Extension
UNIVERSITY OF WISCONSIN–MADISON

The Contribution of Health Care Services to the Wisconsin Economy with a Focus on Hospitals

October, 2019

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Disclaimer

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Funding for this study was provided in part by the Wisconsin Hospital Association and the Economic Development Administration University Center at the Center for Community and Economic Development, UW-Madison Division of Extension.

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Executive Summary

The intent of this study is to update prior analysis documenting the contribution of hospitals to the Wisconsin economy. For this update we use the most recently available data (2016) and expand the analysis to also consider non-hospital related health care sectors.

- The health care sector remains one of the fastest growing sectors in the U.S. and Wisconsin. Employment in the health care sector in Wisconsin grew by 29.6 percent from 1998 to 2017, while total employment grew by 12.3 percent. Employment in hospitals grew by 24.0 percent over the same period. Nationally, health care sector employment grew by 49.0 percent, hospital employment by 27.9 percent and total employment grew 23.8 percent, also over the same period.
- The Great Recession strongly affected employment growth in hospitals and the recovery has been modest. The Great Recession had only modest impacts on the growth of employment in the broader health care industry.
- Growth in wages and salary has been strong since 1998 with some evidence of a dampening effect from the Great Recession when Wisconsin is compared to the national average.
- The typical wage and salary job in Wisconsin paid $38,848 in 2017 (an increase of 61.8% from 1998), but in the broad sector of health care, the typical wage and salary job paid $52,788 (an increase of 82.3% from 1998) and the typical hospital job paid $57,253 (a 95.5% increase). This is a reflection of the large share of occupations in health care, and hospitals in particular, that require higher levels of education.
- Compared to national averages, hospitals remain a relative strength for the Wisconsin economy with a Location Quotient of about 1.13 (greater than 1 indicating a strength).
- After accounting for the multiplier effect, the health care sector contributes almost 571,900 jobs (15.6% of total Wisconsin employment), $32.67 billion in labor income (17.1% of state total), $45.19 billion in total income (14.4% of state total), and $74.41 billion to industrial sales/revenue (11.9% of state total).
- Hospitals contribute almost 209,400 jobs (5.7% of total Wisconsin employment), $12.13 billion in labor income (6.3% of state total), $17.3 billion in total income (5.5% of state total), and $30.62 billion in industrial sales/revenue (4.9% of state total).
- The state and local government tax revenues generated by that economic activity is $1.06 billion for hospitals and $1.99 billion for non-hospital related health care for a total of $3.06 billion.
- For every additional ten jobs created in hospitals an additional nine jobs are created elsewhere in the Wisconsin economy. For every $1,000 of additional labor income created in hospitals an additional $600 of labor income is created elsewhere in Wisconsin and for every $1,000 in additional revenue generated by hospitals an additional $860 industrial sales/revenues is generated.

This study does not consider the contribution of access to quality health care to labor productivity, which directly effects the profitability of Wisconsin businesses. Thus, the economic contribution analysis presented in this study takes a narrow view of the importance of health care and hospitals to Wisconsin.

For every additional ten jobs created in hospitals an additional nine jobs are created elsewhere in the Wisconsin economy.

Introduction

The health care sector contributes to Wisconsin in several ways: (1) directly through employment, wages/salaries paid, and general operation expenses; (2) improved labor productivity which influences the profitability of businesses; and (3) general improvement to the overall quality of life of Wisconsin residents. For this study we are interested in exploring the contribution of health care, and particularly hospitals, as a source of employment and income. The health care industry is much like any other industry in Wisconsin: it employs workers who spend their wages and salaries in the local economy as well as purchase goods and services such as office supplies, utility services and contracted services (e.g., landscaping), among others. These operations generate direct economic activity as well as indirect activity through the multiplier effect.

In 2016, the most recent year sufficiently detailed data are available at the sub-state level, there were some 157 non-public hospitals in Wisconsin, up from 149 in 2005, directly employed more than 108,000 people and paying some $7.55 billion in wages and salaries, which is based on $16.43 billion in revenues. Non-hospital health care services account for an additional 218,500 jobs, $14.24 billion in wages and salaries, and $23.63 billion in revenues. In this study we aim to explore how hospitals and other health care providers contribute to the Wisconsin economy over time and across the state. We pay articular attention to documenting the multiplier effects, or how the direct operations of health care providers and hospitals ripple throughout the rest of the Wisconsin economy.

Beyond these brief introductory comments the study is composed of two additional section, plus a detailed technical appendix. In the next section we explore levels of employment and income (wages and salaries) in the health care sector, again with a focus on hospitals, have changed over time for Wisconsin, the Great Lake States, and the United States as a whole. As part of this analysis we pay particular attention to the types of jobs (occupations) that are make up a typical hospital's labor force. In the following section we detail the economic contribution of health care and hospitals to Wisconsin. We look at both the whole of Wisconsin along with nine sub-regions within Wisconsin. We provide the broad summary results in the main body of this study and the detailed results are provided in the technical appendix.

General Trends

Health care as an industry is unique for two reasons. First, the industry has been one of the fastest growing sectors in terms of employment and income in the United States, and Wisconsin, for several years. Second, the industry is remarkably stable and has historically been resistant to recessionary pressures (Goodman 2006). Nationally, employment in the health care sector grew 49.0 percent from 1998 to 2017 whereas total employment grew by 23.8 percent and there is little evidence of the industry being effected by the Great Recession (Figure 1A).[1] The rate of growth for the Great Lake States and Wisconsin, while still stronger than overall employment growth, was slower than the national average at 34.8 and 29.6 percent, respectively. The rate of growth in Wisconsin's health sector employment, while still strongly positive, appears to have slowed after the end of the Great Recession and there was a slight downtick between 2016 and 2017.

Figure 1A: Health Care Employment Growth Index

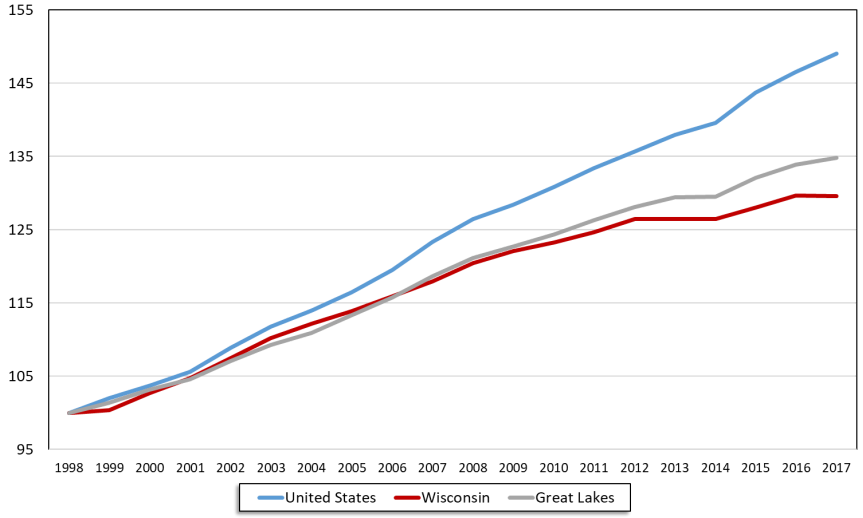
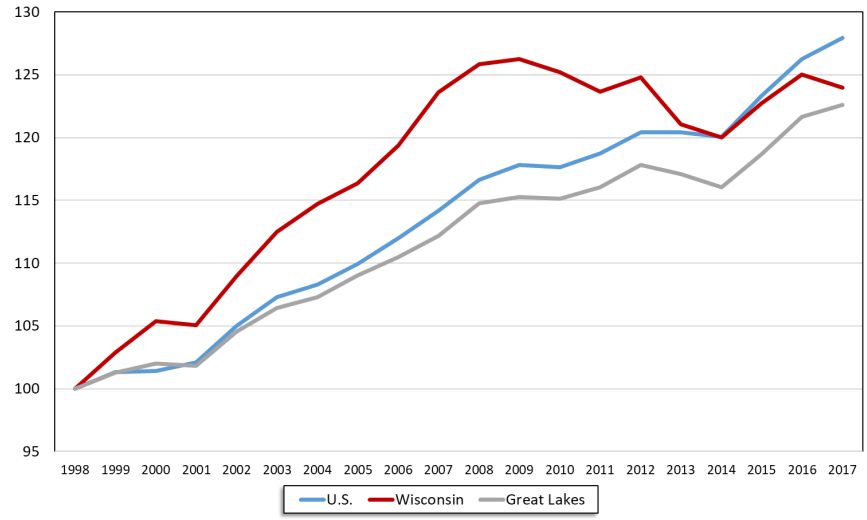


Figure 1B: Hospital Employment Growth Index



A major part of the explanation for the slowdown in the growth rate of health care sector employment centers on hospitals. For the ten year period of 1998 to 2008 growth in hospital employment in Wisconsin outpaced both the U.S. and the Great Lake States, but starting with the Great Recession there appears to be a structural shift downward (Figure 1B). Several reasons have been offered for this shift including advances in electronic billing and record keeping which has greatly reduced the need for accountants and clerks, consolidation in hospitals allowing for gains in efficiencies, and the migration to ambulatory care setting (clinics, urgent care centers, etc.). The latter is seen as a way to divert non-emergency care away from hospitals to reduce congestion at hospitals as well as costs. In addition, hospital-based clinicians often transition to ambulatory care settings where the hours and stress levels are perceived to be more manageable. In efforts to further reduce costs many hospitals are outsourcing many services, such as food preparation, billing, transcription, and information technologies, to non-hospital vendors. For some of these outsourced services the physical location of the job may or may not move out of the community. Jobs related to food preparation may still

[1] The trend analysis begins in 1998 because of a structural change in how the Federal Government reports employment and income data by industry. Prior 1997 the Federal Government used the Standard Industrial Classification system (SIC) but shifted to the NAISC (North American Industry Classification System) starting with 1998. The older SIC system provided extreme detail on "goods producing" industries, such as manufacturing but limited detail on "service producing" industries such as health care. As the U.S. economy became more dependent on goods producing sectors the older SIC system was insufficient and was thus replaced with NAISC. The difficulty that this introduces in the discontinuity in industry classifications pre- and post-1998.

physically be in the hospital but are no longer "counted" as being employed by the hospital. Rather they are contracted for services by the hospital. Regardless of the shifting employment patterns in Wisconsin hospitals it is clear that health care remains a strong source of employment growth as well as adding an element of stability to the economy (Figure 1C).

Figure 1C: Wisconsin Employment Growth Index
Total Employment, Health Care and Hospitals

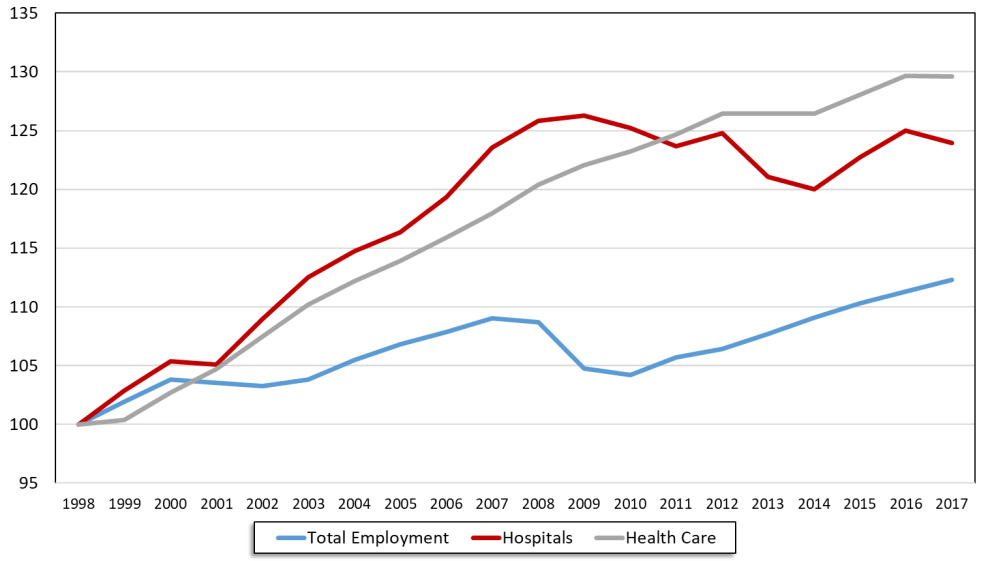
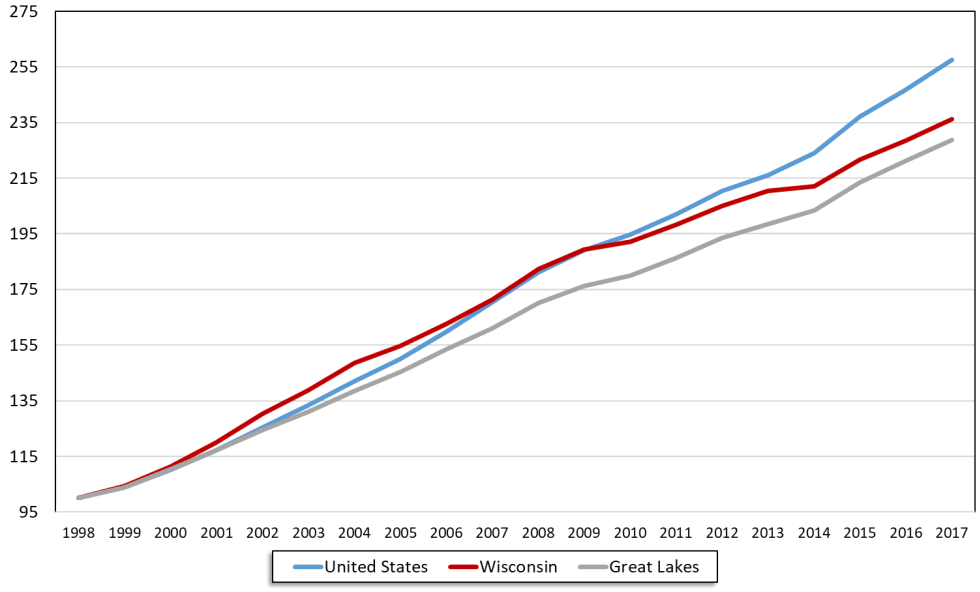


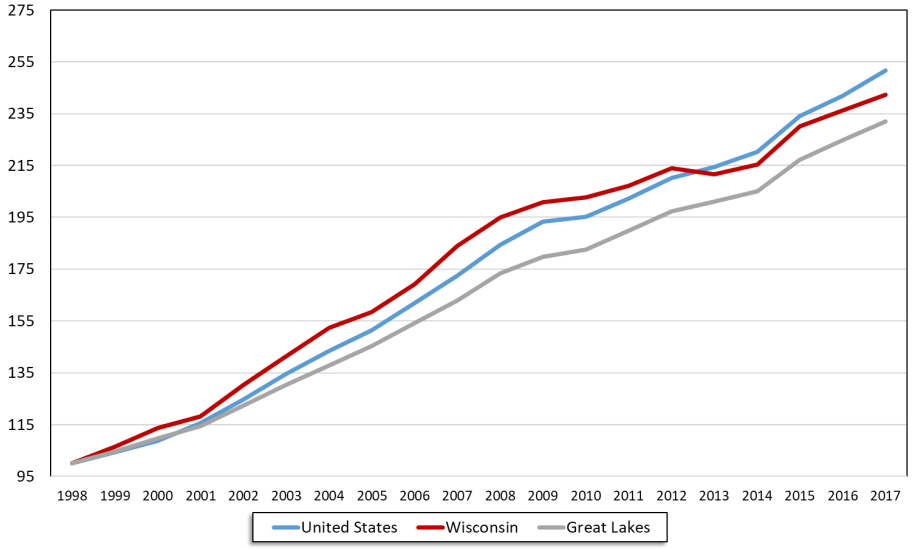
Figure 2A: Health Care Wage and Salary Income Growth Index



While many elected officials in Wisconsin focus on jobs as the key metric of economic performance, an equally important metric is the wages and salaries paid to employees. Some (e.g., Deller, Conroy and Kures 2017) have expressed concern that narrowly focusing on jobs ignores the issue surrounding the quality of the jobs. While quality of a job has many dimensions (e.g., safety, security, work satisfaction, etc.) one important element is the level of wages and salaries. Nominally (i.e., not correcting for inflation), total wages and salaries grew by 157.5 percent across the United States between 1998 and 2017, 128.8 percent in the Great Lakes region, and 136.3 percent in Wisconsin (Figure 2A). The stability of the health care sector is particularly noticeable when looking at wages and salaries: there is little if any evidence of the Great Recession. For Wisconsin, one can see a slight down tick in the rate of growth in wages and salaries in 2008: from 1998 to 2007 the average annual growth rate was 7.9 percent and from 2008 to 2017 slowed to 6.5 percent. Even at this slightly lower rate, growth in wages and salaries in health care remains strong.

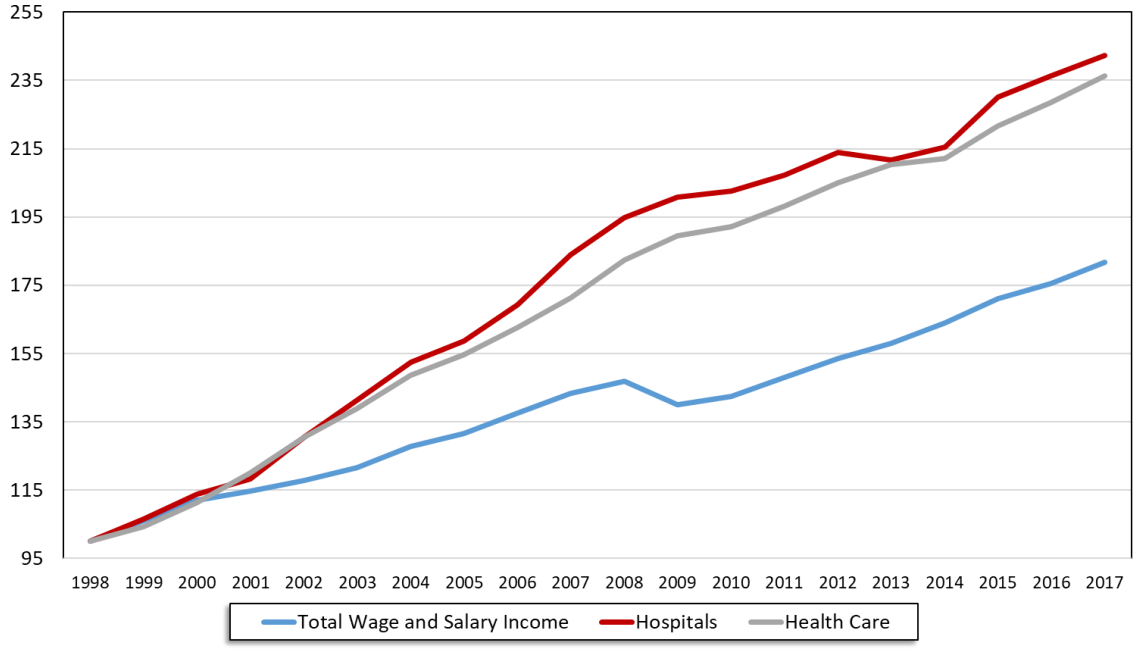
Nationally, wages and salaries in hospitals grew by 151.6 percent, for the Great Lakes region 132.1 percent, and for Wisconsin 142.3 percent.

Figure 2B: Hospitals Wage and Salary Income Growth Index



Separating out hospitals from the larger health industry, the same general patterns in wage and salary income remains (Figure 2B). Nationally, wages and salaries in hospitals grew by 151.6 percent, for the Great Lakes region 132.1 percent, and for Wisconsin 142.3 percent. While one sees a modest break in that trend for Wisconsin in 2013 and 2014, the longer-term growth trend returns in 2015. But unlike the hospital employment trends, there is no evidence of impacts of the Great Recession on Wisconsin hospital wages and salaries, rather the slight down tick in 2013-14 is unrelated to the larger economy (Figure 2C). When compared to the overall Wisconsin economy, where wages and salaries grew by 81.6 percent from 1998 to 2017, the broader health care sector saw wages and salaries grow by 136.3 percent and in hospitals 142.3 percent. Perhaps more interesting is that, although employment in the broader health care sector grew faster than hospital employment (Figure 1C) in Wisconsin, wages and salaries growth in hospitals kept pace with health care (Figure 2C).

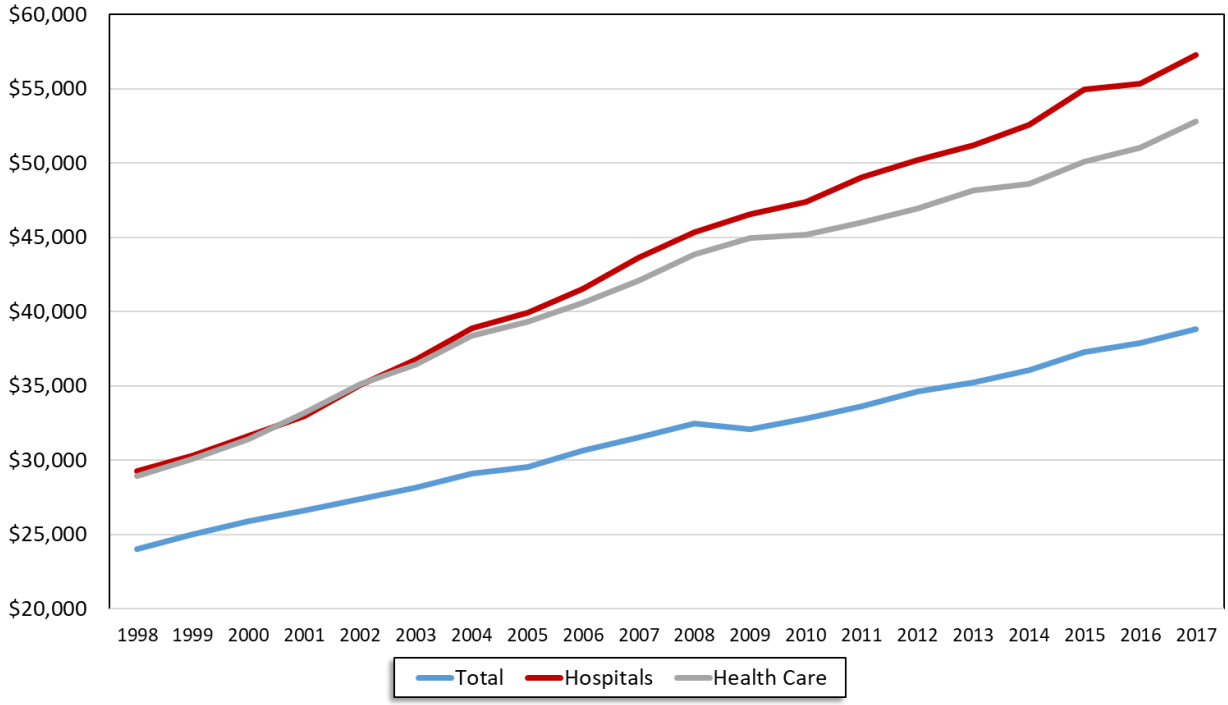
Figure 2C: Wisconsin Wage and Salary Income Growth Index
Total Wage and Salary Income, Health Care and Hospitals



One of the most important elements of having a strong health care presence within the community, in addition to access to quality health care, is the nature of the pay these jobs provide the residents of Wisconsin. Wages and salaries in the health care sector, including hospitals, are growing at a faster rate that the rest of Wisconsin (Figure 2C). But when one considers that pay of a typical job in health care, the quality of the job becomes even more apparent (Figure 3). In 1998 the typical job [2] in Wisconsin earned $24,105 but the typical job in health care earned $28,954 and in hospitals the premium is even greater at $29,289, or about 21 percent. By 2017, that premium increased to just over 41 percent: the typical job in Wisconsin was paid an average of $38,848 in wages and salary, but in health care the average was $52,788 and $57,253 in hospitals. It is clear that the growth rate in pay to health care workers is outpacing overall growth in pay for the typical Wisconsin worker. From the perspective of the local community, the health care sector and hospitals provide high paying jobs which translates into larger overall economic impacts.

One of the most important elements of having a strong health care presence within the community is the nature of the pay these jobs provide the residents of Wisconsin.

Figure 3: Wisconsin Wage and Salary Income per Job
Total, Health Care, Hospitals



When looking at the overall wage and salary structure of the health care provider industry, two issues are often at the forefront. First, some discount the higher average wages and salaries per job statistic because of the perception of highly paid medical doctors distorting the industry average. Second, the range of occupation or employment opportunities within health care is significant, meaning that the health care industry, including hospitals, offers a wide range of jobs across the educational and skill spectrum.

[2] It is important to note that these are wage and salary jobs and does not consider income earned by the self-employed or proprietorships.

Table 1A: Occupational Structure Wisconsin Ambulatory Health Care Services

Occupational Title	Share of Occupations	Mean Hourly Wage/Salary	Mean Annual Wage/Salary	Hourly Wage/Salary Lower 25%	Hourly Wage/Salary Upper 75%	Typical education needed for entry	Typical on-the-job training needed to attain competency in the occupation
Registered Nurses	7.6%	33.27	69,200	28.07	37.81	Bachelor's degree	None
Medical Assistants	6.8%	17.40	36,180	14.60	18.81	Postsecondary nondegree award	None
Home Health Aides	5.9%	12.16	25,300	10.13	14.43	High school diploma or equivalent	Short-term on-the-job training
Receptionists and Information Clerks	5.3%	13.64	28,360	10.81	16.28	High school diploma or equivalent	Short-term on-the-job training
Medical Secretaries	5.1%	17.42	36,230	15.15	19.33	High school diploma or equivalent	Moderate-term on-the-job training
Personal Care Aides	4.5%	11.15	23,190	9.92	12.28	High school diploma or equivalent	Short-term on-the-job training
Dental Assistants	4.4%	18.49	38,450	15.88	21.53	Postsecondary nondegree award	None
Licensed Practical and Licensed Vocational Nurses	3.0%	21.21	44,120	18.78	23.63	Postsecondary nondegree award	None
Office Clerks, General	2.9%	16.59	34,520	12.72	19.53	High school diploma or equivalent	Short-term on-the-job training
Dental Hygienists	2.8%	31.21	64,910	27.51	35.68	Associate's degree	None
Physicians and Surgeons, All Other	2.5%	119.95	249,490	92.76	—	Doctoral or professional degree	Internship/residency
Billing and Posting Clerks	2.1%	17.95	37,350	15.38	20.48	High school diploma or equivalent	Moderate-term on-the-job training
First-Line Supervisors of Office and Administrative Support Workers	2.0%	26.49	55,100	19.47	31.66	High school diploma or equivalent	None
Physical Therapists	1.8%	38.74	80,570	33.01	45.98	Doctoral or professional degree	None
Emergency Medical Technicians and Paramedics	1.7%	16.02	33,330	12.48	18.73	Postsecondary nondegree award	None
Nursing Assistants	1.7%	13.86	28,830	11.97	15.42	Postsecondary nondegree award	None
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	1.7%	17.54	36,490	14.43	20.86	High school diploma or equivalent	Short-term on-the-job training
Medical and Health Services Managers	1.4%	48.76	101,430	36.18	55.71	Bachelor's degree	None
Dentists, General	1.4%	104.71	217,800	70.23	—	Doctoral or professional degree	None
Nurse Practitioners	1.3%	49.00	101,930	43.09	55.57	Master's degree	None
Family and General Practitioners	1.3%	116.51	242,340	85.92	—	Doctoral or professional degree	Internship/residency
Customer Service Representatives	1.1%	17.73	36,890	13.41	20.86	High school diploma or equivalent	Short-term on-the-job training
Radiologic Technologists	1.0%	27.89	58,010	23.56	31.66	Associate's degree	None
Physician Assistants	1.0%	49.52	103,000	43.21	58.54	Master's degree	None
Phlebotomists	1.0%	16.66	34,650	14.21	18.51	Postsecondary nondegree award	None

Table 1B: Occupational Structure Wisconsin Hospitals

Occupational Title	Share of Occupations	Mean Hourly Wage/Salary	Mean Annual Wage/Salary	Hourly Wage/Salary Lower 25%	Hourly Wage/Salary Upper 75%	Typical education needed for entry	Typical on-the-job training needed to attain competency in the occupation
Registered nurses	31.8%	33.27	69,200	28.07	37.81	Bachelor's degree	None
Nursing assistants	7.1%	13.86	28,830	11.97	15.42	Postsecondary nondegree award	None
Medical secretaries	2.7%	17.42	36,230	15.15	19.33	High school diploma or equivalent	Moderate-term on-the-job training
Medical and health services managers	2.2%	48.76	101,430	36.18	55.71	Bachelor's degree	None
Radiologic technologists	2.2%	27.89	58,010	23.56	31.66	Associate's degree	None
Licensed practical and licensed vocational nurses	2.0%	21.21	44,120	18.78	23.63	Postsecondary nondegree award	None
Maids and housekeeping cleaners	2.0%	10.71	22,270	8.93	11.98	No formal educational credential	Short-term on-the-job training
Respiratory therapists	1.9%	29.26	60,860	25.80	33.15	Associate's degree	None
Physicians and surgeons, all other	1.9%	119.95	249,490	92.76	—	Doctoral or professional degree	Internship/residency
Medical assistants	1.7%	17.40	36,180	14.60	18.81	Postsecondary nondegree award	None
Office clerks, general	1.4%	16.59	34,520	12.72	19.53	High school diploma or equivalent	Short-term on-the-job training
Pharmacists	1.4%	62.82	130,670	54.91	72.19	Doctoral or professional degree	None
Interviewers, except eligibility and loan	1.4%	16.29	33,890	12.91	19.49	High school diploma or equivalent	Short-term on-the-job training
Surgical technologists	1.4%	25.52	53,080	21.49	29.14	Postsecondary nondegree award	None
Medical records and health information technicians	1.3%	20.57	42,780	16.26	24.35	Postsecondary nondegree award	None
Janitors and cleaners, except maids and housekeeping cleaners	1.2%	13.06	27,160	10.03	15.29	No formal educational credential	Short-term on-the-job training
Secretaries and administrative assistants, except legal, medical, and executive	1.2%	17.54	36,490	14.43	20.86	High school diploma or equivalent	Short-term on-the-job training
Pharmacy technicians	1.2%	15.34	31,900	12.47	17.97	High school diploma or equivalent	Moderate-term on-the-job training
Physical therapists	1.1%	38.74	80,570	33.01	45.98	Doctoral or professional degree	None
Customer service representatives	1.0%	17.73	36,890	13.41	20.86	High school diploma or equivalent	Short-term on-the-job training
Healthcare social workers	1.0%	24.62	51,210	20.22	28.89	Master's degree	Internship/residency

To further explore these two issues, consider the distribution of occupations for ambulatory health care (Table 1A) and hospitals (Table 1B) along with educational/training requirements and wage and salary ranges. The occupational distribution is based on national averages but the wage and salary ranges are based on Wisconsin data for 2017. Please note that for space considerations we report only those occupations that account for at least one percent of all jobs.

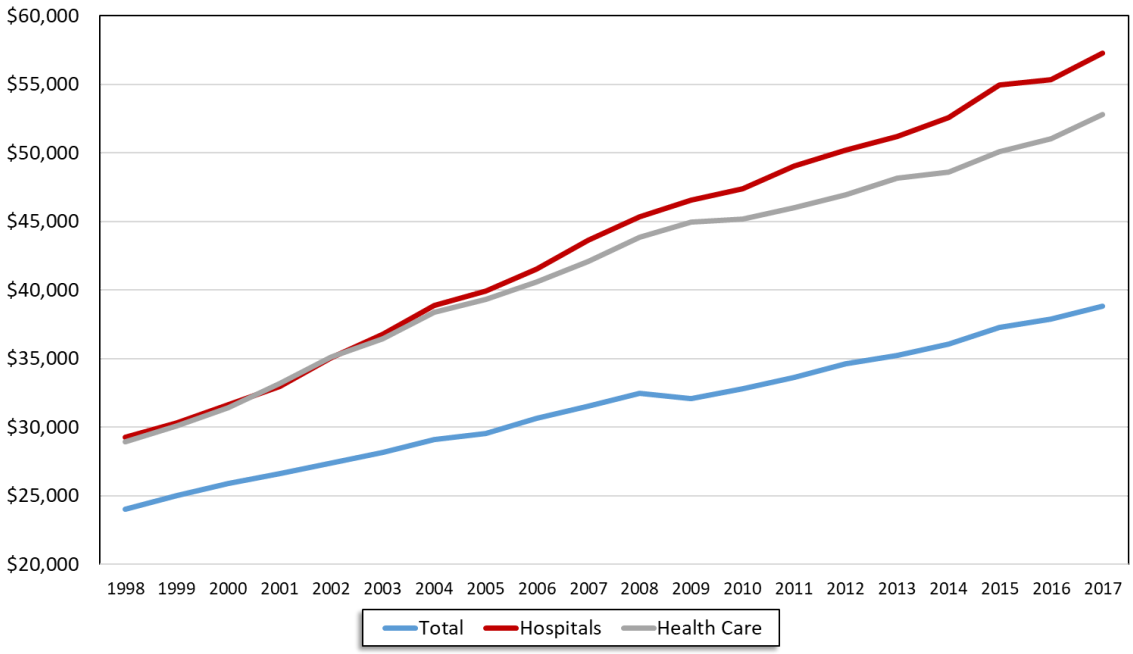
The dominant individual occupation in both sectors is registered nurses, accounting for 31.8 percent of all jobs in hospitals.

While it is true that medical doctors (MDs), including dentists and pharmacists tend to be the highest paying occupations requiring the highest level of formal training, they generally account for less than five percent of total employment in the ambulatory health care (clinics, urgent care facilities, etc.) and hospital sectors. The dominant individual occupation in both sectors is registered nurses, accounting for 31.8 percent of all jobs in hospitals. This is followed by nursing or medical aids/assistants then what might be called clerical workers. This latter point is particularly important: while the occupations that work directly with patients in some health care capacity account for most jobs, there is a large share of health care and hospital workers that seldom interact directly with patients. One could think of these as “back office” workers.

This diversity in occupations in health care and hospitals is also reflected in the type of educational and training needs. Consider the top ten occupations in the broader health care industry; only one requires a Bachelor’s degree (nurses), and five require only a high school diploma or equivalent, with the remaining four requiring some additional training post high school. A similar pattern appears to apply for hospitals, but with a higher share of the top ten occupations requiring formal training beyond high school. This variation in formal educational and training requirements is reflected in the wages and salaries being paid to employees. As expected, occupations requiring higher levels of education/training are paid higher wages and salaries. Focusing on hospitals (Table 1B), the average hourly wage for a registered nurse (which requires a Bachelor’s degree) is $33.27 and the hourly for the upper quartile (upper 75%) is $37.81, but for nursing assistants (which requires some training post high school but not a degree such as an Associates) the average hourly wage is only $13.86 which translates into an annual income of $28,830.

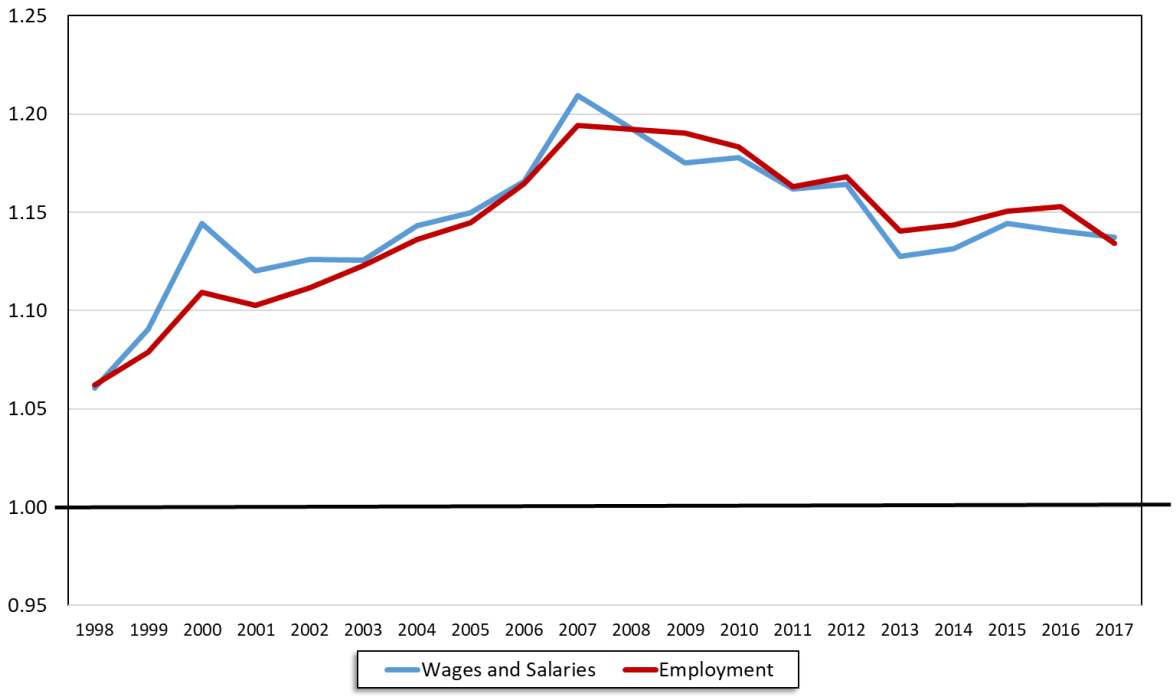
This diversity in occupations within health care services and hospitals means, from the local community's perspective, that there are a wide range of employment opportunities across the educational spectrum. In other words, a hospital within the community means that there is a wide variety of employment opportunities. Because so many of these occupations offer strong wages and salaries it explains why the "typical" or "average" job in health care and hospitals is higher than the Wisconsin state-wide average (Figure 3). It is not that case that higher wages and salaries in health care and hospitals is driven by a handful of highly paid medical doctors.

Figure 3: Wisconsin Wage and Salary Income per Job
Total, Health Care, Hospitals



Prior analysis of hospitals and the Wisconsin economy (Deller 2011, 2015) revealed that, compared to the United States, hospitals were a relative strength and what could be classified as a potential "economics cluster". Here a cluster is defined as an industrial sector where we have more activity (employment is a common measure) that we might expect (compared to the nation) and that "strength" is growing over time. This means that as Wisconsin is looking at specific industries to strategically invest, hospitals should be considered along with other potential clusters such as agricultural processing and tourism/recreation. For the updated analysis presented here, we used two measures of economic activity: employment as well as wage and salary income. To be consistent with prior analyses, we compare the share or percent of state employment (wages and salaries) that is attributed to hospitals and compare that to a national average. If the resulting Location Quotient (LQ) is greater than one, we have more activity than we might expect and the sector is considered a potential strength, particularly if the LQ is trending upward.

Figure 4: Location Quotient for Wisconsin Hospitals



The results of this analysis are provided in Figure 4. Note that the LQ using both employment and wages/salaries is greater than one across the entire time period examined. This suggests that we have more economic activity in hospitals than we might expect, hence is a potential economic strength. Also note that from 1998 to right before the Great Recession (2007) the LQ was trending upward, providing more evidence that hospitals could be a viable economic cluster for Wisconsin. This is the result identified by Deller (2011, 2015). From 2007, however, there has been a downward trend in the hospital LQ. If we return to the trend analysis for employment (Figure 1B) and wages and salaries (Figure 2B) it becomes clear that the growth in Wisconsin hospitals has slowed relative to the nation.

This slowdown in Wisconsin growth vis-à-vis the nation explains the downward trend in the Location Quotients.

Unfortunately, this simple trend analysis cannot shed light on the exact causes of this slight downward trend. It could be that the efficiency gains from hospital consolidations in Wisconsin or the rate of outsourcing or contracting for services (e.g., contracting for food services) is outpacing the U.S. average. One could also note that the slowdown in population growth in Wisconsin compared to the nation is placing an upward bound on the growth potential for hospitals. Alternatively, it could be that other regions of the U.S. are catching up to Wisconsin in terms of access to hospitals.

Economic Contributions

The core analysis of this study centers on calculating the contribution of Wisconsin hospitals to the state's economy. Specifically, how do the approximately 108,500 hospital jobs and the economic activity associated with those jobs (i.e., industry sales and worker income) impact the rest of the Wisconsin economy? How does this contribution vary across Wisconsin? For context we expand the analysis to compare hospitals to other health care sectors. Thus we conduct state level analysis for hospitals and nine other sectors ranging from dentists offices to medical and diagnostics laboratories to nursing and community care facilities. For the sub-state analysis we focus only on hospitals. In the next section we provide a simple review of the methods employed, then discuss the state wide average, then turn to the sub-state analysis. We also provide an estimate of the economic impact of patients from out of Wisconsin that come into the state to use the services offered by hospitals. Detailed results are provided in an appendix.

How do the approximately 108,500 hospital jobs and the economic activity associated with those jobs (i.e., industry sales and worker income) impact the remainder of the Wisconsin economy?

A Simple Review of Methods

The analysis considers the total economic contribution of health care and hospitals to the Wisconsin economy. Health care workers spend their wages and salaries in the local economy: they spend money in local grocery stores, local restaurants and go out to the movies. This revenue to grocery stores, restaurants and theaters is then further re-spent in the economy. In addition hospitals and health related facilities pay utility bills, buy office equipment and supplies, and pay taxes among other expenses. This spending by employees and the health care facilities itself in the local economy generates what is referred to as a multiplier effect. The question we address now is how this multiplier effect for Wisconsin hospitals is derived.

To answer this question we use a family of regional economic models referred to input-output analysis. An input-output model can be described as a "spreadsheet of the economy" capturing the demand and supply of the different actors (industries and institutions such as households, government or imports/exports) that make up that economy. Consumers, whether it be households or businesses, are across the columns of the "spreadsheet" and reflects demand while suppliers or sellers are down the rows. Any individual cell of the "spreadsheet" captures the flow of money from demanders (consumers or buyers) to suppliers (sellers). Thus reading down the column of any particular demander (e.g., industry) outlines how the demander spends money. For an industry, such as hospitals, reading down the column reveals the "production function" of the industry. For a given level of production how much labor or electricity or accounting services do hospitals need to purchase? At the same time reading across the row of a supplier tells us who that industry is selling to. Grain farmers, for example, could be selling to dairy farmers, food processors, directly to households or exporting their product out of the region.

Given that the economy is in "equilibrium" or, more specifically, supply must equal demand for all industries, we can use this "spreadsheet" representation of the economy to capture how changes in one part of the economy influence or impact other parts of the economy. For example, if a hospital expands operations it must purchase more inputs (e.g., labor, utilities, accounting services) and the industry that supplies those inputs must increase their own production to meet that new demand. This "ripple" effect is commonly referred to as the multiplier effect. Not only can we measure the total impact or contribution of any given industry on the whole of the economy but also what industries are impacted and to what extent. The multiplier is composed of three individual parts: direct, indirect, and induced.

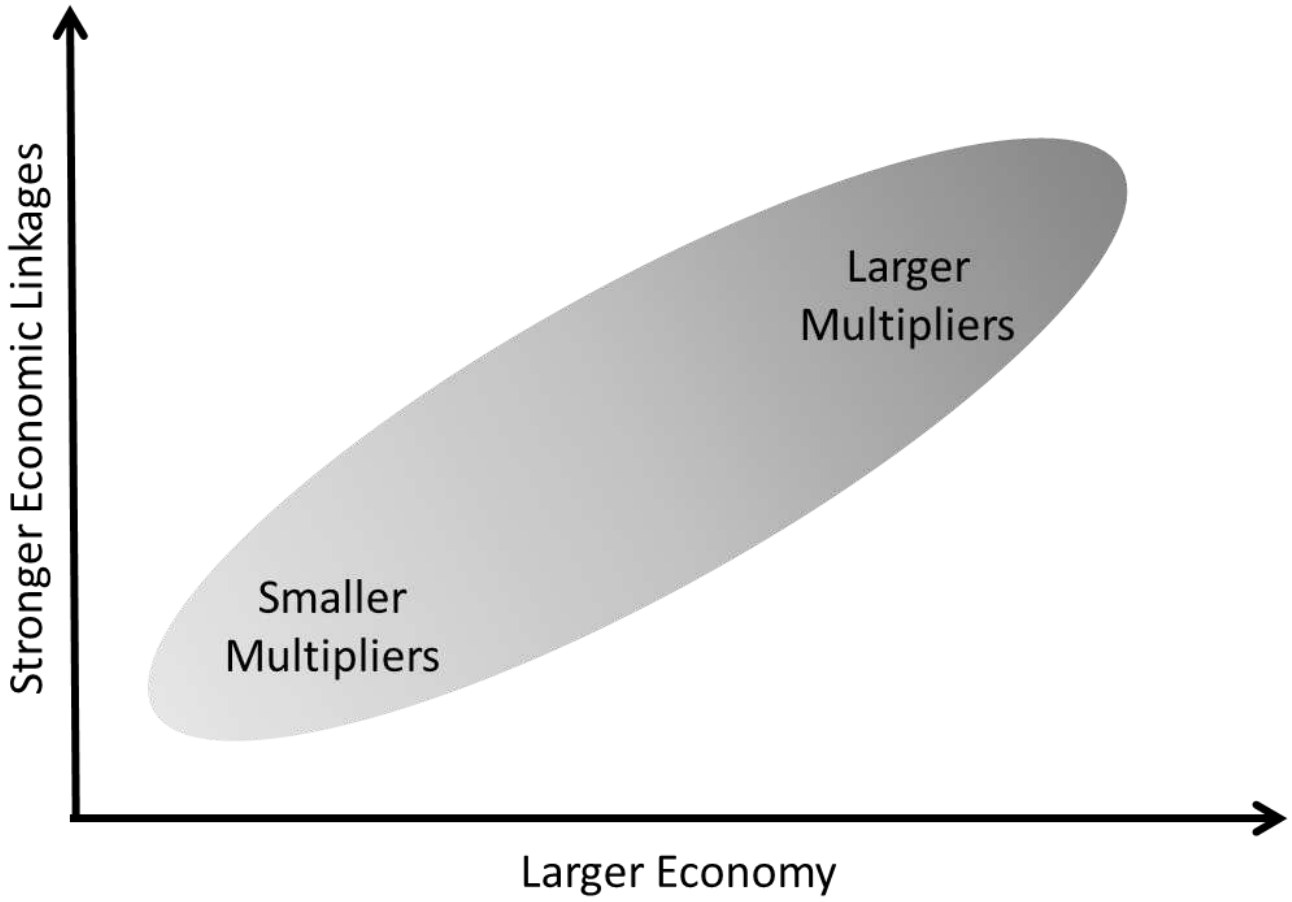
The three parts added together provides the total economic contribution. The direct effect is the health care facility or hospital itself. For hospitals, the direct employment contribution is 108,500 jobs. The indirect effect is generally associated with non-labor related expenses and would capture how a hospital spending on, for example utilities or office supplies, ripples throughout the economy. The induced effect is the impact of workers spending their wages and salaries in the local economy. By comparing the indirect and induced components of the multiplier we can gain some insights into the nature of the industry. For example, if the induced impacts are larger than the indirect we could interpret this as evidence that the industry is relatively labor intensive and/or pays higher wages/salaries.

Not only can we measure the total impact or contribution of any given industry on the whole of the economy but also what industries are impacted and to what extent.

We have four different ways to measure the size of the economy: employment, labor income, total income, and industrial sales or revenues. Employment is not a full-time equivalent and a job is a job. The induced impact, or labor spending income, generally affects personal services and retail because this is where most people spend their income. But some of these sectors use many part-time workers. Unfortunately, our models do not allow us to separate full- and part-time employment. Labor income is any income associated with work and includes wages, salaries and proprietor income. The latter is largely from self-employment where the proprietor draws from business profits as their income. Total income includes labor income plus all other sources of income such as dividends, interest and rental income, transfer payments (e.g., social security or unemployment compensation), and pension income, among others. One could think of total income as akin to gross domestic product. Industry sales/revenue is simply the revenues or sales within any particular industry.

Consider for example a dairy farmer with two paid employees and $1 million in sales/revenue. Employment is three; the farmer and the two workers. Suppose farther that the farmer pays the two employees $25,000 each and has the business structured that she takes a $50,000 salary. All profits that might be taken as proprietor income are reinvested in the business. Labor income here would be $100,000. Suppose also that the farmer inherited some land that they themselves cannot use but rather rent it to another farmer and takes that rental income as a payment to the farmer directly. Suppose that rental income is $10,000. The farmer receives no other income. Here total income would be $110,000. So, industry sales/revenue is $1 million, jobs/employment is three, labor income is $100,000 and total income is $110,000. These would be associated with the direct effects of the dairy farm.

Figure 5: Patterns of Economic Multiplier



For insights into how health care and hospitals impact local economies, it is important that the multipliers reflect the unique structure of the local economy. As outlined in Figure 5, the size of the economic multipliers vary by the overall size of the economy as well as the unique degree of inter-industry linkages within the local economy. The overall size of any regional economic multiplier hinges on how fast, or slow, spending "leaks" out of the economy. For larger economies, such as the state as a whole or the Milwaukee metropolitan region, the opportunities for money to be respent locally are higher than a smaller more rural economy, such as northern Wisconsin. In larger economies, businesses have a higher likelihood of having stronger connections to other businesses (indirect effects) within the region and consumers have greater opportunities to spend their money locally (induced effects). In smaller economies with weaker linkages, the ability to retain dollars is lower thus a lower multiplier. This variation across Wisconsin must be considered when looking at the impact of health care and hospitals in the local economy.

Economic Impact Results

Table 2: Contribution of Hospitals and Other Health Care Industries to the Wisconsin Economy (2016).

	Employment	Labor Income (MM$)	Total Income(MM$)	Industry Sales/Revenue (MM$)
Hospitals				
Direct Effect	108,454	7,553.2	9,206.2	16,429.1
Indirect Effect	40,508	2,007.9	3,416.8	6,069.9
Induced Effect	60,425	2,568.9	4,678.2	8,119.2
Total Effect	209,387	12,130.0	17,301.2	30,618.2
Multiplier	1.931	1.606	1.879	1.864
Medical Non-Hospitals				
Direct Effect	218,459	14,236.9	16,108.9	23,634.4
Indirect Effect	41,844	1,961.2	3,860.2	6,424.8
Induced Effect	102,259	4,346.0	7,915.9	13,736.7
Total Effect	362,561	20,544.1	27,885.1	43,795.9
Multiplier	1.660	1.443	1.731	1.853

	Medical Non-Hospitals	Hospitals
State & Local Govt Revenues (MM$)		
Personal Income Tax	469.3	275.9
Property Tax	713.7	359.3
Sales Tax	569.6	286.1
Misc	238.1	143.7
Total St & Loc Government	1,990.7	1,065.0

The results of the analysis for the state of Wisconsin are provided in Table 2 where we have hospitals and all other medical non-hospitals reported. Recall that the most current year in which we have data in sufficient detail to conduct the analysis at the sub-state level is for 2016. The total economic contribution of hospitals, after taking into account the multiplier effects, is about 209,400 jobs, $12.1 billion in labor income (wages, salaries and proprietor income), $17.3 billion in total income, and $30.6 billion in industrial sales/revenue. This represents 5.7 percent of total state employment, 6.3 percent of labor income, 5.5 percent of total income, and 4.9 percent of industrial sales/revenue. The economic multipliers range from a high of 1.931 for employment to a low of 1.605 for labor income.[3]

[3]To interpret the multipliers consider this example: if hospitals added 100 new jobs, the employment multiplier suggests that a total of 193 jobs would be created, the original (or direct) 100 jobs plus an additional 93 jobs elsewhere in the economy through the multiplier effect. For labor income, if a hospital gave its employees a $100,000 pay raise, the total impact on labor income would be $160,500, the original (or direct) pay increase of $100,000 plus an additional $60,500 of labor income generated via the multiplier.

The medical non-hospitals part of the Wisconsin health care industry generated 362,600 jobs (9.9% of state total employment), $20.5 billion in labor income (10.7% of state total), $27.9 billion in total income (8.9% of state total), and $43.8 billion of industrial sales/revenues (7.0% of state total). If we combine the contributions of hospitals and medical non-hospitals the economic contributions are noticeable: 571,900 jobs (15.5% of state total), $32.7 billion in labor income (17.1%), $45.2 billion in total income (14.4%) and $74.4 billion in industrial sales/revenue (11.9%). For comparison, consider the contribution of agriculture to the Wisconsin economy, last updated using 2012 data (Deller 2014). Here agriculture is defined as on-farm production and immediate value added food processing (e.g., cheese, bakeries, etc.) and contributed 413,500 jobs, $18.6 billion to labor income, $30.1 billion to total income, and $88.3 billion to industrial sales/revenue. Based on these analyses, one could reasonably argue that health care, broadly defined, has a larger contribution to the Wisconsin economy than agriculture.[4]

It is also important to note that the economic activity supported by hospitals and the broader health care industry generates tax revenues that flow to state and local governments. Hospital related activity generated $1.06 billion in total state and local tax revenues, with about $360 million in property taxes that flow to local government, predominately public schools. The bulk of the rest of the tax revenues generated tend to flow to state government and it is beyond the reach of this study to estimate how much of that may flow back to local governments in the form of aids and grants. The medical non-hospital sector (or health care with hospitals removed) generate just short of $2 billion with a similar distribution pattern across types of taxes and flows between local and state governments.

We have defined the non-hospital related health care industry broadly and it ranges from offices of physicians nd dentists to medical and diagnostic laboratories to nursing homes and community care facilities. In total we look at nine specific health care subsectors (Table 3).[5] A detailed discussion of all the results would be tedious and for brevity we will focus on jobs being supported by each subsector. Of the nine, the offices of physicians generates the most jobs at 110,607 with a slightly larger employment multiplier (2.157) than either hospitals (1.931) or medical non-hospitals (1.660). This is followed by nursing and community care facilities with 92,128 jobs and an employment multiplier of 1.424. This relatively small multiplier is likely due to a higher concentrations of lower paying occupations (e.g., personal care aides). Offices of dentists, offices of other health care practitioners (e.g., chiropractors), and outpatient care centers each supports about 32,000 jobs. Home health services supports 24,000 jobs and has the second smallest employment multiplier with 1.361 and this has two explanations: the industry is very labor intensive (note the relatively small indirect impact relative to the induced impact) and wages tend to be modest. Thus, a labor intensive industry that pays modest wages/salaries will have smaller multipliers. The one sector that is seldom discussed but has a relatively important contribution to jobs is residential out-patient, mental health, substance abuse and other similar care facilities with 23,000 jobs. The very modest employment multiplier (1.314) is explained by the labor intensive nature of the industry and the generally low paying occupations.

[4] Note the relative differences in jobs and income impacts across health care and agriculture; one could point to the much larger impact on incomes as an indicator of the wages and salaries paid in the health care sector relative to agriculture. This is consistent with the wage and income per job analysis discussed above (Figure 3).

[5] These nine sectors compose the medical non-hospital group in Table 2.

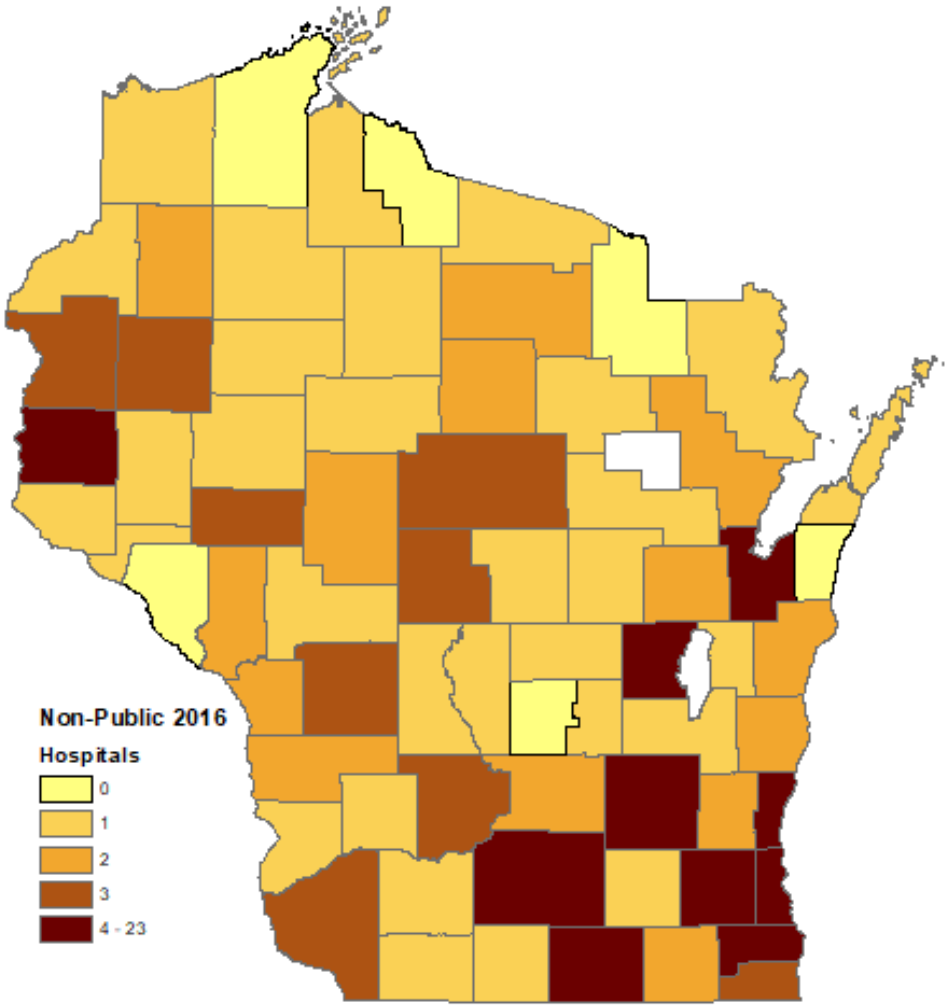
Table 3: Contributions of Non-Hospital Health Care Industries to the Wisconsin Economy (2016)

	Employment	Labor Income (MM$)	Total Income(MM$)	Industry Sales/Revenue (MM$)
Offices of physicians				
Direct Effect	51,273	6,291.8	6,260.9	8,704.8
Indirect Effect	14,903	738.4	1,339.0	2,238.8
Induced Effect	44,432	1,889.0	3,440.0	5,970.3
Total Effect	110,607	8,919.3	11,039.9	16,913.9
Multiplier	2.157	1.418	1.763	1.943
Offices of dentists				
Direct Effect	19,237	1,305.8	2,028.2	2,803.6
Indirect Effect	3,374	170.9	322.7	541.4
Induced Effect	9,328	396.5	722.2	1,253.3
Total Effect	31,939	1,873.2	3,073.1	4,598.4
Multiplier	1.660	1.435	1.515	1.640
Offices of other health practitioners				
Direct Effect	21,698	1,038.6	1,332.3	1,924.3
Indirect Effect	3,300	146.1	289.0	483.9
Induced Effect	7,453	316.4	576.7	1,000.3
Total Effect	32,451	1,501.1	2,197.9	3,408.5
Multiplier	1.496	1.445	1.650	1.771
Outpatient care centers				
Direct Effect	16,246	1,220.0	1,861.2	3,063.1
Indirect Effect	6,472	291.7	626.8	1,013.0
Induced Effect	9,550	406.0	739.4	1,283.2
Total Effect	32,268	1,917.6	3,227.3	5,359.2
Multiplier	1.986	1.572	1.734	1.750
Medical and diagnostic laboratories				
Direct Effect	3,768	244.9	251.9	410.6
Indirect Effect	784	40.9	67.7	114.6
Induced Effect	1,804	76.7	139.7	242.4
Total Effect	6,356	362.4	459.2	767.6
Multiplier	1.687	1.480	1.823	1.869
Home health care services				
Direct Effect	17,871	759.5	690.7	911.5
Indirect Effect	1,314	58.2	112.7	184.5
Induced Effect	5,144	218.4	398.0	690.4
Total Effect	24,330	1,036.1	1,201.4	1,786.4
Multiplier	1.361	1.364	1.739	1.960
Other ambulatory health care services				
Direct Effect	6,142	280.1	305.4	561.4
Indirect Effect	1,153	58.9	115.7	196.3
Induced Effect	2,138	90.8	165.5	287.2
Total Effect	9,434	429.9	586.6	1,044.8
Multiplier	1.536	1.535	1.921	1.861
Nursing and community care facilities				
Direct Effect	64,687	2,470.6	2,782.6	4,430.2
Indirect Effect	9,308	403.7	863.8	1,449.2
Induced Effect	18,133	770.5	1,403.5	2,435.4
Total Effect	92,128	3,644.7	5,050.0	8,314.7
Multiplier	1.424	1.475	1.815	1.877
Residential and non-residential mental health, substance abuse and other facilities				
Direct Effect	17,537	625.6	595.8	824.9
Indirect Effect	1,235	52.4	122.8	203.2
Induced Effect	4,276	181.7	331.0	574.3
Total Effect	23,049	859.6	1,049.6	1,602.5
Multiplier	1.314	1.374	1.762	1.943

Sub-State Regional Analysis

There are three reasons to explore the contribution of hospitals to regional economies across Wisconsin: (1) the distribution of hospitals is not even across Wisconsin; (2) the economic multipliers vary across Wisconsin reflecting unique characteristics of each region, and (3) local economic growth and development policies must reflect local or regional conditions that may be different from state-wide averages.

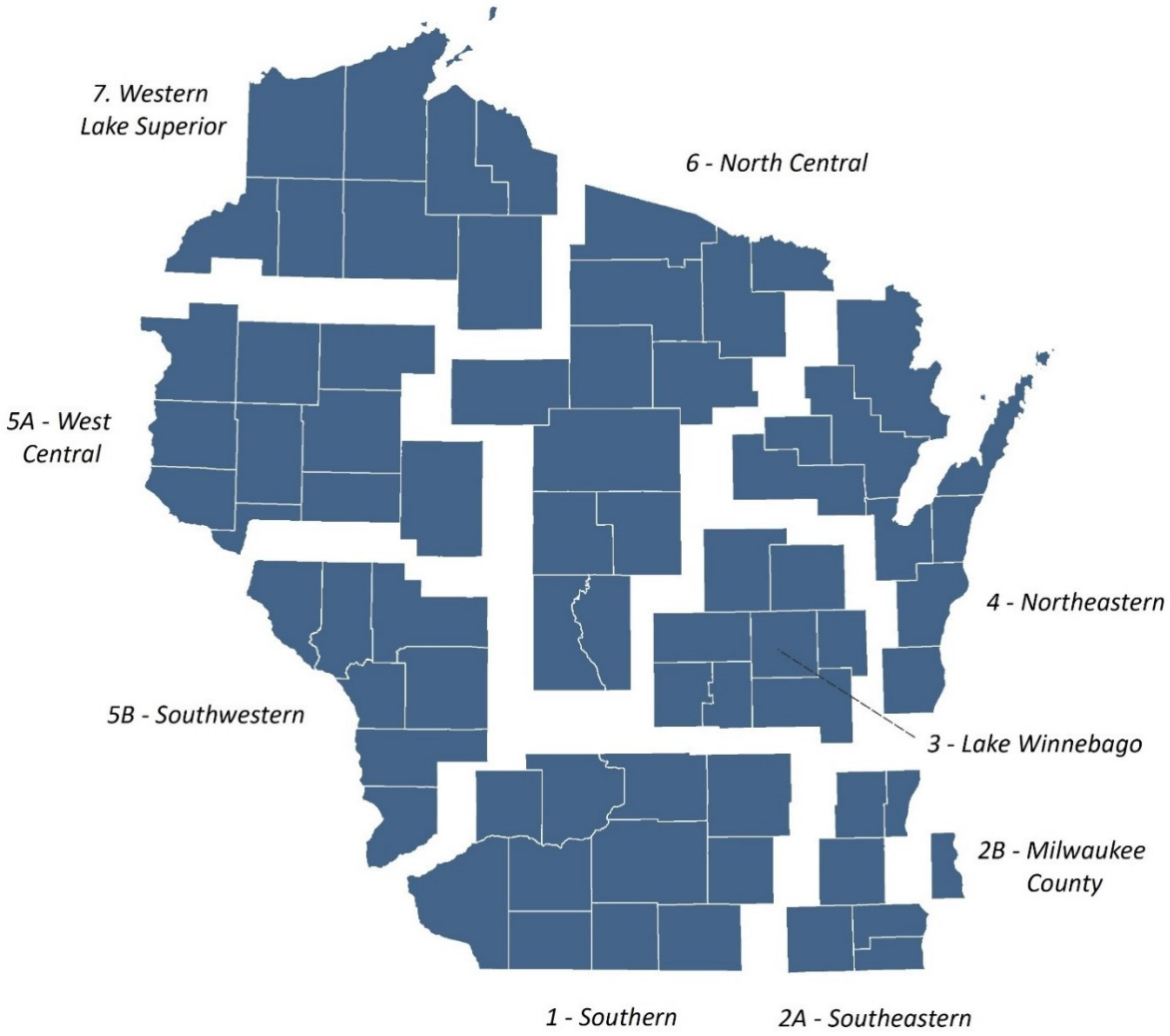
Map 1: Concentration of Hospitals (2016)



If one looks at the spatial distribution of hospitals across Wisconsin it becomes clear that there are patterns of clustering around urban hubs (Map 1). One can clearly see the Madison-Green Bay-Milwaukee/Racine/Kenosha "triangle" in the southeastern region of Wisconsin, along with the spillover effects of the Twin Cities in Minnesota. This distribution could lead to the mistaken interpretation that all of the economic contribution effects are narrowly limited to those areas. In addition, as noted above (Figure 5), the structure of the economy varies across Wisconsin and, to gain finer insights into how hospitals impact the economy at local levels, we must use region-specific multipliers.

For this analysis we use the regions defined by the Wisconsin Hospitals Association (Map 2).

Map 2 - Wisconsin Hospital Association Regions



A summary of the total economic contribution of hospitals for each of the nine regions within Wisconsin is provided in Table 4. The detailed results are provided in the Appendix to this report. The region with the largest contribution is Region 2B (Milwaukee County) where hospital activity supports almost 47,000 jobs, $2.8 billion in labor income, $3.9 billion in total income, and $6.6 billion in industrial sales/revenues. The smallest impact level is in Region 7 (Ashland, Bayfield, Burnett, Douglas, Iron, Rusk, Sawyer, and Washburn Counties), one of the more rural parts of Wisconsin, where hospitals support 2,060 jobs, $96.7 million in labor income, $131.0 million in total income and $259.7 million in industrial revenues/sales. This regional variation is not only explained by the direct impact (absolute size of hospitals) but also the differences in regional economic multipliers. In more rural areas, hospitals tend to be smaller (smaller direct effects) because of smaller population, or patient bases, and have smaller multiplier effects (indirect and induced) because money tends to leak out of the economy faster (Figure 5). Thus, this variation across Wisconsin is expected.

Contribution of Out-State Patients

One element of the economic contribution of hospitals to Wisconsin that is often overlooked is the inflow of out-of-state patients. These are patients that are not residents of Wisconsin but are treated in Wisconsin hospitals. This could be due to specialized services or reputation of the specific hospital and/or the spatial proximity of patients who live close to the state boarder. For 2017, out-of-state patients spent some $2.3 billion on hospital services which generated 29,300 jobs throughout the Wisconsin economy. In addition, the injection of money from these out-of-state patients generates $1.7 billion in labor income, $2.4 billion in total income and $4.3 billion in industrial revenues/sales. It is important to note that this impact of out-of-state patients is already part of the total economic contributions (Table 4). Thus it would be in error to add the impacts of out-of-state patients to the summary estimates of the total contribution. A more detailed reporting of these impacts is also provided in the Appendix. As Wisconsin looks for new strategies to inject money into the economy, looking to hospitals as a potential "export" sector is a possible approach. For every $1 million in spending from out-of-state patients, a total of 13 new jobs are created (total impact), with $737,700 in labor income, $1.1 million in total income, and $1.86 million in total industrial sales/revenues.

Table 4: Impact of Out-of-State Hospital Patients

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	15,163	1,056.0	1,287.1	2,296.9
Indirect Effect	5,663	280.7	477.7	848.6
Induced Effect	8,448	359.2	654.0	1,135.1
Total Effect	29,274	1,695.9	2,418.8	4,280.6
Top Ten Impacted Sectors				
Hospitals	15,667	1,091.1	1,329.9	2,373.4
Employment services	976	33.2	49.2	68.2
Full-service restaurants	770	14.0	15.8	34.2
Real estate	741	14.7	120.6	164.5
Limited-service restaurants	468	8.1	20.4	37.5
Wholesale trade	446	33.7	60.2	96.2
Other financial investment activities	381	13.8	16.7	64.5
Management consulting services	310	20.1	19.5	34.1
All other food and drinking places	299	6.4	5.2	10.5
Insurance carriers	294	28.6	91.8	153.6
Impacts by Super Sectors				
Agriculture	76	2.2	2.9	7.1
Mining	5	0.2	0.5	0.9
Construction	153	9.0	11.5	23.9
Manufacturing	249	17.1	30.5	101.4
TIPU	675	42.7	86.0	194.6
Trade	1,951	78.5	130.7	211.5
Service	26,000	1,534.0	2,141.8	3,708.5
Government	165	12.3	15.0	32.8
State & Local Govt Revenues				
Personal Income Tax	38.6			
Property Tax	50.2			
Sales Tax	40.0			
Misc	20.1			
Total St & Loc Government	148.9			

Conclusions

The intent of this study was to document the contribution of health care and hospitals in particular on the Wisconsin economy. The analysis found after accounting for the multiplier effect the health care sector contributes almost 571,900 jobs (15.6% of total Wisconsin employment), $32.67 billion in labor income (17.1% of state total), $45.19 billion in total income (14.4% of state total), and $74.41 billion to industrial sales/revenue (11.9% of state total). Hospitals contribute almost 209,400 jobs (5.7% of total Wisconsin employment), $12.13 billion in labor income (6.3% of state total), $17.3 billion in total income (5.5% of state total), and $30.62 billion in industrial sales/revenue (4.9% of state total). The state and local government tax revenues generated by that economic activity is $1.06 billion for hospitals and $1.99 billion for non-hospital related health care for a total of $3.06 billion. Employment in the health care sector in Wisconsin grew by 29.6 percent from 1998 to 2017, while total employment grew by 12.3 percent. Employment in hospitals grew by 24.0 percent. Nationally, health care sector employment grew by 49.0 percent, hospital employment by 27.9 percent and total employment grew 23.8 percent. Perhaps most important is the quality and breadth of employment opportunities that the health care sector and hospitals provide to community residents. The typical wage/salary offered in health care is significantly higher that the statewide average and the occupational mix creates opportunities from these with just a high diploma to those with the highest levels of education and training.

What we did not explore in this study is how access to quality health care and hospitals improves worker productivity, which translates into higher levels of business profitability. The interplay between access to quality care, worker health, worker productivity and firm profitability is clear and should be viewed as an integral part of economic growth and development policies. We also do not address how access to quality health care and hospitals improves overall quality of life independent of worker productivity. Thus, in this study we documented the contribution of health care and hospitals to Wisconsin in a relatively narrow way: hospitals employ people (direct effects) who spend wages/salaries in the local economy (induced effects) and purchase goods and services from other businesses (indirect effects). Because the roles of enhanced worker productivity and quality of life is not considered, our estimates should be viewed as conservative.

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Appendix

Appendix Table A1: Region 1 (Columbia, Dane, Dodge, Grant, Green, Iowa, Juneau, Jefferson, Lafayette, Richland, Rock, Sauk)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	16,618	1,221.8	1,488.6	2,594.7
Indirect Effect	5,634	274.1	487.7	853.1
Induced Effect	8,094	330.6	643.2	1,094.6
Total Effect	30,346	1,826.5	2,619.5	4,542.3
Multiplier	1.826	1.495	1.760	1.751
Top Ten Impacted Sectors				
Hospitals	16,618	1,221.8	1,488.6	2,594.7
Full-service restaurants	835	16.6	18.5	38.4
Employment services	795	31.6	46.8	62.3
Real estate	782	14.1	149.5	195.9
Limited-service restaurants	522	9.6	23.7	42.8
Wholesale trade	439	35.0	61.3	96.8
Other financial investment activities	365	7.1	8.8	54.6
Management consulting services	349	20.9	20.2	36.7
Services to buildings	339	6.5	7.3	12.6
Insurance carriers	302	28.9	92.8	156.3
Impacts by Super Sectors				
Agriculture	37	1.1	1.4	3.3
Mining	5	0.2	0.2	0.8
Construction	145	9.2	11.8	23.6
Manufacturing	149	10.6	19.7	61.0
TIPU	654	41.5	93.1	214.5
Trade	1,958	81.0	136.2	216.2
Service	27,276	1,672.6	2,346.1	4,001.3
Government	122	10.3	11.1	21.6

State & Local Govt Revenues (MM$)	
Personal Income Tax	41.2
Property Tax	49.3
Sales Tax	46.4
Misc	21.4
Total St & Loc Government	158.3

Appendix Table 2A: Region 2A (Kenosha, Ozaukee, Racine, Walworth, Washington, Waukesha)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	15,425	977.7	1,192.7	2,221.0
Indirect Effect	4,063	182.7	293.8	480.6
Induced Effect	5,078	203.7	376.3	621.2
Total Effect	24,566	1,364.1	1,862.8	3,322.8
Multiplier	1.593	1.395	1.562	1.496
Top Ten Impacted Sectors				
Hospitals	15,425	977.7	1,192.7	2,221.0
Full-service restaurants	842	28.6	42.3	58.8
Real estate	686	13.4	91.9	132.5
Limited-service restaurants	628	11.4	12.9	27.8
Employment services	379	6.6	16.4	30.3
Wholesale trade	257	5.6	6.3	10.3
Retail - General merchandise stores	223	6.9	9.9	15.5
Other financial investment activities	200	10.6	11.4	19.8
All other food and drinking places	191	5.9	8.1	12.5
Offices of physicians	184	3.7	3.0	6.3
Impacts by Super Sectors				
Agriculture	6	0.2	0.2	0.5
Mining	2	0.1	0.3	0.4
Construction	106	6.5	8.4	17.0
Manufacturing	95	6.8	11.5	28.0
TIPU	285	13.4	24.4	54.6
Trade	1,230	51.4	78.9	122.8
Service	22,779	1,279.9	1,731.9	3,086.6
Government	63	5.7	7.3	12.9
State & Local Govt Revenues (MM$)				
Personal Income Tax	32.0			
Property Tax	35.4			
Sales Tax	25.2			
Misc	15.4			
Total St & Loc Government	108.0			

Appendix Table 2B: (Milwaukee)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	29,238	1,935.3	2,360.1	4,308.3
Indirect Effect	7,933	420.5	718.6	1,086.4
Induced Effect	9,698	444.1	794.2	1,247.4
Total Effect	46,869	2,799.9	3,872.9	6,642.2
Multiplier	1.603	1.447	1.641	1.542
Top Ten Impacted Sectors				
Hospitals	29,238	1,935	2,360	4,308
Full-service restaurants	1,940	62.6	92.9	130.7
Real estate	1,199	25.2	27.9	56.4
Limited-service restaurants	827	23.4	241.1	290.6
Employment services	687	12.9	32.6	57.7
Wholesale trade	547	12.7	14.3	22.9
Retail - General merchandise stores	546	29.1	31.5	54.3
Other financial investment activities	366	10.1	15.0	24.3
All other food and drinking places	359	9.8	7.4	13.9
Offices of physicians	357	9.1	8.4	12.1
Impacts by Super Sectors				
Agriculture	1	0.0	0.0	0.0
Mining	1	0.4	(0.1)	0.1
Construction	120	7.3	9.7	19.4
Manufacturing	75	5.4	8.7	22.7
TIPU	484	33.3	61.6	133.9
Trade	1,834	68.1	100.2	156.3
Service	44,136	2,668.8	3,670.3	6,264.6
Government	219	16.5	22.4	45.0

State & Local Govt Revenues (MM$)	
Personal Income Tax	51.8
Property Tax	61.7
Sales Tax	40.8
Misc	27.9
Total St & Loc Government	182.3

Appendix Table 3: Region 3 (Calumet, Fond du Lac, Green Lake, Marquette, Outagamie, Waupaca, Waushara, Winnebago)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	7,425	$534.3	$651.1	$1,145.5
Indirect Effect	2,361	$108.4	$182.8	$330.9
Induced Effect	3,421	$132.3	$245.3	$428.6
Total Effect	13,207	$775.1	$1,079.2	$1,904.9
Multiplier	1.779	1.451	1.657	1.663
Top Ten Impacted Sectors				
Hospitals	7,592	$546.3	$665.8	$1,171.3
Full-service restaurants	353	$5.9	$6.7	$15.1
Employment services	352	$13.9	$20.6	$27.5
Real estate	308	$5.9	$38.3	$56.5
Limited-service restaurants	208	$3.2	$8.3	$16.0
Other ambulatory health care services	166	$8.5	$9.3	$16.2
Wholesale trade	161	$10.1	$18.8	$31.8
Other financial investment activities	159	$3.3	$4.0	$23.9
Insurance carriers	152	$12.4	$40.2	$72.1
All other food and drinking places	137	$2.6	$2.1	$4.5
Impacts by Super Sectors				
Agriculture	10	$0.3	$0.4	$0.9
Mining	4	$0.0	$0.2	$0.4
Construction	63	$3.9	$5.0	$10.1
Manufacturing	64	$4.3	$7.4	$22.0
TIPU	251	$13.2	$26.3	$61.7
Trade	870	$29.3	$49.6	$84.0
Service	11,897	$720.1	$986.2	$1,717.0
Government	49	$3.9	$4.0	$8.7

Appendix Table 4: Region 4 (Brown, Door, Kewaunee, Manitowoc, Marinette, Menominee, Oconto, Shawano, Sheboygan)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	12,279	943.7	1149.3	1966.2
Indirect Effect	4,014	172.3	289.9	538.1
Induced Effect	6,144	241.1	435.9	767.2
Total Effect	22,437	1357.1	1875.1	3271.5
Multiplier	1.827	1.4	1.6	1.7
Top Ten Impacted Sectors				
Hospitals	12,279	943.7	1149.3	1966.2
Full-service restaurants	621	11.1	12.5	27.3
Employment services	548	16.6	24.6	35.3
Real estate	528	10.0	60.2	91.4
Limited-service restaurants	357	5.9	15.1	28.2
Wholesale trade	318	20.9	38.5	64.2
Management consulting services	264	13.5	13.0	25.5
Insurance carriers	260	20.9	67.7	122.2
Other ambulatory health care services	254	8.7	9.6	20.1
Other financial investment activities	234	2.9	3.6	33.0
Impacts by Super Sectors				
Agriculture	31	0.8	0.9	1.9
Mining	2	0.1	0.2	0.4
Construction	109	5.9	7.6	16.5
Manufacturing	90	5.5	8.9	29.2
TIPU	356	21.6	43.9	99.6
Trade	1,555	53.2	88.4	151.1
Service	20,160	1260.2	1711.2	2943.0
Government	135	9.9	13.8	29.8

State & Local Govt Revenues (MM$)	
Personal Income Tax	30.9
Property Tax	36.9
Sales Tax	28.9
Misc	15.3
Total St & Loc Government	112.1

Appendix Table 5A: Region 5A (Barron, Buffalo, Chippewa, Clark, Dunn, Eau Claire, Pepin, Pierce, Polk, St. Croix)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	9,116	616.7	751.6	1,358.9
Indirect Effect	2,857	104.9	173.9	338.3
Induced Effect	3,781	139.5	257.6	463.5
Total Effect	15,754	861.1	1,183.1	2,160.7
Multiplier	1.728	1.4	1.6	1.6
Top Ten Impacted Sectors				
Hospitals	9,116	616.7	751.6	1,358.9
Employment services	558	16.4	24.2	35.1
Full-service restaurants	389	6.4	7.3	16.6
Real estate	328	4.5	36.7	56.0
Limited-service restaurants	247	3.9	10.0	19.1
Wholesale trade	232	11.3	22.1	40.8
Other financial investment activities	153	2.3	2.9	22.1
Retail - General merchandise stores	145	4.3	6.3	9.9
All other food and drinking places	144	2.4	2.0	4.6
Other ambulatory health care services	138	5.6	6.1	11.8
Impacts by Super Sectors				
Agriculture	21	0.7	0.9	1.9
Mining	2	0.1	0.2	0.3
Construction	78	4.1	5.1	11.4
Manufacturing	43	2.4	4.0	15.9
TIPU	286	14.4	28.2	69.0
Trade	983	33.1	56.6	97.8
Service	14,248	800.1	1,080.8	1,946.1
Government	92	6.3	7.3	18.2

State & Local Govt Revenues (MM$)	
Personal Income Tax	19.2
Property Tax	21.6
Sales Tax	21.4
Misc	9.1
Total St & Loc Government	71.4

Appendix Table 5B: Region 5B (Crawford, Jackson, La Crosse, Monroe, Tempealeau, Vernon)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	9,761	801.0	975.2	1,624.0
Indirect Effect	2,491	95.4	157.0	303.6
Induced Effect	4,781	170.9	318.8	573.8
Total Effect	17,033	1,067.3	1,451.0	2,501.4
Multiplier	1.745	1.332	1.488	1.540
Top Ten Impacted Sectors				
Hospitals	9,761	801.0	975.2	1,624.0
Full-service restaurants	493	7.8	9.0	20.7
Real estate	371	10.4	54.0	76.0
Limited-service restaurants	286	4.6	11.8	22.3
Employment services	266	8.9	13.2	18.4
Wholesale trade	239	15.8	29.2	48.5
Retail - General merchandise stores	193	5.5	8.2	13.0
Other financial investment activities	178	2.8	3.5	25.9
All other food and drinking places	175	3.2	2.5	5.7
Offices of physicians	160	12.5	12.6	20.3
Impacts by Super Sectors				
Agriculture	28	0.6	1.0	2.0
Mining	2	0.1	0.2	0.4
Construction	85	4.6	5.8	12.7
Manufacturing	69	3.4	5.5	17.7
TIPU	340	20.6	40.2	97.4
Trade	1,199	39.6	66.7	115.1
Service	15,250	994.4	1,331.0	2,247.8
Government	61	4.1	0.5	8.3

State & Local Govt Revenues (MM$)	
Personal Income Tax	23.6
Property Tax	25.0
Sales Tax	22.0
Misc	10.7
Total St & Loc Government	81.3

Appendix Table 6: Region 6 (Adams, Florence, Forest, Langlade, Lincoln, Marathon, Oneida, Portage, Price, Taylor, Vilas, Wood)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	7,560	467.5	570.3	1,074.3
Indirect Effect	2,001	78.5	138.9	264.9
Induced Effect	2,704	100.4	188.2	333.1
Total Effect	12,265	646.4	897.4	1,672.4
Multiplier	1.622	1.383	1.574	1.557
Top Ten Impacted Sectors				
Hospitals	7,560	467.5	570.3	1,074.3
Full-service restaurants	283	4.4	5.1	11.8
Real estate	270	4.4	26.9	42.8
Limited-service restaurants	239	6.6	9.8	14.5
Employment services	172	2.8	7.1	13.4
Wholesale trade	162	9.7	18.2	31.3
Retail - General merchandise stores	150	1.1	1.5	20.4
Other financial investment activities	137	12.6	40.5	69.1
All other food and drinking places	112	1.9	1.6	3.6
Offices of physicians	104	3.0	4.4	7.0
Impacts by Super Sectors				
Agriculture	18	0.6	0.7	1.4
Mining	2	0.0	0.1	0.3
Construction	57	2.8	3.5	8.1
Manufacturing	28	1.5	2.4	8.8
TIPU	205	12.3	21.7	47.9
Trade	731	25.0	43.0	73.1
Service	11,164	599.8	821.3	1,522.8
Government	60	4.3	4.6	9.9

State & Local Govt Revenues (MM$)	
Personal Income Tax	14.3
Property Tax	18.4
Sales Tax	16.0
Misc	6.7
Total St & Loc Government	55.4

Appendix Table 7: Region 7 (Ashland, Bayfield, Burnett, Douglas, Iron, Rusk, Sawyer, Washburn)

Impact Type	Employment	Labor Income (MM$)	Total Income (MM$)	Industry Sales/Revenue (MM$)
Direct Effect	1,373	76.0	92.8	184.5
Indirect Effect	295	9.2	15.3	32.4
Induced Effect	378	11.5	22.8	42.8
Total Effect	2,046	96.7	131.0	259.7
Multiplier	1.490	1.272	1.410	1.408
Top Ten Impacted Sectors				
Hospitals	1,373	76.0	92.8	184.5
Full-service restaurants	55	0.8	0.9	2.2
Real estate	45	0.5	3.9	6.6
Limited-service restaurants	23	0.4	1.0	1.8
Employment services	19	1.0	1.9	3.4
Wholesale trade	18	0.3	0.3	0.6
Retail - General merchandise stores	17	0.4	0.6	1.0
Other financial investment activities	17	0.7	0.9	1.4
All other food and drinking places	16	0.2	0.2	0.5
Offices of physicians	14	0.1	0.1	1.9
Impacts by Super Sectors				
Agriculture	4	0.0	0.1	0.1
Mining	0	0.0	0.0	0.0
Construction	7	0.3	0.4	1.0
Manufacturing	2	0.1	0.4	1.8
TIPU	28	1.7	3.2	8.1
Trade	103	3.1	5.2	9.3
Service	1,885	90.4	120.4	236.3
Government	16	1.0	1.2	2.9

State & Local Govt Revenues (MM$)	
Personal Income Tax	2.1
Property Tax	3.3
Sales Tax	1.9
Misc	1.0
Total St & Loc Government	8.2

The Contribution of Health Care Services to the Wisconsin Economy with a Focus on Hospitals