

**The Economic Impact  
of the Rural Residency Program  
at the Medical Center  
of Southeastern Oklahoma  
on the Economy  
of Durant, Bryan County, Oklahoma**

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## **The Economic Impact of the Rural Residency Program at the Medical Center of Southeastern Oklahoma on the Economy of Durant, Bryan County, Oklahoma**

Medical training programs have a tremendous medical and economic impact on the community in which they are located. These programs not only employ a number of people and have a large payroll, but they also provide the community with additional health care services.

The overall objective of this study is to measure the economic impact of Rural Residency Program on the economy of Durant in Bryan County. The specific objectives of this report are:

1. To discuss national trends in health care;
2. To review county demographic and economic data;
3. To summarize the direct economic activities of the rural residency program in Durant in Bryan County, Oklahoma;
4. To review concepts of community economics and multipliers;
5. To estimate the economic impact of the rural residency program on the economy of Durant in Bryan County, Oklahoma; and
6. To illustrate the intrinsic value of a residency program upon community hospitals.

No recommendations will be made in this report.

## National Health Trend Data

*The health care services is an extremely fast-growing sector in the United States, and based on the current demographics, there is every reason to expect this trend to continue.*

Data in **Table 1** provide selected expenditure and employment data for the United States.

Several highlights from the national data are:

- In 1970, health care services as a share of the national gross domestic product (GDP) were 7.2 percent and increased to 16.0 percent in 2006;
- Per capita health expenditures increased from \$356 in 1970 to \$7,026 in 2006;
- Employment in health services increased almost 313.0 percent from 1970 to 2006; and
- Annual increases in employment from 2003 to 2006 ranged from 2.0 percent to 2.3 percent.

The U. S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, predicts that health care expenditures will account for 18.4 percent of GDP by 2014 and increase to 19.5 percent of GDP in 2017. Per capita health care expenditures are projected to increase to \$11,043 in 2014 and to \$13,101 in 2017. Total health expenditures are projected to increase to almost \$4.3 trillion in 2017.

**Figure 1** illustrates 2006 health expenditures by percent of gross domestic product and by type of health service. The largest health service type was hospital care, representing 31 percent of the total. The next largest type of health services was physician services with 21 percent of the total.

National health expenditures are projected to double from 2006 to 2017. This increase in health expenditures from \$2.1 trillion to \$4.3 trillion would infer a reciprocal increase in the number of physicians. As the need for physicians continues to rise, additional residency training programs will be necessary to provide an adequate physician supply.

**Table 1**  
**United States Health Expenditures and Employment Data**  
**1970-2006; Projected for 2008, 2011, 2014 & 2017**

United States Data					
Year	Total Health Expenditures (\$Billions)	Per Capita Health Expenditures (\$)	Health as % of GDP (%)	Health Services Employment (000)	Avg. Annual Increase in Employment (%)
1970	\$74.9	\$356	7.2%	3,052 <sup>a</sup>	N/A
1980	253.4	1,100	9.1%	5,278 <sup>a</sup>	7.3%
1990	714.0	2,813	12.3%	7,814 <sup>a</sup>	4.8%
2000	1,353.6	4,790	13.8%	10,858 <sup>a</sup>	3.9%
2001	1,469.6	5,148	14.5%	11,188 <sup>a</sup>	3.0%
2002	1,603.4	5,560	15.3%	11,536 <sup>a</sup>	3.1%
2003	1,732.4	5,952	15.8%	11,817 <sup>b</sup>	N/A
2004	1,852.3	6,301	15.9%	12,055 <sup>b</sup>	2.0%
2005	1,973.3	6,649	15.9%	12,314 <sup>b</sup>	2.1%
2006	2,105.5	7,026	16.0%	12,602 <sup>b</sup>	2.3%
<b>Projections</b>					
2008	2,394.3	7,868	16.6%		
2011	2,905.1	9,322	17.4%		
2014	3,523.6	11,043	18.4%		
2017	4,277.1	13,101	19.5%		

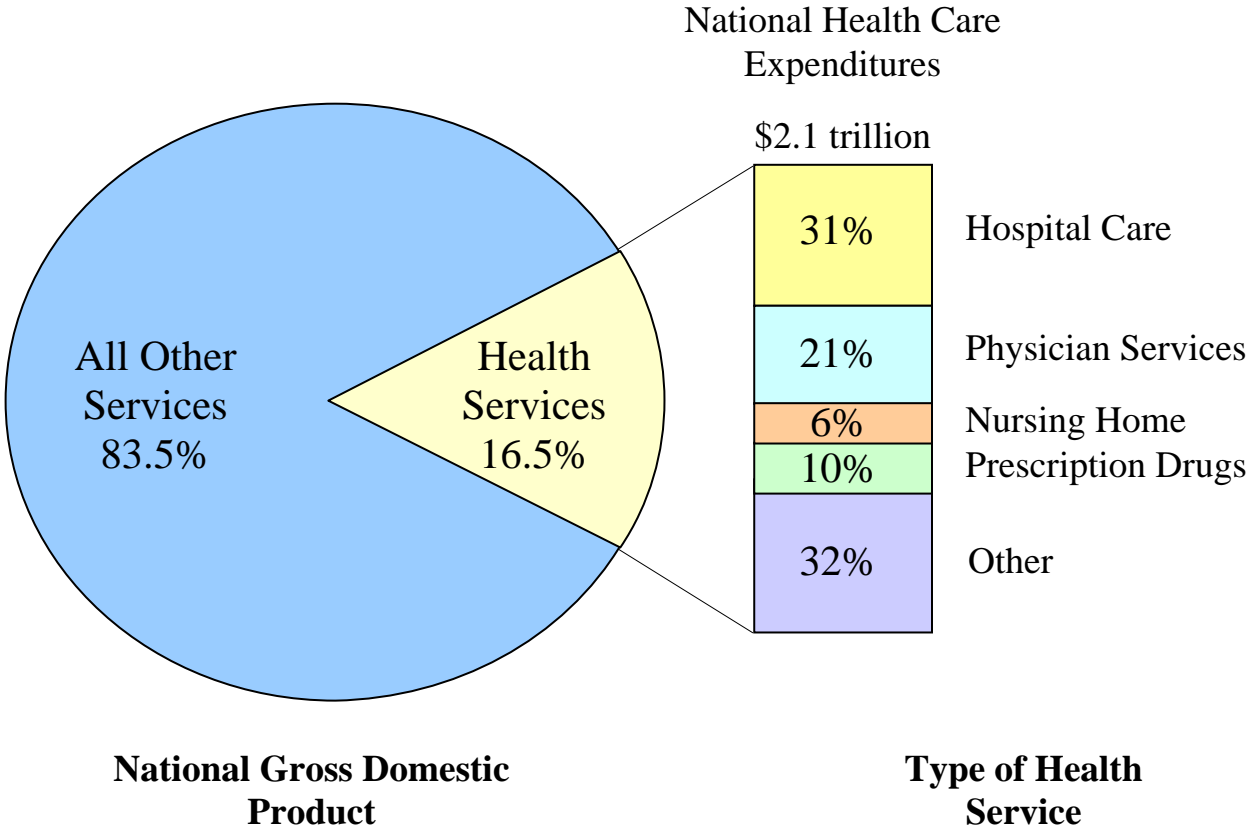
SOURCES: 2008 Bureau of Labor Statistics; 2008 Bureau of Economic Analysis; 2008 Centers for Medicare & Medicaid Services, National Health Expenditures 1970-2006 and National Health Expenditure Projections 2007-2017 (<http://www.cms.hhs.gov/NationalHealthExpendData> [March 2008]).

N/A - Not Available.

<sup>a</sup> Based on Standard Industrial Classification (SIC) codes.

<sup>b</sup> Based on North American Industry Classification System (NAICS).

**Figure 1**  
**National Health Expenditures**  
**As a Percent of Gross Domestic Product**  
**and by Health Service Type, 2006**



## County Demographic and Economic Data

The study is based on the medical service area that includes all of Bryan County, Oklahoma. Bryan County is located in the southeastern part of Oklahoma. The population of Bryan County and the state of Oklahoma are illustrated in **Table 2**. Durant is the county seat of Bryan County. Durant had a population of 12,823 in 1990 which increased to 13,549 in the 2000 Census, representing an increase of 5.7 percent. The 2007 estimated population for Durant was 16,161, representing an estimated increase of 19.3 percent from the 2000 Census. Bryan County increased 13.9 percent in population from 1990 to 2000 and is estimated to increase an additional 8.3 percent from 2000 to 2007. The state of Oklahoma experienced the same population trends as the county and is estimated to increase by 4.8 percent from 2000 to 2007.

**Table 3** shows the projected populations for both Bryan County and the state of Oklahoma from the 2000 census year through 2010, 2015, 2020, 2025 and 2030. Both the county and the state are projected to steadily increase in population through all of the projection years.

Data in **Table 4** present the 2007 Census estimated population by age and gender for Bryan County, Oklahoma. As seen from the data, the largest age groups are from 20-24 with 8.6 percent of the population and 25-29 with 8.2 percent. The smallest age groups are the 80-84 with 1.9 percent of the population and the 85+ age group with 2.3 percent of the population.

**Table 5** presents the population by race and ethnic groups for Census years 1990, 2000 and estimated Census population for 2007. Hispanic populations are steadily rising from 2.7 percent in 1990 to 7.2 percent in the 2007 Census estimates. The race groups have not changed considerably since the 1990 census with the White group comprising 83.5 percent in 1990 and 80.5 percent in 2007. The Native American race group proportion is higher in Bryan County

**Table 2**  
**Census Population, Population Estimates, and Percent Changes**  
**for Cities and Towns in Bryan County, Bryan County, and the State of Oklahoma**

	<u>Census</u>		<u>Estimates</u>	<u>10 Years</u>	<u>7 Years</u>
	1990	2000	2007	'90-'00	'00-'07
Achille town	491	506	528	3.1%	4.3%
Armstrong town	122	141	147	15.6%	4.3%
Bennington town	251	289	300	15.1%	3.8%
Bokchito town	576	564	578	-2.1%	2.5%
Caddo town	918	944	979	2.8%	3.7%
Calera town	1,536	1,739	1,811	13.2%	4.1%
Colbert town	1,043	1,065	1,111	2.1%	4.3%
Durant city	12,823	13,549	16,161	5.7%	19.3%
Hendrix town	108	79	79	-26.9%	0.0%
Kemp town	138	144	147	4.3%	2.1%
Kenefic town	147	192	201	30.6%	4.7%
Mead town	109	123	128	12.8%	4.1%
Silo town	249	282	293	13.3%	3.9%
Balance of Bryan County	<u>13,578</u>	<u>16,917</u>	<u>17,100</u>	24.6%	1.1%
Bryan County	<u>32,089</u>	<u>36,534</u>	<u>39,563</u>	<u>13.9%</u>	<u>8.3%</u>
State of Oklahoma	<u>3,145,585</u>	<u>3,450,654</u>	<u>3,617,316</u>	<u>9.7%</u>	<u>4.8%</u>

SOURCE: U.S. Census Bureau; 1990 & 2000 Census Population; 2007 Census Population Estimates (www.census.gov [October 2008]).



**Table 3**  
**Population, Projections, and Percent Change**  
**for Bryan County, and the State of Oklahoma**

County/ State	Census 2000	<u>Population Projections</u>				
		2010	2015	2020	2025	2030
Bryan County	36,534	40,700	42,800	44,900	47,000	49,200
% Change from 2000		11.4%	17.2%	22.9%	28.6%	34.7%
State of Oklahoma	3,450,654	3,591,516	3,661,694	3,735,690	3,820,994	3,913,251
% Change from 2000		4.1%	6.1%	8.3%	10.7%	13.4%

Source: Oklahoma Department of Commerce; Population Projections ([www.okcommerce.gov](http://www.okcommerce.gov) [October 2008]); U.S. Census Bureau; 2000 Census Population ([www.census.gov](http://www.census.gov) [October 2008]).

**Table 4**  
**Age Groups and Gender**  
**for Bryan County, Oklahoma**

Age	Male	Female	Total	% of Total
<b>2007 Estimated Population</b>				
0-4	1,313	1,288	2,601	6.6%
5-9	1,307	1,283	2,590	6.5%
10-14	1,299	1,224	2,523	6.4%
15-19	1,509	1,463	2,972	7.5%
20-24	1,739	1,673	3,412	8.6%
25-29	1,766	1,465	3,231	8.2%
30-34	1,229	1,165	2,394	6.1%
35-39	1,235	1,214	2,449	6.2%
40-44	1,178	1,203	2,381	6.0%
45-49	1,187	1,238	2,425	6.1%
50-54	1,236	1,277	2,513	6.4%
55-59	1,088	1,203	2,291	5.8%
60-64	966	1,060	2,026	5.1%
65-69	728	851	1,579	4.0%
70-74	638	726	1,364	3.4%
75-79	496	633	1,129	2.9%
80-84	302	465	767	1.9%
85+	303	613	916	<u>2.3%</u>
Total	<u>19,519</u>	<u>20,044</u>	<u>39,563</u>	<u>100.0%</u>

SOURCE: U.S. Census Bureau, 2007 County Population Estimates (www.census.gov [October 2008]).

**Table 5**  
**Race and Ethnic Groups**  
**Population and Percent of Total Population**  
**for Bryan County and the State of Oklahoma**

Race/Ethnic Group	Bryan County		State of Oklahoma	
	Number	Percent	Number	Percent
<b>1990 Census</b>				
White	26,790	83.5%	2,583,512	82.1%
Black	422	1.3%	233,801	7.4%
Native American <sup>1</sup>	4,557	14.2%	252,420	8.0%
Other <sup>2</sup>	320	1.0%	75,852	2.4%
Two or more Races <sup>3</sup>	N/A	N/A	N/A	N/A
Hispanic Origin <sup>4</sup>	465	1.4%	86,160	2.7%
<b>2000 Census</b>				
White	29,236	80.0%	2,628,434	76.2%
Black	520	1.4%	260,968	7.6%
Native American <sup>1</sup>	4,443	12.2%	273,230	7.9%
Other <sup>2</sup>	566	1.5%	132,037	3.8%
Two or more Races <sup>3</sup>	1,769	4.8%	155,985	4.5%
Hispanic Origin <sup>4</sup>	967	2.6%	179,304	5.2%
<b>2007 Census Estimate</b>				
White	31,852	80.5%	2,833,428	78.3%
Black	841	2.1%	286,849	7.9%
Native American <sup>1</sup>	4,848	12.3%	285,764	7.9%
Other <sup>2</sup>	280	0.7%	66,250	1.8%
Two or more Races <sup>3</sup>	1,742	4.4%	145,025	4.0%
Hispanic Origin <sup>4</sup>	1,499	3.8%	261,635	7.2%

SOURCE: U.S. Census Bureau, 1990 & 2000 Census data, 2007 Census estimates (www.census.gov [September 2008]).

<sup>1</sup> Native American includes American Indians and Alaska Natives.

<sup>2</sup> Other is defined as Asian Americans, Native Hawaiians, Pacific Islanders and all others.

<sup>3</sup> Two or more races indicates a person is included in more than one race group; it was introduced as a new category in the 2000 Census.

<sup>4</sup> Hispanic population is not a race but rather a description of ethnic origin; Hispanics are included in the five race groups.

NA = Not Available.

than in the state of Oklahoma, while the Black group is lower in Bryan County than in the state of Oklahoma.

Data in **Tables 6** and **7** are from the U.S. Department of Commerce, Regional Economic Information System, Bureau of Economic Analysis, for the year 2006 and are based on the North American Industry Classification System (NAICS). The purpose of **Tables 6** and **7** is to demonstrate the importance of health services as compared to the other industries in the economy of Bryan County and the state of Oklahoma. In 2006, the health care and social assistance sector (which includes hospitals and graduate medical education programs) accounted for 2,177 full- and part-time employees or 14.7 percent of the private employment in Bryan County (**Table 6**), compared to 10.1 percent for the state of Oklahoma. For Bryan County, the health care and social assistance sector was the largest sector of private employment followed by retail trade with 2,040 full and part-time employees (13.8 percent).

Personal income data are presented in **Table 7**. The health care services sector accounted for \$69.2 million or 18.1 percent of the private earnings in Bryan County and was tied with manufacturing as the largest sector of private earnings, followed by retail trade (#2), which was then followed by administration and waste services (#3). For the state of Oklahoma, the health care services sector accounted for 11.1 percent of the private earnings and was the third largest sector in the state, preceded by manufacturing and mining, respectively.

**Table 8** compares the employment and payroll for the health services sector to the total of all other sectors for both Bryan County and the state of Oklahoma. From the data, health services employment increased by 30.4 percent from 1998 to 2006 in Bryan County, while total county employment increased by 1.9 percent. Health services as a percent of total county employment increased from 15.3 percent in 1998 to 19.6 percent in 2006, compared to the state's

**Table 6**  
**Full-Time and Part-Time Employment by Type of Employment and by Major Industry**  
**for Bryan County and the State of Oklahoma <sup>1</sup>**

Employment Categories	Bryan County			State of Oklahoma	
	No. of	% of Total	% of Private	% of Total	% of Private
<b>Total FT &amp; PT</b>	<u>23,150</u>	<u>100.0%</u>		<u>100.0%</u>	
Wage & salary	17,244	74.5%		76.2%	
Proprietors'	<u>5,906</u>	<u>25.5%</u>		<u>23.8%</u>	
Farm proprietors'	1,711	29.0%		16.5%	
Nonfarm proprietors' <sup>2</sup>	<u>4,195</u>	<u>71.0%</u>		<u>83.5%</u>	
<b>By Industry:</b>					
Farm employment	1,945	8.4%		4.5%	
Nonfarm employment	<u>21,205</u>	<u>91.6%</u>		<u>95.5%</u>	
Private employment	<u>14,800</u>	69.8%	<u>100.0%</u>	82.6%	<u>100.0%</u>
For, fshng, rel <sup>3</sup>	(D)		**		0.5%
Mining	(D)		**		4.2%
Utilities	75		0.5%		0.6%
Construction	1,085		7.3%		7.8%
Manufacturing	1,265		8.5%		9.3%
Wholesale trade	805		5.4%		3.9%
Retail trade	2,040		13.8%		13.5%
Transp & wrhsng	455		3.1%		3.8%
Information	215		1.5%		2.1%
Finance & ins	620		4.2%		5.0%
RE rental & leasing	486		3.3%		4.4%
Prof & techn svcs	934		6.3%		6.0%
Mgmt of cos & enterp	98		0.7%		0.8%
Admin & waste svcs	1,576		10.6%		7.9%
Educational svcs	129		0.9%		1.6%
<b>Hlth care &amp; soc assist</b>	<b>2,177</b>		<b>14.7%</b>		<b>11.7%</b>
Arts, entert, & rec	210		1.4%		1.8%
Accomm & food svcs	1,221		8.3%		7.9%
Other svcs, not pub	<u>1,223</u>		<u>8.3%</u>		<u>7.4%</u>
Govt & govt enterprises	<u>6,405</u>	<u>30.2%</u>		<u>17.4%</u>	

SOURCE: U. S. Department of Commerce, Bureau of Economic Analysis, 2006 data (www.bea.gov [October 2008]).

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

<sup>2</sup> Excludes limited partners.

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

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

**Table 7**  
**Personal Income, Earnings by Place of Work and by Industry**  
**for Bryan County and the State of Oklahoma <sup>1</sup>**

Employment Categories	Bryan County			State of Oklahoma	
	Income (\$1,000s)	% of Total	% of Private	% of Total	% of Private
<b>Total Personal Income</b>					
Total earnings by place of work	<u>628,001</u>	<u>100.0%</u>		<u>100.0%</u>	
Wage & salary disbursements	439,526	70.0%		64.0%	
Proprietors' income <sup>2</sup>	59,845	9.5%		18.9%	
Other	<u>128,630</u>	<u>20.5%</u>		<u>17.0%</u>	
<b>Earnings by Industry</b>					
Total by industry	<u>628,001</u>	<u>100.0%</u>		<u>100.0%</u>	
Farm earnings	-3,883	-0.6%		0.5%	
Nonfarm earnings	<u>631,884</u>	<u>100.6%</u>		<u>99.5%</u>	
Private earnings	<u>381,739</u>	60.4%	<u>100.0%</u>	79.2%	<u>100.0%</u>
For, fshng, rel <sup>3</sup>	(D)		**		0.3%
Mining	(D)		**		12.2%
Utilities	4,880		1.3%		2.0%
Construction	15,499		4.1%		6.1%
Manufacturing	69,193		18.1%		19.1%
Wholesale trade	28,472		7.5%		5.2%
Retail trade	40,780		10.7%		8.3%
Transp & wrhsng	16,612		4.4%		4.8%
Information	7,713		2.0%		2.9%
Finance & ins	19,357		5.1%		4.9%
RE rental & leasing	3,894		1.0%		2.1%
Prof & techn svcs	27,372		7.2%		6.9%
Mgmt of cos & enterp	3,285		0.9%		1.5%
Admin & waste svcs	36,792		9.6%		4.8%
Educational svcs	1,278		0.3%		0.9%
<b>Hlth care &amp; soc assist</b>	<b>69,211</b>		<b>18.1%</b>		<b>11.1%</b>
Arts, entert, & rec	1,854		0.5%		0.7%
Accomm & food svcs	14,184		3.7%		2.9%
Other svcs, not pub	<u>18,351</u>		<u>4.8%</u>		<u>3.3%</u>
Govt & govt enterprises	<u>250,145</u>	<u>39.6%</u>		<u>20.8%</u>	

SOURCE: U. S. Department of Commerce, Bureau of Economic Analysis, 2006 data (www.bea.gov [October 2008]).

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

<sup>2</sup> Excludes limited partners.

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

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

**Table 8**  
**Employment and Payroll for Bryan County and the State of Oklahoma**

	Employment			
	Health Services <sup>1*</sup>	Total County	Health Svcs as a % of Total County Employment	Health Svcs as a % of Total State Employment
1998	1,511	9,853	15.3%	14.7%
1999	1,479	9,798	15.1%	14.2%
2000	1,423	9,777	14.6%	14.1%
2001	1,477	9,892	14.9%	14.3%
2002	1,672	10,912	15.3%	15.1%
2003	1,901	11,934	15.9%	15.2%
2004	1,767	13,027	13.6%	15.4%
2005	1,788	10,567	16.9%	15.4%
2006	1,971	10,041	19.6%	15.1%
% Change from 1998 to 2006	30.4%	1.9%		

	Payroll (\$1,000s)			
	Health Services <sup>1*</sup>	Total County	Health Svcs as a % of Total County Payroll	Health Svcs as a % of Total State Payroll
1998	30,543	173,711	17.6%	14.5%
1999	29,489	191,233	15.4%	14.1%
2000	28,936	195,121	14.8%	14.0%
2001	33,747	218,306	15.5%	14.5%
2002	37,698	241,491	15.6%	15.2%
2003	39,613	257,691	15.4%	15.2%
2004	40,942	323,440	12.7%	15.7%
2005	45,936	262,057	17.5%	15.5%
2006	51,161	259,520	19.7%	15.1%
% Change from 1998 to 2006	67.5%	49.4%		

Source: U.S. Census Bureau, County Business Patterns; 1998-2006 based upon NAICS (www.census.gov [October 2008]).

<sup>1</sup> 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.

\*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).

health services portion of total state employment increasing from 14.7 percent in 1998 to 15.1 percent in 2006. Health services payroll in Bryan County grew 67.5 percent from 1998 to 2006, while the total county payroll increased by 49.4 percent. Health services as a percent of total county payroll increased from 17.6 percent in 1998 to 19.7 percent in 2006, compared to the state's health services payroll as a percentage of total state payroll increasing from 14.5 percent in 1998 to 15.1 percent in 2006.

**Table 9** presents economic indicators for Bryan County, the state of Oklahoma and the nation. In 2006, per capita income for Bryan County was \$25,733, which was lower than the state of Oklahoma and the United States. The 2007 annual unemployment rate for Bryan County was 3.7 percent, compared to 4.3 for the state, and 4.6 for the nation. However, in September 2008, the unemployment rate in Bryan County of 3.0 percent was lower than the state and the nation. The percentage of people and children in poverty was greater in Bryan County in 2005, as compared to that of the state and the nation. The percentage of total personal income from transfer dollars in 2006 for Bryan County was 24.3 percent, compared to 17.1 for the state, and 14.7 for the United States.



**Table 9**  
**Economic Indicators for Bryan County,**  
**the State of Oklahoma and the Nation**

Indicator	Bryan County	State of Oklahoma	United States
Total Personal Income (2006)	\$999,994,000	\$115,881,184,000	\$10,968,393,000,000
Per Capita Income (2006)	\$25,733	\$32,391	\$36,714
Employment (2007)	19,691	1,657,964	146,047,000
Unemployment (2007)	752	74,739	7,078,000
Unemployment Rate (2007)	3.7%	4.3%	4.6%
Employment (Sept 2008)	19,974	1,690,706	146,448,000
Unemployment (Sept 2008)	615	61,797	9,199,000
Unemployment Rate (Sept 2008)	3.0%	3.5%	6.0%
% of People in Poverty (2005)	21.9%	16.4%	13.3%
% of Under 18 in Poverty (2005)	30.1%	23.0%	18.5%
Transfer Dollars (2006)	\$243,425,000	\$19,836,764,000	\$1,612,935,000,000
Transfer Dollars as Percentage of Total Personal Income (2006)	24.3%	17.1%	14.7%

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics ([www.bls.gov](http://www.bls.gov) [October 2008]); U. S. Department of Commerce, Bureau of Economic Analysis ([www.bea.gov](http://www.bea.gov) [October 2008]); U.S. Census Bureau ([www.census.gov](http://www.census.gov) [October 2008]).

## **The Direct Economic Activities**

Employment and payroll are the important direct economic activities created in Bryan County from the rural residency program. The rural residency program involves two sectors from IMPLAN, the hospital sector and the physicians, dentists, and other health professionals' sector. These two sectors have been combined to provide aggregated multipliers applicable to the impact of the rural residency program.

The rural residency program includes the medical education staff and the resident physicians. The medical education staff includes two general practitioners and a medical education coordinator. There are currently 12 resident physicians. Total employment of the rural residency program is 15 full- and part-time employees, with an estimated payroll including benefits of \$803,500 (**Table 10**). In summary, the rural residency program is vitally important as a community employer and important to the community's economy. The rural residency program employees purchase a large amount of goods and services from businesses in Bryan County. These impacts are referred to as secondary impacts or benefits to the economy. Before the secondary impacts of the health services sector are discussed, basic concepts of community economics will be discussed.

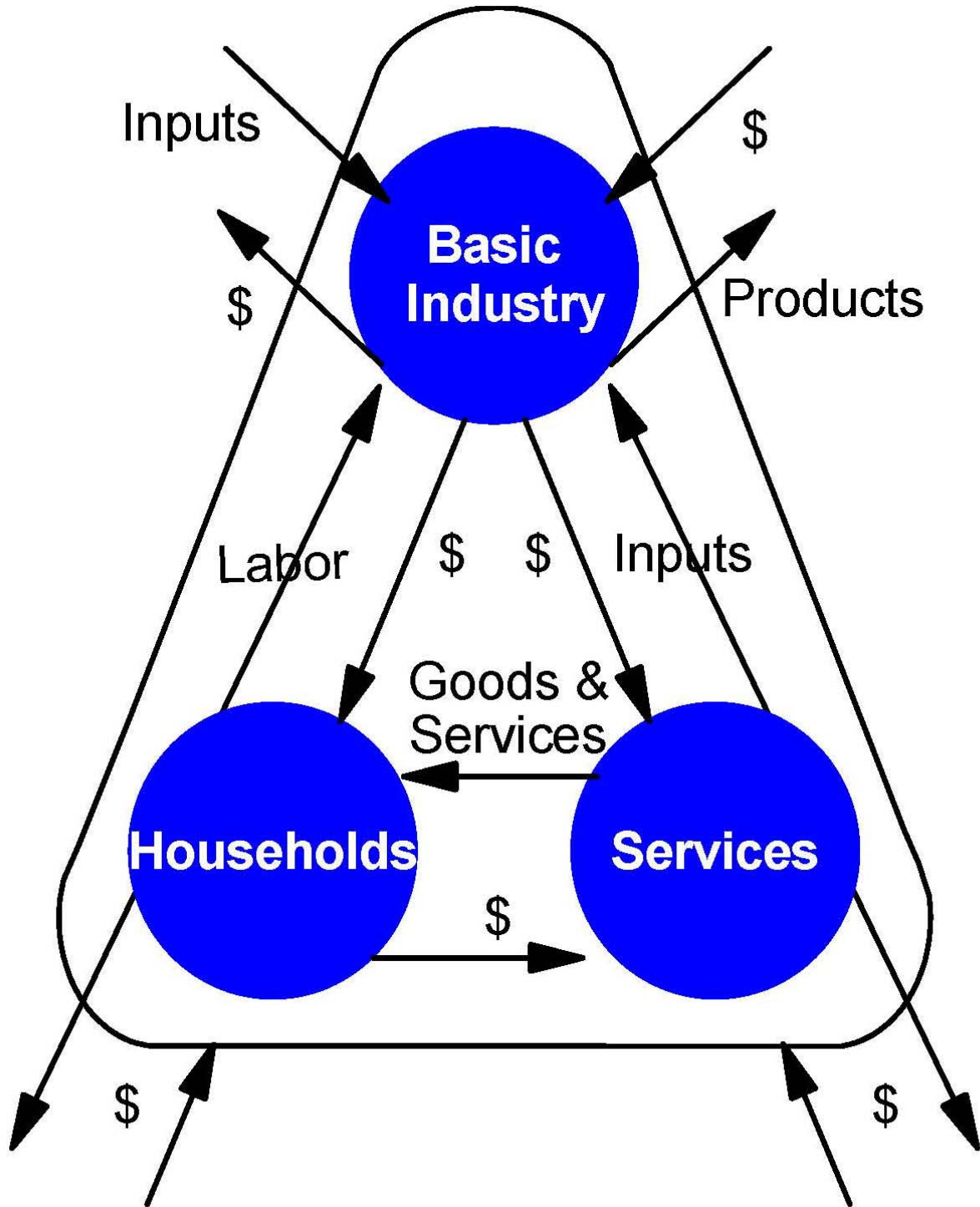
## **Some Basic Concepts of Community Economics and Income and Employment Multipliers**

**Figure 2** illustrates the major flows of goods, services, and dollars of any economy. The foundation of a community's economy are those businesses which sell some or all of their goods and services to buyers outside of the community. Such a business is a basic industry. The flow of products out of, and dollars into, a community are represented by the two arrows in the upper right portion of **Figure 2**. To produce these goods and services for "export" outside the community, the basic industry purchases inputs from outside of the community (upper left portion of **Figure 2**), labor from the residents or "households" of the community (left side of **Figure 2**), and inputs from service industries located within the community (right side of **Figure 2**). The flow of labor, goods, and services in the community is completed by households using their earnings to purchase goods and services from the community's service industries (bottom of **Figure 2**). **Figure 2** illustrates 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 dollars going to households will stop. Likewise, the hospital will not purchase goods from other businesses and dollar flow to other businesses will stop. This decreases income in the "households" segment of the economy. Since earnings would decrease, households decrease their purchases of goods and services from businesses within the "services" segment of the economy. This, in turn, decreases these businesses' purchases of labor and inputs. Thus, the change in the economic base works its way throughout the entire local economy.

The total impact of a change in the economy consists of direct, indirect, and induced impacts. Direct impacts are the changes in the activities of the impacting industry, such as the

**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 produces an indirect impact in the business sectors. Both the direct and indirect impacts change the flow of dollars to the community's households. The households alter their consumption accordingly. The effect of this change in household consumption upon businesses in a community is referred to as an induced impact.

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

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

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

## **Secondary Impacts of the Durant Rural Residency Program on the Economy of Bryan County, Oklahoma**

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

The employment multiplier of 1.62 for the rural residency program is shown in **Table 10**. This indicates that for each job created by the rural residency program, a 0.62 job is created throughout the area due to business (indirect) and household (induced) spending. Applying the employment multiplier of 1.62 to the employment number of 15 brings the total employment impact to 24 employees ( $15 \times 1.62 = 24$ ) (**Table 10**). The secondary impact is 9 employees ( $15 \times 0.62 = 9$ ); these are the jobs created in other industry sectors in the Bryan County economy as a result of the spending of the rural residency program and the spending of the 15 rural residency program employees.

The income multiplier for the rural residency program is 1.31 (**Table 10**). This indicates that for each dollar created in that sector, \$0.31 are created throughout the area due to business (indirect) and household (induced) spending. The rural residency program has a total payroll of \$803,500; applying the income multiplier of 1.31 brings the total income impact to \$1,052,585 ( $\$803,500 \times 1.31 = \$1,052,585$ ). The secondary income impact is \$249,085, which is the income generated in the other industry sectors in the Bryan County economy due to the rural residency program spending and the rural residency program employees' spending.

Income also has an impact on retail sales. If the county ratio between retail sales and income continues as in the past several years, then direct and secondary retail sales generated by the rural residency program and its employees equals \$376,777 (**Table 10**). A 1.0 percent sales

**Table 10**  
**Impact of Durant Rural Residency Program**

<b>DIRECT ECONOMIC ACTIVITIES</b>	Full- and Part-time Employment	Income (including Benefits)
Rural Residency Program	<u><b>15</b></u>	<u><b>\$803,500</b></u>
<hr/>		
<b>EMPLOYMENT IMPACT</b>	Multiplier	Impact
Direct Employment Impact		15
Multiplier	1.62	
Secondary Impact		<u>9</u>
Total Impact		<u><b>24</b></u>
<hr/>		
<b>INCOME IMPACT</b>	Multiplier	Impact
Direct Income Impact		\$803,500
Multiplier	1.31	
Secondary Impact		<u>\$249,085</u>
Total Impact		<u><b>\$1,052,585</b></u>
<hr/>		
<b>RETAIL SALES IMPACT</b>	Retail Sales	1% County Sales Tax Impact
Retail Sales Impact	<u><b>\$376,777</b></u>	<u><b>\$3,768</b></u>

SOURCE: Direct employment and income from the Durant Rural Residency Program at the Medical Center of Southeastern Oklahoma, 2008; 2006 multipliers, Minnesota IMPLAN Group, Inc.

tax collection is estimated to generate \$3,768 in Bryan County as a result of the total income impact. The bottom line is that health services not only contribute greatly to the medical health of the community, but also to the economic health of the community.

## **The Intrinsic Value of a Residency Program on a Community**

To present the impact of a residency program only from an economic perspective would shortchange some of the benefits that many communities have realized by integrating the residents and their medical education support staff into their communities. Thomas Gentile<sup>a</sup> through his article, “Value of Graduate Medical Education at a Community Teaching Hospital,” provides an excellent discussion of the intrinsic values of a residency program on community teaching hospitals.

First, medical education improves the quality of care to patients because there is constant monitoring of the patient’s medical care by the resident physicians, as well as by the attending physician staff. The residency program provides an ongoing, professional review mechanism which promotes appropriate diagnostic work-ups and treatment programs. Quality assessment and risk management programs are improved because there are more physicians monitoring patient care for errors and omissions. Highly skilled resident physicians are available 24 hours each day to assist in the medical management of the patient.

Second, the quality of the medical staff is enhanced in a teaching hospital by medical education programs. Recruitment and retention of high quality medical staff are more effective because of the presence of medical education programs. The image of the hospital in the eyes of physicians is enhanced by the commitment to education. This enhanced image improves recruitment and leads to an availability of specialists who make it possible for the hospital to offer a broader range of tertiary and medical support services. The climate of the teaching hospital is one of inquiry, easy communication with one’s peers, and the constant stimulus of alert and inquiring residents and medical students.

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<sup>1</sup>Thomas Gentile article - Proper citation is still pending.



Third, the opportunity for patient care research in a teaching hospital is made possible by the presence of full-time residents and fellows who participate in research both from a personal interest and to fulfill academic requirements. There can be no question that patient care research is an elevating influence on the level of professional competence in teaching institutions.

Fourth, full-time resident physicians provide the community and the hospital with a more fiscally plausible means to serve the medical needs of the poor and underserved in the medical services area through the staffing of ambulatory care centers (clinics).

Fifth, residents develop a degree of loyalty to the hospital and also develop referral patterns and contacts with physicians on the hospital staff during their years of training. Nationally, approximately 60% of graduating residents locate their practice within the service area of the hospital in which they trained. Community teaching hospitals receive over 40% of their admissions from medical staff who have graduated from their training programs. Many of the key leaders of the medical staff will also be graduates of their training programs.

Although these benefits are intrinsically valuable to the hospital and physicians, the integration of a rural residency program into a local community will also positively impact other health care providers.

## **Summary**

The economic impact of the Durant rural residency program on the economy of Bryan County is important not only to Bryan County but also to the Medical Center of Southeastern Oklahoma and to the larger surrounding region that benefits from the physicians trained in the Durant rural residency program. In order to provide quality primary care physicians for the future, it is crucial that the area have a quality rural residency program.

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## APPENDIX A

### **Model and Data Used to Estimate Employment and Income Multipliers**

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

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

### **A Review of Input-Output Analysis**

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

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

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

### **MicroIMPLAN**

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

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

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

### **Minnesota IMPLAN Group, Inc. (MIG)**

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

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