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Economic Impact of Knox County Hospital

Prepared By:

Eric A. Scorsone, Ph.D.
UK Department of Agricultural Economics

Sharon Garcia, BS
UK Department of Agricultural Economics

Bethany Adams, BSMT
UK Center for Rural Health

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Kentucky Rural Health Works
Attn: Eric Scorsone
University of Kentucky
400 Charles E. Barnhart Bldg.
Lexington, KY 40546-0276

Phone: 859-257-7257
Fax: 859-323-1913
Website: http://www.ca.uky.edu/krhw/

Preface

This report is being furnished to the staff and Board of Knox County hospital. The report was generated based on a request by the hospital administrator John Rigsby. Kentucky Rural Health Works, a program of the University of Kentucky Cooperative Extension Service and Center for Rural Health, was contacted to conduct the study and create the report. The objective of KY Rural Health Works is to provide timely information and assistance to rural health care providers and policymakers concerning the economic impact and economic development role of health care in rural economies. This objective is carried out through market demand studies, feasibility studies, policy research studies and economic impact studies. The Kentucky Rural Health Works Program combines the health care knowledge and strengths of the UK Center for Rural Health with economic development expertise of the UK College of Agriculture.

Introduction

Over the last two decades, health care services have become a critical engine of growth in rural Kentucky. In 1980, health care industry earnings represented 6.7 percent of all industry earnings. By the late 1990's, health care's share of industry earnings had risen to 12.3 percent in rural Kentucky. These statistics indicate that health care is the second largest industry category in rural Kentucky trailing only local government. Furthermore, medical transfer payments, in the form of Medicare and Medicaid, now represent more than 9 percent of rural Kentucky's personal income. This is contrast to 1980 when these payments only represented 2.9 percent of personal income.

Health services include nursing homes, adult daycares, hospitals, physician and dentist offices, pharmacies and emergency medical services. An important question is why are health care services growing so quickly? These industries are in part responding to the growing levels of retirement and medical transfer payments, Social Security and Medicare, which are occurring in rural Kentucky.

Retirement-based personal income is the fastest source of income growth in rural areas. In 1990, retirement-based income represented 4.1% of personal income, while in 1999 that share had risen to 6.2%. Non-wage income is growing at twice the rate of job and wage based income. Combined with the aging of the population, rural health services will play an increasingly important role in the rural economy. These changes pose important challenges to rural communities. However, for these changes to result in economic prosperity, the source of income must be external to the community.

Health care as a Basic Industry

A community's economic prosperity is based on export or basic industries. Basic industries are those that sell to customers or businesses from outside the community. These export or external dollars then allow a community to purchase a wider variety of goods and services from other communities. Larger markets also reduce firm costs and create more competitive local firms. In order for a community to prosper, it must attract and retain export or basic industries. For example, many manufacturing facilities sell their products to buyers outside of the county or region of interest. Agricultural producers generally sell their products to consumers outside of the region. Further, health care services, by attracting Social Security and Medicare dollars, are part of the economic base of the community. These retirement and health care dollars are external sources of income from the federal government.

The dependence of the hospital on Medicare and Medicaid represents both an opportunity and threat. These programs bring external dollars into a community. These external dollars expand the strength and opportunity in the local community. At the same time, these government programs often do not reimburse hospitals at the same rate as private insurance. In fact, hospitals are often reimbursed well below the cost of providing services.

Health Care as a Purchaser of Local Goods and Services

However, health care role as a basic or export industry is only part of its influence on a community's economy. Health care employers and employees are important purchasers of goods and services supporting many local business establishments. The occupations and employees who in work in health care, such as hospital and nursing home workers, physicians, dentists and pharmacists, are an important source of income in the community supporting services such as housing and construction, retail establishments, restaurants and other local services. The hospitals and other health care institutions are also important purchasers of local inputs such as laundry services, waste management and other resources.

Supply-Demand Gaps: Keeping Health Care Dollars at Home

A third potential role for health care in rural development is the identification of supply-demand gaps or helping to "keep health care dollars at home". A supply-demand gap occurs when a local economy does not provide the supply of a good or service demanded in a local community. Residents are then forced to search elsewhere to make purchases. As discussed previously, these non-local purchases represent leakages from the local economy and reduce the number of potential employment and income opportunities in a community. In some cases, a community cannot provide these goods or services because of market or financial limitations. However, there may be cases where the circumstances will support such businesses locally. The potential should be explored by a community to determine if opportunities are being missed. This may be especially true when key demographic or economic changes occur. These changes can generate new opportunities that did not exist in the community previously.

Health care: Attracting and Recruiting Industry

An often-overlooked aspect of the health care system in economic development is the ability to attract and recruit firms based on community services. Company surveys reveal that managers often look at health care as an important issue in locating facilities. The existence of a strong health care network can lower health care costs for firms and their employees and provide value-added services for firms such as occupational health. Also, retirees and workers will be more likely to choose a location that has access to quality health care.

There are three major roles for health care in rural economic development: (1) as an economic base industry attracting external dollars, (2) whose employees and institutions are purchasers of local goods and services and (3) identifying and addressing supply-demand gaps or "keeping health care dollars at home" and (4) as a factor to recruit businesses and workers. The combination of changing demographics, growth in health care service employment and increased medical transfer payments implies that the health care system will be a major player in the future of rural Kentucky. This fact was recognized in the Kentucky Appalachian Commission's strategic plan, "State Goal 5.2: Kentucky will recognize health care as a substantial economic sector and pursue strategies to grow the sector" (Kentucky Appalachian Commission, 2000). Economic development agencies, businesses groups and local governments should play a more active role in promoting the health care sector as a key partner and primary sector in generating new economic opportunities.

The Kentucky Rural Health Works Program is working to define and provide greater recognition of rural health care in local economies. This group includes representatives from the Department of Agricultural Economics (Eric Scorsone), Department of Rural Sociology (Ric Maurer), Cooperative Extension (Ric Maurer and Bonnie Tanner) and the Center for Rural Health (David Reese, Woody Dunn, Larry Allen and Bethany Adams). An important aspect of this project is establishing the economic impact of health care in the rural economy. Further studies are attempting to estimate the demand for health care in rural regions and financial feasibility for additional health care facilities.

Knox County Economy

The Knox County economy is a diversified group of industries including manufacturing, agriculture, retail and wholesale trade, finance, transportation and services (see table 1). The local economy has a strong presence in manufacturing (40.0 million dollars), transportation (25 million dollars) and mining (10.0 million dollars). However, the service sector (50.0 million dollars) is the largest part of the economy. Over the past decade, the service sector has grown faster than any other part of the local economy. Health care, including the hospital, represent an important part of that growth and potential comprising nearly 50 percent of the service sector.

The growth in private industry was more than matched by growth in federal and state transfer payments to individuals (see table 2). These transfer payments were primarily driven by Social Security, Medicare and Medicaid. Overall, these transfer payments represent nearly 160 million dollars of local personal income. This is three times the size of the manufacturing or service sector.

Table 1: Knox County Economy: Personal Income by Industry (Thousands of Dollars)

	1990	1999	% Change
Agriculture	1,348	-391	-129%
Mining	12,337	10,378	-16%
Construction	6,176	8,483	38%
Manufacturing	26,956	36,950	37%
Transportation	8,499	25,370	199%
Wholesale	5,672	7,564	34%
Retail	21,992	34,093	55%
Finance and Insurance	4,889	8,423	73%
Services	30,061	48,184	60%
Health Care	8,743	17,068	95%
Government	33,136	48,195	82%

Table 2: Knox County Medicare and Medicaid Transfer Payments (thousands of Dollars)

	1990	1999	% Change
Medicare	9,870	20,467	107.4%
Medicaid	14,647	41,777	185.2%

Economic Impact Analysis

Basic Introduction

A local economy can be conceived of as a barrel with inflows and outflows. The inflows represent external dollars coming into the community that expand the size and strength of the region's economy. Inflows include federal and state expenditures, tourists and other people driving into the community to shop at a local retail outlet. The outflows represent leakages out from the economy that does not create jobs or local income. Outflows include state and federal taxes, non-local purchases of goods and services and people traveling to other sites for vacation or receiving medical care in another county or urban area. Local taxes are not an outflow as they are spent on creating local public goods such as roads, schools and police and fire protection.

The economic impact of a hospital is dependent on a number of factors. In determining the economic impact of a large institution, there are two major purchasing categories to consider: local purchases and non-local purchases. In effect, non-local purchases represent a leakage or loss to a local economy. For hospitals, many purchases by necessity must be made to distant locations. The complex technology and equipment of modern medicine is subject to large economies of scale and are only produced in a few places in the nation. This equipment might include x-ray machines, MRI equipment and other surgical equipment. Pharmaceutical supplies and drugs are also subject to these same forces. Further, some types of audit, legal and accounting services must be purchased from urban regions due to the complexity of services.

Employees and other professionals are a major source of economic impact in the local economy. These employees, turned consumers, spend large amounts of their income in local retail outlets, housing, automobiles and other services. These consumer expenditures, in turn, support a large number of local resident service jobs such as mechanics, retail clerks, real estate agents and bankers.

Economic Impact Multipliers

The impact of hospital expenditures and hospital employee expenditures are called multiplier effects. Multiplier effects are a simplified and compact way of representing these economic effects in a local economy. The multiplier is interpreted as the impact of a one-unit change in sales, employment or income results in an "x" impact on the local economy. In essence, the multiplier represents the recycling of local dollars and income. This recycling process creates new job opportunities and higher wages for individuals. Leakage of dollars and income out of the community, via taxes or non-local spending, reduces the size of the multiplier effect and reduces the potential size of the local economy.

There are three types of multipliers based on the type of economic impact analysis (see table 3). The direct multiplier is based on the industry's or company's initial economic impact on the community. For example, if a manufacturing plant has revenue of 5 million dollars, then this figure becomes the direct economic impact on the community. The indirect multiplier is based on industry-to-industry transactions only. For example, the hospital purchases local laundry services, food, landscaping or floral arrangements. This type of multiplier does not include the effect of local employee spending on retail and service sectors in the community such as housing, grocery store or video store purchases. The induced multiplier includes both the industry-to-industry transactions and household purchases. In some cases, we may wish to only investigate industry transactions and leave out household purchases. The total economic impact is defined as the direct plus indirect plus induced economic effects.

There is a further subdivision of multipliers into sales, employment or income multipliers (see table 3). Sales or output multipliers represent the change in local sales or revenue due to a change in an industry. Employment multipliers are the impact of a one million dollar change in economic output on the number of jobs in a local economy. Income multipliers are a one-unit change in economic output on local income. Economic output is measured as a change in total sales for a new or existing business or institution ion a region.

Table 3: Hospital Related Economic Impact Multipliers

	Direct	**Indirect**	**Induced**
Employment Multiplier	Hospital jobs	Hospital supplier jobs	Local retail and service jobs related to hospital employee spending
Income Multiplier	Hospital employee income	Hospital supplier employee income	Local retail and service income related to hospital employee spending hospital employee
Sales or Output Multiplier	Hospital revenue	Hospital supplier revenue	Local retail and service revenue related to hospital employee spending

Literature Review: Economic Impact of U.S. Rural Hospitals (1980-2000)

Previous literature has established the basis for determining the economic impact of rural hospitals. In 1981, Christianson et al. (1981) was one of the first major studies to look at the economic role of rural hospitals. Their findings were set against a backdrop of chronic operating losses and low occupancy for rural hospitals, particularly those related to the Hill-Burton act. They surveyed 57 hospitals to determine their financial situation and purchasing patterns. Hospitals represented from 1.54 to 2.37 percent of all county income. Overall, they estimated that the closure of a rural hospital would result in 1.0 million to 4.5 million dollars in lost economic activity in the sample counties.

Other studies have since followed this groundbreaking work. Doeksen et al. (1990) found that the loss of a hospital in Stigler, Oklahoma would lead to a net loss of 78 jobs including 43 hospital jobs and 25 other local jobs. In another study, Doeksen and Altbolei (1990) found that in three rural Texas hospitals the loss of 100 hospital jobs would lead to the loss of a further 12 jobs in the local service sector. McDermott et al. (1991) estimated that for every 100 hospital employees a further 43 people were employed due to hospital or hospital employee spending. Finally, Cordes et al. (1999) estimated employment multipliers ranging from 1.12 to 1.49 for rural hospitals. Hospitals in the range of 200 to 300 employees typically generated an additional 70 –100 employees due to indirect and induced economic effects.

Methodology

The IMPLAN model was used to generate the economic impact of Knox County hospital. IMPLAN is an input-output model that can be used to examine the economic impact of new industries, loss of an existing industry, fiscal impact analysis and the existence of supply demand gaps. Model version 2.0 was used in this study with the 1998 Kentucky data and structural matrices.

For this study, it was felt important to capture the nature of Knox County Hospital's purchasing patterns as opposed to the use of national standard production function. After the initial model for Knox County was developed, the expenditure records for the hospital were reviewed to determine hospital spending patterns. These patterns were in some cases significantly different from the original IMPLAN hospital expenditure patterns. Also, the regional purchase coefficients were significantly different in some cases between the original IMPLAN model and the revisions based on Knox county records. The revisions of local spending correspond with findings from other studies that rural hospitals generally effect wholesale and retail trade activities in the county.

A series of steps were followed to generate the results. First, the Knox County 1998 model was estimated from IMPLAN. The second step was to create a hospital in sector 492 (currently the hospital resides hidden in the state and local government non-education sector). Once the hospital sector was created, the sales (12.040 million) and employment (301) figures were entered along with changes in the gross absorption coefficients to reflect differences between national and local production functions. Changes in the production function were based on an examination of hospital records including the September 2001 preliminary financial report. Finally, the model was rerun to calculate the new multiplier values. These new multipliers represent the revised Knox County hospital and associated indirect and induced economic effects. The economic impact was calculated by removing the newly created hospital sector through the Impact screen and determining the loss in employment, labor income and output.

Data

The data for this report came from the IMPLAN model and the Knox County Hospital accounting records and financial statements. The 1998 Kentucky data set was used for the IMPLAN model. The Knox County hospital financial statements indicated that 12.040 million dollars in cash expenditures existed during the 2001 fiscal year (September to September). This figure excludes non-cash expenses related to depreciation and amortization. Out of the 12.040 million dollars, 6.625 million dollars was related to wage and salaried employees. The payroll figure was adjusted downward to account for the fact that only 71.1 percent of the hospital employees live in Knox County. The remaining 28.9 percent of payroll is assumed to leak from the county economy. Non-salary expenditures, including items live drugs, blood, surgical equipment and office supplies were distributed to IMPLAN sectors based on the closest match. Out of a total expenditure of 5.45 million dollars, 861,000 dollars were spent in the local economy. The IMPLAN model overstated the degree of in-county spending so this figure was adjusted downward through the regional purchase coefficients.

Results

Economic Impact Multipliers

The Knox County Hospital is an important component of the local economy. The hospital expenditures and staff are an important piece of the economic puzzle. The results of this analysis will be presented in the following order: 1) output or sales multiplier 2) employment multiplier 3) income multiplier.

Based on the sales or output multiplier, Knox county hospital has a secondary economic impact of nearly 4 million dollars. These sales represent revenue based on direct suppliers to the hospital, indirect suppliers to the hospital and employees purchases in the local economy. Of this 4 million dollars, 1.3 million dollars is associated with industry-to-industry transactions. 2.4 million dollars is associated with employees' purchases of goods and services locally. The total output (sales) multiplier impact of Knox County hospital is 15.8 million dollars (see table 2 for more details).

The employment multiplier demonstrates the relationship between hospital expenditures and employment creation in the community. In essence, these community jobs rely on the hospital for their existence. For Knox County Hospital, the employment multiplier effect is that an additional 76 jobs are created by hospital spending and hospital employee spending. 28 of these jobs are based on industry-to-industry transactions and 47 of these jobs are based on employees spending. In total, 377 jobs in Knox County are directly or indirectly tied to the existence of the hospital.

The income multiplier indicates the level of personal income dependent on the existence of the hospital. In Knox County, employees are paid a total of 6.2 million dollars in payroll. This income translates into local spending and more jobs and income in the community. The spillover of income for the hospital is estimated to be $565,892 for indirect impact and $861,145 in induced effects.

Comparative Results: Oklahoma State study and UK study

The results from this study can be compared to the previous study completed by Oklahoma State University (Eilrich and St. Clair, 2000). In general, the results estimated here are significantly higher than the results from the Oklahoma State study. Partly, this is due is reflected in the updated data available to the University of Kentucky. While the overall impact is higher, the multiplier figures are smaller due to adjustments made by UK to better reflect local economic conditions.

The Oklahoma State study found that the hospitals 169 employees and 3.95 million dollar payroll generated an additional 152 jobs in the community and an additional 2.7 million dollars in local personal income. The employment multiplier was estimated by Oklahoma State to be 1.90 and the income multiplier was found to be 1.71. These are much higher than the University of Kentucky (UK) study. The UK study estimated an employment multiplier of 1.25 and an income multiplier of 1.21. These are considerably smaller than the Oklahoma State study due to the higher degree of hospital spending leakage estimated by the University of Kentucky team.

Results Summary

The results indicate that Knox County hospital is an important economic contributor to the community. Its impact is primary felt through hospital expenditures on local services as well as employee spending in the local retail and service sector. Like many rural and urban hospitals, the complex equipment and rugs of modern medicine must be purchased outside the community that does reduce the size of the economic impact.

Summary

Overall, the results indicate that the economic activities of the hospital and its employees create 376 local jobs, 16 million dollars and nearly 7.8 million dollars in local income. In terms of the local private economy, the hospital represents nearly ten percent of private economic activity. This percentage compares favorably with mining, lumber and wood products, trucking and other local services. Furthermore, the existence of a new hospital facility means that this impact is likely to rise faster than many other local industries over the next decade. Health care has been called the “main economic engine” of the next decade. Knox County is in a position to capture many of the economic and financial benefits of this engine.

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