

**Economic Impact of**  
**Rockcastle County Hospital and Respiratory Care Center, Inc.**  
**On Rockcastle County, Kentucky**

**Prepared By:**

**KY Rural Health Works<sup>1</sup>**

UK Department of Agricultural Economics

KY State Office of Rural Health

UK Center for Rural Health

UK Cooperative Extension Service

**Revised August 2004**

---

<sup>1</sup>Copyright by Eric Scorsone, Ph.D. All rights reserved. Readers may make verbatim copies of this document for non-commercial use by any means, provided that this copyright notice appears on all such copies.

## **Table of Contents**

Preface .....	3
Introduction .....	4
Methodology and Data .....	5
Methodology .....	5
Data .....	6
Results and Discussion .....	7
Local and Non-local Purchases .....	7
Economic Impact Multipliers .....	8
Economic Impact Results .....	10
Summary .....	14

## **PREFACE**

This report is being furnished to the Rockcastle Hospital and Respiratory Care Center, 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.

## **INTRODUCTION**

Health care services play 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 Rockcastle Hospital and Respiratory Care Center on Rockcastle County and its community. This analysis is divided into four sections and shows the economic impact of output (sales), employment, labor income, and value added due to Rockcastle Hospital and Respiratory Care Center. On average, the Rockcastle Hospital and Respiratory Care Center generates a total impact of 24,524,456 dollars in output (sales). The 24,524,456 dollars represents the amount of local sales or revenue generated in the Rockcastle County due to the impact of the Rockcastle Hospital and Respiratory Care Center. Rockcastle Hospital and Respiratory Care Center directly creates 484 jobs, indirectly creates 31 jobs and

hospital employee spending creates 64 jobs. The Rockcastle Hospital and Respiratory Care Center represents a total impact of 12,592,606 dollars in labor income in the Rockcastle County economy. Overall, the results indicate that the economic activities of the hospital and its employees create 579 local jobs, 24.5 million from hospital revenues, over 12.5 million dollars in labor income and 14.6 million in valued added in Rockcastle County.

## **METHODOLOGY AND DATA**

### *Methodology*

The IMPLAN Model was used to generate the economic impact of Rockcastle Hospital and Respiratory Care Center. 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 of Rockcastle Hospital's purchasing patterns as opposed to the use of national standard production function. After the initial model for Rockcastle 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 Rockcastle 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 Rockcastle 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 (484) figures was 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 hospital records for the 2002 preliminary financial report. Finally, the model was re-run to calculate the new multiplier values. These new multipliers represent the revised Rockcastle Hospital's direct, indirect and induced economic effects. The economic impact was calculated by removing the 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 Rockcastle Hospital and Respiratory Care Center's accounting records and financial statements. The 2000 Kentucky data set was used for the IMPLAN Model. The Rockcastle Hospital financial statements indicated that 27,237,072 dollars in cash expenditures existed during the 2002 fiscal year. This figure includes cash expenses related to depreciation and amortization. Out of the 27,237,072 dollars, 16,915,430 dollars was related to wage and salaried employees. The payroll figures show that 74 percent of the hospital employees live in Rockcastle County. The remaining payroll expenditures from the 26 percent of the 'out-of-county' employees are assumed to be a leak (a loss) from the Rockcastle 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 a 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. 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**

<b>Multiplier Type</b>	<b>Direct Multiplier</b>	<b>Indirect Multiplier</b>	<b>Induced Multiplier</b>
<b>Employment Multiplier</b>	Health care jobs	Health care supplier jobs	Local retail and service jobs related to health care employee spending
<b>Income Multiplier</b>	Health care employee income	Health care supplier employee income	Local retail and service income related to health care employee spending
<b>Sales or Output Multiplier</b>	Health care revenue	Health care supplier revenue	Local retail and service revenue related to health care employee spending
<b>Value Added Multipliers</b>	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 is 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 Rockcastle County due to the impact of the Rockcastle Hospital and Respiratory Care Center (see Table 2). This revenue represents sales from vendors to the Rockcastle Hospital and Respiratory Care Center. The 19,463,854 dollars in Table 2 represents the direct sales from the Rockcastle Hospital and is the direct multiplier effect. Rockcastle Hospital vendors are supplied by other vendors, which creates more employment and income opportunities. Subsequently, the indirect impact is 1,560,901 dollars and represents the Rockcastle Hospital vendors' spending within the Rockcastle County. This 1.5 million dollars is associated with industry-to-industry transactions. Hospital employees purchase goods and services in the local economy and represent the induced impact on the community. The induced impact on Rockcastle County economy is 3,588,025 dollars and is associated with the employees' purchases of goods and services within their communities. Based on the total expenditures (direct impact) of 19,463,854 dollars for fiscal year 2002, Rockcastle Hospital has a significant total economic impact of 24,524,456 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**  
**Rockcastle Hospital and Respiratory Care Center, Inc.**  
**Impact on Rockcastle 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)
\$19,463,854	\$1,560,901	\$3,588,025	1.26	\$24,524,456

Source: 2000 IMPLAN Data Base and 2002 hospital data

The employment multiplier demonstrates the relationship between the Rockcastle Hospital and Respiratory Care Center expenditures and employment creation in the Rockcastle County and its community. In essence, Rockcastle County local community jobs rely on the hospital for their existence. Rockcastle Hospital and Respiratory Care Center directly creates 484 full time equivalents (FTEs) or jobs (for this report, we have assumed that 1 FTE equals 1 job), indirectly creates 31 jobs and hospital employee spending creates 64 jobs (see Table 3). For Rockcastle Hospital, the employment impact from 484 jobs creates an additional 95 jobs through hospital and employee spending. Thirty-one (31) of these jobs are based on industry-to-industry transactions and 64 of these jobs are based on employees spending. The Rockcastle Hospital and Respiratory Care Center employment multiplier is 1.25 as shown in Table 3. The employment multiplier indicates that for every Rockcastle Hospital job, an additional 0.25 jobs are created in the local economy. In total, 579 jobs in Rockcastle County are directly or indirectly tied to the existence of the hospital.

**Table 3**  
**Rockcastle Hospital and Respiratory Care Center, Inc.**  
**Impact on Rockcastle 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.
484 jobs	31 jobs	64 jobs	1.25	579 jobs

Source: 2000 IMPLAN Data Base and 2002 hospital data

Table 4 shows the direct, indirect and induced impact on the Rockcastle County labor income due to Rockcastle Hospital and Respiratory Care Center. The impact from labor income indicates the level of personal income dependent on the existence of the hospital. In Rockcastle County, employees are paid an estimated 10,775,672 dollars in payroll. This income translates into local spending and more jobs, which creates more income in the community. The indirect impact from labor income for the Rockcastle Hospital is estimated to be 629,430 dollars. The induced impact is 1,187,504 dollars and the total labor income impact of 12,592,606 dollars for the Rockcastle County. The Rockcastle Hospital income multiplier is 1.16. This means that for every dollar of income generated by the Rockcastle Hospital and Respiratory Care Center, an additional 0.16 cents of income is generated in the rest of the Rockcastle County economy.

**Table 4**  
**Rockcastle Hospital and Respiratory Care Center, Inc.**  
**Impact on Rockcastle 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.
\$10,775,672	\$629,430	\$1,187,504	1.16	\$12,592,606

Source: 2000 IMPLAN Data Base and 2002 hospital data

Table 5 shows the value added impact of Rockcastle Hospital and Respiratory Care Center on Rockcastle County and its community. Valued added impacts represent the compensation or returns of labor, management and ownership generated by the activities of Rockcastle Hospital. The direct impact of value added from employees' compensation, proprietor income, other property income, plus the indirect business taxes are estimated at 11,469,474 dollars. This value added revenue indirectly generates an additional 902,898 dollars and has an induced effect of 2,248,655 dollars in Rockcastle County economy. The total economic impact from value added is estimated to be 14,621,028 dollars. The value added multiplier was determined to be 1.27. For every dollar of value added from the hospital and the hospital employees an additional 0.27 cents of value added is generated in other local organizations and businesses.

**Table 5**  
**Rockcastle Hospital and Respiratory Care Center, Inc.**  
**Impact on Rockcastle 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
\$11,469,474	\$902,898	\$2,248,655	1.27	\$14,621,028

Source: 2000 IMPLAN Data Base and 2002 hospital data

## SUMMARY

The results indicate that Rockcastle Hospital and Respiratory Care Center, Inc. is an important economic contributor to Rockcastle County and its community. For example, nearly 12.5 percent of the county labor income and 9.8 percent of the local jobs in Rockcastle County are dependent upon Rockcastle Hospital and Respiratory Care Center. 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 Rockcastle Hospital and Respiratory Care Center, Inc.**  
**On Rockcastle County, Kentucky**

<b>Multiplier Type</b>	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Multiplier</b>	<b>Total</b>
<b>Output (Sales)</b>	\$19,463,854	\$1,560,901	\$3,588,025	1.26	\$24,524,456
<b>Labor Income</b>	\$10,775,672	\$629,430	\$1,187,504	1.16	\$12,592,606
<b>Value Added</b>	\$11,469,474	\$902,898	\$2,248,655	1.27	\$14,621,028
<b>Employment</b>	484 jobs	31 jobs	64 jobs	1.25	579 jobs

Source: 2000 IMPLAN Data Base and 2002 hospital data

To reiterate, the sales or output multiplier represents the amount of local sales or revenue generated in the Rockcastle County due to the impact of the Rockcastle Hospital and Respiratory Care Center. Based on the sales or output multiplier, the Rockcastle Hospital and Respiratory Care Center has a total economic impact of about 24,524,456 dollars. The employment multiplier demonstrates the relationship between the Rockcastle Hospital and Respiratory Care Center expenditures and employment creation in the community. Rockcastle Hospital and

Respiratory Care Center directly creates 484 jobs, indirectly creates 31 jobs and hospital employee spending creates 64 jobs. The total impact of labor income from Rockcastle Hospital was estimated to be 12,592,606 dollars. The income multiplier indicates the level of Rockcastle County income that is dependent on the Rockcastle Hospital and Respiratory Care Center's payroll. The Rockcastle Hospital income multiplier is 1.16. This means that for every dollar of income generated by the Rockcastle Hospital and Respiratory Care Center an additional 0.16 cents of income is generated in the rest of the economy. The total impact of value added from the hospital and employees was estimated to be 14,621,028 dollars for Rockcastle County and its community.

**Kentucky Rural Health Works**

**[www.ca.uky.edu/krhw](http://www.ca.uky.edu/krhw)**