

The Economic and Fiscal Impact
of the
Louisville Medical Center

a report for
Jewish Hospital

by
Paul A. Coomes, Ph.D.
Associate Professor of Economics, and
National City Research Fellow
University of Louisville
and
Barry Kornstein
Research Associate
University of Louisville

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Executive Summary

The Louisville Medical Center in downtown Louisville is made up of six hospitals, the University of Louisville's Health Sciences Center and its medical school, several nursing homes, a number of clinics, and a variety of health-related offices. The hospitals are Kosair Children's Hospital, Norton Hospital, Alliant Medical Pavilion, Frazier Rehabilitation Center, Jewish Hospital, and the University of Louisville Hospital.

Frazier Rehabilitation Center and Jewish Hospital are owned and operated by Jewish Hospital HealthCare Services. The Medical Pavilion, Norton Hospital, and Kosair Children's Hospital are owned and operated by Alliant Health Systems. The University of Louisville Hospital is owned by the Commonwealth of Kentucky, and is operated by a partnership between Alliant Health Systems and Jewish Hospital HealthCare Services. All the downtown hospitals are organized as not-for-profit corporations.

The complex, located over 24 blocks just east of city center, provides comprehensive medical services, ranging from a birthing center to Magnetic Resonance Imaging, indigent care, traumatic care, organ transplants, teaching, and research. The medical center is the largest concentration of health care providers in the metropolitan area, the State of Kentucky, and the region.

Each year the hospitals in the complex serve over 60,000 inpatients, graduates over 100 medical students, and performs millions of dollars in contract research. Sales of medical services were \$1 billion in 1994, up 8 percent over 1992. The complex directly employs around 12,000 persons for a combined payroll of \$453 million, up 8.6 percent over 1992. Employment at the complex accounts for one in six jobs in downtown Louisville. The medical center generated about \$37 million in tax revenues for Kentucky state government in 1994, and an additional \$9 million for local governments in Jefferson County.

Because of the quality and variety of sophisticated medical services produced by the six hospitals, the downtown medical center attracts a relatively large volume of patients from outside the Louisville metropolitan area. While the center serves 39 percent of all hospital inpatients from the Louisville metro, it serves over 50 percent of nonresident inpatients. Moreover, the average expenditure is higher for nonresident patients than for resident patients. For these reasons, the downtown medical center is an important source of "export" earnings for the Louisville economy.

We estimate that the export-based hospital and research activity amounts to around \$300 million per year. Because the hospitals purchase much of their supplies and services locally, and because the resultant payroll is spent and respent several times in the Louisville economy, the total net new dollar impact of export sales is around \$540 million per year. These export sales support over 6,600 local jobs, and also generate around \$10.0 million in net new tax revenues for Kentucky state government, around \$3.7 million for local government, and over \$5.0 million per year for Indiana state government.

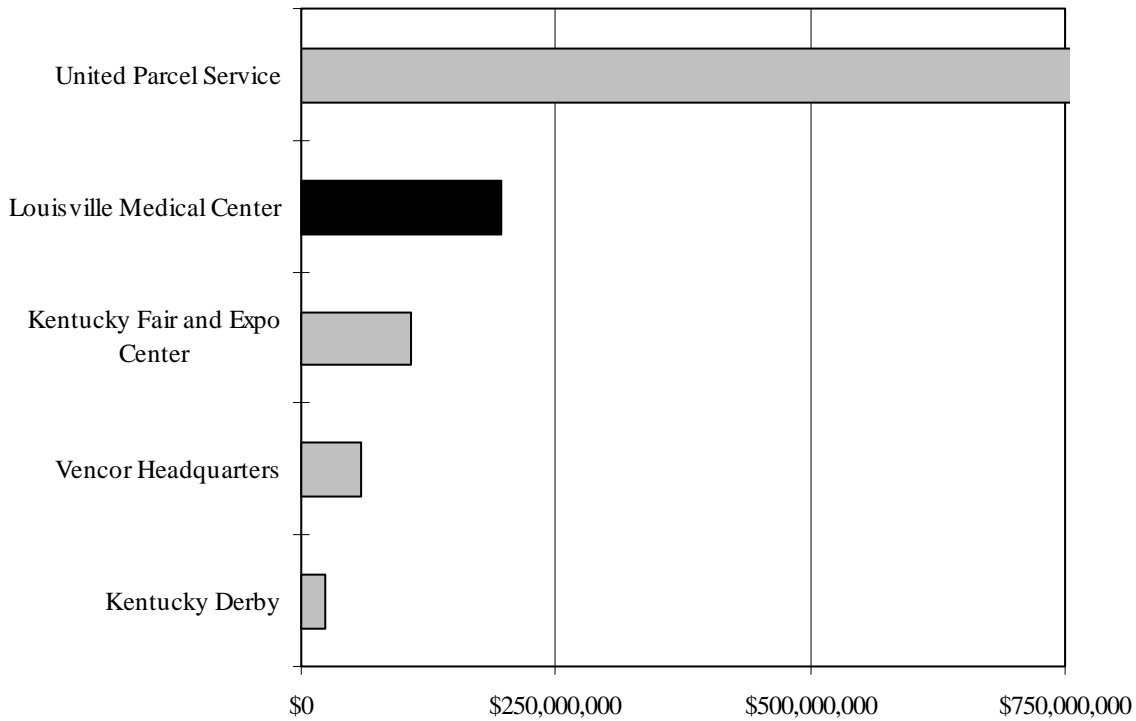
As a comparison, consider the new area payroll generated by export sales from the Louisville Medical Center relative to some other prominent economic engines. Using estimates from other studies we have performed, we know that the Louisville Medical Center generates about ten times the new payroll as does the Kentucky Derby, over three times as much as the new Vencor Headquarters, nearly twice as much as the activities at the Kentucky Fair and Exposition Center, and about one-fourth as much as that from United Parcel Service operations.

By nearly any measure, the health services industry in Louisville is large and expanding. The industry accounts for 11.5 percent of all Louisville area payrolls, compared to 9 percent nationally. Revenues,

payroll, and jobs at hospital and physicians' offices have been growing by between 5 and 10 percent per year.

In this report, we present a fairly detailed analysis of the economic and fiscal impact of Louisville's downtown medical center. We begin by documenting the overall importance of the health care industry in the Louisville economy. Next we analyze current data on patient discharges, and hospital revenues, jobs, and payrolls. We use these to quantify the volume of hospital activity in the Louisville metropolitan area, as well as downtown's portion of total activity. The analysis also includes estimates of physician activity linked to the downtown hospitals, and of teaching and research activity at the University of Louisville. Finally, we estimate that portion of health care activity that is attributable to sales to nonresidents. Our estimates of the export-based portion of the local industry are used to derive estimates of the annual net new economic and fiscal impact of the downtown medical center.

**Annual 'Net New' Payroll Impacts
Selected Firms and Industries, Louisville MSA Economy**



Estimates by authors. Only payroll generated by nonresidents is counted.

Relation to 1994 Study

This report updates our 1994 estimates of the economic impact of the downtown medical center. Several institutional changes have occurred since then, and new data are available. We have organized all data for Norton, Kosair, and the Medical Pavilion hospitals under its current rubric: Alliant Health System. The University of Louisville Hospital, operated by Columbia HCA during our previous study period, is now run by a nonprofit joint venture of Jewish, Alliant, and the University.

We have incorporated recently available data from the 1992 Census of Service Industries on the health services industry in Louisville. This gives us, among other things, a more current snapshot of the relationship

between hospital revenues and physician revenues. Also, we have analyzed Association of American Medical Colleges data on research and development expenditures at medical schools, including the University of Louisville.

Among the more interesting developments since we last studied Louisville's health care industry are:

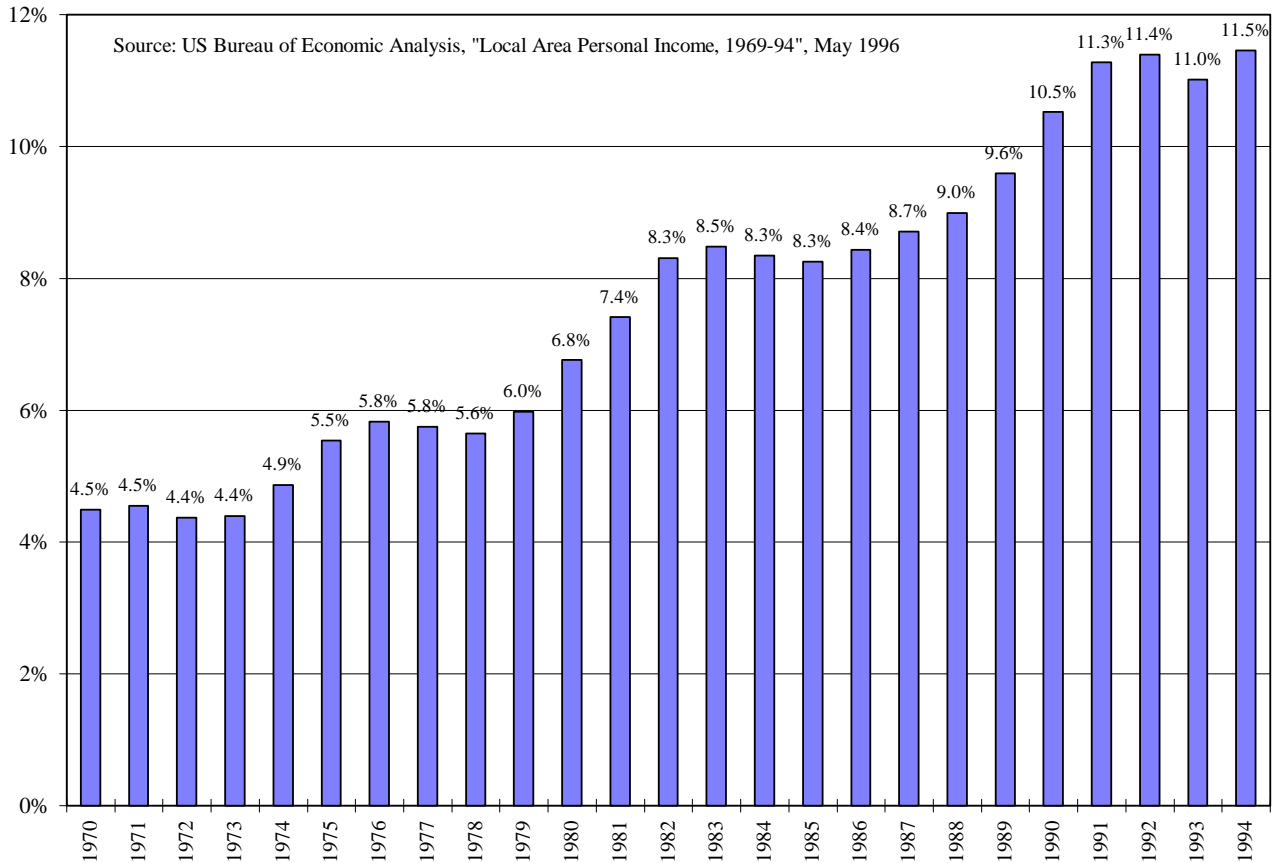
- Steady growth in revenues and payrolls at the downtown medical center.
- An increase in the average bill for nonresident patients, further enhancing the economic impact of the downtown medical center. Records showed that the average bill of a nonresident patient at Jewish Hospital was 36 percent higher than that for an area resident in 1992. By 1994, the differential had grown to 50 percent.
- The total amount of research grants and contracts awarded to the University of Louisville Medical School has grown steadily this decade (an average annual rate of over 6 percent), but still lags behind the value of grants and contracts awarded to many of the medical schools in similar cities throughout the South and Midwest.

I. The Health Services Industry in the Louisville MSA Economy

By nearly any measure, the health services industry in Louisville is large and expanding. In comparison to the United States or to other nearby metropolitan areas, Louisville has a high volume of medical activity. For example, the health services industry accounts for 11.5 percent of Louisville area rolls, but only 9 percent nationally. Total Louisville area health care payrolls are high both as a percentage of total area payroll and on a per capita basis. Revenues, payroll, and jobs at hospital and physicians' offices have been growing by between 5 and 10 percent per year - double the rate of the rest of the area economy.

The health services industry (SIC 80) is defined by the federal government to include medical offices, hospitals, clinics, and labs. It does not include health insurance firms, producers of medical equipment, or firms that provide management services to hospitals.

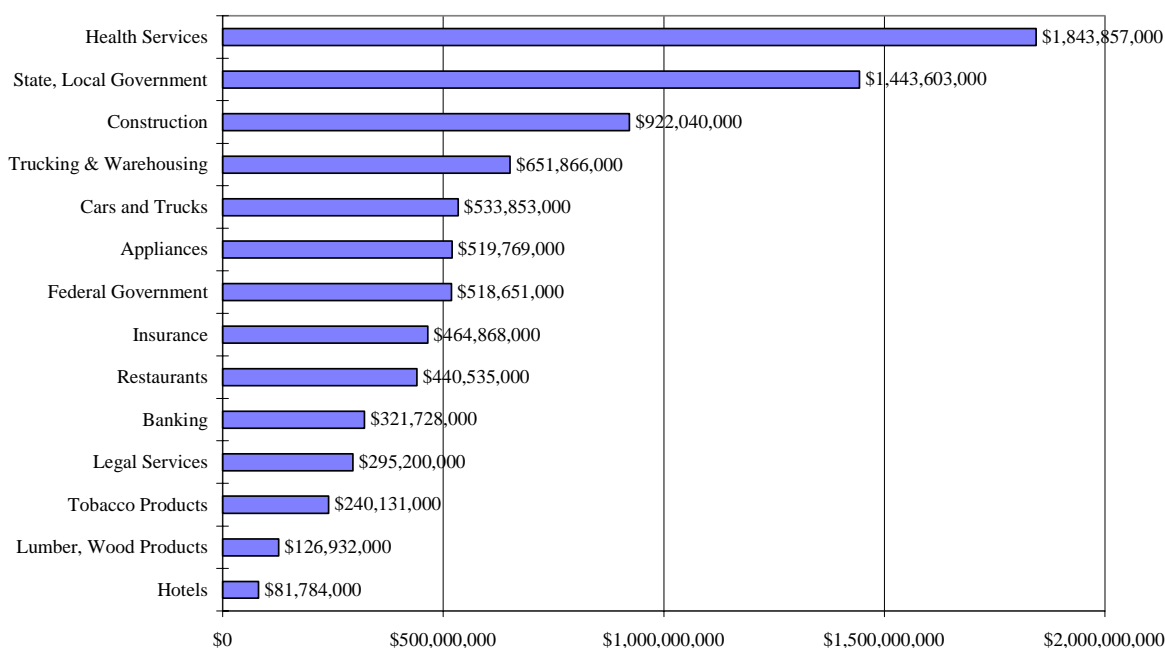
Chart 1
Health Services Share of Total Workers' Earnings
in Louisville MSA



Workers and business owners in the Louisville market earned about \$16.1 billion in 1994, the latest year for which complete data are available. Of that, \$1.8 billion was earned in the health services industry.

To put the numbers in perspective, note that the payroll in Louisville's health services industry is greater than in several prominent local industries, including car and truck production, appliance production, restaurants, banking, insurance, tobacco processing, and hotels.

Chart 2
Earnings of Workers and Proprietors
Selected Industries, Louisville MSA Economy



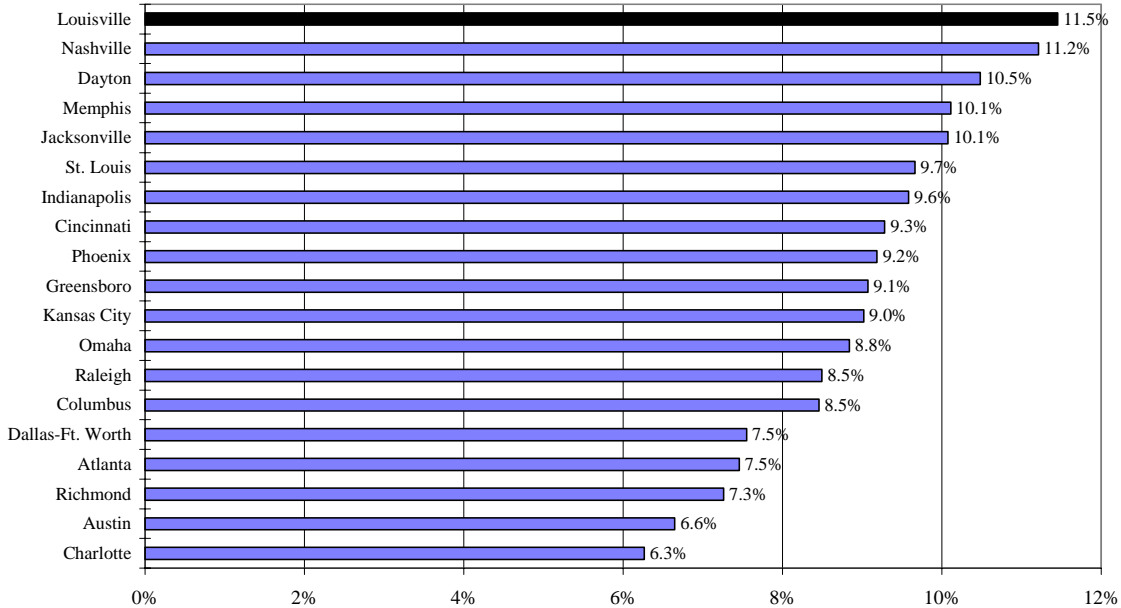
Source: US Bureau of Economic Analysis, "Local Area Personal Income, 1969-94", May 1996; augmented by authors.

This high concentration in health services is partly due to the fact that Louisville is a large urban area - where health care is concentrated in this country. Metropolitan areas have a much larger health care presence than do rural areas. Cities export health care to the surrounding hinterlands. Secondly, Louisville has a relatively older population - at least compared to its primary economic competitors. Nevertheless, it is an impressive statistical fact that the health services industry in Louisville accounts for a larger percentage of labor and proprietors earnings than in any of the 19 markets identified by local economic development officials as our current competition. See accompanying chart. As further evidence, we also examined the earnings of labor and proprietors associated with the health services industry on a per capita basis. Louisville, at \$1,880, ranked second to Nashville in payroll per capita.

We also examined recently available data from the 1992 Census of Service Industries. This is the only consistent and comprehensive database on the revenues of health services firms. It is available for all metropolitan areas, but is produced only every five years. The latest release shows Louisville to have a relatively high volume of health care revenues per capita. Louisville ranks fifth among the nineteen comparison markets, and 19 percent above the US average. As a check, we also examined the revenues and payrolls for doctors offices in each of the markets. Again, Louisville ranked fifth highest in each category.

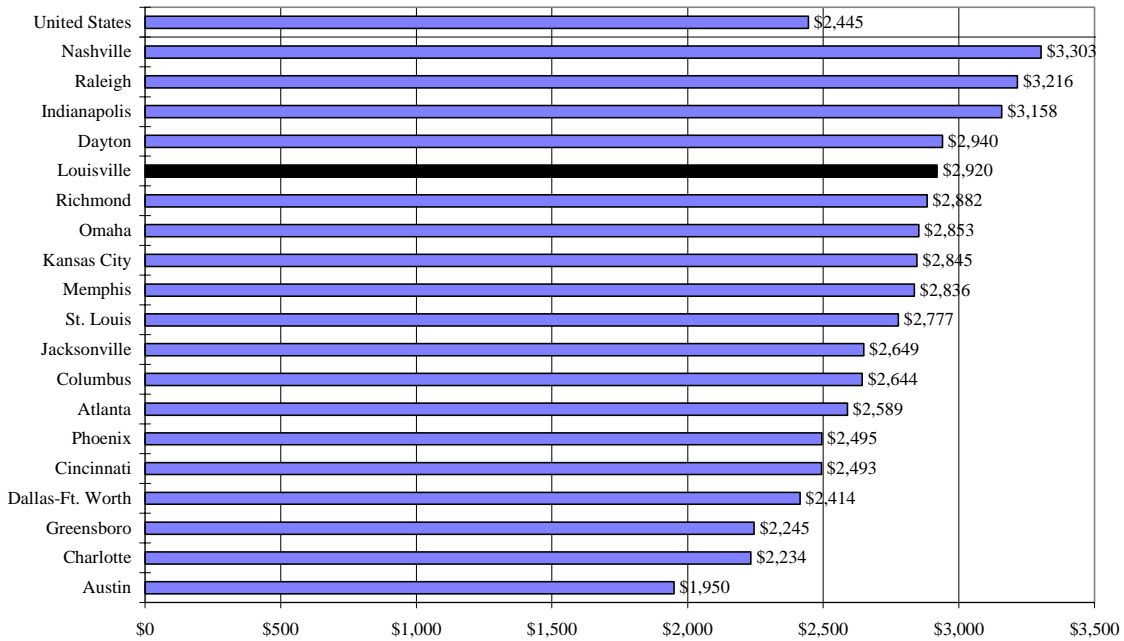
As is evident from the data in the accompanying table, most area health care earnings take place in Jefferson County. Nearly 90 percent of metro area health care services earnings are paid to workers in Jefferson County. Clark and Floyd counties are the next largest generators of health care earnings. We include data for Shelby County even though it was officially removed from the Louisville MSA in 1992. Jewish Hospital operates a hospital there. And many feel that Shelby County will be added back to the MSA definition after the next decennial census. The earnings data include wages, salaries, and profits to proprietors, e.g., physicians that own unincorporated practices. Given the steady growth in local health care payrolls, the total for the metro area is no doubt above \$2 billion as of this writing.

Chart 3
Health Services Payrolls as Percent of Total, 1994
Louisville and 18 Comparison Metros



Source: US Bureau of Economic Analysis, "Local Area Personal Income", May 1996.

Chart 4
Health Services Revenues per Capita, 1992
Louisville and 18 Comparison Metros



Source: US Bureau of the Census, "1992 Census of Service Industries."

Table 1
Health Services in Louisville MSA
Labor and Proprietors Earnings, SIC 80

	1990	1991	1992	1993	1994
Bullitt County	\$4,124,000	\$5,667,000	\$6,151,000	\$6,759,000	\$7,257,000
Jefferson County	\$1,202,665,000	\$1,342,600,000	\$1,471,120,000	\$1,490,792,000	\$1,645,815,000
Oldham County	\$17,142,000	\$20,152,000	\$23,140,000	\$25,220,000	\$29,804,000
Clark County	\$66,526,000	\$72,408,000	\$77,358,000	\$81,668,000	\$88,910,000
Floyd County	\$36,087,000	\$40,617,000	\$43,456,000	\$48,488,000	\$53,669,000
Harrison County	\$7,756,000	\$8,528,000	\$9,359,000	\$10,049,000	\$10,958,000
Scott County	\$5,296,000	\$5,498,000	\$6,316,000	\$6,757,000	\$7,444,000
Louisville MSA	\$1,339,596,000	\$1,495,470,000	\$1,636,900,000	\$1,669,733,000	\$1,843,857,000
Shelby County	\$18,984,000	\$19,791,000	\$22,309,000	\$24,859,000	\$27,160,000
State of Indiana	\$5,599,677,000	\$6,107,744,000	\$6,788,848,000	\$7,235,420,000	\$7,708,322,000
State of Kentucky	\$3,478,051,000	\$3,878,109,000	\$4,320,518,000	\$4,556,452,000	\$4,905,148,000
United States	\$269,748,000,000	\$295,730,000,000	\$324,377,000,000	\$342,909,000,000	\$366,351,886,000

Source: US Bureau of Economic Analysis, "Local Area Personal Income, 1969-94", May 1996.

II. The Volume of Activity at the Louisville Medical Center

The downtown medical center has as its core the six acute care hospital facilities. Surrounding the hospitals are the University medical schools, physician offices, nursing homes, labs, clinics, offices of various medical organizations, and medical equipment and supply businesses. Sprinkled in and around the complex are a number of service operations, including restaurants, motels, parking garages and the like - businesses with close ties to the medical activities in the area.

Table 3 on the next page provides a partial listing of the 200 plus organizations operating in the 24 block area that roughly defines Louisville's downtown medical center. We have also included job estimates for the organizations. The job estimates are based on a variety of sources, ranging from published counts to educated guesses. We estimate that there are over 14,000 total jobs supported by the organizations that are tied to the medical activities in the area.

The primary focus of this report is the volume of activity at the six hospitals, and their economic and fiscal impact on the Louisville area. In this second section, we provide a compilation of available data on medical activity at the downtown medical center - patients, sales, payroll, jobs, and tax revenues. Summary estimates are provided in Table 2 below. Details are given in Tables 4 through 8 on the following pages. The sources of data and a discussion of estimation methods are also presented in this section.

Table 2
Annual Activity at Downtown Medical Center
(latest available data)

Line	In-Patient Volume by County of Residence	
1.	Patients from Bullitt, Jefferson, and Oldham, KY	40,009
2.	Patients from Other Kentucky Counties	12,319
3.	Patients from Clark, Floyd, Harrison, and Scott counties, IN	5,520
4.	Patients from Other Indiana Counties	2,487
5.	Patients from outside Kentucky and Indiana	706
6.	Total Patients	61,041
	Sales of Services	
7.	"Net Patient Revenue" to Hospitals	\$640,859,279
8.	"Net Patient Revenue" to Physicians Using Hospitals	\$228,509,390
9.	Budget of University Health Sciences Schools	\$119,217,142
10.	Total Dollar Volume	\$988,585,811
	Wages and Salaries	
11.	Payroll, Hospital Employees	\$241,164,000
12.	Payroll, Physicians and Their Staffs	\$111,059,492
13.	Payroll, University Health Sciences Schools	\$96,186,867
14.	Payroll, Louisville Medical Center Incorporated	\$3,146,374
15.	Total Wages and Salaries	\$451,556,734
	Jobs	
16.	Number of Jobs, Hospitals	8,887
17.	Number of Jobs, Physicians and Their Staffs	2,208
18.	Number of Jobs, University Health Sciences Schools	1,688
19.	Number of Jobs, Louisville Medical Center Incorporated	95
20.	Total Jobs	12,878
	Tax Revenues	
21.	Kentucky State Hospital Provider Tax Revenues	\$16,021,482
22.	Kentucky State Physician Provider Tax Revenues	\$4,570,188
23.	Kentucky State Individual Income Tax Revenues	\$16,526,976
24.	City of Louisville Occupational Tax Revenues	\$5,644,459
25.	County School Board Occupational Tax Revenues	\$2,709,340
26.	TARC Tax Revenues	\$903,113
27.	Total Tax Revenues to Kentucky State Government	\$37,118,646
28.	Total Tax Revenues to Local Governments, including school system	\$9,256,913

**Table 3
Organizations in Downtown Medical Complex
With Job Estimates**

SIC		Establishments	Jobs
	Utilities		
4961	Louisville Medical Center Steam and Chilled Water Plant	1	95
	Eating and Drinking Establishments		
5812	Eating Places	27	189
	Hotels		
7011	Days Inn	1	30
7011	Holiday Inn	1	50
7011	The Inn at Jewish Hospital	1	50
	Offices and Clinics of MDs, DMDs, other		
801	Medical Doctors	106	1,590
802	Dentists	20	120
8042	Optometrists	9	100
8049	Other Health Care Practitioners	5	100
	Nursing and Personal Care Facilities		
8051	Pediatrics Convalescent Center	1	50
8051	Spradling Rest Home	1	10
8059	Home of the Innocents	1	50
8059	Liberty House Shelter	1	15
8059	Ronald MacDonald House	1	3
8059	Cain Center for Disabled Persons	1	3
	Hospitals		
8062	Alliant Health Care System: Norton, Kosair, Alliant Medical Pavillion	1	4,003
8062	University of Louisville	1	1,646
8062	Jewish Health Care Services: Jewish Hospital	1	2,739
8062	Jewish Health Care Services: Frazier Rehabilitation Center	1	499
8062	Jewish Health Care Services: Outpatient Care Center	1	231
8062	Louisville Surgery Center	1	24
8062	All The Way House	1	0
8062	Jefferson Co. Alcohol and Drug Abuse Center	1	115
8062	Alcoholic Anonymous Central Office	1	7
8063	Seven Counties Services, Inc.	1	300
	Medical and Clinical Laboratories		
8071	International Clinical Laboratory	1	2
8071	Louisville Andrology Laboratory	1	5
8071	National Health Laboratories, Inc.	1	25
8071	SmithKline Beecham Clinical Laboratories	1	2
8072	Dentals Labs	4	12
	Miscellaneous Health and Allied Services		
8093	Easter Seal Hearing and Speech Center	1	17
8093	Reproductive Health	1	15
8099	Plasmatec	1	7
8099	Red Cross Blood Center	1	7
8099	Interstate Blood Bank	1	7
8082	Health Watch of Visiting Nurses Association	1	400
8093	Bingham Child Guidance Center	1	40
	Educational Services		
8221	University of Louisville Medical Schools, Clinics	1	1,688
	Medical Business Services		
8741	JH Properties	1	40
8741	CVS Services, Inc.	1	7
	Hospital, Physician & Surgical Supplies		
5047	Stokes & Associates	1	10
5047	Alliant Respiratory Medical Equipment Services	1	8
7352	Harrison Medical, Inc.	1	11
5047	Spectrum Anesthesia Services, Inc.	1	32
	Membership Organizations		
8641	Baptist Center	1	15
8641	American Red Cross Louisville Area Chapter	1	7
8641	National Kidney Foundation	1	7
8641	American Red Cross	1	7
8641	The Dream Factory	1	7
8641	Sales and Marketing Executive	1	3
8641	Community Living Home Place	1	7
8641	Louisville Community Design Center	1	3
8641	Louisville Medical Center Federal Credit Union	1	3
8641	Y M C A of Greater Louisville	1	7
8641	Leukemia Society of America	1	3
8641	Kentucky Gasoline Dealers Association	1	3
8641	Medical Society of Jefferson County	1	3
8641	The Salvation Army	1	7
		223	14,436

Source: PROPHONE, SelectPhone listings; supplemented by phone call checks, a survey of the October 1995

BellSouth Yellow Pages phonebook, and a walk through.

The listing is not complete. Job estimates taken as a midpoint of range reported by PROPHONE, by a phone call to establishment, from published sources, or simply approximated by authors.

The downtown medical center includes a 24 block area bounded by Second, Jacob, Shelby and Jefferson Streets.

Economic Activity at Area Hospitals

There are 17 acute-care hospitals in the Louisville area. Ten of these are in Jefferson County. Clark County has two hospitals, and there is one each in Floyd, Harrison, Oldham, Scott, and Shelby counties. Bullitt County does not have a hospital. Shelby County, while not officially part of the Louisville metropolitan statistical area, is linked to our economy, and its hospital is therefore included in parts of this study.

Three of the hospitals (Audubon, Southwest, and Suburban) are owned and operated by Columbia HCA, a Nashville-based for-profit corporation. Jewish Hospital HealthCare Services, a local not-for-profit corporation, also owns and operates three area hospitals: Frazier, Jewish, and Jewish Hospital-Shelbyville. The University of Louisville hospital is owned by the State of Kentucky, but is operated by a new partnership between Jewish Hospital HealthCare Services and Alliant Health System. The Veterans Affairs Medical Center is owned and operated by the federal government. All the other hospitals are owned and operated by distinct nonprofit corporations.

Vencor now owns the former St. Anthony Hospital. Vencor Hospital, while licensed as an acute care facility by the state of Kentucky, has been converted to a nursing home and is certified as a long-term care facility by the Health Care Finance Administration, the federal agency that runs the Medicare program. The discrepancy is due to a moratorium that is in effect on the granting of new Certificates of Need by the state. Since Vencor Hospital is no longer an acute care facility, we have excluded it from this report.

In Table 4, we summarize basic data on the economic activity at area hospitals. Combined, the hospitals have around 4,200 beds. They discharged around 157,000 inpatients and 74,000 outpatients in 1994 - the latest year for which complete data are available. The hospitals employed nearly 20,000 persons, with a total payroll of over one-half billion dollars. Net patient revenues - the best measure of hospital sales - were over \$1.4 billion in 1994.

The six downtown hospitals account for a large portion of the hospital-related economic activity in the Louisville area. In 1994, the six downtown hospitals accounted for 45 percent of the revenues, 42 percent of the payroll, and 39 percent of inpatient discharges. There appear to be only small changes in the downtown medical center's share of area hospital activity since our previous study two years ago.

County of Residence of Patients

The county of residence for inpatients and outpatients at Kentucky hospitals is a matter of public record. Indiana hospitals reveal the county of residence for Indiana resident inpatients, but only report totals for residents of other states. We could find no data on outpatient county of residence for Indiana hospitals. The detailed data, including outpatient data on several non-hospital clinics, are provided in Tables 5 and 6.

The 17 Louisville area acute-care hospitals discharged 156,589 patients in 1994, roughly the same as in 1991 - the last year for which we compiled data. Over 88,000 of these patients were residents of Jefferson County, and 126,000 were residents of the Louisville MSA. The 10 Jefferson County hospitals discharged almost 129,000 (82 percent) of all metro area hospital inpatients. Note that Jewish Hospital - Shelbyville serves almost exclusively Shelby County residents.

In all, the 16 Louisville MSA hospitals (all hospitals but the one in Shelby County) discharged 31,000 patients that were not residents of the MSA. As only a few Louisville MSA residents become patients at hospitals outside our area, the nonresident discharge figure is a good measure of the Louisville economy's export of health care to surrounding areas.

The six downtown hospitals, particularly Alliant and Jewish, are the primary suppliers of health care to patients that are not residents of the Louisville area. The six hospitals accounted for 36 percent of all MSA resident inpatient discharges, but 50 percent of MSA nonresident discharges. In 1994, the downtown hospitals served over 15,000 inpatients who were not residents of the seven county Louisville MSA.

Table 4
Economic Data for Louisville Area Acute-Care Hospitals
(latest available)

Hospital	Beds	Inpatient Discharges 1994	Outpatients 1994	Jobs	Payroll	Net Patient Revenue, 1994
Southern Indiana						
Medical Center of Southern Indiana	46	1,345	na	240	\$6,199,000	\$13,014,714
Clark County Memorial Hospital	228	8,968	na	1,088	\$30,969,000	\$71,100,854
Floyd Memorial Hospital	213	9,367	na	884	\$28,789,000	\$65,609,459
Harrison County Hospital	50	1,453	na	223	\$4,523,000	\$11,286,728
Scott Memorial Hospital	40	1,265	na	129	\$4,054,887	\$9,263,401
Jefferson County						
Audubon Regional Medical Center	480	17,484	9,793	1,909	\$58,966,166	\$130,627,459
Baptist Hospital East	407	17,840	12,169	2,253	\$57,519,000	\$127,421,560
Frazier Rehabilitation Center	95	1,515		499	\$12,286,000	\$25,476,000
Jewish Hospital	405	16,433	17,640	2,739	\$58,641,000	\$197,156,000
Alliant Health Systems	665	29,959	16,718	4,003	\$120,180,000	\$281,026,220
Saints Mary and Elizabeth Hospital	331	8,009	4,628	842	\$28,111,000	\$58,452,539
Southwest Hospital	127	4,588	2,449	470	\$11,779,589	\$26,095,266
Suburban Medical Center	380	12,471	6,209	905	\$32,706,000	\$82,476,623
University of Louisville Hospital	379	13,134	1,720	1,646	\$50,057,000	\$137,201,059
Veterans Affairs Medical Center	209	7,469		1,480	\$58,000,000	\$158,972,000
Oldham County						
Tri-County Baptist Hospital	90	2,554	1,230	284	\$8,373,000	\$18,924,671
Shelby County						
Jewish Hospital-Shelbyville	64	2,735	1,075	270	\$7,477,000	\$21,435,000
Estimated Total	4,209	156,589	73,631	19,864	\$578,630,642	\$1,435,539,553
Downtown subtotal: Six Hospitals	1,544	61,041	36,078	8,887	\$241,164,000	\$640,859,279
Downtown Percentage of Total	36.7%	39.0%	49.0%	44.7%	41.7%	44.6%

Bed, job and payroll data are from the 1995 American Hospital Association Guide, supplemented by a report in Business First, December 5, 1994, and by the "Kentucky Annual Hospital Utilization and Services Report, 1994" published by the Kentucky State Center for Health Statistics.

Indiana hospitals payroll data supplied by special request from the Indiana State Department of Health.

Excludes hospital operated nursing home component. Hospital component of joint operation estimated by author if it was not reported to AHA.

Inpatient discharge data from Kentucky State Center for Health Statistics, "Kentucky Annual Hospital Inpatient Origin Report, 1994: Total Discharges by County of Residence by Facility". Data for the five Indiana hospitals is provided by Jewish Hospital.

Outpatient data from Kentucky State Center for Health Statistics, "Kentucky Annual Ambulatory Surgery Outpatient Origin Report, 1993 & 1994: Total Outpatients by County of Residence by Facility".

Data for Veterans Hospital refer to the period October 1994 through September 1995; NPR estimated from payroll data.

Net patient revenue data from "Medicare Cost Reports", compiled by Jewish Hospital.

Shaded cells: values estimated by interpolation from other reported data; na = not available.

Data on the county of residence of hospital outpatients is less complete, but suggest a similar pattern to that for inpatients. Presumably, outpatients do not travel as far for medical services and thus the market for less serious surgeries and treatments is not a source of much export earnings for the Louisville economy. Nevertheless, the downtown medical center attracted 47 percent of the 13,000 Jefferson County hospital outpatients that were not residents of Bullitt, Jefferson, or Oldham counties.

Economic Data for Physician Activity at Hospitals

We have not been able to find a direct measure of the dollar volume of physician billing at area hospitals. Because the physician bills the patient independently of the hospital, hospitals do not know the amount or makeup of the doctor bills. We have used some indirect measures to arrive at an estimate of physician activity linked to hospitals.

Using local physician receipts data from the 1992 Census of Service Industries and current data on health care expenditures nationally, we estimate that the net patient revenue for all physician activity in the Louisville market was about \$745 million in 1994. This is a measure of all sales of medical services by area doctors. We used similar data to estimate that local physicians' offices supported around 2,200 jobs in 1994, with a combined payroll of about \$362 million.

**Table 5
Inpatient Discharges by Louisville Area Acute-Care Hospitals in 1994
by County of Patient Residence**

Hospital	Total	Kentucky Counties					Total Kentucky	Indiana Counties				
		Bullitt	Jefferson	Oldham	Shelby	Other		Clark	Floyd	Harrison	Scott	Oth
Southern Indiana												
Medical Center of Southern Indiana	1,345	na	na	na	na	na	0	1,098	61	5	71	
Clark County Memorial Hospital	8,968	na	na	na	na	na	363	6,148	981	232	544	
Floyd Memorial Hospital	9,367	na	na	na	na	na	130	1,653	5,874	783	66	
Harrison County Hospital	1,453	na	na	na	na	na	116	0	45	968	0	
Scott Memorial Hospital	1,265	na	na	na	na	na	0	50	0	0	1,084	
Jefferson County												
Audubon Regional Medical Center	17,484	1,509	13,395	116	59	1,264	16,343	411	159	60	59	
Baptist Hospital East	17,840	772	13,441	846	307	1,521	16,887	298	188	64	43	
Frazier Rehabilitation Center	1,515	36	1,057	17	22	210	1,342	40	33	17	16	
Jewish Hospital	16,433	270	9,732	193	198	3,307	13,700	740	507	236	213	
Alliant Health Systems	29,959	715	17,696	521	254	5,992	25,178	1,406	1,048	495	318	1,
Saints Mary and Elizabeth Hospital	8,009	103	7,268	5	3	470	7,849	9	7	9	8	
Southwest Hospital	4,588	85	3,849	3	4	596	4,537	14	6	6	0	
Suburban Medical Center	12,471	492	9,473	606	225	976	11,772	305	185	52	35	
University of Louisville Hospital	13,134	63	9,477	232	1	2,335	12,108	224	125	70	32	
Veterans Affairs Medical Center	7,469	250	3,072	182	123	1,070	4,697	415	316	146	101	1,
Oldham County												
Tri-County Baptist Hospital	2,554	4	83	1,325	28	1,073	2,513	3	0	0	1	
Shelby County												
Jewish Hospital-Shelbyville	2,735	9	49	7	1,617	1,047	2,729	1	0	0	0	
Subtotal for reporters	156,589	4,308	88,592	4,053	2,841	19,861	120,264	12,815	9,535	3,143	2,591	7,
Downtown subtotal: 6 Hospitals	61,041	1,084	37,962	963	475	11,844	52,328	2,410	1,713	818	579	2,
Downtown Percentage of Total	39.0%	25.2%	42.9%	23.8%	16.7%	59.6%	43.5%	18.8%	18.0%	26.0%	22.3%	3%

Source: Kentucky State Center for Health Statistics, "Kentucky Annual Hospital Inpatient Origin Report, 1994: Total Discharges by County of Residence by Facility".

Data for the five Indiana hospitals compiled by Jewish Hospital.

Data for Veterans Hospital provided by Phillip Knight, and refer to the period October 1994 through September 1995. 60 % of patients reside in MSA; county of residence is interpolated from population data. Shaded areas: direct data not available.

Table 6
Ambulatory Surgery Outpatients by Louisville Area Hospitals and Surgical Facilities in 1994
by County of Patient Residence

Hospital	Total	Kentucky Counties					Total Kentucky	Total Indiana	Other States
		Bullitt	Jefferson	Oldham	Shelby	All Other			
Southern Indiana									
Medical Center of Southern Indiana									
Clark County Memorial Hospital									
Floyd Memorial Hospital									
Harrison County Hospital									
Jefferson County									
Audubon Regional Medical Center	9,793	904	7,324	98	49	640	9,015	766	12
Baptist Hospital East	12,169	506	9,096	559	253	1,119	11,533	554	82
Dupont Surgery Center	2,762	54	2,045	128	64	294	2,585	171	6
EMW Womens Surgical Center	3,622	40	1,032	36	45	1,753	2,906	507	209
Iroquois Surgical Center	1,884	70	1,486	13	6	259	1,834	49	1
Jewish Hospital	6,600	151	3,901	77	70	1,166	5,365	1,115	120
Louisville Surgery Center	1,281	102	985	21	15	87	1,210	71	0
Alliant Health Systems	16,718	452	10,286	334	147	2,758	13,977	2,576	165
Outpatients Care Center at Jewish Hospital	11,040	311	7,083	194	92	1,858	9,538	1,494	8
Saints Mary and Elizabeth Hospital	4,628	64	3,961	3	0	525	4,553	71	4
Southwest Hospital	2,449	75	2,075	6	1	243	2,400	49	0
Suburban Medical Center	6,209	279	4,330	265	119	756	5,749	445	15
Surgecenter of Louisville	3,203	130	2,307	123	107	378	3,045	153	5
University of Louisville Hospital	1,720	13	1,247	20	0	318	1,598	113	9
Veterans Affairs Medical Center									
Oldham County									
Tri-County Baptist Hospital	1,230	2	56	613	13	532	1,216	11	3
Shelby County									
Jewish Hospital-Shelbyville	1,075	4	22	6	679	362	1,073	1	1
Subtotal for reporters	86,383	3,157	57,236	2,496	1,660	13,048	77,597	8,146	640
Downtown subtotal: 6 Hospitals	37,359	1,029	23,502	646	324	6,187	31,688	5,369	302
Downtown Percentage of Total	43.2%	32.6%	41.1%	25.9%	19.5%	47.4%	40.8%	65.9%	47.2%

Source: Kentucky State Center for Health Statistics, "Kentucky Annual Ambulatory Surgery Outpatient Origin Report, 1993 & 1994: Total Outpatients by County of Residence by Facility".

In an attempt to determine that portion of physician activity linked to hospitals, we adjusted down these estimates by the number of physicians classified under family practice, internal medicine, pediatrics, and obstetrics and gynecology. We used national data from the American Medical Association to estimate the composition of practices in Louisville (*Statistical Abstract of the United States, 1995*, Table 175), Nationally, 31 percent of physicians are classified under the four practice types. We are assuming that all the other physician activity (69 percent) in the Louisville area is linked to some hospital.

To estimate that portion of physician activity that is linked to downtown hospitals, we used the distribution of hospital net patient revenue, provided above. The downtown hospitals generate 45 percent of area hospital revenues, and we use that factor to allocate physicians' hospital activity at the six hospitals. The estimates are summarized in the table above, and on lines 8, 12, and 17 of Table 2.

Activity at the University of Louisville Health Science Center

In addition to its hospital arrangement with Alliant and Jewish Hospitals, the University of Louisville operates four medical schools and a number of clinics at the downtown medical complex. We used University budget data to measure the volume of expenditures and payroll at the Health Science Center. The combined budgets of the Schools of Medicine, Nursing, Dentistry and Allied Health was nearly \$130 million in fiscal year 1995-1996. A little over \$110 million of the budget was for wages, salaries and benefits.

Included in the budgets of the Schools are expenditures for the Brown Cancer Center, the Children and Youth Project, the Child Evaluation Center, University Child Health Specialists, the Dialysis Center and the Dental Clinic. Research grant and contract activity is also included in the Schools' budgets.

The budget data needs to be adjusted to include central support expenditures by the University and to eliminate some double-counting of patient revenue data at downtown hospitals. Table 8 provides the budget data and these adjustments. The totals are replicated on Lines 9 and 13 of Table 2. The University reports

that the Health Science Center employees 535 faculty and 1,154 staff, for a total of 1,688 jobs. The job entry is on Line 18 of Table 2.

Table 7
Estimate of Physician Activity at Downtown Hospitals

1. Net Patient Revenue (NPR) of Louisville Area MDs, 1994	\$744,698,972
2. Estimated Payroll at Offices of Louisville Area MDs, 1994	\$361,936,504
3. Jobs at Offices of Louisville Area MDs, 1994	7,196
4. % of Physicians NOT in Fam Practice, Internal Med, Pediatrics, ObGyn (US)	68.8%
5. % of Area Hospitals' NPR in Downtown Hospitals	44.6%
6. Estimated NPR of MDs Using Downtown Hospitals: (1) x (4) x (5)	\$228,509,390
7. Estimated Payroll at Offices of MDs Using Downtown Hospitals: (2) x (4) x (5)	\$111,059,492
8. Estimated of Jobs at Offices of MDs Using Downtown Hospitals: (3) x (4) x (5)	2,208

Table 8
University of Louisville Health Sciences Center
Budgeted Expenditures, 1995-1996

	Total	Wages, Salaries and Benefits
Schools		
School of Medicine	\$114,178,759	\$96,687,895
School of Nursing	\$1,722,498	\$1,632,917
School of Dentistry	\$11,311,339	\$9,809,306
School of Allied Health	\$2,339,665	\$2,190,932
Total: Four Schools	\$129,552,261	\$110,321,050
Adjustments		
Plus: Ambulatory Care Center	\$2,500,000	\$2,125,000
Plus: Support Services from U of L central adm.	\$2,374,904	\$1,840,817
Plus: Utilities, budgeted centrally by U of L	\$2,889,977	\$0
* Minus: Payments to HSC from hospitals	\$18,100,000	\$18,100,000
Adjusted Total Expenditures	\$119,217,142	\$96,186,867

Sources: University of Louisville 1995-96 Operating Budget and 1995-96 Operating Budget Detail.

The budgets for most clinics, including the Primary Care Center, are imbedded in the school budgets.

The adjustments for the Ambulatory Care Center and payments to the HSC from hospitals are based upon data available in 1994.

* The Health Sciences Center receives payment for the services of HSC personnel from the University of Louisville Hospital,

Alliant Health System and Jewish Hospital. As these receipts are already counted as net patient revenue to the hospitals, we subtract them here to avoid double counting.

Research and Development at the Health Science Center

The Association of American Medical Colleges (AAMC) reports that the University of Louisville received nearly \$9 million in total research grants and contracts during the 1994-95 fiscal year. If reimbursements for the administrative and facilities costs of federal research were included, the total for the Health Science Center would be approximately \$10.5 million. According to the AAMC, the total amount of research grants and contracts awarded to the U of L Medical School has been increasing throughout this decade. The 1994-95 total represents a 28 percent increase over the total for the 1990-91 fiscal year.

The University of Louisville Health Science Center does not rank highly among medical school campuses in terms of the value of research grants and contracts. The Association of American Medical Colleges reports that the University of Louisville ranked 95th out of the 127 medical schools in the U.S. and Puerto

Rico for total research grants and contracts. Out of 27 medical schools listed in Table 9, chosen because they are located in large to medium sized metropolitan areas in the South and Midwest, the University of Louisville ranked 19th for total research grants and contracts during the 1994-95 fiscal year. The University of Kentucky ranked 66th nationally and had two and a half times the value of grants and contracts than did U of L. Medical schools in our three closest out-of-state neighbors among the 23 cities (Nashville, Cincinnati and Indianapolis) ranked far higher than U of L (29th, 42nd, and 45th, respectively) and all had at least four and a half times the value of grants and contracts as did U of L.

Table 9
Total Research Grants & Contracts, 1994-95

	National Rank	Total Research Grants & Contracts
Washington Univ. (St. Louis)	5	\$131,877,737
Duke Univ. (Raleigh-Durham-Chapel Hill)	8	\$117,699,333
Univ. of Alabama (Birmingham)	17	\$89,754,715
Univ. of North Carolina (Raleigh-Durham-Chapel Hill)	23	\$63,863,627
Vanderbilt Univ. (Nashville)	29	\$59,172,176
Wake Forest Univ. (Greensboro-Winston-Salem)	39	\$51,820,579
Univ. of Cincinnati	42	\$44,998,813
Indiana Univ.-Purdue Univ. (Indianapolis)	45	\$42,134,382
Ohio State Univ. (Columbus)	46	\$41,364,065
Virginia Commonwealth Univ. (Richmond)	48	\$37,008,574
Medical Univ. of South Carolina (Charleston)	54	\$31,772,323
Univ. of Tennessee (Memphis)	62	\$26,324,866
Univ. of Kentucky (Lexington)	66	\$22,594,534
Univ. of Nebraska (Omaha)	76	\$19,723,624
Univ. of Oklahoma (Oklahoma City)	79	\$17,265,548
Univ. of Arkansas (Little Rock)	80	\$17,092,245
Univ. of Kansas (Kansas City)	84	\$15,054,900
St. Louis Univ.	85	\$14,831,764
Univ. of Louisville	95	\$8,972,603
West Virginia Univ. (Morgantown)	96	\$8,958,071
Creighton Univ. (Omaha)	98	\$8,176,754
Univ. of South Alabama (Mobile)	102	\$7,402,537
Univ. of Mississippi (Jackson)	104	\$7,099,971
Wright State Univ. (Dayton-Springfield)	108	\$5,968,965
Meharry Medical College (Nashville)	110	\$5,443,786
Univ. of South Carolina (Columbia)	116	\$4,230,468
Univ. of Missouri-Kansas City	118	\$3,524,507

Source: Association of American Medical Colleges, special request.

Total research grants and contracts include those funds that are recorded on medical school accounts as well as all externally sponsored research projects that are carried out by medical school faculty, whether or not the grantee institution is the medical school. The totals above exclude federal reimbursements for the administrative and facilities costs of federal research. Inclusion of these amounts may slightly alter the rankings.

Estimated Taxes Paid Directly by Downtown Hospitals and Employees

In 1994, Kentucky state government levied provider taxes on hospital and physician revenues. The provider tax was 2.5% of net patient revenues for hospitals and 2.0% for physicians. (The provider tax on physicians' revenues is being phased out over three years. The rate was 1.5% in 1996.) Lines 21 and 22 of Table 2 provide these calculations.

Using effective tax rates calculated from historical data (Table 10), we have estimated the amount of state and local taxes paid directly by the downtown hospitals and their employees. These estimates are provided on Lines 23 through 26 of Table 2. Our calculations do not include the many other tax revenues generated by employee spending. Certainly, the payrolls of workers at the downtown medical center is linked to millions of dollars more in state sales taxes, state and local property taxes, state gasoline taxes, and the like.

Kentucky's individual income tax rate progresses from zero to 6% over the individual's first \$8,000 of taxable earnings, and is 6% for taxable earnings above \$8,000 per year. Of course, not all hospital employees are Kentucky residents and the tax deductions taken by those who are vary widely. To estimate the average effective tax rate, we simply divided the amount of Kentucky income taxes paid by MSA residents by the total payroll in the MSA. The last year for which complete payroll and tax data are available is 1993. The effective tax rate for that year is 3.66%.

City of Louisville Occupational Taxes. The occupational tax is 1.25% and applies to the payroll of all workers in the City.

Jefferson County School Board Occupational Taxes. The School Board portion of the occupational tax is .75% of payroll, but only county residents are liable for this tax. Using historical population data, We estimate that 80% of all Jefferson County workers are Jefferson County residents, and further that the downtown hospitals have the same employment pattern as the county. The effective tax rate is, then, .75 % times .8, or .60%.

TARC Occupational Taxes. The Transit Authority of River City, or TARC, levies an occupational tax of .2% on all payroll earned in the county.

Table 10
Effective Tax Rate Calculations, Louisville MSA

	1989	1990	1991	1992	1993
Wages and Salaries by Place of Work					
Bullitt County, KY	\$119,266,000	\$127,880,000	\$137,914,000	\$155,553,000	\$173,161,000
Jefferson County, KY	\$8,370,348,000	\$8,866,186,000	\$9,146,385,000	\$9,866,685,000	\$10,338,491,000
Oldham County, KY	\$133,031,000	\$150,971,000	\$157,858,000	\$171,669,000	\$188,579,000
Shelby County, KY	\$146,943,000	\$171,501,000	\$182,070,000	\$204,191,000	\$224,120,000
Clark County, IN	\$662,597,000	\$728,514,000	\$765,262,000	\$823,347,000	\$848,254,000
Floyd County, IN	\$470,254,000	\$508,486,000	\$543,639,000	\$595,317,000	\$638,092,000
Harrison County, IN	\$103,439,000	\$113,673,000	\$117,599,000	\$129,909,000	\$136,527,000
Scott County, IN	\$80,900,000	\$87,472,000	\$95,657,000	\$107,638,000	\$118,828,000
Old MSA sum (incl Shelby, excl Scott)	\$10,005,878,000	\$10,667,211,000	\$11,050,727,000	\$11,946,671,000	\$12,547,224,000
Jefferson County Share	83.7%	83.1%	82.8%	82.6%	82.4%
Individual Income Tax Collections					
Bullitt County, KY	\$13,524,720	\$18,341,514	\$16,710,046	\$18,705,296	\$20,188,120
Jefferson County, KY	\$260,058,650	\$346,279,183	\$351,412,879	\$391,807,709	\$403,287,677
Oldham County, KY	\$13,202,854	\$18,676,136	\$17,925,067	\$21,389,191	\$23,653,914
Shelby County, KY	\$7,771,937	\$10,331,861	\$10,197,062	\$11,713,153	\$12,570,097
Clark County, IN	\$26,241,122	\$28,069,772	\$29,261,161	\$31,272,938	\$32,529,881
Floyd County, IN	\$21,789,830	\$23,661,311	\$25,311,720	\$27,714,735	\$30,556,895
Harrison County, IN	\$7,957,130	\$8,899,189	\$9,159,954	\$9,942,074	\$10,423,535
Sum, 4 Kentucky Counties	\$294,558,161	\$393,628,694	\$396,245,054	\$443,615,349	\$459,699,808
% of MSA Wages and Salaries	2.94%	3.69%	3.59%	3.71%	3.66%
Sum, 3 Indiana Counties	\$55,988,082	\$60,630,272	\$63,732,835	\$68,929,747	\$73,510,311
% of MSA Wages and Salaries	0.56%	0.57%	0.58%	0.58%	0.59%
Sum, 7 MSA Counties	\$350,546,243	\$454,258,966	\$459,977,889	\$512,545,096	\$533,210,119
Sales Tax Collections					
Bullitt County, KY	\$5,196,216	\$5,743,848	\$6,863,612	\$7,634,003	\$6,897,714
Jefferson County, KY	\$294,337,895	\$293,680,898	\$386,030,969	\$406,142,637	\$400,308,921
Oldham County, KY	\$5,605,874	\$5,438,143	\$6,268,335	\$6,585,414	\$6,720,008
Shelby County, KY	\$5,621,570	\$5,701,852	\$6,284,289	\$7,789,546	\$7,440,081
Clark County, IN	\$16,580,310	\$19,255,198	\$18,894,554	\$21,044,738	\$23,060,730
Floyd County, IN	\$8,327,965	\$8,754,241	\$8,311,216	\$9,017,301	\$9,491,611
Harrison County, IN	\$4,056,471	\$4,207,595	\$4,236,645	\$4,627,018	\$5,114,571
Sum, 4 Kentucky Counties	\$310,761,555	\$310,564,741	\$405,447,205	\$428,151,600	\$421,366,724
% of MSA Wages and Salaries	3.11%	2.91%	3.67%	3.58%	3.36%
Sum, 3 Indiana Counties	\$28,964,746	\$32,217,034	\$31,442,415	\$34,689,057	\$37,666,912
% of MSA Wages and Salaries	0.29%	0.30%	0.28%	0.29%	0.30%
Sum, 7 MSA Counties	\$339,726,301	\$342,781,775	\$436,889,620	\$462,840,657	\$459,033,636
Occupational Tax Collections					
City of Louisville	\$63,573,727	\$67,409,744	\$69,736,173	\$71,831,130	\$74,824,944
Jefferson County Government	\$45,810,105	\$46,087,329	\$49,910,149	\$49,856,937	\$56,564,893
Jefferson County Public Schools	\$55,216,253	\$56,185,331	\$59,036,971	\$59,292,182	\$63,803,255
Transit Authority of River City	\$17,679,519	\$18,382,889	\$19,383,968	\$19,593,377	\$21,124,220
Total	\$182,279,604	\$188,065,293	\$198,067,261	\$200,573,626	\$216,317,312
as % of Jefferson County Wages and Salaries					
City of Louisville	0.76%	0.76%	0.76%	0.73%	0.72%
Jefferson County Government	0.55%	0.52%	0.55%	0.51%	0.55%
Jefferson County Public Schools	0.66%	0.63%	0.65%	0.60%	0.62%
Transit Authority of River City	0.21%	0.21%	0.21%	0.20%	0.20%
Total	2.18%	2.12%	2.17%	2.03%	2.09%

Sources: Payroll data from US Bureau of Economic Analysis, "Local Area Personal Income, 1969-94", May 1996. State tax receipt data from the Kentucky and Indiana Revenue Cabinets; calendar year basis.

Local government occupational tax receipt data from Louisville Revenue Commission and budgets; data include employee withholdings, net profits tax, plus compact payments from County to City; fiscal year basis.

III. Export-Based Economic and Fiscal Impact

The first section of the report presents measurements of the gross volume of economic activity at the downtown medical center. In this second part of the report, we present estimates of the percentage of the activity generated by sales of health services to nonresidents. This so-called export base portion of the health care industry is of prime interest from an economic development perspective. We also present and apply economic multipliers for the health care industry in Louisville. Finally, we present estimates of the total annual economic and fiscal impact of the downtown medical center.

Measurement of Economic and Fiscal Impacts

In principle, estimating the impact of the downtown medical center is the same exercise as measuring the impact of other local economic developments, such as Ford’s new truck plant expansion, the UPS air freight hub, or the Stride-Rite distribution center at Riverport. One obtains a measure of the number of jobs and the dollars of payroll at the site, applies an industry-specific multiplier for the local economy to capture the spin-off activity, and uses historical tax relationships to measure the expected tax revenues. This is roughly the methodology used in Louisville and around the country to measure the economic and fiscal impacts of economic development projects.

In the case of the health care industry, the estimation of impacts is complicated by the fact that much of the activity is supported by sales to local residents as opposed to consumers around the United States or the world. The estimation problem is further complicated by the fact that physicians, the primary health care provider at the hospitals, are generally not employees of the hospitals. Good information on physicians’ billing for hospital services does not appear to be available. Hence we have had to make a number of assumptions and use a variety of indirect data sources to approximate the important sales, payroll and tax impacts of physician activity at the hospitals.

Meaning of Economic Impact

“Economic Impact” is a widely used term that means different things to different people. To some it means simply the overall volume of activity of a firm or industry. To a regional economist, it means the amount of sales, jobs and payroll that a firm or group of firms generate over and above what is required to meet purely local demand for the product. In other words, economic impact springs from sales of locally produced exports to firms and residents of other areas. Only a fraction of the economic activity in the Louisville area is part of our “export base”.

For example, restaurants, grocery stores, department stores and banks by and large serve only a local market and hence, by our strict definition, have no economic impact. They exist primarily to serve the local population and expand only when that population gains additional income. Manufacturers such as GE and Ford produce almost exclusively for export and are vital components of Louisville’s economic base. The payroll linked to product sales at these plants are the tide that raises and lowers the boats in local service industries. Similarly, the UPS international air freight hub is an important source of export earnings in the Louisville economy.

Measurement of Health Services “Exports”

Measuring the volume of exports and imports of a metropolitan economy is quite difficult for most goods and services. Unlike the national economy, there are no ports, checkpoints, tariffs, currency exchanges or the like. Goods and services flow freely around the US, largely unfettered by political jurisdic-

tions. The resultant lack of data makes it hard to distinguish how much of local production in an industry is for local consumption and how much is for export. Indeed, estimating that split is one of the most critical and time-consuming components in studies like the current one.

The most solid data we could find to make the local/export distinction are the patient discharge statistics by hospital. The state of Kentucky compiles data on the county of residence of each patient discharged from acute care hospitals. Their reports also provide information on patients from out-of-state. While comparable data is not completely available for the Indiana hospitals in the Louisville area market, we were able to construct a fairly solid representation of the patient flows in and out the Louisville health care market in general, and the downtown medical center in particular (Table 5, above). We used this information in the impact analysis to estimate that portion of total economic activity which is supported by export sales.

Export Portion of Activity at Medical Center

We estimate the “export” portion of economic activity at downtown hospitals by prorating the 1994 totals by the county of residence of inpatients, and adjusting for the higher patient revenues for nonresidents. Nonresident patients have a higher average hospital charge than do Louisville residents. Jewish Hospital reports that the average charge for nonresidents was \$22,289 in 1995, compared to only \$14,983 for residents. The nonresident bill is 49 percent higher than for residents, reflecting the attraction of out-of-towners to the sophisticated services available at the downtown medical center.

Except for University research activity, the estimates in Table 11 are calculated by first deriving the average hospital net patient revenue resulting from a non-Louisville MSA resident patient, assuming that the ratio of nonresident to resident billings reported by Jewish Hospital is valid for all the downtown hospitals. This figure is then used to calculate the percentage of net patient revenue found in Table 2 that comes from nonresident patients. Direct downtown medical centers sales, payroll and jobs, respectively, provided in Table 2 of the last section, are multiplied by this percentage to arrive at the results in Table 11. Direct data on externally-funded University research activity was provided by the Medical School.

Table 11
Estimate of Export Portion of Activity at Downtown Medical Center

Line	Revenues Attributable to Non-Residents
1. Six Hospitals	\$216,746,569
2. Offices of Physicians	\$77,284,714
3. University external research grants	\$13,800,000
4. Total Revenues	\$307,831,283
Payroll Attributable to Non-Resident Expenditures	
5. Six Hospitals	\$81,564,661
6. Offices of Physicians	\$37,561,700
7. University external research grants and contacts	\$13,800,000
8. Louisville Medical Center Incorporated	\$1,064,143
9. Total Payroll	\$133,990,503
Jobs Attributable to Non-Residents	
10. Jobs attributable to non-resident patient activity: Hospitals	3,006
11. Jobs attributable to non-resident patient activity: Offices of Physicians	747
12. Jobs attributable to non-resident patient activity: LMC, Inc	32
13. Total Jobs	3,785

Economic Multipliers for Metro Area

Table 12 provide the multipliers for Louisville MSA hospitals and physician offices as estimated using our input-output model. The model has interindustry linkages between 500 local industries. The model can predict the volume of sales, jobs and payroll induced in the local economy by new export sales for any other

local industry. This is the same model that has been used by the authors to evaluate approximately 150 industrial developments in Louisville over the past eight years. For documentation, see *PC-IO User's Manual: Regional Impact Model for the Personal Computer*, 1994, by the Regional Science Research Institute.

Table 12
Economic Multipliers for Louisville Metropolitan Area

1. Sales: Hospitals	1.85
2. Sales: Offices of Physicians	1.86
3. Payroll: Hospitals	1.49
4. Payroll: Offices of Physicians	1.42
5. Jobs: Hospitals	1.67
6. Jobs: Offices of Physicians	2.12

Economic multipliers are from the Louisville area input-output model, PCIO, Version 6.10, June 1994.

Total Net New Economic and Fiscal Impact on MSA

The net new economic impact is obtained by multiplying the net direct impact times the respective multipliers. This is done on Lines 1, 2 and 4 of Table 13. We also estimate the number of jobs and the volume of payroll accruing to workers in Jefferson County. We are assuming that 80 percent of the spin-off activity (and all of the direct) takes place in Jefferson County. These calculations are performed on lines 3 and 5.

The tax effects are calculated using effective tax rates as they were in Table 2, except that now we report only those tax revenues that are due to the presence of patients who are either non-Kentucky, non-Indiana, or non-Louisville MSA residents. For the Kentucky state tax revenues (lines 6 through 9), an adjustment must be made to account for the fact that many of the patients who are not Louisville area residents are Kentucky residents. That is, a large percentage of the exports from the Louisville economy are to Kentucky residents and that business cannot be counted in calculating the tax proceeds to Kentucky state government. To make the adjustment, we utilize the non-MSA versus MSA resident billing information provided by Jewish Hospital and the patient residence distribution data in Table 2 (lines 1 through 5) to arrive at estimates of the net patient revenue and payroll that can be attributed to out of state patients. We then apply the appropriate multipliers, if any, and the effective tax rates.

The Indiana state income and sales tax revenues (lines 10 and 11) generated from the export sales of the downtown hospitals have been computed in a similar fashion, so that only the effects of non-Indiana resident patients are shown. Calculation of the local government tax impact (lines 12 through 14) is straightforward. We multiply the payroll impact given in line 3 by the appropriate effective tax rate. The effective tax rate calculations are shown in Table 10.

Table 13
Export-Based Economic and Fiscal Impact on MSA Economy

Line	Economic Impacts	
1.	Sales of Goods and Services in the Metro Area	\$544,312,336
2.	Payroll in Metro Area	\$195,793,722
3.	Payroll in Jefferson County	\$183,433,079
4.	Jobs in the Metro Area	6,662
5.	Jobs in Jefferson County	6,080
	Tax Impacts	
6.	Kentucky State Hospital Provider Tax Revenues	\$2,400,882
7.	Kentucky State Physician Provider Tax Revenues	\$684,861
8.	Kentucky State Individual Income Tax Revenues	\$3,604,931
9.	Kentucky State Sales Tax Revenues	\$3,309,445
10.	Indiana State Individual Income Tax Revenues	\$3,356,499
11.	Indiana State Sales Tax Revenues	\$1,706,695
12.	City/County Occupational Tax Revenues	\$2,292,913
13.	County School Board Occupational Tax Revenues	\$1,100,598
14.	TARC Tax Revenues	\$366,866
	Summary of Net New Tax Revenues	
15.	Kentucky State Government	\$10,000,119
16.	Indiana State Government	\$5,063,194
17.	Local Government (City, County, School Board, TARC)	\$3,760,378

Additional tax revenues and other collections are likely, but are not as easy to measure. These include the County-wide net profits tax, the County-wide insurance premium tax, Kentucky corporate income and license taxes, Kentucky motor vehicle usage and gasoline taxes.

References

- American Hospital Association, *American Hospital Association Guide to the Health Care Field, 1995-96 Edition*, 1995.
- Association of American Medical Colleges, *1995 Institutional Goals Ranking Report*, December 1995.
- Business First*, December 4, 1995.
- Coomes, Paul, "The Economic and Fiscal Impact of Louisville's Downtown Medical Center," University of Louisville research report for Jewish Hospital, 1994.
- HCIA, *Profiles of US Hospitals*, 1996.
- Indiana State Department of Health, *Aggregate Discharges by Bed Report*, June 1996.
- Kentucky State Center for Health Statistics, *Kentucky Annual Ambulatory Surgery Outpatient Report, 1993 & 1994*, 1996.
- Kentucky State Center for Health Statistics, *Kentucky Annual Hospital Inpatient Origin Report, 1994*, 1996.
- Kentucky State Center for Health Statistics, *Kentucky Annual Hospital Utilization and Services Report, January through December 1994*, 1996.
- National Science Foundation, Division of Science Resource Studies, *Survey of Scientific and Engineering Expenditures at Universities and Colleges, Fiscal Year 1994*, 1995.
- Regional Science Research Institute, *PC-IO User's Manual: Regional Impact Model for the Personal Computer*, 1992.
- University of Louisville, *1995-96 Operating Budget*, 1995.
- US Bureau of Economic Analysis, *Local Area Personal Income, 1969-1994*, May 1996.
- US Department of Commerce, Bureau of the Census, *1992 Census of Service Industries*, 1994.
- US Department of Commerce, 1995, *Statistical Abstract of the United States: 1995*, 115th edition.