The Economic Contribution of Hospitals to Wisconsin

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ECONOMIC CONTRIBUTION OF HOSPITALS TO THE WISCONSIN ECONOMY

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Summary
This study represents an update of a 2008 analysis of the contribution of hospitals to the Wisconsin economy which examined 2006 data. In this study we use the most current data which is for 2009. As in the former analysis, in this study we do not examine the whole of the health care industry but focus on hospitals. As such we do not consider independent physician’s offices, dentists, or resident care facilities. From 1990 to 2009 total employment in Wisconsin grew at an average annual rate of about 1.08 percent while employment at hospitals grew by an annual average of 1.78 percent. This is a reflection of the growing strength of the health care sector, and hospitals in particular, as a source of employment. In addition hospital employment tends to be less sensitive to national recessions.

Hospitals employed about 110,000 people in 2009 and when the “multiplier effect” is considered hospitals in Wisconsin contributed 226,600 jobs, $6.403 billion in labor income (wages, salaries and proprietor income), $7.304 billion in total income (all sources of income) and $14.067 billion of total industrial sales. This accounts for 6.7 percent of all employment in Wisconsin, 7.3 percent of labor income, 6.3 percent of total income and 6.0 percent of industry sales. This economic activity supports $1.259 billion in state and local government revenues of which $388.8 million is in the form of property taxes going to local governments.

In addition to conducting an analysis of the overall contribution of hospitals to the Wisconsin economy we replicate the analysis for each county in Wisconsin. Of the 72 counties in Wisconsin nearly nine in ten (88.9 percent) have a hospital. Not surprisingly, Milwaukee County accounts for 23.6 percent of the total contribution of hospitals to Wisconsin employment, or 52,200 jobs. The county with second largest contribution to employment is La Crosse County where hospital employment contributed 14,410 jobs, or about 6.5 percent of the total.

1 Support for this work was provided in part by the Wisconsin Hospitals Association, the Wisconsin Agricultural Experiment Station and the University of Wisconsin-Extension, Cooperative Extension. This study has benefited from the helpful comments of Mary Kay Grasmick and others at the WHA. All errors are the responsibility of the author.

2 See the full report at: http://www.uwex.edu/ces/cced/economies/documents/HealthyHospitals_web.pdf
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The growth of the health care industry across the US has been the topic of considerable discussion in the popular press and policy debates at the federal and state level. As we age as a society, both the aging of the Baby Boomer generation and lengthening life expectations, the demand for health care services has been and will continue to grow. A major piece of the health care industry is hospitals. Here hospitals are defined as institutions where people receive medical, surgical, or psychiatric treatment and nursing care. Hospitals are different from medical clinics or doctors’ offices (inclusive of dentists and psychiatrists/counselors’ offices) or resident care facilities such as nursing homes. Hospitals generally provide in-patient care as well as some out-patient treatments. In the name of reducing health care costs, hospitals are providing higher levels of out-patient care services.

The question that is addressed in this study is how do hospitals fit into and contribute to the Wisconsin economy. To what extent are hospitals an engine of job and income growth? How sensitive are hospitals as an industry sensitive to economic fluctuates, such as the most recent recession? What are the prospects for future growth? How does the contribution of hospitals to the economy vary across Wisconsin? What is the relative importance of hospitals to the local economy across Wisconsin counties? The analysis represented in this technical report is aimed at attempted to provide some insights into each of these questions.

The analysis proceeds in four steps. First we outline general trends in hospital employment comparing Wisconsin to the U.S. and the neighboring Great Lake states from 1990 to 2009, the most current year for which comprehensive data is available. We also examine employment projections to help understand the growth potential of hospitals to the year 2018. Second, we provide a summary discussion of the impact of hospitals on the Wisconsin economy. Using the idea of economic multipliers we are able to “trace-out” how hospitals impact the state’s economy. Third, we provide a summary of the individual county-level analysis. In essence, we replicate the state-level analysis for each Wisconsin county which has a hospital. We close the analysis with a simple discussion of the relative strength of hospitals to each individual Wisconsin county. This technical report closes with a brief review of the key findings of this analysis.

Historical and Future Trends in the Hospital Industry

In 1990 hospitals accounted for 2.6 percent of total employment in the U.S. and grew to 2.7 percent in 2009. From 1990 to 2009 total employment in the U.S. grew by 25.6 percent but hospital employment grew by 30.0 percent. The growth pattern in hospital employment in Wisconsin is more dramatic. In 1990 hospitals share of employment was 2.8 percent and increased to 3.2 percent in 2009. In essence, total employment in Wisconsin increased by 22.4 percent over the 1990 to 2009 timeframe but hospital employment increased by 39.5 percent. As evident from the employment growth index for Wisconsin (Figure 1a), growth in hospital employment paralleled total employment from 1994 to about 2001 after which hospital growth employment far outpaced total employment growth. When comparing
Wisconsin to the U.S. and the Great Lake states (Figure 1b) it is clear that hospital employment has been very robust in Wisconsin, particularly over the past nine years.

Perhaps most interesting is the how hospital employment has fared in the most recent recession. Over the 1990 to 2009 period the U.S. economy has experienced three economic down-turns: 1991, 2000 and the most recent 2008-2009. Examination of employment trends in hospitals in not only Wisconsin, but also the U.S. and the Great Lakes states reveals that the industry experienced declines in the early 1990s as well as 2000, but there is no decline in hospital employment over the last recession. There is a noticeable slow-down in hospital employment growth over the last recession but there is no decline. National monthly data that is current through June of 2011 reveals that reduced rate of hospital employment growth at the height of the most recent recession has returned to pre-recession growth rates.

Another way to examine these employment trends in hospitals is to look at the percent change from one year to the next. Consider Wisconsin total employment and employment in hospitals (Figure 2a). Notice that for Wisconsin the recession of 1991 had very little impact on total employment but there was a noticeable decline in hospital
employment in 1994. The recession of 2001 caused modest declines in both total and hospital employment; but the decline in hospital employment was about half the level of decline in total employment. Most interesting is the most recent recession which saw a significant decline in total employment in Wisconsin, but hospital employment actually increased. Note that over the 1990 to 2009 time period total employment growth in Wisconsin had an average annual growth rate of 1.08 percent but for hospitals the growth rate averaged 1.78 percent. This higher rate of hospital employment growth is particularly evident over the past ten years.

If we compare year-to-year Wisconsin hospital employment growth patterns to the U.S. we see that the drop in hospital employment in 1994 was not unique to Wisconsin but reflected national trends. Also notice that from a national perspective hospital employment experienced growth during the most recent recession. This latter point asks if the health care industry, and in particular hospitals, has become somewhat of a counter-balance to recessionary pressures. Also notice how hospital employment growth in Wisconsin has consistently outpaced U.S. and Great Lakes hospital employment growth (Figures 1b and 2b).

The U.S. Bureau of Labor Statistics periodically provides long-term forecasts of industrial employment growth with the most recent being released in December 2009. Looking over a ten year period from 2008 to 2018 five of the industries with the largest projected employment growth are in the health care sector. In order these include: offices of health care practitioners (1.25 million jobs added), nursing and residential care facilities (636.8 thousand jobs added), hospitals (550.7 thousand jobs added), home health care services (441.4 thousand jobs) and finally outpatient, laboratory and other ambulatory care services (308.4 thousand jobs added). While it must be noted that these forecasts were conducted just prior to the last recession and the exceptionally slow recovery will undoubtedly alter these forecasts, the underlying socio-economic and demographic trends are unlikely to alter the basic trajectory of health care employment growth. As a society we continue to age placing upward pressure on the demand for health care services including hospitals. In addition, the fact that hospital employment growth

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3 It should be noted that part of this latter pattern is due to the smaller base upon with the growth is occurring. For exampleing, adding 10 jobs on a base of 100 will provide a much larger percent increase than adding the same 10 jobs onto a base of 1000.

growth was only modestly affected by the most recent recession speaks to the growing underlying demand for health care services.

A similar effort to look at future employment growth was undertaken by the Wisconsin Department of Workforce Development, again looking at growth from 2008 to 2018. While the Wisconsin analysis does not provide as fine industrial detail as the U.S. analysis, three of the top six largest growing industries are related to health care. Indeed, the single largest growing sector is ambulatory health care services with an anticipated growth of 22,670 jobs between 2008 and 2018, a 21.4 percent increase. The second largest sector in terms of forecasted employment growth is hospitals with about 15,080 jobs, about a 12.6 percent increase. Nursing and residential care facilities is the sixth largest growth industry with an estimated 12,260 additional jobs added by 2018. This compares to an expect loss of 34,380 durable manufacturing jobs and 16,330 nondurable goods manufacturing. The arts, entertainment and recreation industry, one element of the Wisconsin tourism industry, is expected to see an increase of 1,560 jobs while accommodations (hotels, motels, etc.) is expected to experience employment growth of 1,480 jobs. Restaurants and drinking places, however, is expected to grow by 12,420 jobs by 2018.

Clearly, the growth in the health care industry, including but not limited to hospitals, in terms of jobs is significant. During a weak economy, many people tend to focus on jobs as the single metric of the contribution of an industry to the local economy. Increasingly local decision makers and concerned citizens are worried about the wages associated with those jobs. For hospitals, there is a wide range of occupations ranging from food preparers and janitorial staff to highly specialized doctors. In Wisconsin, the typical pharmacy aid has a salary of about $20,800 and a physical therapy aide has a salary of $24,800, surgical technologists have an average annual salary of $44,800, radiologic technologists and technicians earn an average of $52,760 and dietitians and nutritionists have an average annual salary of $53,900. Clearly, medical doctors (MDs) have much higher salaries: a general internist has an average salary of $212,290, family and general practitioners have average annual salaries of $203,040. For non-medical related jobs the salary range is equally as wide from $24,500 for janitors and $21,170 for non-restaurant food servers to $98,370 for human resource managers. Thus when we think about how hospitals contribute to the Wisconsin economy we must be sensitive to not only the jobs that are supported, but also the wages, salaries and income that is generated.

If we look at the contribution of the health care sector, and in particular hospitals, to total employment in Wisconsin in 2009 (the most current year that the data are available), we can see that about nine percent of total employment is attributable to health care before any multiplier effects are considered (Figure 3a). Doctors’ offices including physicians and dentists, account for about three percent of total employment while hospitals account for another three percent. But for labor income, which includes wages, salaries and proprietor income, health care accounts for 12 percent of labor income (Figure 3b). Doctors’ offices account for five percent while hospitals account for four percent of labor income. When

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comparing employment and labor income shares it becomes readily apparent that labor income paid in the health care sector is higher than the broad Wisconsin average. Indeed, in 2009 the typical worker in Wisconsin earns about $44,690 in wages, salary and proprietor income (i.e., labor income), but for doctors’ offices it is nearly twice the level at $86,690 and for hospitals it is $58,300. The lower level for hospitals when compared to doctors’ offices is the inclusion of lower paid food preparers and janitorial staff that are generally not found at doctors’ offices.

We can gain additional insights into how hospitals contribute to the Wisconsin economy by considering total income. Here total income captures all income including labor income (wages, salary and proprietor income), transfers (e.g., social security payments and income maintenance payments), interest income, dividend payments and rental income. From an income accounting framework, total income is akin to gross domestic product (GDP), the most widely used measure of economic activity. The share of total employment from the health care sector (Figure 3a) is nearly identical to total income shares from health care (Figure 3c). Nearly all of the income generated by the health care sector, prior to any multiplier impact analysis, takes the form of wages, salary and proprietor income (i.e., labor income). As such this result is not unexpected.
A fourth way of thinking about the contribution of any given industry to the state’s economy is industrial sales or revenue. For Wisconsin the health care sector accounted for seven percent of total industrial sales which is the smallest relative share of the four economic metrics considered. Doctors’ offices account for only two percent but hospitals remains at three percent. Despite the reputation of health care being a “high cost” industry the share of industry revenue is lower than might be expected given employment and income levels.

This latter observation is likely due to the nature of some of the manufacturing sectors in Wisconsin. Because of mechanization in many of Wisconsin’s manufacturing sectors, such as paper production, sales-per-worker can be exceptionally high. Output or sales per worker for paper mills in Wisconsin in 2009 was about $715,600 but for hospitals it is about $128,000 per worker.

What are the key observations to be made from the analysis presented to this point? First, employment growth in the health care sector, and hospitals in particular, has been robust (Figures 1a and 1b) and while not isolated from recessionary pressures there is some evidence that hospital employment could be a counter balance to recessionary downturns in the economy (Figures 2a and 2b). For the U.S. health care is expected to be among the largest growing industries in terms of employment. For Wisconsin, the Department of Workforce Development has predicted that health care, and hospitals in particular, will be the single largest source of employment growth over the next several years. Second, while the occupational mix of hospital employment is strong ranging from modestly paid food preparers to highly paid doctors the typical wages and salaries paid in hospitals is above the Wisconsin economy-wide average. In other words, hospitals in Wisconsin represent a significant and growing source of higher paying employment opportunities.

**Economic Impacts**

**A Simply Review of Methods**  
The analysis, as presented, considers the total economic contribution to the Wisconsin economy. Specifically, how do the approximately 110,000 hospital jobs and the economic activity associated with those jobs (i.e., industry sales and income) impact the remainder of the Wisconsin economy? For example, hospital 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. In addition hospitals pay utility bills, buy office equipment and supplies, and pay taxes among other expenses. This spending by hospital employees and the hospital itself in the local economy generates what is referred to as a multiplier effect. The question we address now is what this multiplier effect for Wisconsin hospitals is.
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. Demanders or consumers are across the columns of the “spreadsheet” and 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.

**Economic Impact Results**

The summary of the economic impact of hospitals on the Wisconsin economy is presented in Table 1. Consistent with the analysis presented in Figures 3a-3d there are four metrics of economic activity: employment, labor income, total income and industry sales. The base or “direct” impact of hospitals is a simple count of the size of the hospital industry before accounting for the multiplier effect. Consistent with the descriptive analysis presented above, there are about 110,000 jobs paying $6.4 billion in labor income associated with Wisconsin hospitals. These hospitals pay out about $7.3 billion in total income and generate almost $14.1 billion in industry sales. The difference between labor and total income can be explained largely from the fact that most hospitals in Wisconsin are private for-profit businesses which must earn a return on the owners’ investments. This generally comes in the form of dividend payments which is reflected in total income but not labor income. In addition, hospitals may be paying rent on facilities or land and that rental income flows to the owners of the land or facilities and is again reflected in total income but not labor income.

<table>
<thead>
<tr>
<th></th>
<th>Employment</th>
<th>Labor Income (M$)</th>
<th>Total Income (M$)</th>
<th>Industry Sales (M$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base or &quot;Direct&quot; Hospitals</td>
<td>109,843</td>
<td>$6,403</td>
<td>$7,304</td>
<td>$14,067</td>
</tr>
<tr>
<td>Impacts</td>
<td>226,652</td>
<td>$11,166</td>
<td>$15,229</td>
<td>$28,584</td>
</tr>
<tr>
<td>Share of Wisconsin Total</td>
<td>6.7</td>
<td>7.3</td>
<td>6.3</td>
<td>6.0</td>
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<tr>
<td>Multiplier</td>
<td>2.063</td>
<td>1.744</td>
<td>2.085</td>
<td>2.032</td>
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</table>
When we consider the multiplier effect the total impact of Wisconsin hospitals is 226,600 jobs, $11.17 billion in labor income, $15.2 billion in total income and $28.6 billion in industrial sales (Table 1). To place these calculated impacts in perspective, 226,600 jobs account for 6.7 percent of total Wisconsin employment. The $11.2 billion in labor income accounts for 7.3 percent of the Wisconsin total while the $15.2 billion in total income accounts for 6.3 percent of the Wisconsin total. The relatively larger share of labor income generated by hospitals compared to employment is again explained by the relatively higher wages and salaries paid by hospitals. The lower share of total income is again attributed to hospitals generating more wage, salary and proprietor income than other types of income. This result is not unexpected. Once the multiplier effect is considered, hospitals account for six percent of total industrial sales.

As documented in Table 2 we can also decompose the total economic impact of hospitals across the different sectors of the economy. As expected, the one sector impacted to the largest extent is the broader health care and social services sector. The bulk of these are hospitals themselves but there is spillover or multiplier effect that will impact other health care sectors. This will include services contracted by hospitals and the drop in demand for health care services from the jobs both directly and indirectly associated with hospitals. But there are another sectors of the Wisconsin economy that are heavily impacted by hospitals including real estate establishments with nearly 17,300 jobs, $179.7 million in labor income but almost $1.8 billion in total income. Notice the large difference between labor and total income impacts on real estate and rental firms. The bulk of the impact hospitals have on this particular sector is rental income which is included in total income but not labor income. Other sectors that are heavily impacted by hospitals include retail trade with 14,400 jobs, administrative and waste services with 13,100 jobs and accommodation and food services. The retail trade and accommodation and food services (dominated by restaurants and drinking places) impacts are driven largely by labor spending their income in the local economy. The administrative and waste services are dominated by employment services which are heavily used by hospitals because of the special fields or occupations within hospitals. But more importantly, nearly every industry within Wisconsin is affected in some way by the operation of hospitals in Wisconsin including mining (e.g., gravel via landscaping services) and agriculture. This impact on agriculture can come from labor spending on Wisconsin agricultural goods to the growing interest in Wisconsin hospitals to source local foods. Beyond the health care services offered through hospitals it is evident that hospitals are an important part of the economy.

All this economic activity generated by the operation of hospitals also generates tax revenues. For example, all the retail activity along with some of the services industries are subject to both state and county sales taxes and generates about $277 million in sales taxes. The labor income generated by hospitals either directly through hospital employment or through the multiplier effect is subject to the state income tax and generates some $248 in income taxes. In addition, there is almost $389 million in property taxes generated through the economic activity associated with hospitals and $344 million in other taxes (e.g., dividends, corporate profits, etc.), fees and charges and other miscellaneous revenues. In aggregate the economic activity generated by hospitals generates in turn $1.26 billion in state and local government revenues.
Also contained in Table 1 is the value of the overall multiplier for all four metrics of economic activity. For example, for employment the multiplier is 2.063 which can be interpreted as for every job in hospitals there is an addition 1.063. The way this type of a multiplier is best used is if a hospital expands and desires a basic estimate of the potential economic impact of that expansion. Consider a hospital that is expanding and will employ 100 additional people. With an employment multiplier of 2.063 the total employment impact will be 206 jobs: the initial 100 employed by the hospital expansion and an additional 106 jobs through the multiplier effect.

Now suppose that the hospital that is expanding offers an average wage/salary for the typical employee. We know from the analysis in the previous section that the average “labor income” for hospitals in Wisconsin is about $58,000. If this average applies to the 100 new employees total labor income will increase by $5,800,000. With a labor income multiplier of 1.744 (see Table 1), the total impact of the hospital expansion would be $10,115,200 in new labor income ($5,800,000 times 1.744). We can conduct a similar analysis for total income with a multiplier of 2.085 and an industry sales or revenue multiplier of 2.032.

In addition to the state level analysis provided in Tables 1 and 2, the hospital impact analysis was conducted for every county in Wisconsin where a hospital is located. The results of these individual

<table>
<thead>
<tr>
<th>Hospital Impact Analysis</th>
<th>Employment</th>
<th>Labor Income (M$)</th>
<th>Total Income (M$)</th>
<th>Industry Sales (M$)</th>
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<tbody>
<tr>
<td>Ag, Forestry, Fish &amp; Hunting</td>
<td>720</td>
<td>$24.4</td>
<td>$22.9</td>
<td>$666.6</td>
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<tr>
<td>Mining</td>
<td>21</td>
<td>$1.1</td>
<td>$2.2</td>
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<td>Utilities</td>
<td>658</td>
<td>$80.5</td>
<td>$275.7</td>
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<td>Construction</td>
<td>1,086</td>
<td>$53.1</td>
<td>$64.0</td>
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<td>Manufacturing</td>
<td>2,693</td>
<td>$166.1</td>
<td>$267.7</td>
<td>$1,061.8</td>
</tr>
<tr>
<td>Wholesale Trade</td>
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<td>$402.1</td>
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<tr>
<td>Transportation &amp; Warehousing</td>
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<td>$198.1</td>
<td>$376.1</td>
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<td>Information</td>
<td>1,982</td>
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<td>$272.9</td>
<td>$528.4</td>
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<td>Finance &amp; insurance</td>
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<td>$436.8</td>
<td>$918.8</td>
<td>$1,651.8</td>
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<td>Real estate &amp; rental</td>
<td>17,337</td>
<td>$179.7</td>
<td>$1,870.2</td>
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<td>Professional- scientific &amp; tech svc</td>
<td>6,302</td>
<td>$354.2</td>
<td>$478.7</td>
<td>$716.0</td>
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<tr>
<td>Management of companies</td>
<td>2,498</td>
<td>$254.7</td>
<td>$310.2</td>
<td>$512.5</td>
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<tr>
<td>Administrative &amp; waste services</td>
<td>13,130</td>
<td>$367.4</td>
<td>$458.1</td>
<td>$702.0</td>
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<td>Educational svc</td>
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<td>$76.5</td>
<td>$82.8</td>
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<tr>
<td>Health &amp; social services</td>
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<td>$7,559.8</td>
<td>$8,107.7</td>
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<td>Arts- entertainment &amp; recreation</td>
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<td>Accomodation &amp; food services</td>
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<td>Other services</td>
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<td>$543.1</td>
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<td>Government &amp; non NAICs</td>
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<td>$154.4</td>
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<td>$339.8</td>
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analyzes are present in Tables 3, 4 and 5. The summary of the total economic impact of hospitals on each county’s economy is provided in Table 3. Here the four metrics of economic activity including employment, labor income, total income and industry sales or revenues are provided along with the total impact on state and local government revenues. The relative contribution of hospitals to the overall size of the county’s economy is presented in Table 4. Here we are asking what percentage or share of the county’s total economy is attributable to hospitals. In Table 5 we report the economic multipliers for hospitals for each county that has at least one hospital. These individual county multipliers are specific to the county and reflect the structure of that specific county. A series of maps have also been generated to provide a visualization of the hospital impact analysis.

The pure volume of results prevents a detailed discussion of all of the results. But there are several patterns in the analysis that warrants some discussion. Some of these patterns, in no particular order:

- All but eight counties have at least one hospital and those that do not tend to be very small from a population perspective.

- The county with the single largest impact is Milwaukee with 52,000 jobs attributed to hospitals followed, as expected, by the larger counties in Wisconsin. Interestingly La Crosse County, which is the 13th largest county in Wisconsin based on population, has the second largest number of jobs, 14,400 or 18 percent of total county employment, generated by the operation of hospitals.

- The share of total county employment attributed to hospitals is uniformly smaller than the share of labor income attributed to hospitals. This is due to the relatively higher wages and salaries paid by hospitals.

- The multiplier for hospitals tends to be smaller for smaller counties, as expected. As a general rule, the smaller the economy the smaller the multiplier for that economy. We would expect the multiplier for Wisconsin to be larger than that for Milwaukee which in turn would be larger than the multiplier for Dane County and so on. Larger economies are better positioned to retain business and labor spending hence increasing the size of the multiplier. Conversely, in smaller economies the ability of money to “leak” out of the economy at faster rate is higher resulting in smaller multipliers.

In terms of spatial patterns revealed in the mapping of the analysis presented in Tables 3, 4 and 5 nearly all of the results are as expected: larger absolute impacts of hospitals tend to be in more urban areas, the share of total county economic activity attributed to hospitals appears to be slightly more random, and the relative size of the multipliers closely match population sizes.

**Relative Dependency on Hospitals for Economic Activity**

To complete the analysis we look at the relative dependency of local (i.e., county) economies on hospitals for economic activity. From the relative shares analysis presented in Table 4 and the
respective maps we have seen a relatively large range of dependency with some counties having no hospitals present within the county to La Crosse County which has a high level of dependency. But we can improve on the insights gained by these simple shares by using a simple indicator of relative strength called a “Location Quotient”.

The Location Quotient is a simple indicator that is the ratio of the share of local economic activity to the share of state economic activity. We would expect that the two shares would be the same providing a Location Quotient equal to one. But if the local share is greater than the state share then the Location Quotient would be greater than one indicating that the local economy is “more dependent” on the industry of interest, in our case hospitals, than expected. The industry would be considered a strength for the local economy. If the local share of activity is less than the state average then the Location Quotient would be less than one and the industry would not be considered a strength.

Before moving onto a discussion of the results a choice must be made between using the “direct” contribution of hospitals to the local economy (i.e., no multiplier effect considered) or the “total” contribution (i.e., including the multiplier effect). As discussed above, the multiplier for hospitals will tend to be larger for larger county economies which may distort the size of the Location Quotient in favor of larger counties. Thus to avoid any potential distortions we use the “direct” levels of activity to compute our Location Quotients. We computed the share of employment, labor income, total income and industry sales for each county as well as for the state. We then took an average across those four metrics of economic activity.

The results of these calculations are presented in Table 6 and Map 6. Consider the graphical presentation in Map 6. Here counties that are highlighted in orange and red have Location Quotients greater than one suggesting that hospitals are particularly important to local economic activity. Again La Crosse County stands out as being particularly dependent on hospitals (LQ=4.004). While a simple Location Quotient cannot be the sole foundation for building an economic development strategy it is clear that the La Crosse regional has a strength or “specialization” in hospitals that may serve as the foundation for economic development strategies.

Perhaps most interesting is the band of counties across the northern tier of Wisconsin where the Location Quotient is greater than one suggesting higher levels of dependency on hospitals for economic activity. Other than the northern ban there does not appear to be any particular pattern to the Location Quotients: counties with Location Quotients greater than one do not appear to cluster in more urban areas and are just as common in rural as urban Wisconsin.

Counties that have Location Quotients less than one are in yellow and gray. The latter (those in gray) are those counties that have the lowest level of dependency on hospitals for economic activity. The one county that is somewhat surprising for the lack of “specialization” (i.e., a large Location Quotient) is Dane County (LQ=0.520). This is surprising because of the presence of the UW Hospitals and Meriter and the draw those two hospitals have for specialized services.
In the end, the one broad observation that can be drawn from the analysis presented in this section of the study is the apparent “random” pattern of dependency on hospitals for economic activity. In essence, there does not appear to be an urban-rural dichotomy that one might expect to find.

**Conclusions**

The analysis presented in this study has documented the relative importance of hospitals to the Wisconsin economy. We find that employment growth in hospitals has been robust for more than ten years and appears to have weathered the most recent recession well. This is not to suggest that hospitals are immune to economic downturns but rather hospitals may be less susceptible to economic downturns. We also found that with the aging of the baby-boomer generation and rising life expectancies the demand for hospitals will grow. For Wisconsin, hospitals are expected to be the single largest source of new employment growth through 2018.

Using the regional economic tool referred to as input-output modeling we were able to document the contribution of hospitals to not only Wisconsin but for all counties that have a hospital. We found that hospitals employ about 110,000 people “directly” and once the multiplier effect is consider contributes a total of 226,600 jobs to the Wisconsin economy. For every job in hospitals there is an additional 1.063 job created elsewhere in Wisconsin. Hospitals also generate $11.2 billion in labor income, $15.2 billion in total income, and $28.6 billion in total industrial sales. In addition, this economic activity generated slightly more than $1.2 billion in state and local government revenues.

The county level analysis provided important insights into the geography of how hospitals impact the Wisconsin economy. Somewhat surprisingly, there are some counties (e.g., La Crosse) that stand out for having a high level of dependency, or specialization, on hospitals for economic activity and some (e.g., Dane) that have lower levels of dependency than one might expect. Most importantly, the spatial pattern of county dependency on hospitals appears to be somewhat random. This latter result essential means that hospitals are not “clustered” in urban areas but are present throughout Wisconsin.
<table>
<thead>
<tr>
<th>County, WI</th>
<th>Employment</th>
<th>Labor Income (M$)</th>
<th>Total Income (M$)</th>
<th>Industry Sales (M$)</th>
<th>State &amp; Local Govt Rev (M$)</th>
</tr>
</thead>
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<td>$0.00</td>
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## Table 3 (cont): Impact of Hospitals on Individual Wisconsin Counties 2009

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<th>County, WI</th>
<th>Impacts: Employment</th>
<th>Impacts: Labor Income (M$)</th>
<th>Impacts: Total Income (M$)</th>
<th>Impacts: Industry Sales (M$)</th>
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Table 4: Hospitals Impacts as Share of Individual Wisconsin Counties 2009

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<th>County</th>
<th>Employment (Share)</th>
<th>Labor Income (Share)</th>
<th>Total Income (Share)</th>
<th>Industry Sales (Share)</th>
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<td>FOND DU LAC, WI</td>
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Table 5 (cont): Hospital Multiplier for Individual Wisconsin Counties 2009

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Table 6: Location Quotients for Hospitals

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Map 1a: Hospital Employment Impacts (2009)

Map 1b: Hospital Employment Impacts (2009)
Share of Total County Employment
Map 2b: Hospital Labor Income Impacts (2009)
Share of County Total Labor Income

Map 2c: Hospital Labor Income Multipliers (2009)
Map 3a: Hospital Total Income Impacts (2009)

Map 3b: Hospital Total Income Impacts (2009)
Share of County Total Income
Map 3c: Hospital Total Income Multiplier (2009)

Map 4a: Hospital Total Industry Sales Impacts (2009)
Map 4b: Hospital Total Industry Sales Impacts (2009)
Share of County Total Industrial Sales

Map 4c: Hospital Total Industry Sales Multipliers (2009)