

**Economic Impact of Livingston Hospital and Healthcare Services, Inc.
On Livingston County, Kentucky**

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PREFACE

This report is being furnished to the Livingston Hospital and Healthcare Services, Inc. through their request. The Kentucky Rural Health Works Program (a program of the University of Kentucky Department of Agricultural Economics, UK Cooperative Extension Service, Kentucky State Office of Rural Health and UK Center for Rural Health) was contacted to conduct an economic impact study. The Kentucky Rural Health Works Program offers decision-making information to rural health care providers, local community leaders and policymakers regarding health care and its impact on rural economies. This 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.

Questions or concerns regarding this analysis should be directed to Dr. Eric Scorsone, Assistant Professor of Agricultural Economics at the University of Kentucky College of Agriculture. . See the Kentucky Rural Health Works website at www.ca.uky.edu/krhw

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INTRODUCTION

The Health care sector plays an important role in rural economies. There are four major roles for health care in rural economic development. First, rural health care services keep local dollars at home within the community. Second, it attracts external dollars into the community from outside the local area. Third, the local health care system attracts and retains industries and companies into the community. Lastly, the health care system can promote a healthy and productive workforce within a rural community.

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 economy. The outflows represent leakages from the local economy, which does not create jobs or local income. In determining the economic impact of a hospital on a rural community, two major purchasing categories need to be considered: 1) local purchases, and 2) non-local purchases. Local and non-local purchases affect these inflows and outflows in the economy. The hospital and its employees are a major source of economic impact in the local community because of their local spending and support of other local businesses. .

This report examines the economic impact of Livingston Hospital and Healthcare Services, Inc. (LHHS) on Livingston County, Kentucky. This analysis is divided into four sections and shows the economic impact of output (sales), employment, labor income and value added due to Livingston Hospital and Healthcare Services. On average, LHHS generates a total impact of 19,314,797 dollars in output (sales). The 19,314,797 dollars represents the amount of local sales or revenue generated in Livingston County due to the impact of the Livingston Hospital and Healthcare Services. LHHS directly creates 151 jobs, indirectly creates 19.4 jobs and hospital employee spending creates 44 jobs. Livingston Hospital and Healthcare Services represents a total impact of 9,668,846 dollars in labor income in the local economy. Overall, the results indicate that the economic activities of the hospital and its employees

created 214.3 local jobs, 19.3 million in local revenues, 9.6 million dollars in labor income and about 11 million in valued added in Livingston County.

METHODOLOGY AND DATA

Methodology

The IMPLAN Model was used to generate the economic impact of Livingston Hospital and Healthcare Services, Inc. (LHHS). 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 2000 Kentucky data and structural matrices.

For this study, it was important to capture the nature the purchasing patterns of LHHS as opposed to the use of national standard production function. After the initial model for Livingston County was developed, the expenditure records for the hospital were reviewed to determine hospital spending patterns. These patterns were in some cases slightly 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 Livingston 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 economic impact results. First, the Livingston County 2000 Model was estimated from IMPLAN. Second, the study area data was edited to include the actual hospital figures in sector 492. Under the hospital sector, the sales and employment figures were entered along with the changes in the gross absorption coefficients, as well as, the differences between national and local production functions. Changes in the production function were based on an examination of the hospital's 2003

financial report. Finally, the model was re-run to calculate the new multiplier values. These new multipliers represent the revised Livingston Hospital's direct, indirect and induced economic effects. By moving the hospital sector through the Impact screen and determining the loss in employment, labor income and output calculated the economic impact.

Data

The data for this report came from the IMPLAN Model and Livingston Hospital and Healthcare Services accounting records and financial statements. The 2000 Kentucky data set was used for the IMPLAN Model. The Livingston Hospital and Healthcare Services, Inc. financial statements indicated that \$9,091,230 in cash expenditures existed during the 2003 fiscal year. This figure includes cash expenses related to depreciation and amortization. Out of the \$9,091,230 in total expenditures, \$3,610,011 was related to wage and salaried employees. The payroll figures show that approximately 47.7 percent of the hospital employees live in Livingston County. The remaining payroll expenditures from the 52.3 percent of the 'out-of-county' employees are assumed to be a leak (a loss) from the Livingston County economy.

RESULTS AND DISCUSSION

Local and Non-local Purchases

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 local 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 (a loss) from the economy, which reduces job creation 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 hospital, there are two major purchasing categories to consider: 1) local purchases, and 2) non-local purchases. In effect, non-local purchases represent a leakage 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 audits, and legal and accounting services must be purchased from outside the local area due to the complexity of services.

Hospital employees are a major source of the economic impact in the local economy. These employees, turned consumers, spend large amounts of their income in local retail outlets, housing 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 the hospital and the hospital employee expenditures are measured in IMPLAN using a technique called multiplier analysis. 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, income and value added 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 several types of multipliers based on the type of economic impact analysis (see **Table 1**). The economic impacts are classified in terms of how they are generated in the economy. The **direct** impact is directly attributable to the revenues generated by businesses that serve the hospital, thus measuring the value of production or services. The direct multiplier is based on the industry's or firm's initial economic impact on the community. For example, if a manufacturing plant has generated 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. Indirect impacts count the expenditures made by the industry or company on the output and purchases of their suppliers. For example, the hospital purchases local laundry services, food, landscaping or floral arrangements. These purchases affect the revenue of those local suppliers. The indirect multiplier does not include the effect of employee spending on the local community.

The **induced** multiplier includes both the industry-to-industry transactions and household purchases. Therefore, the induced effects include the impacts from the spending in the local economy by employees and owners of directly and indirectly affected businesses. Finally, the **total** impact is the sum of the direct, indirect and induced effects and measures the complete impact of an activity as it ripples throughout the local economy.

There is a further subdivision of multipliers into sales, employment, income and value added multipliers (see **Table 1**). **Sales or output** multipliers represent the change in local sales or revenue due to a change in an industry. Economic output is measured as a change in total sales for a new or existing business or institution in a region. **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. **Value added** multipliers reflect a one unite change in economic returns to labor, in the

economy, due to a unite change in the returns from labor, management and ownership generated by the hospital.

Table 1: Economic Impact Multipliers

| Multiplier Type | Direct | Indirect | Induced |
|------------------------|---|--|---|
| Employment | Health care jobs | Health care supplier jobs | Local retail and service jobs related to health care employee spending |
| Income | Health care employee income | Health care supplier employee income | Local retail and service income related to health care employee spending |
| Sales or Output | Health care revenue | Health care supplier revenue | Local retail and service revenue related to health care employee spending |
| Value Added | Hospital returns to labor, management and ownership | Hospital supplier returns to labor, management and ownership | Local retail and service returns to labor, management and ownership |

Economic Impact Analysis

The results of this analysis are divided into four sections according to following multipliers: 1) output or sales, 2) employment, 3) labor income, and 4) value added. Each section shows the direct, indirect, induced and total economic impacts for the various economic impact categories.

The sales or output multiplier represents the amount of local sales or revenue generated in the Livingston County due to the impact of the Livingston Hospital and Healthcare Services, Inc. (LHHS) (see **Table 2**). This revenue represents sales from vendors to LHHS. The 15,147,324 dollars in **Table 2** represents the direct sales from LHHS and is the direct multiplier effect. Livingston Hospital and Healthcare Services vendors are supplied by other dealers and wholesalers, which in turn, creates other income opportunities within the local community. Subsequently, the indirect impact is 1,290,679 dollars and represents vendors' spending within the local area. This 1,290,679 dollars is associated with industry-to-industry transactions within

Livingston County area. Hospital employees purchase goods and services in the local economy and represent the induced impact on the community. The induced impact on Livingston County economy is 2,876,794 dollars and is associated with the employees' purchases of goods and services within their communities. Based on the total expenditures (direct impact) of 15,147,324 dollars for fiscal year 2003, Livingston Hospital and Healthcare Services has a significant total economic impact of 19,314,797 dollars. The total impact represents generated revenue based on direct suppliers to the hospital, indirect suppliers to the hospital and employees purchases in the local economy.

**Table 2: Livingston Hospital and Healthcare Services, Inc.
Impact on Livingston County Output (Sales)**

| Direct Impact of the Hospital Output | Indirect Impact of the Hospital Output | Induced Impact of the Hospital Output | Output (Sales) Multiplier | Total Impact of the Hospital Output (Sales) |
|--------------------------------------|--|---------------------------------------|---------------------------|---|
| \$15,147,324 | \$1,290,679 | \$2,876,794 | 1.28 | \$19,314,797 |

Source: 2000 IMPLAN Data Base and 2003 hospital data

The employment multiplier demonstrates the relationship between the Livingston Hospital and Healthcare Services expenditures and employment creation in the Livingston County and its community. In essence, Livingston County local community jobs rely on the hospital for their existence. Livingston Hospital and Healthcare Services directly creates approximately 151 jobs within Livingston County and its community (see **Table 3**). For LHHS, the employment impact from 151 jobs creates an additional 63.4 jobs within the community through hospital and employee spending; 19.4 of these jobs are based on industry-to-industry transactions and 44 of these jobs are based on employee spending within the local community. The employment multiplier is 1.42 as shown in **Table 3**. The employment multiplier indicates that for every one of hospital job, an additional 0.42 jobs are created in the local economy. In

total, 214.3 jobs in Livingston County are directly or indirectly tied to the existence of the Livingston Hospital and Healthcare Services.

**Table 3: Livingston Hospital and Healthcare Services, Inc.
Impact on Livingston County Employment**

| Direct Impact of the Hospital Employment | Indirect Impact of the Hospital Employment | Induced Impact of the Hospital Employment | Employment Multiplier | Total Impact of the Hospital Employment. |
|--|--|---|-----------------------|--|
| 151 jobs | 19.4 jobs | 44 jobs | 1.42 | 214.3 jobs |

Source: 2000 IMPLAN Data Base and 2003 hospital data

Table 4 shows the direct, indirect and induced impact on the Livingston County labor income due to LHHS. The impact from labor income indicates the level of personal income dependent on the existence of the hospital. LHHS employees were paid an estimated 3,610,011 dollars in payroll in Fiscal Year 2003. This income translates into local spending and more jobs, which creates more income in the community. The indirect impact from labor income for LHHS is estimated to be 537,999 dollars. The induced impact is 980,544 dollars and the total labor income impact of 9,668,846 dollars for the Livingston County. The income multiplier is 1.19. This means that for every dollar of income generated by LHHS, an additional 0.19 cents of income is generated in the local economy.

**Table 4: Livingston Hospital and Healthcare Services, Inc.
Impact on Livingston County Labor Income**

| Direct Impact of the Hospital Income | Indirect Impact of the Hospital Income | Induced Impact of the Hospital Income | Income Multiplier | Total Impact of the Hospital Income. |
|--------------------------------------|--|---------------------------------------|-------------------|--------------------------------------|
| \$8,150,303 | \$537,999 | \$980,544 | 1.19 | \$9,668,846 |

Source: 2000 IMPLAN Data Base and 2003 hospital data

Table 5 shows the value added impact of LHHS on Livingston County and its community. Valued added impacts represent the compensation or returns of labor, management and ownership generated by the activities of Livingston Hospital and Healthcare Services, Inc. The direct impact of value added from employees' compensation, proprietor income, other property income plus the indirect business taxes are estimated at 8,675,074 dollars. This value added revenue indirectly generates an additional 741,819 dollars and has an induced effect of 1,796,308 dollars in the Livingston County economy. The total economic impact on Livingston County's local economy from value added through LHHS and its employees' financial activities was estimated to be 11,213,200 dollars. The value added multiplier was determined to be 1.30, which means that for every dollar of value added from the hospital and its employees, an additional 0.30 cents of value added is generated in other local businesses.

**Table 5: Livingston Hospital and Healthcare Services, Inc.
Impact on Livingston County Value Added**

| Direct Impact of the Hospital Value Added | Indirect Impact of the Hospital Value Added | Induced Impact of the Hospital Value Added | Value Added Multiplier | Total Impact of the Hospital Value Added |
|---|---|--|------------------------|--|
| \$8,675,074 | \$741,819 | \$1,796,308 | 1.30 | \$11,213,200 |

Source: 2000 IMPLAN Data Base and 2003 hospital data

SUMMARY

The impact study results indicate that Livingston Hospital and Healthcare Services, Inc. (LHHS) is an important economic contributor to Livingston County, Kentucky and its community. For example, approximately 5.4 percent of the local jobs in Livingston County, Kentucky are dependent upon the hospital. **Table 6** shows a summary of the economic impact tables. 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, complex medical equipment must be purchased outside the community, which reduces the size of the economic impact.

**Table 6: Economic Impacts of Livingston Hospital and Healthcare Services, Inc.
On Livingston County, Kentucky**

| Multiplier Type | Direct | Indirect | Induced | Multiplier | Total |
|------------------------|---------------|-----------------|----------------|-------------------|--------------|
| Output (Sales) | \$15,147,324 | \$1,290,679 | \$2,876,794 | 1.28 | \$19,314,797 |
| Labor Income | \$8,150,303 | \$537,999 | \$980,544 | 1.19 | \$9,668,846 |
| Value Added | \$8,675,074 | \$741,819 | \$1,796,308 | 1.30 | \$11,213,200 |
| Employment | 151 jobs | 19.4 jobs | 44 jobs | 1.42 | 214.3 jobs |

Source: 2000 IMPLAN Data Base and 2003 hospital data

To reiterate, the sales or output multiplier represents the amount of local sales or revenue generated in the Livingston County, Kentucky due to the impact of the Livingston Hospital and Healthcare Services, Inc. Based on the sales or output multiplier, LHHS has a total economic impact of about 19,314,797 dollars. The employment multiplier demonstrates the relationship between the hospital's expenditures and employment creation within the community. LHHS directly creates 151 jobs, indirectly creates 19.4 jobs and hospital employee spending creates 44 jobs. The employment multiplier indicates that for every one LHHS job, an additional 0.42 jobs are created in the local economy. The total impact of labor income from

Livingston Hospital and Healthcare Services, Inc. was estimated to be 9,668,846 dollars. The income multiplier indicates the level of Livingston County income that is dependent on LHHS payroll. The labor income multiplier is 1.19, which means that for every dollar of labor income generated by LHHS an additional 0.19 cents of income is generated in the rest of the economy. The total impact of the value added from the hospital and its employees was estimated to be 11,213,200 dollars for Livingston County, Kentucky. The value added multiplier indicates that for every dollar of value added from the LHHS and its employees, an additional 0.30 cents of value added is generated in other local businesses.

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