

Economic Impacts of Healthcare: Clarke County, Mississippi

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Executive Summary

The healthcare sector includes hospitals, doctors and dentists offices, nursing and protective care facilities, and home health care and other allied health services. H.C. Watkins Memorial Hospital in Quitman contributes 57% of the direct economic impacts in the healthcare sector: it provides most of the health-related jobs in the county and \$3.35 million of income. The impact of healthcare in Clarke County includes \$16.2 million of industry sales in the healthcare sector and \$3.8 million of industry sales in all other sectors of the local economy, including business organizations in the services sectors, finance, insurance, real estate, as well as wholesale and retail trade sectors. The total impact on industry sales was estimated at \$19 million. One accurate measure of economic impacts is the total contribution of the healthcare sector to value-added components of the economy: rent, profits, interest, and wages. The total impact of healthcare to value-added contributions in the economy was estimated at \$10.2 million annually. Healthcare directly and indirectly supports 301 jobs, with a total impact on labor income of \$8.4 million.

Statewide, average per-capita spending for healthcare is \$4,028, yet in Clarke County spending for healthcare was estimated at \$1,977 per-capita. Discharge data from local hospitals suggests that only 20.4% of residents seek healthcare in the county. It is outside the scope of this report to address this issue specifically, yet it is likely that increased consumption of local healthcare can have a positive impact on Clarke County's economy. This is possible because of the linkages that the healthcare sector has with other businesses in the local economy, including the service sector, finance, and trade and real estate sectors. The data suggests that for every additional dollar spent on healthcare in Clarke County, an additional \$0.235 is generated in the form of inter-industry sales in other sectors, including income, rents, interest, and profits. Community leaders who capitalize on this multiplier effect should find a responsive economy and positive growth in the long term.

Introduction

Clarke County, named after Joshua Clarke, the first chancellor of the State of Mississippi, has had an agricultural and natural resource heritage since its official beginning on December 23, 1833. The county's early economic history was largely influenced by the construction of a railroad that provided transportation from Mobile, Alabama to the Ohio River. More than 86% of the county's population is rural, which is reflected by the low population density of 62 persons per square mile in 2000.

Quitman, Mississippi (also named after an early state chancellor) is the city in which the county seat resides. Quitman is the most populous area in the county with 2,463 residents. Other cities (population) are Stonewall (1,149), Shubuta (651), Enterprise (474), and Pachuta (245). There are two school districts: Enterprise Consolidated School District (875 students) and Quitman Consolidated School District (2,540 students). Special districts include the Clarke County Soil Conservation District, Quitman-Clarke County Airport Board, and Chickasawhay Natural Gas District.

The total ad valorem assessment for Clarke County was \$111 million in 2000. An average county millage of 112.21 results in estimated levies of about \$997,000 annually. Gross retail sales were \$94 million in 2001. The largest manufacturers are Dart Container Corp., Air Vent, Inc., Meyer Packaging, F.C., Southwood Door Co., and USA Fabrics. Combined, these manufacturers employ about 565 persons.

Three demographics that affect spending on healthcare are: (1) population; (2) age distribution; and (3) personal income. Population is a major factor because it is proportional to levels of spending. The age distribution of the population is an important factor because the elderly consume, on average, almost three times that of the rest of the adult population, and six times that of children. Personal income influences healthcare among local residents, and reflects the cost of producing healthcare services such as wages and salaries of healthcare workers. Healthcare insurance is also an important factor, because uninsured persons spend considerably less on healthcare than those who are fully insured.

The population in Clarke County in 2000 was 17,970 persons, up 4% from the previous decennial census in 1990 (Table 1). The population in 2000 included 4,520 school-aged children, which represented 25% of the population. The elderly made up 15% of the population with 2,720 persons aged 65 years or older. The population is anticipated to grow by about 2% through 2010. In 2000 the unemployment rate was 8.8% or 810 persons out of 9,160 total in the civilian labor force. The labor force itself had grown by more than 11% from 1990 to 2000.

Table 1. Selected Demographics and Income Data for Clarke County.

	1990	2000	2010
Total Population:	17,290	17,970	18,350
School-aged Children:	3,680	4,520	3,370
Elderly Persons:	2,570	2,720	2,820
Civilian Labor Force:	8,230	9,160	9,354
Employment:	7,640	8,350	8,527
Unemployment:	590	810	827
Total Personal Income: (\$ million)	238.72	291.08	354.63
Regular Income: (\$ million)	158.23	170.76	208.00
Dividends, Interest and Rent: (\$ million)	32.62	48.37	53.52
Transfer Payments: (\$ million)	47.87	71.95	93.11

Source: State and County QuickFacts, Woods & Poole Economics, County and City Databook 2000.

Regular income is defined as wages, salaries, proprietor's income and other labor income less social contributions and residence adjustments. Estimates for 2010 based on Woods & Poole and historical fractions.

Total personal income includes regular income in the form of wages, salaries, proprietary and property incomes, as well as dividends, interest and rents, and governmental transfer payments. In Clarke County, total personal income was \$291.08 million in 2000, up 22% from 1990. Total personal income is expected to increase by about 22% through 2010. Transfer payments made up 25% of total personal income in 2000.

Another factor that influences healthcare spending is healthcare insurance. Uninsured persons spend considerably less on healthcare than those who are fully insured. In 2002 16.7% of Mississippi's population were without health insurance, compared to 15.2% of the U.S. population (United Health Foundation). Mississippi ranked 38th in the nation. The proportion of Mississippi's uninsured exceeds that of Alabama (12.7%) and Tennessee (10.8%).

Healthcare in Clarke County

H.C. Watkins Memorial Hospital in Quitman is Clarke County's center for acute medical care. In 2003, H.C. Watkins had 32 licensed beds and discharged a total of 533 patients. About 86% (or 459) of these patients were residents of Clarke County (Table 2a). Even so, this represented only 20.4% of all residents who received hospital care; 1,791 residents received hospital care in 2003 but were discharged from hospitals outside of Clarke County (Table 2b).

Table 2a. H.C. Watkins Memorial Hospital Discharges in 2003

	Clarke County	Other Counties	Total
H.C. Watkins Memorial	459	74	533

Source: 2003 Report on Hospitals, Mississippi State Department of Health

Table 2b. Clarke County Residents Discharged from Hospitals in 2003

	H.C. Watkins	All Other Hospitals	Total
Clarke County Residents	459	1,791	2,250

Source: 2003 Report on Hospitals, Mississippi State Department of Health

The data is indicative of where Clarke County residents go for their hospital care, and suggests where they make other healthcare purchases. During 2002-2003, only 20.4% of Clarke County residents who received hospital care were discharged from H.C. Watkins Memorial Hospital in Clarke County (Figure 1). More than half were discharged from hospitals in Meridian (64%), and the balance was discharged from hospitals in Waynesboro, Laurel, Jackson, and Hattiesburg.

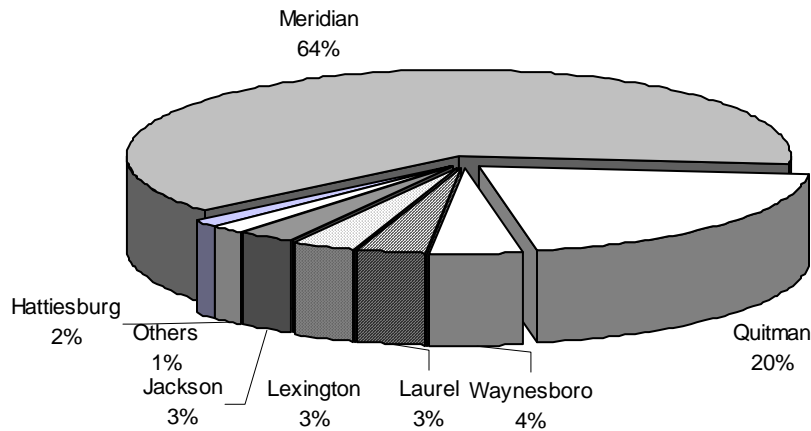


Figure 1. Percentage of Clarke County Patients Discharged by Location of Hospital

Complementing acute care in Clarke County were six primary care physicians and three dentists, as well as a number of home health agencies, medical clinics, hospices and related healthcare organizations (Amy *et al.*, 2003).

Local Healthcare Spending

The demand for local healthcare depends on a diverse set of factors. In Clarke County this may include the size as well as the type of healthcare businesses located within the community. Quality of care is also an issue, because the lack of a particular type of service can motivate people to seek care outside the community. The manner in which healthcare is utilized can also have a measurable impact on local health provision, and can ultimately affect the entire economy.

Local healthcare spending is indicative of the level of demand for healthcare. It includes out-of-pocket payments, private health insurance, federal, state and local payments, Medicare and Medicaid. To estimate local healthcare spending in Clarke County, per-capita local spending is multiplied times the local population. Per-capita spending for healthcare is based on average statewide per-capita spending and the fraction of local purchases for particular goods and services.

For example, average per-capita spending for hospital services in Mississippi was \$1,798. It was shown in the previous section that 20.4% of all local residents discharged from hospitals were discharged from the local hospital in Quitman. Thus, local per-capita spending for hospital services was 1798 times 20.4%, or \$367. Therefore, the local spending for hospital services was estimated at \$6.6 million (367 times the population of Clarke County in 2000). Other healthcare sectors were estimated in a similar way (see the technical appendix for an explanation), and the results were totaled (Table 3).

Table 3. Estimated Local Healthcare Spending in Clarke County, 2000.

Category	State Spending Per-Capita (\$)	Percent Local	Local Spending Per-Capita	2000 Population	Total Spending (\$)
Hospitals	1,798	20.40%	367	17,970	6,590,091
Physicians	1,019	66.78%	680	17,970	12,226,009
Home Health Care	130	100.00%	130	17,970	2,332,746
Nursing Homes	294	100.00%	294	17,970	5,290,335
Dental	143	34.42%	49	17,970	881,790
Medical Durables	42	70.93%	30	17,970	531,841
Drugs & Non-durables	515	70.93%	365	17,970	6,559,373
Other	88	70.93%	62	17,970	1,122,776
TOTAL	4,028	-	1,977		35,534,961

Source: Centers for Medicare and Medicaid Services, Mississippi Hospital Association, U.S. Census Bureau QuickFacts.

Total spending for personal healthcare in Clarke County was estimated at \$35.5 million, and includes \$6.6 million for local hospital care, \$12.2 million for physicians and other professionals, and \$2.3 million for home healthcare. These estimates are consistent with healthcare spending trends in the nation and in Mississippi.

The reader is advised to use caution with this information. Spending estimates are based on state per-capita values – it may be unrealistic to expect rural counties to have the same level of spending (even after accounting for local percentages). The actual amount of spending will probably be lower, as it likely depends on local demographic patterns (*e.g.*, income distributions), as well as the characteristics and availability of local healthcare. *Potential spending*, a term used in previous studies (Berry *et al.*, 2001), is an alternative and perhaps more appropriately used.

Even so, the totals in each category provide some insight with regard to expansion or contraction of local healthcare sectors. The local percentages in particular are revealing, because they specifically identify where healthcare dollars are leaking out of the local economy. Increasing the percentage of local purchases for some sectors will necessarily improve the economy as well as quality-of-life issues related to healthcare.

Economic Impacts

The healthcare system in Clarke County is an important part of the local economy. This section quantifies local healthcare in terms of industrial output (often referred to as industry sales), jobs, labor income, and contributions to value added components of the economy. Value added impacts represent the sum of returns to land, labor, management, and capital; that is, rent, wages, profit, and interest, respectively.

One reason why healthcare is important is that it is a definite and integral part of the economy. As a consequence, changes in the healthcare sector affect other sectors; this sort of consequence is referred to as an “indirect effect”. For example, consider the impact of the healthcare sector on employment: hospitals provide jobs to healthcare professionals (this is a direct effect on employment) – an expansion of existing facilities places increased demands on healthcare suppliers, who consequently find it necessary to create new jobs - this is an indirect effect. Another form of an indirect effect is the change in the number of local retail and services jobs related to healthcare employee spending, as well as spending made by employees of healthcare suppliers. Income, industrial output, and contributions to value added are considered in a similar fashion (Table 4). The total economic impact of healthcare is then calculated as the sum of direct plus indirect impacts over all of the industry sectors in the county.

Estimation of economic impacts was made possible through input-output analysis, which was first modeled by Polish-born Wassily Leontief, who was awarded the Nobel Prize in Economic Sciences in 1973. The reader is referred to the appendix for more information about input-output analysis, and the complex mathematical software used to create the models from which the estimates in this report were obtained.

Table 4. Healthcare Related Economic Impacts

	Direct	Indirect
Output or Sales	Healthcare revenue	Healthcare supplier revenue, local retail and service revenue related to healthcare employee spending
Employment	Jobs in the healthcare sector	Health care supplier jobs and other jobs in retail and service sectors related to employee spending
Income	Healthcare employee income. (Income is a component of value added – see below)	Income paid to healthcare supplier employees and income received by employees in retail and service sectors related to healthcare employee spending.
Value Added	Returns to land, labor, management and capital in the healthcare sector	Returns to healthcare supplier's land, labor, management and capital

The healthcare sector in Clarke County directly contributed \$15.3 million to the local economy (Table 5) in 2000. This level of economic activity directly supported 247 jobs in the healthcare sector and contributed \$7.4 million to value added components of the economy in the form of labor income.

Table 5. Local Contributions of Healthcare to the Clarke County Economy

	Output¹	Jobs	Income¹	Value Added¹
Doctors and Dentists	3.90	84	2.43	2.96
Nursing and Protective Care	0.61	23	0.30	0.31
Hospitals	8.37	103	3.95	4.01
Other Medical and Health Services	1.49	14	0.16	0.19
Pharmacies	0.97	23	0.53	0.71
Total	15.34	247	7.37	8.18

¹Output, income, and value added in \$ million.

Economic activity is generated by the healthcare sector in the form of direct effects – these percolate through the community’s economy as supporting sectors meet the demand for products and services required for efficient provision of healthcare services (*i.e.*, indirect effects). Additionally, income received by healthcare professionals, when spent locally, also generates sales, an induced effect which is combined with indirect effects in this report.

The total impact of the healthcare sector on the Clarke County economy was estimated at \$10.2 million of contributions to value added components, which included the \$8.2 million of direct effects plus \$2 million of indirect impacts (Table 6). The 247 jobs that are closely linked to healthcare were augmented by an additional 54 jobs in other sectors, and resulted in \$8.4 million of labor income. The total impact on industry sales (output) was estimated at \$19 million, which included \$15.3 million of direct and \$3.7 million of indirect impacts.

Table 6. Summary of Economic Impacts of Healthcare on Clarke County

	Direct	Indirect	Total
Industry Sales (<i>output</i>)	15.3	3.7	19.0
Jobs	247	54	301
Labor Income	7.4	1.0	8.4
Economic Impact (<i>total value added</i>)	8.2	2.0	10.2

Output, income and value added in \$ million.

Distribution of Indirect Impacts

Indirect effects reflect the level of interaction between the healthcare sector and other sectors of the economy. A higher level of interaction usually results in a greater degree of indirect impacts, and thus higher total impacts on the local economy for any given direct impact (total = direct + indirect). The healthcare sector generates indirect effects because the businesses and social services in the health sector purchase goods and services from others. The organizations that provide these goods and services must also purchase inputs (materials and labor) to efficiently meet their objectives. Consequently, additional relationships are created *ad infinitum*.

An analysis of indirect effects reveals the level of interaction that the healthcare sector has with other sectors in the economy. The source of most of the indirect effects that arise from the healthcare sector comes from: (1) Services; (2) Finance, Insurance and Real Estate (FIRE); and (3) Wholesale and Retail Trade. Together these three major sectors make up 72% of indirect effects related to healthcare (Figure 2).

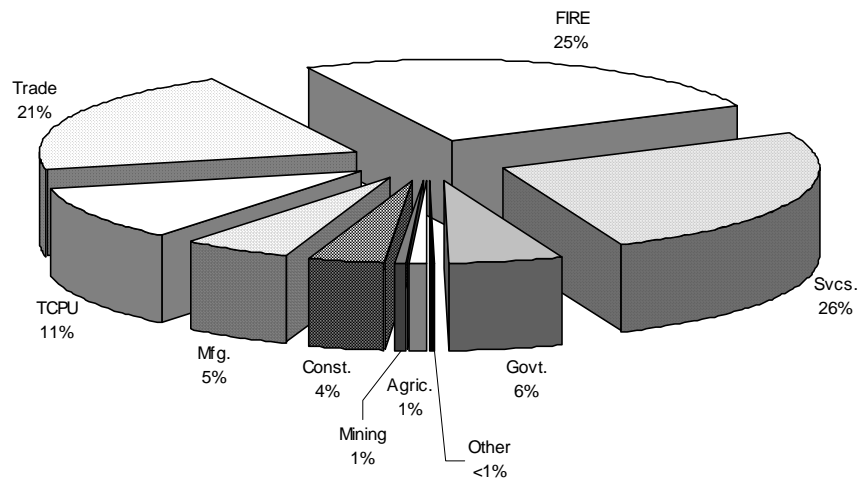


Figure 2. Distribution of Health Sector-Related Indirect Effects

Summary

The healthcare sector consists of hospitals, physicians, dentists, nursing homes, home healthcare agencies, pharmacies, and other professionals; it represents a substantial and important part of a rural community, in terms of both jobs and income. Sixty-five of Mississippi's 82 counties were classified as non-metropolitan in the 2000 Census. Statewide, non-metropolitan healthcare provides more than 81,000 jobs and \$2.5 billion of income. What makes these statistics remarkable is that more than 10% of the rural counties in Mississippi have no hospital, historically one of the largest segments of the healthcare sector.

Federal transfer payments represent an enormous part of healthcare spending. In 2002, nearly \$2 billion was injected into the State's economy in the form of Medicaid payments. This level of dependence upon the federal government for local assistance will likely continue, and is an indicator of the magnitude of individuals and families with limited income, and without adequate health insurance. Still more telling is the number of rural residents who have limited access to healthcare, income and insurance notwithstanding.

In the past decade, healthcare costs have risen faster than the cost of living in Mississippi. In real terms, the health component of gross state product grew statewide by an average of almost 10% per year from 1990 through 2001. Some segments of the healthcare sector exhibited even greater growth. For example, real home healthcare spending grew by an average of 16% annually, and personal spending for hospital services, the largest segment, grew by more than 12.4% annually in real terms.

Healthcare is an important part of Clarke County, and represented \$19 million of economic activity in 2000, of which 19% was attributable to indirect purchasing made by suppliers to the healthcare sector, as well as local spending by healthcare professionals. Local healthcare supported 247 jobs directly, and another 54 jobs in supplier sectors, particularly trade, finance, real estate, and insurance, which together accounted for almost half of the indirect impacts – an indication of a great deal of interaction and industrial interdependence. The total impact on labor income was \$8.4 million, part of the \$10.2 million of total value added to the economy because of healthcare.

Clarke County is fortunate to be one of 75 counties in Mississippi that has a hospital. Eighty-six percent of the patients discharged from H.C. Watkins Memorial Hospital in 2003 were residents of Clarke County. Yet this represented only 20.4% of residents who sought hospital care; the balance of patients was discharged from hospitals in nearby counties. Spending for local healthcare was estimated in this report at \$35.5 million. Is expansion of local healthcare warranted? It is a worthy consideration for local leaders and a populace that is expected to experience slow growth through 2010. Comprehensive healthcare planning is essential to develop the strongest healthcare sector that efficiently and effectively meets local needs. It is hoped that the information in this report will stimulate further community interest in local healthcare.

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Appendix 1. Input-Output Analysis

Public policy makers, elected officials, and decision makers at the local level frequently assess the priority of potential and ongoing projects. These projects often take the form of either a new industry locating in an area, or the expansion of an existing industry. In either case there is often an expectation that a new project will expand the labor market through increased demand for employment and local services. As new jobs are added, total income increases and local unemployment decreases. Demographic aspects of the economy, such as population and commuting patterns also change. New businesses are created to support expansion and provide locally available inputs to production. Increased income stimulates the growth of retail and service sectors. These changes to the economic and fiscal landscape of a local area, or region have implications on further economic development, as well as on tax policy, and the provision of public services, such as education and public safety.

Input-output analysis was developed in the 1930's by Wasily Leontief, who won the Nobel Prize in 1973 for his contributions to economics. Since then it has become one of the best-known, and most widely used techniques for assessing regional economic impacts. It excels at analyzing the economic relationships or linkages among major sectors of the economy. Input-output analysis is based on the fact that an initial change (increase or decrease in sales) in one sector of the economy can affect other sectors of the economy.

The initial change is often referred to as an impact, or a direct effect. The direct effect is measured in terms of sales to final demand, and it is the economic variable that drives an input-output model. The initial impact requires increased production by secondary industries, the suppliers of goods and services to the primary industry. Increased production by secondary industries is referred to collectively as indirect effects. Additionally, induced effects arise as a result of spending of the new income by households. Through careful examination of the relationships among industries themselves and between industries and households one can estimate the total effect, which is the sum of the direct, indirect, and induced effects.

One widely used input-output model is Implan, a commercial software produced by the Minnesota Implan Group, Inc. at Stillwater, Minnesota. Its popularity is due to its geographic and model formulation flexibility, and the extensive economic information that it provides. The Implan system, developed originally for use by the U.S. Forest Service, has been in use since 1979 and is capable of developing input-output models for any county, state, or group of counties or states in the United States.

Technical Appendix 1

Estimating Direct Impacts for Hospital Sectors in Mississippi

The objective was to develop a consistent framework for estimating direct impacts of hospital sectors in each county. State-level data on expenditures, jobs and income were combined with hospital employment data to estimate gross output for each hospital. The level of output is dependent on the statewide output:job ratio, resulting in proportional and consistent estimations. Gross output of each hospital was then assigned to each county in which it was located.

However, one of the hospitals in the region, Alliance-Laird Hospital (ALH), is located in Union, a small town on the border of Neshoba and Newton counties. Therefore, it was not entirely clear to which county ALH's economic impacts should be assigned. Though the hospital itself is located entirely in Newton County, it seemed unreasonable to assign all of the direct effects there - surely the economic benefits of the hospital spill over into Neshoba County as well. The only question was by how much.

Initially, the use of hospital discharge data was considered. In 2003, ALH discharged 36.21% of its patients to Neshoba County, 45.51% to Newton County, and 18.28% elsewhere. However, the trouble with this approach is that it assumes that patients, upon being discharged, are somehow taking the economic benefit of the hospital home with them. In fact, it is irrelevant where the patients are discharged (to test this, consider the following: in the extreme case of 100% non-local discharges, then by implication all of the economic impact leaks out of the local economy).

Economic impacts based on changes to final demand are place-based. The magnitude of the economic importance of a hospital depends a great deal on where its inputs are purchased (this forms the basis of input-output analysis). Increased non-local purchasing will result in smaller multipliers, thus lowering total impacts on the local economy - the reverse is also true: higher proportional local spending results in less leakage, and higher multipliers and total impacts.

Labor, and other variable-cost related inputs, make up a substantial portion of inputs required for operations. Data were not available on whether these purchases were made in Newton or Neshoba. Even so, the spatial nature of these data suggests that population is a suitable proxy variable. Therefore, the direct impacts were apportioned to Neshoba and Newton based on the distribution of the population of Union, Mississippi, where 24% of the population resides in Neshoba County, and 76% reside in Newton County. The level of ALH gross output was apportioned to the two counties in the same proportions.

Statewide hospital expenditures: \$4,170 million
 Number of hospital jobs: 51,585
 Labor income: \$1,969 million

Output per job = \$80,837.45
 Income per job = \$38,170.01

	Full-time	Part-time	FTE	Exp/Job	Output
H.C. Watkins	82	43	103.5	\$80,837.45	\$8,366,676.36
Neshoba Co. General	195	77	233.5	\$80,837.45	\$18,875,545.22
Newton Regional	105	51	130.5	\$80,837.45	\$10,549,287.58
Alliance Laird	138	98	187	\$80,837.45	\$15,116,603.66

County Allocations	Output (\$M)	Jobs	Income (\$M)
Clarke	\$8.367	104	\$3.951
Kemper	\$0.000	0	\$0.000
Neshoba	\$22.504	278	\$10.626
Newton	\$22.038	273	\$10.406

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Statewide expenditures are from *The Economic Contributions of Hospitals. In: Trendwatch Chartbook 2004. Trends Affecting Hospitals and Health Systems, September 2004.* Local hospital employment data from American Hospital Association via *Directory of America's Hospitals*, U.S. News & World Report website. Population apportionment data is from the Mississippi Department of Transportation.

TrendWatch Chartbook 2004

www.hospitalconnect.com/ahapolicyforum/trendwatch/chartbook2004.html

Directory of America's Hospitals

www.usnews.com/usnews/health/hospitals/hosp_home.htm

Mississippi Department of Transportation

www.gomdot.com/maps/county_maps.asp

Technical Appendix 2 Estimating County-Level Spending for Healthcare

Local healthcare spending is indicative of the level of demand for healthcare. It includes out-of-pocket payments, private health insurance, federal, state and local payments, Medicare and Medicaid. Estimates of county-level spending for healthcare are based on statewide per-capita spending for healthcare, a local spending percentage (LSP), and the local population. The LSP represents the proportion of statewide per-capita spending spent locally, that is, local purchases for healthcare goods and services.

The LSP for healthcare spending categories in each county is based on several factors, depending on the category:

Hospitals. The LSP for hospitals is based on hospital discharge data. That is, 2002-2003 Aggregate Patient Origin Study – Mississippi State Department of Health (MSDH).

Physicians. Data from the U.S. Department of Health and Human Services (HRSA) indicates that in 2000 the average number of primary care physicians per 100,000 population was 50, or 2,000 persons per physician (State Health Workforce Profiles. Highlights. Mississippi). Absolute local coverage (ALC) was calculated by multiplying the number of physicians (from the Mississippi Department of Health County Health Profiles) in the county by 2000. The LSP for physicians was then calculated as ALC divided by the population. For example, data from MSDH indicates that Kemper County has three primary care physicians. $3 * 2000 = 6000$ people covered at the state rate of coverage. The population in Kemper County in the same year (i.e., 2000) was 10,420: $6000/10,420 = 57.6\%$

Dentists. The methodology for estimating local spending in the dental sector was the same as that used for Physicians.

Drugs, Medical Durables and Non-Durables. The LSP for medical durables, drugs, and non-durables, and other items was estimated based on trade area capture (TAC) of drug stores in the retail sector for each county. LSP was calculated as TAC divided by population with an upper bound of 100%. For example, the trade area capture for Kemper County drug store sales was calculated to be 2707.62. Therefore the LSP was estimated as $2707.62 / 10420 = 26\%$

County	Population	Trade Area Capture	TAC %	Local TAC %
Clarke	17,970	12,746.65	70.93	70.93
Kemper	10,420	2,707.62	25.99	25.99
Neshoba	28,710	26,629.57	92.75	92.75
Newton	21,880	34,394.86	157.20	100.00

Home Healthcare. All spending for this category was assumed to be local (100%).

Nursing Homes. All spending for this category was assumed to be local (100%).

Data Sources

State Health Workforce Profiles and Highlights: bhpr.hrsa.gov/healthworkforce/reports/profiles

County Health Profiles: www.health.ms.gov/county

Patient Origin Studies: www.msdh.state.ms.us/msdhsite/index.cfm/15,312,111,html

Demographic data such as population: U.S. Census Bureau , www.census.gov

Technical Appendix 3 Estimating Health-Related Productivity Losses

Data obtained from the survey was combined with secondary employment and wage data from the Mississippi Employment Security Commission to estimate productivity losses in each county. This analysis concentrates on lost income from wages due to poor health as reported in the survey.

The first step in the analysis was to cross-tabulate survey respondents who were employed for wages with the total number of days lost due to poor health. Lost working days were calculated using a probabilistic approach: 21.57 working days per 30 days total results in 71.9% of the 30 day reporting period in the survey. The average number of working days lost per year by each working respondent was then calculated by multiplying the number of working days lost in the past thirty days times 12, then divided by the number of working respondents. The result is the average number of working days lost per employed person in a year.

	Employed for wages	Reported Days Lost	Calculated Working Days Lost	Annual Working Days Lost
Clarke	169	149	107.131	7.607
Kemper	224	212	152.428	8.166
Neshoba	215	193	138.767	7.745
Newton	192	186	133.734	8.358

Kemper County, with a figure of 8.166, had the highest number of annual working days lost per employed person.

The average number of working days lost per employed person in a year was then multiplied by county employment to calculate the total number of lost days annually in each county. Total days lost was annualized by dividing it by the number of working days in a year (260.58). Neshoba County had the highest level of lost productivity with 445 employee-years annually (Total Years Lost).

	Annual Working Days Lost	County Employment in 2000	Total Days Lost	Total Years Lost	Wage Rate in 2000 (\$)	Annual Lost Income in \$ million
Clarke	7.607	8350	63,518	243	21,277	5.180
Kemper	8.166	4010	32,745	126	19,611	2.461
Neshoba	7.745	15000	116,177	445	22,960	10.224
Newton	8.358	7960	66,533	255	21,240	5.417

Lost income was calculated by multiplying the wage rate by Total Years Lost. The data indicates that Neshoba loses an estimated \$10.2 million of wage income each year due to poor health. The total for the region was \$23.3 million, or approximately \$19.4 million of lost disposable income annually due to poor health.



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