

ECONOMIC IMPACT ANALYSIS

BROOKINGS HEALTH SYSTEM

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Prepared for:



Prepared by:



Dr. Weiwei Zhang
State Demographer
State Data Center

TABLE OF CONTENTS

| | |
|--|--------|
| List of Tables and Figures | - 3 - |
| Executive Summary..... | - 4 - |
| Introduction to the Report..... | - 4 - |
| Summary of Findings..... | - 5 - |
| Section I: Economic and Demographic Context..... | - 6 - |
| Section II: Brookings Health Economic Impact | - 12 - |
| Data and Methods | - 12 - |
| Impact Assessment..... | - 13 - |

LIST OF TABLES AND FIGURES

| | |
|--|--------|
| Table 1 State and Local Trends of Total Number of Employees and Average Annual Pay in All Sectors, from 2005 to 2014 | - 6 - |
| Table 2 Paid Employees and Annual Payroll of All Sectors in Brookings County, 2013..... | - 7 - |
| Table 3 Economic Impact of the Brookings Health on the County's Health Care and Social Assistance Sector and the Overall Economy, 2010, 2011, and 2013..... | - 14 - |
| | |
| Figure 1 Total Number of Employed in Health Care and Social Assistance and Annual Payroll (Adjusted and Unadjusted), from 2006 to 2013, Brookings County | - 8 - |
| Figure 2 Employees and Annual Payroll of the Health Care and Social Assistance Sector, as the Share of All Sectors, from 2006 to 2013, Brookings County | - 9 - |
| Figure 3 Population Pyramids and Selected Indicators of Brookings County Oopulation, 2010, 2020, and 2013..... | - 11 - |

EXECUTIVE SUMMARY

INTRODUCTION TO THE REPORT

This study is an economic impact analysis focusing on Brookings Health System, a non-profit, city-owned health system with its base in the City of Brookings, South Dakota.¹ The purpose of the study is to evaluate the impact of Brookings Health on the economic well-being of the region. The study tasks include identifying the direct and indirect impacts of Brookings Health on the growth of employment and labor income in the region in 2013.²

The report first provides the analysis of the economic and demographic context of Brookings County, where Brookings Health locates. The analysis examines the overall employment trend and average annual wages in the County compared to the statewide levels in South Dakota. The analysis then focuses on the Health Care and Social Assistance sector in Brookings County that includes hospitals. Examinations are conducted to look at the growth trend in the sector regarding the number of employees and annual payroll and their respective shares of the total employment and payroll for all sectors combined. The section concludes with a discussion on population projections and potential changes in the structure of the County population. The analysis of the economic and demographic context provides understanding the social and economic environment where Brookings Health locates and the communities that Brookings Health provides service to.

The study then examines the economic impact of Brookings Health. The analysis first looks at the direct impact, including the number of jobs created and the amount of payroll generated by Brookings Health System and clinics over years from 2010 to 2013.³ These direct contributions may generate further impacts on the County's overall employment and economy by adding supported supplier and consumer businesses that benefit from purchases by Brookings Health and the Avera Clinic, and their employees. To capture the indirect effects, the analysis adopts the multiplier factors for employment and payroll recommended by the American Hospital Association. The evaluation of the economic impact of Brookings Health includes the assessment of direct and indirect impacts on the County's employment and payroll base.

¹ <http://www.cityofbrookings.org/index.aspx?nid=394>

² Due to data availability, most hospital findings reflect the 2013 operations.

³ Data of jobs and total payroll generated by the BHS do not include the 2012 data. The analysis will evaluate the economic impact of the year 2010, 2011, and 2013.

SUMMARY OF FINDINGS

Brookings Health System generates substantial economic impacts to the benefit of the region's economy, benefiting workers through job creation and income earnings, business output, and the local tax base. These benefits are all in addition to the incomparable health benefits provided by Brookings Health. Highlights of these findings are as follows:

The healthcare sector is a strong sector in Brookings County, and is strengthening gradually over time. In 2013 the sector ranked second in terms of total annual payroll and the fourth regarding the employment size. The strength of Brookings County's healthcare and social assistance sector is the result of a continuous growth over the period from 2006 to 2013. The sector's share in the County's employment and payroll reached a share of more than 10 percent of the County's employment and payroll base in 2013.

The current and projected County populations show an increase in youth dependency ratio, aged dependency ratio, and the index of aging. In the period from 2010 to the projected year of 2030, the County's population will gain a substantial population segment of youth and elderly. The growth of these populations may impose new and increasing demands for health care and social assistance delivered by Brookings Health.

Brookings Health System had employees (full- and part-time) of 386 in 2010, 438 in 2011, and 440 in 2013. The total gross payroll in these three time points had a relative large increase from \$15,036,942 in 2011 to \$16,653,815 in 2013. Adding the jobs and income generated by associated clinics, these employment and payroll numbers comprised roughly half of the employment and payroll base of the Health Care and Social Assistance sector in the County.

In addition to these jobs and payroll at Brookings Health and the associated clinics, there were jobs and payroll emerged as a result of the operation of Brookings Health. The indirect impact of Brookings Health on the overall employment and payroll base was manifested through an increment of more than 300 jobs and approximately \$10,000,000 labor income in the evaluated years. The economic impact of Brookings Health, after adding the jobs and labor income generated by the operation and associated clinics and their derived effects on jobs and labor income in other sectors, is estimated at 7-8 percent of the county total employment and labor income.

Finally, Brookings Health provides an extensive array of community benefits to cities, towns, as well as rural communities, which have been projected to embrace a growth in youth and elderly populations in the near future. In addition to economic impacts, a close look at the services that go beyond economic impacts on the economy may provide a more complete assessment of the institution's critical role in improving the quality of life for the residents and especially vulnerable populations.

SECTION I: ECONOMIC AND DEMOGRAPHIC CONTEXT

According to the Quarterly Census of Employment of Wages conducted by the Bureau of Labor Statistics, the statewide total employees and average wage in South Dakota, on average, increased annually from 2005 to 2014, except for the 2008-2009 and the 2009-2010 periods. Similar trends are found in Brookings County. Table 1 presents the trends and the percent change of every two consecutive years for the state and the county. Comparisons between the statewide growth and the county growth from 2005 to 2014, Brookings County outpaced the statewide level slightly in both total numbers of employees and average annual wages. The unweighted average annual growth rate of total number of employees in Brookings County in this period was 1.18 compared to the statewide rate at 1.01. The County's average annual wage was growing at an annual rate of 3.68 compared to the statewide rate of 3.20. In 2014 the average annual wage for all employees in Brookings had reached \$39,047, slightly higher than the state average at \$38,690.

TABLE 1 STATE AND LOCAL TRENDS OF TOTAL NUMBER OF EMPLOYEES AND AVERAGE ANNUAL PAY IN ALL SECTORS, FROM 2005 TO 2014

| South Dakota | | | | | Brookings County | | | | |
|--------------|------------------------|----------------------------|-------------------------|----------------------------|------------------------|-------------------------|----------------------------|----------------------------|--|
| Year | Annual Total Employees | %change from previous year | Average Annual Pay (\$) | %change from previous year | Annual Total Employees | Average Annual Pay (\$) | %change from previous year | %change from previous year | |
| 2005 | 375,707 | -- | 29,149 | -- | 15,817 | 28,269 | -- | -- | |
| 2006 | 383,876 | 2.17 | 30,291 | 3.92 | 16,664 | 29,822 | 5.35 | 5.49 | |
| 2007 | 392,060 | 2.13 | 31,655 | 4.50 | 17,244 | 32,305 | 3.48 | 8.33 | |
| 2008 | 397,108 | 1.29 | 32,822 | 3.69 | 17,387 | 33,644 | 0.83 | 4.14 | |
| 2009 | 389,360 | (1.95) | 33,352 | 1.61 | 16,684 | 33,780 | (4.04) | 0.40 | |
| 2010 | 389,198 | (0.04) | 34,331 | 2.94 | 16,439 | 34,622 | (1.47) | 2.49 | |
| 2011 | 393,744 | 1.17 | 35,413 | 3.15 | 16,729 | 35,925 | 1.76 | 3.76 | |
| 2012 | 400,475 | 1.71 | 36,534 | 3.17 | 16,783 | 36,773 | 0.32 | 2.36 | |
| 2013 | 404,652 | 1.04 | 37,225 | 1.89 | 16,967 | 37,526 | 1.10 | 2.05 | |
| 2014 | 410,929 | 1.55 | 38,690 | 3.94 | 17,519 | 39,047 | 3.25 | 4.05 | |

Source: Quarterly Census of Employment and Wages, Bureau of Labor Statistics

Note: numbers in parentheses are negative values.

In order to understand the economic context of the sector that Brookings Health belongs to, the analysis pulls out the data for the Health Care and Social Assistance sector from the County Business Patterns⁴. Hospital employment is subsumed within this larger sector. Due to the confidentiality related to data disclosure, statistics are not provided for subcategories within the

⁴ The sector of “Health Care and Social Assistance” is defined by the North American Classification System (NAICS), the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.

sector. Table 2 presents the 2013 data of paid employees⁵ and total annual payroll for all NAICS-defined sectors in Brookings County.

TABLE 2 PAID EMPLOYEES AND ANNUAL PAYROLL OF ALL SECTORS IN BROOKINGS COUNTY, 2013

| | Paid Employees | Annual Payroll (\$) |
|--|----------------|---------------------|
| Total for all sectors | 13,353 | 449,173 |
| Agriculture, forestry, fishing and hunting | a | 803 |
| Mining, quarrying, and oil and gas extraction | a | D |
| Utilities | 62 | 5,279 |
| Construction | 548 | 23,009 |
| Manufacturing | 4,497 | 205,708 |
| Wholesale trade | e | 14,517 |
| Retail trade | 1,764 | 38,304 |
| Transportation and warehousing | 209 | 6,993 |
| Information | c | 4,165 |
| Finance and insurance | 586 | 28,630 |
| Real estate and rental and leasing | 211 | 4,829 |
| Professional, scientific, and technical services | 590 | 25,195 |
| Management of companies and enterprises | b | D |
| Administrative and support and waste management and remediation services | 302 | 4,711 |
| Educational services | b | 1,054 |
| Health care and social assistance | 1,513 | 48,943 |
| Arts, entertainment, and recreation | 122 | 2,497 |
| Accommodation and food services | 1,730 | 19,893 |
| Other services (except public administration) | 635 | 13,090 |
| Industries not classified | a | D |

a: 0 to 19 employees

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

e: 250 to 499 employees

c: 100 to 249 employees

b: 20 to 99 employees

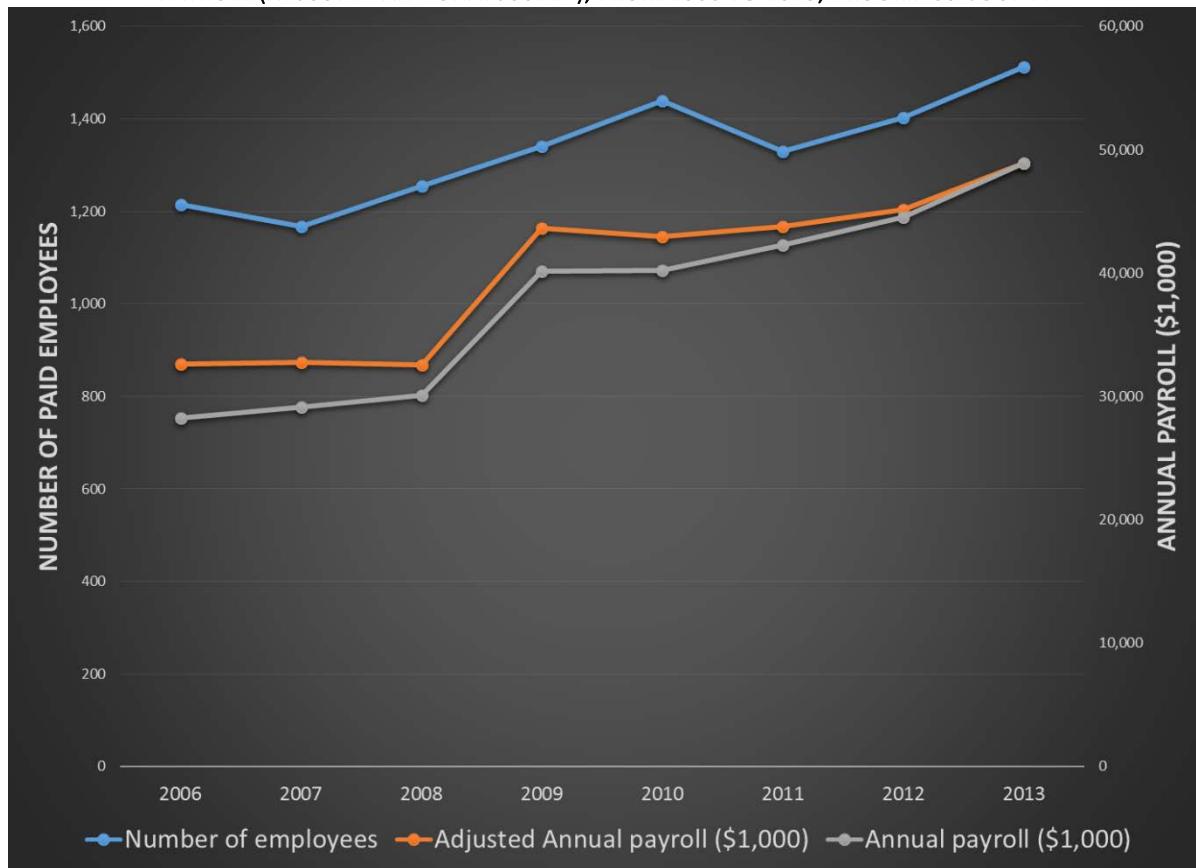
Source: U.S. Census Bureau, 2013 County Business Patterns

⁵ The Quarterly Census of Employment and Wages (QCEW) reports employment count as a total derived from quarterly contribution reports filed by almost every employer in selected geographies. It counts filled jobs, whether full or part-time, temporary or permanent, by place of work. The quarterly reports include the establishment's monthly employment levels for the pay periods that include the twelfth of the month. Because the QCEW data is based on an establishment census which counts only filled jobs, it is likely that a multi-job holder will be counted two or more times in QCEW data. County Business Patterns reports paid employees, which consist of full- and part-time employees, including salaried officers and executives of corporations, who are on the payroll in the pay period including March 12. However, County Business Patterns does not include employment in government, agriculture, railroads, the self-employed, or sole proprietors and partners of unincorporated businesses.

The number of employees reported in Quarterly Census of Employment and Wages (QCEW) may be larger than the employment counts reported in County Business Patterns (CBP) because the former data source may count a multi-job holder two or more times while the latter source does not include employment in government, agriculture, railroads, the self-employed, or sole proprietors and partners of unincorporated businesses. Nevertheless, the comparisons can be made using the same data source between sectors, geographies, and time periods.

In 2013 the sector in Brookings County with the largest employment and payroll was manufacturing. Health Care and Social Assistance ranked second in terms of annual payroll and fourth with respect to employment.

FIGURE 1 TOTAL NUMBER OF EMPLOYED IN HEALTH CARE AND SOCIAL ASSISTANCE AND ANNUAL PAYROLL (ADJUSTED AND UNADJUSTED), FROM 2006 TO 2013, BROOKINGS COUNTY



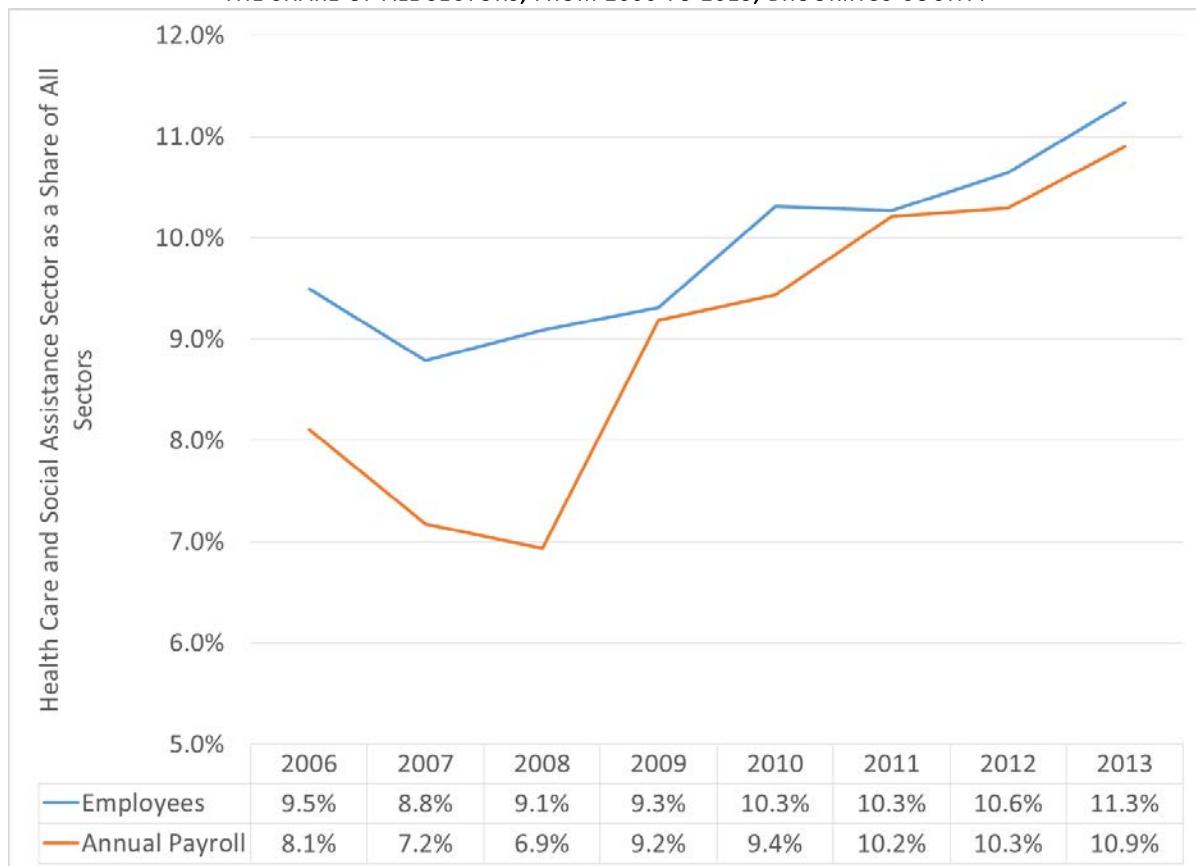
Source: The 2006-2013 County Business Pattern.

Indeed, the Health Care and Social Assistance sector in the County has been in a continuous growth since 2006. Figure 1 presents the trends in sectoral employment and payroll (both adjusted for inflation and unadjusted) from 2006 to 2013. The line shaded in blue denotes the trend in total number of employees in Health Care and Social Assistance from 2006 to 2013 in Brookings County, reported by County Business Patterns. The Y-axis on the left corresponds to the employment. Except the period between 2010 and 2011, the trend has been continuously

rising, from around 1,200 in 2006 to the employment at 1,513 in 2013. The orange (adjusted to taking into account the inflation) and gray (unadjusted) lines represent the trend in the sector's annual payroll. The Y-axis on the right corresponds to the payroll. Even after adjusted for inflation, the annual payroll in the sector has been increasing steadily over the observed period.

In addition, the sector's employment and payroll have become growing in the share of all sectors combined from 2006 to 2013. In 2006, employment in this sector comprised 9.5 percent of the County's employment base (Figure 2: the blue line). By 2013, this sector grew to 11.3 percent of the County's employment. At the same time, the sector grew from 8.1 percent of the County's total annual payroll in 2006 to 10.9 percent in 2013 (Figure 2: the orange line).

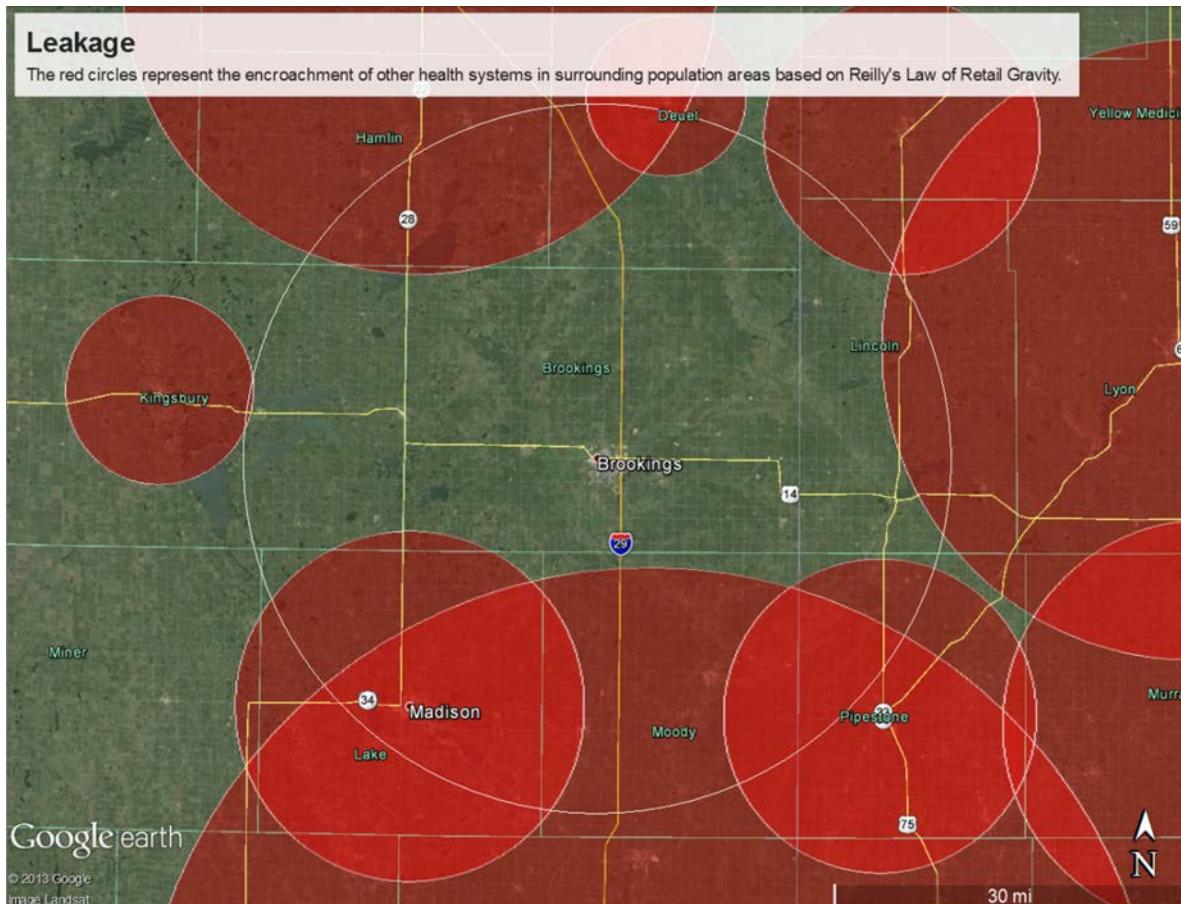
FIGURE 2 EMPLOYEES AND ANNUAL PAYROLL OF THE HEALTH CARE AND SOCIAL ASSISTANCE SECTOR, AS THE SHARE OF ALL SECTORS, FROM 2006 TO 2013, BROOKINGS COUNTY



Source: *The 2006-2013 County Business Pattern.*

The Heath Care and Social Assistance sector is a strong and important sector for the County's employment and labor income and its contribution is strengthening over time.

Brooking Health System covers communities in Brookings County and the surrounding areas⁶. According the previous economic impact report⁷, the theoretical service area of Brookings Health, highlighted by the white line that surrounds Brookings is the 30-mile radius, covers communities that may be less likely to have readily access to health care providers and systems in Sioux Falls, Madison, and Pipestone, MN. Brookings Health System serves the needs of the population in these areas.



Source: Brookings Health System Economic Impact (<http://brookingshealth.org/why-brookings-health/economic-impact/>)

Populations in these communities are changing. It is critical to examine possible changes in the structure of the population targeted for healthcare services. Figure 3 presents population pyramids and several indicators of the population structure in 2010, 2020, and 2030.⁸ As reflected in the pyramids, the bars at the bottom and the top, representing youth and elderly

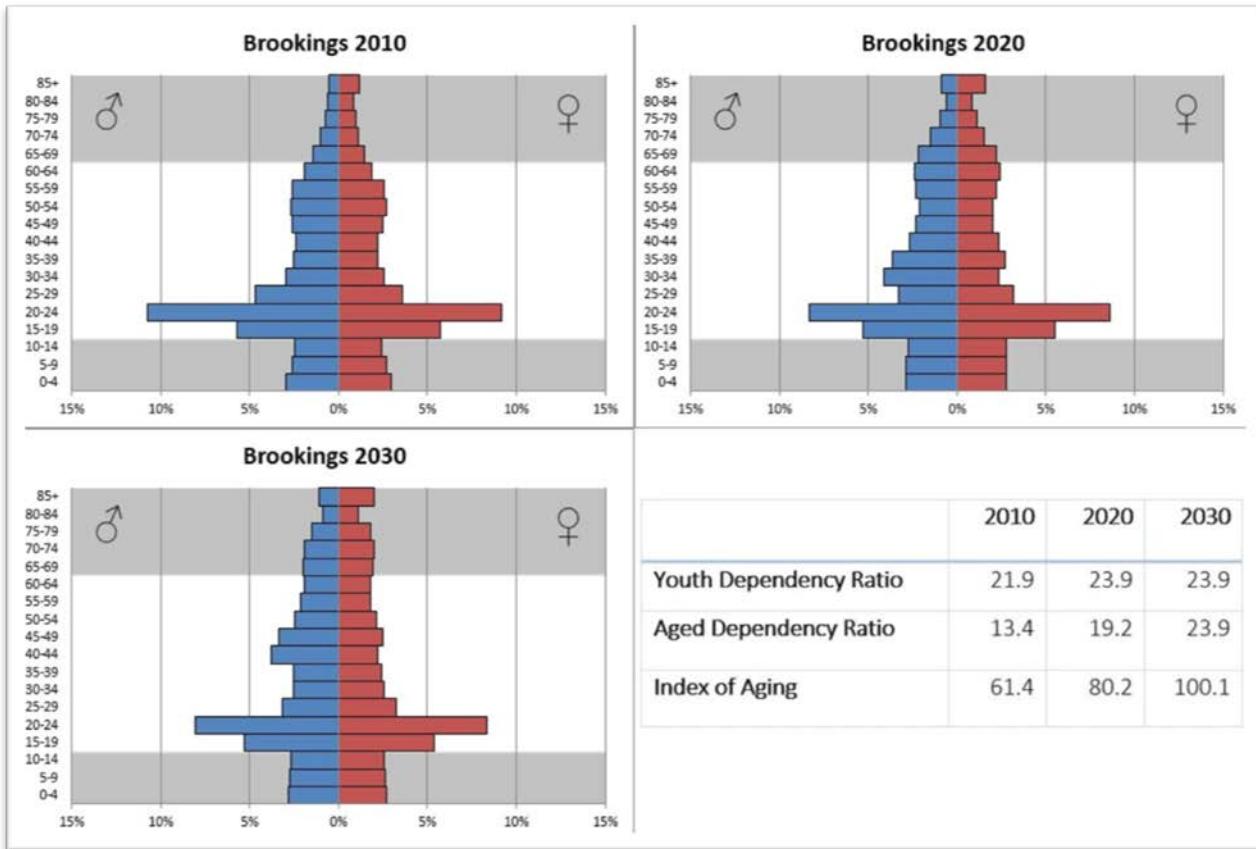
⁶ Communities in service areas include Arlington, Badger, Hetland, Lake Preston, Sinai, Nunda, Rutland, Estelline, Dempster, Bruce, Toronto, Astoria, White, Bushnell, Aurora, Elkton, Ward, Volga. (<http://brookingshealth.org/our-centers/brookings-health-system/>)

⁷ <http://brookingshealth.org/why-brookings-health/economic-impact/>

⁸ Brookings County population of 2020 and 2030 are projections created by the Census Data Center in 2013. (<https://www.sdstate.edu/soc/rlcdc/generaldemographicdata/age-and-sex-structure.cfm>)

population segments, are projected to grow gradually. The numbers on the lower right quadrant show increases in youth dependency ratio, aged dependency ratio, and the index of aging. In the period from 2010 to the projected year of 2030, the County's population will gain relative more youth and elderly populations. The growth of these two segments may put new and increasing demands on the health care system.

FIGURE 3 POPULATION PYRAMIDS AND SELECTED INDICATORS OF BROOKINGS COUNTY POPULATION, 2010, 2020, AND 2030



SECTION II: BROOKINGS HEALTH ECONOMIC IMPACT

DATA AND METHODS

Total number of employees and payroll data of 2010, 2011, and 2013 are provided by Brookings Health System. The data are used for calculating Brookings Health System's direct as well as indirect impact on the employment and labor income of the County.

The economic impacts include both on-going operations impacts on the Health Care and Social Assistance sector as well as the overall economy by providing jobs and by purchasing goods and services. The economic impacts include the "multiplier" effects because "the goods and services hospitals purchase from other businesses create additional economic value for the community (American Hospital Association, March 2011)."⁹ In other words, the "multiplier" is the factor by which spending in one sector of the economy affects other sectors.¹⁰

The economic impact analysis for Brookings Health System takes into account (1) the direct impact on the employment and payroll base of the Health Care and Social Assistance sector and the overall County economy, (2) an additive indirect impact on the overall employment and payroll base in the County, and finally (3) the total economic impact.

To estimate the indirect impacts, the analysis utilizes the multiplier factors, specifically for South Dakota, recommended by American Hospital Association in 2011. The multiplier factor for employment is 1.5667 and the factor for payroll is 1.4124 (American Hospital Association, March 2011).¹¹

⁹ "Economic Contribution of Hospitals Often Overlooked" by American Hospital Association, March 2011.

¹⁰ For instance, nationally each job in hospitals results in a total of 2.8 jobs in the economy as a whole based on BEA RIMS-II (2002/2007) multipliers for hospital NAICS Code 622, released 2010, applied to American Hospital Association Annual Survey data for 2008, according to the American Hospital Association in 2011. These multipliers are part of the Regional Input-Output Modeling System (RIMS II) developed by the Bureau of Economic Analysis, U.S. Department of Commerce. More information about the RIMS II is available at www.bea.doc.gov/bea/regional/rims.

¹¹ The set of multipliers published in 2014 is not used for this analysis because the 2014 factors are national averages, and the multiplier effects are stronger compared to the 2011 South Dakota specific factors. Some studies suggest differential factors for hospitals in rural and urban areas and hospitals in rural areas are often assigned with a lower factor. Within no existing references for South Dakota, this analysis adopts a state-wide factor.

IMPACT ASSESSMENT

Brookings Health System had employees (full- and part-time) of 386 in 2010, 438 in 2011, and 440 in 2013. The total gross payroll in these three time points had a relative large increase from \$15,036,942 in 2011 to \$16,653,815 in 2013. The Clinic had employees of 207 in 2011 and a total payroll of \$8,103,033.¹² Table 3 reports the direct and indirect impacts of Brookings Health on the County's overall economy. These employment and payroll numbers contributed by Brookings Health System comprised roughly 40-50 percent of the employment and 50-60 percent of the payroll base of the Health Care and Social Assistance sector in the County.

The increase in the employment at the Brookings Health from 2010 to 2011 resulted in an increased share of the sector's employment base in the County (41.2 percent in 2010 VS 48.5 percent in 2011). The Increase in share was also a result of the substantial decline in the total county employment in the health care and social assistance sector in 2011. In 2013, the share in the sector's employment dropped to 42.8 percent although the total number of employees had a slight change (incremented by two at the Brookings Health). It may reflect the growth of employment in other healthcare organizations in the County. Total gross payroll of Brookings Health had a relatively large increase from 2011 to 2013. Yet, as a share of the County's total payroll associated with the Health Care and Social Assistance sector, it dropped slightly from 54.7 to 50.6 percent. It suggests that there was a faster increase in the labor payroll in other healthcare and assistance providers in the County than the payment increase at the Brookings Health.

Applying the selected multiplier factors, Brookings Health System had indirectly affected the overall employment and payroll base by adding additional jobs and payroll. The indirect impact of Brookings Health in 2013 on the overall employment base was manifested through an increment of 367 jobs. Putting together the 440 jobs created at the Brookings Health, the 207 jobs at clinics, and the additional 367 jobs in other businesses, a total of 1,014 jobs were yielded for the county. The operation of Brookings Health in 2013 also generated a total of \$34,966,572 gross payroll consisting of \$16,653,815 from Brookings Health, \$8,103,033 from clinics, and an additional indirect payroll of \$10,209,724. Turning to the economic impact of Brookings Health measured by its share of the County's employment and payroll base, the operation of Brookings Health along with clinics comprised roughly 5 percent of the County's employment pool and 5.5 percent of the payroll base. After combining the indirect effects, the share is close to 8 percent of the county's employment and payroll base.

¹² Because the employment and payroll data from clinics of 2010 and 2013 were partially collected at the time when this analysis was conducted, the full employment and payroll data of 2011 were then used as a proxy for the other two time points.

TABLE 3 ECONOMIC IMPACT OF THE BHS AND THE AVERA CLINIC ON THE COUNTY'S HEALTH CARE AND SOCIAL ASSISTANCE SECTOR AND THE OVERALL ECONOMY, 2010, 2011, AND 2013

| | 2010 | 2011 | 2013 |
|--|------------|------------|------------|
| Direct Impact | | | |
| Employment (BHS) | 386 | 438 | 440 |
| Gross Payroll (BHS) | 15,110,005 | 15,036,942 | 16,653,815 |
| Employment (Clinic) | 207 | 207 | 207 |
| Gross Payroll (Clinic) | 8,103,033 | 8,103,033 | 8,103,033 |
| Indirect Impact | | | |
| Employment | 336 | 366 | 367 |
| Gross Payroll | 9,573,057 | 9,542,926 | 10,209,724 |
| Total Impact | | | |
| Employment | 929 | 1,011 | 1,014 |
| Gross Payroll | 32,786,095 | 32,682,901 | 34,966,572 |
| IMPACT ON THE COUNTY'S HEALTH CARE AND SOCIAL ASSISTANCE SECTOR | | | |
| % of the County's sectoral employment | 41.2 | 48.5 | 42.8 |
| % of the County's sectoral payroll | 57.7 | 54.7 | 50.6 |
| DIRECT IMPACT ON THE COUNTY'S OVERALL ECONOMY | | | |
| % of the County's overall employment | 4.25 | 4.98 | 4.85 |
| % of the County's overall payroll | 5.44 | 5.59 | 5.51 |
| TOTAL IMPACT ON THE COUNTY'S OVERALL ECONOMY | | | |
| % of the County's overall employment | 6.65 | 7.81 | 7.59 |
| % of the County's overall payroll | 7.69 | 7.89 | 7.78 |