	1.40	**60**	**209**
Long Term Care Facility, 2016	**116**	1.25	**29**	**145**
Operations Total	**265**		**89**	**354**

LABOR INCOME IMPACT FROM OPERATIONS

Categories	Direct Labor Income	Labor Income Multiplier	Secondary Labor Income Impact	Total Labor Income Impact
Hospital, 2016	**$3,205,078**	1.23	**$737,168**	**$3,942,246**
Long Term Care Facility, 2016	**$5,615,762**	1.15	**$842,364**	**$6,458,126**
Operations Total	**$8,820,840**		**$1,579,532**	**$10,400,372**

SOURCE: Direct employment and labor income data for 2016 provided by St. Aloisius Medical Center, 2016; Multipliers from IMPLAN Group, LLC.

Data obtained from St. Aloisius Medical Center indicate that direct labor income for the hospital is $3.2 million. Using the hospital labor income multiplier of 1.23 derived from IMPLAN, St. Aloisius Medical Center generates secondary labor income impact of $0.7 million and total labor income impact of $3.9 million. Using the long term care labor income multiplier, the long term care facility has a direct labor income impact of $5.6 million, secondary labor income impact of $0.8 million, and total labor income impact of $6.5 million. For the hospital and long term care facility combined, St. Aloisius Medical Center has direct labor income impact of $8.8 million, secondary labor income impact of $1.6 million, and total labor income impact of

$10.4 million.

The Impact from Construction Activities

The employment and labor income impacts from the 2015 and 2016 estimated construction activities of St. Aloisius Medical Center are presented in **Table 13**. Direct employment of 18 jobs and labor income of $659,034 from the $2.5 million construction activities in 2015 were derived from IMPLAN data. Direct employment of two jobs and labor income of $73,226 from the $280,539 construction activities in 2016 were also derived from IMPLAN data. The multipliers specific to Wells County, ND, are derived from IMPLAN data.

In 2015 with a construction employment multiplier of 1.30, the construction activities will generate 18 direct employment impact, five secondary employment impact and 23 total employment impact. In 2015 with a construction labor income multiplier of 1.29, the construction activities will generate $659,034 direct labor income impact, $191,120 secondary labor income impact, and $850,154 total labor income impact.

In 2016, the construction activities are estimated to generate two direct employment impact, one secondary employment impact and three total employment impact. In 2016, the construction activities are estimated to generate $73,226 direct labor income impact, $21,236 secondary labor income impact, and $94,462 total labor income impact.

Summary

Both the operating activities and construction activities of St. Aloisius Medical Center impact the economy of Wells County. Often overlooked can be the economic impact created from construction activities. This report measures the impact that St. Aloisius Medical Center will have on the economy due to its normal operating activities in 2016 and its construction

Table 13
Economic Impact of Construction Activities of St. Aloisius Medical Center on Wells County, 2015-2016

EMPLOYMENT IMPACT FROM CONSTRUCTION

Categories	Direct Employment	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
Construction Activities, 2015	**18**	1.30	**5**	**23**
Construction Activities, 2016	**2**	1.30	**1**	**3**

LABOR INCOME IMPACT FROM CONSTRUCTION

Categories	Direct Labor Income	Labor Income Multiplier	Secondary Labor Income Impact	Total Labor Income Impact
Construction Activities, 2015	**$659,034**	1.29	**$191,120**	**$850,154**
Construction Activities, 2016	**$73,226**	1.29	**$21,236**	**$94,462**

SOURCE: Construction ratios and construction average compensation used to estimate construction employment and labor income from IMPLAN data and multipliers from IMPLAN Group, LLC.

activities in 2015 and 2016. The operating impact occurs every year; whereas, the construction impact will only occur during the construction year.

In 2016, St. Aloisius Medical Center employed 149 full-time and part-time and contractual employees for hospital operations and 116 employees for the long term care facility operations, this generated $3.2 million in labor income (wages, salaries, and benefits and contractual compensation) for hospital operations and $5.6 million for the long term care facility operations. Total direct employment impact is 265 jobs with $8.8 million in labor income.

When the secondary impacts are included, the total employment impact from hospital operations is 209 jobs and the total labor income impact is $3.9 million. For the long term care facility operations, the total employment impact is 145 jobs with $6.5 labor income impact. The

combined employment impact from all operations is 354 total employment impact, including 265 total direct employment impact, and 89 total secondary employment impact. The combined labor income impact from all operations is $10.4 total labor income impact, which includes $8.8 million total direct labor income impact and $1.6 million total secondary labor income impact.

The employment and labor income impacts from operating activities are annual and will continue each and every year that St. Aloisius Medical Center operates in the future; these are long term economic benefits of St. Aloisius Medical Center.

In 2015, St. Aloisius Medical Center had $2.5 million in construction. This construction generated 18 direct jobs with $659,034 direct labor income. The total impact from the 2015 construction was 23 jobs and $850,154 labor income, with the secondary impacts of five jobs and $191,120 labor income.

In 2016, construction activities are estimated in the amount of $280,539. This construction will generate an estimated two direct jobs with $73,226 direct labor income. The total impact from the 2016 construction is estimated to generate a total employment impact of three jobs and total labor income impact of $94,462, with the secondary impacts of one job and $21,236 labor income. These construction impacts only occur during the year of construction.

The impacts generated by St. Aloisius Medical Center contribute to the local economy of Wells County. The hospital employs local residents. The hospital and its employees spend money in Wells County and generate a secondary impact. If the hospital increases or decreases in size, the medical health of Wells County as well as the economic health of Wells 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 Wells County, as well as the overall medical health of the Wells County residents. Given this, not only does St. Aloisius Medical Center contribute to the health and wellness of the local residents but St. Aloisius Medical Center also contributes to the overall economic strength of Wells County. Local decisionmakers should be aware of the economic contributions of St. Aloisius Medical Center and support their local hospital and healthcare providers.

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.