

THE ECONOMIC IMPACT OF THE UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

FISCAL YEAR 2017



An Economic Impact Report by

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MAJOR POINTS

- This fact sheet summarizes the estimated economic impact of the University of Tennessee Health Science Center (UTHSC) on the Tennessee economy for fiscal year 2017 (FY2017).
- The economic impact reported here includes both total economic output (i.e., the market value of total sales) and jobs supported by UTHSC, its faculty clinical-practice organizations, students who shop in local stores, and the patients and visitors who spend money in the local economy when they seek care provided by UTHSC faculty, medical residents, and students.
- Total Economic Impact: The total economic impact of UTHSC and its faculty clinical practices located in Memphis, Knoxville, Nashville, and Chattanooga was estimated to be approximately \$4.0 billion for FY2017.
- The state of Tennessee benefited from the presence of UTHSC and its affiliated organizations in two additional ways:
 - **Federal, State, and Local Taxes:** The economic impact of UTHSC and its faculty clinical practices enabled taxing authorities to collect \$506.7 million of federal, state, and local taxes to support government operations and various public service programs such as education, healthcare, transportation, social services, and public safety. Of this total, \$358.7 million was federal taxes and \$148.0 million was state and local taxes.
 - **Jobs:** UTHSC and its faculty-practice organizations also provided a large number of jobs, together directly hiring more than 6,000 full-time and part-time administrative and academic employees across the state. In addition, the economic impact of UTHSC supported a total of 32,333 jobs across the state through the multiplier effect of UTHSC's initial direct contribution.
- The following represents the economic impact of UTHSC as measured by three different types of impact effects that comprise the total economic impact:
 - **The Direct Effect** (state appropriations, research grants and contracts, and other budgeted dollars created and/or earned by UTHSC) was \$2.2 billion (53.9% of total economic impact) for FY2017;
 - **The Indirect Effect** (increases in sales, income, and jobs in the local economy by firms that supply goods and services to UTHSC) was \$719.3 million (18.0% of total); and
 - **The Induced Effect** (increased sales from household spending of the income earned in the economic sectors that benefited from the presence of UTHSC) was \$1.1 billion (28.1% of total).
- The major industries that benefited significantly from the presence of UTHSC and its faculty-practice organizations in FY2017 were other institutions of higher education in the same region, local healthcare organizations and facilities, hotels and restaurants, retail and wholesale trade establishments, rental property owners, and real estate firms.
- UTHSC received \$146.8 million of state appropriations, which represented 28.6 percent of the school's total operating budget for FY2017. When compared to the total estimated economic impact of \$4.0 billion, the economic contributions of Tennessee's flagship public medical school to the state economy exceeded state appropriations for university operation (Orange Dollars) by a factor of 27:1 in FY2017.

EXECUTIVE SUMMARY

The University of Tennessee Health Science Center (UTHSC) is located in Memphis, Tennessee, with satellite campuses, residency programs, and strategic partners in Knoxville, Nashville, and Chattanooga. As the flagship public academic health system in Tennessee, UTHSC has dedicated itself to bringing the benefits of the health sciences to the improvement of both population and individual health, with a focus on the citizens of Tennessee and the other regions it serves.

As a major employer and purchaser of goods and services, UTHSC contributes to the local communities in Memphis, West Tennessee, and beyond in another significant way: It contributes substantively to the economic well-being of the communities it serves by creating jobs, stimulating economic activities, and supporting public programs through tax revenues generated directly and indirectly by the economic benefits derived from the presence of UTHSC.

The purpose of this report is twofold: (1) to describe the “direct economic impact” of UTHSC on Tennessee and the local economies where UTHSC’s campuses are located, and (2) to estimate and summarize the “total economic impact” of UTHSC. We will identify the direct economic benefits arising from the purchases of goods and services directly by UTHSC and its highly-educated and skilled employees who spend their earned wages and salaries in the local markets. We will also analyze the “multiplier effect” of how these direct impacts create additional spill-over benefits throughout the local economies as the initial dollars spent change hand from one person to another and from one industry to another.

The economic impacts estimated in this report include economic output (total sales) and the major individual components that comprise the total output of UTHSC and its affiliate organizations. Also included in the report are estimates of tax revenues raised and jobs supported by the money spent by UTHSC and its affiliates, their employees, and the patients and visitors who spend money in Memphis and other areas when they seek care at a UTHSC facility or affiliated clinic.

Methodology and Study Design

This impact report uses financial and employment data from various administrative sources to estimate the economic impact of UTHSC. These administrative data were supplemented by relevant publicly-available data such as Consumer Price Index (CPI) data from the U.S. Department of Labor and hospital spending trends data from the Becker's Hospital CFO Report.

The economic impact of UTHSC was estimated using the IMPLAN Input-Output Economic Impact Model (IMPLAN Model) initially developed by the U.S. Department of Interior and currently maintained by the Minnesota IMPLAN Group (MIG). The IMPLAN Model has been used by more than 500 universities, government agencies, and nonprofit organizations to estimate the economic and fiscal impacts of fresh investments and/or changes in economic activities.

We use a broad definition of economic impact; therefore, our analysis is not limited to the economic impact of the main and satellite campuses of UTHSC. It also includes the economic impact of affiliated organizations, such as the many ambulatory care centers and physician practices fully or partially owned by UTHSC, and UTHSC's many community-based social services organizations and foundations that improve the well-being of residents in the communities they serve. Most important, this impact analysis includes the inpatient care revenues earned by local hospitals as a result of the ambulatory and sub-specialty services provided by UTHSC's clinical faculty. Though not earned explicitly by UTHSC, these enormous economic benefits would not have occurred without the patient-care services provided by UTHSC faculty to patients who are also treated by area hospitals.

As an input-output economic model, the IMPLAN Model reports three types of economic effects:

- Direct effects, which are the initial changes in the industry in question (e.g., in the healthcare markets and local communities served by UTHSC and its affiliates);
- Indirect effects, changes in inter-industry transactions when supplying industries (e.g., retail drug stores and nursing homes) respond to increased demands from the directly affected industries (the hospital inpatient care market); and
- Induced effects, which reflect changes in local spending that result from increases in business and individual incomes in the industries affected by the direct and indirect effects of UTHSC.

In this analysis, the total economic impact of UTHSC and its affiliates is represented by the total economic output estimated by the IMPLAN Model, and this total is the sum of the three types of effects defined above. The first effect, or the direct effect, is the total direct expenditures of UTHSC and its affiliates. It can be thought of as the economic "engine" that drives the total or overall economic impact. The second and third effects (i.e., the indirect and induced effects) are subsequent spill-over impacts that add to or "multiply" the direct economic impact of an initial increase in spending by UTHSC or one of its affiliates.

Summary of Total Impact

Table ES 1 summarizes the general findings of the total economic impact of UTHSC and its affiliated organizations for FY2017.

TABLE ES 1 - Total Economic Impact of University of Tennessee Health Science Center (UTHSC), FY2017

	SOURCES OF ECONOMIC IMPACT			UTHSC
	UNIVERSITY OPERATION - UTHSC	FACULTY PATIENT CARE ACTIVITIES	STUDENTS, FAMILIES, AND VISITORS	
Economic Output Generated	\$1,394,605,552	\$2,480,769,897	\$111,633,199	\$3,987,008,646
% of UTHSC	35.0%	62.2%	2.8%	100.0%
Federal, State, and Local Tax Revenues	\$177,233,463	\$315,268,672	\$14,186,906	\$506,689,041
% of UTHSC	35.0%	62.2%	2.8%	100.0%
JOBS CREATED	11,310	20,118	905	32,333
% of UTHSC	35.0%	62.2%	2.8%	100.0%

- In FY2017, UTHSC and its affiliated organizations supported 32,333 jobs and approximately \$4.0 billion of total economic output generated for Tennessee.
- In addition, UTHSC and its affiliates contributed approximately \$506.7 million of federal, state, and local tax revenues to finance government programs and services throughout the state.
- UTHSC's university operation was responsible for 35.0 percent (or \$1.4 billion) of the total economic impact, while the affiliated organizations, such as UTHSC-owned physician practices and other ambulatory care centers and clinics, contributed 62.2 percent (or \$2.5 billion) of the total. Students, patients, families, and visitors contributed the remaining 2.8 percent (\$111.6 million).

Estimates of Total Output by Type of Effects

Table ES 2 presents estimated total economic output for the state by type of impact effects. Specifically,

- The “direct effect” of UTHSC’s economic impact as measured by the market value of the total output produced in FY2017 was estimated to be \$2.2 billion (53.9% of total) for Tennessee.
- The “indirect effect” and “induced effect” were estimated to be \$719.3 million (18.0% of total) and \$1.1 billion (28.1% of total), respectively.

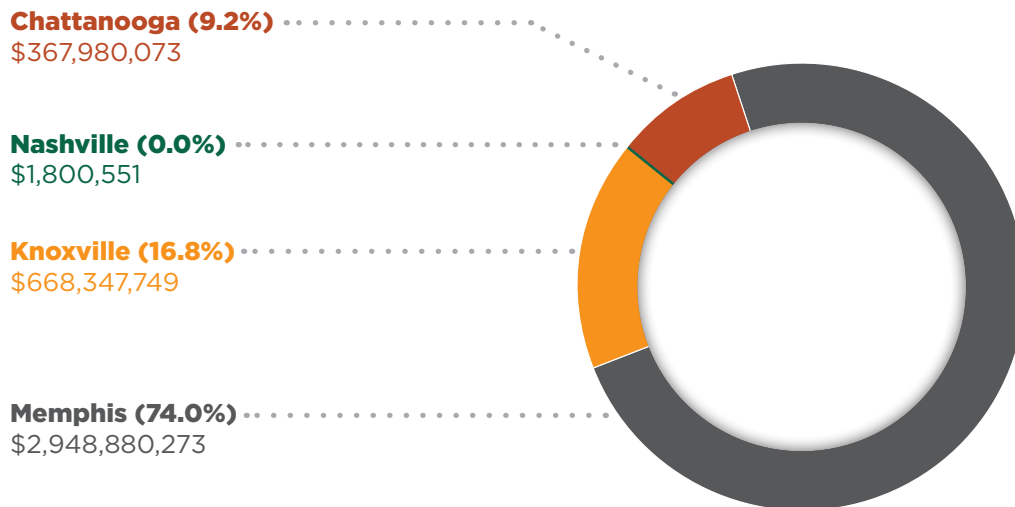
TABLE ES 2 - Total Economic Impact of UTHSC: Estimates of Total Economic Output Generated for Tennessee by Type of Impact Effect, FY2017

	SOURCES OF ECONOMIC IMPACT			UTHSC
	UNIVERSITY OPERATION - UTHSC	FACULTY PATIENT CARE ACTIVITIES	STUDENTS, FAMILIES, AND VISITORS	
Direct Effect	\$751,520,421	\$1,336,829,068	\$60,156,529	\$2,148,506,018
% of Total Impact	53.9%	53.9%	53.9%	53.9%
Indirect Effect	\$251,603,590	\$447,560,683	\$20,139,970	\$719,304,243
% of Total Impact	18.0%	18.0%	18.0%	18.0%
Induced Effect	\$391,481,539	\$696,380,146	\$31,336,701	\$1,119,198,385
% of Total Impact	28.1%	28.1%	28.1%	x 28.1%
TOTAL IMPACT	\$1,394,605,550	\$2,480,769,897	\$111,633,199	\$3,987,008,646
% of Total Impact	100.0%	100.0%	100.0%	100.0%

Estimates of Total Impact by Location

Figure ES 1 shows the distribution of the total impact of UTHSC among the four locations across Tennessee where UTHSC medical training programs and patient-care practices and facilities are located.

FIGURE ES 1 - Distribution of Total Economic Impact of UTHSC by Location

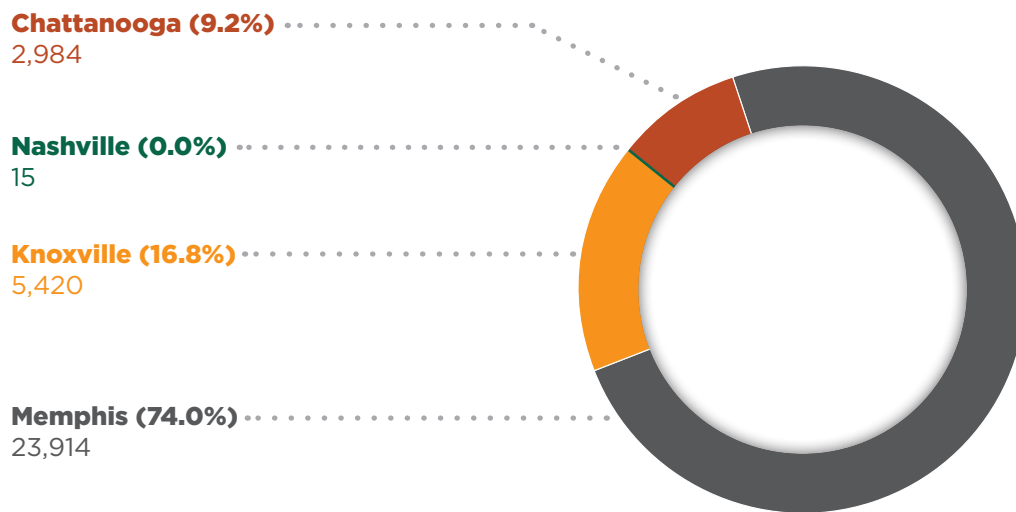


- The total economic impact of UTHSC was concentrated predominantly (74.0% of total) in the Memphis area, where UTHSC's main campus is located.
- The other three areas contributed 16.8 percent (Knoxville), 9.2 percent (Chattanooga), and less than 1.0% (Nashville) of the total economic impact for FY2017.
- Specifically, UTHSC created approximately \$3.0 billion of total economic impact in the Memphis area and \$668.4 million, \$368.0 million, and \$1.8 million in Knoxville, Chattanooga, and Nashville, respectively.

Estimates of Jobs Supported

Figure ES 2, which follows, shows the number of jobs supported by the four different Tennessee locations.

FIGURE ES 2 - Distribution of Jobs Supported by UTHSC by Location



- The educational activities of UTHSC and its many faculty-practice affiliates were responsible for creating a total of 32,333 jobs for Tennessee in FY2017 as reported earlier in Table ES 1.
- Of this total, 23,914 jobs were generated in the Memphis area, while 5,420, 2,984, and 15 jobs were generated in Knoxville, Chattanooga, and Nashville, respectively.

Estimates of Federal, State, and Local Tax Revenues

Table ES 3 contains estimates of federal, state, and local tax revenues that could be attributed to the presence of UTHSC.

TABLE ES 3 - Total Economic Impact of UTHSC: Estimates of Federal, State and Local Tax Revenues – Generated for Tennessee, FY2017

	MEMPHIS	KNOXVILLE	NASHVILLE	CHATTANOOGA	TOTAL TAXES
Federal Tax Revenues	\$265,267,329	\$60,121,404	\$161,969	\$33,101,748	\$358,652,450
% of Total Tax Revenues	70.8%	70.8%	70.8%	70.8%	70.8%
State and local Tax Revenues	\$109,491,155	\$24,815,578	\$66,854	\$13,663,004	\$148,036,591
% of Total Tax Revenues	29.2%	29.2%	29.2%	29.2%	29.2%
TOTAL TAX REVENUES	\$374,758,484	\$84,936,982	\$228,823	\$46,764,752	\$506,689,041
% of Total Tax Revenues	100.0%	100.0%	100.0%	100.0%	100.0%

- UTHSC and the affiliated organizations made it possible for federal taxing authorities to collect \$358.7 million (70.8% of total) of federal taxes in FY2017.
- In addition, state and local taxing authorities collected another \$148.0 million (29.2% of total) of taxes to support the operations of state and local governments and their various public service programs.

The Top Ten Affected Industries

Table ES 4 reports the ten industries that benefited the most from the presence of UTHSC and its many patient-care and community-service affiliates. Specifically,

- The top ten most affected businesses include such major industries as other institutions of higher education located in the same area, real estate owners and firms, hospitals, physician offices, full-service and limited-service restaurants, wholesale trade establishments, and local government enterprises.
- The distribution of the economic impact of UTHSC was uneven among the various industries, with the top ten affected industries receiving 73.9 percent of the total economic impact.

TABLE ES 4 - Top 10 Industries Affected by UTHSC’s Economic Impact, FY2017

AFFECTED INDUSTRIES	TOTAL OUTPUT
1. Other Institutions of Higher Education	\$2,159,295,323
2. Real Estate	\$281,707,106
3. Owner-occupied Dwellings	\$133,684,215
4. Wholesale Trade	\$77,087,290
5. Hospitals	\$70,649,099
6. Other Local Government Enterprises	\$69,521,985
7. Limited-service Restaurants	\$42,593,189
8. Wireless Telecommunications Carriers	\$41,828,075
9. Offices of Physicians	\$38,057,425
10. Full-service Restaurants	\$33,028,024
TOP 10 TOTAL	\$2,947,451,730
TOTAL IMPACT OF UTHSC	\$3,987,008,646
TOP 10 AS % OF TOTAL	73.9%

This report applied the IMPLAN Model to the financial and other administrative data to estimate the economic impact of the University of Tennessee Health Science Center. Health care has frequently been described as the engine that drives the local economy in many major cities and urban centers across the United States. The impact results presented in this report add weight to this claim, and UTHSC is a major component of that economic engine that drives the economies of Tennessee and its major cities.

The Economic Impact of the University of Tennessee Health Science Center (UTHSC) for Fiscal Year 2017

I. INTRODUCTION

Established in 1911 and located in Memphis, the University of Tennessee Health Science Center (UTHSC) is Tennessee's flagship public academic health system, with satellite campuses and residency programs in Knoxville, Nashville, and Chattanooga. For over a century, UTHSC has dedicated itself to bringing the benefits of the health sciences to the achievement and maintenance of the health of individuals as well as the health of the general population, with a focus on the citizens of Tennessee and the region it serves.

As a major employer and purchaser of goods and services, UTHSC contributes to the local communities in Memphis, West Tennessee, and beyond in another significant way: It contributes substantively to the economic well-being of the communities it serves by creating jobs, stimulating economic activities, and supporting public programs through tax revenues generated directly and indirectly by the economic benefits derived from the presence of UTHSC.

Purpose of Report

The purpose of this report is twofold:

1. to describe the "direct economic impact" of UTHSC as a purchaser of goods and services and a major employer of highly-educated and skilled workforces in the local economies where UTHSC's campuses are located, and
2. to estimate the "total economic impact" of UTHSC and summarize the economic contributions of UTHSC that include not only the direct contributions, but also the indirect and spill-over benefits that derive from the direct impact.

We will identify the direct economic benefits arising from the purchases of goods and services directly by UTHSC and its highly-educated and skilled employees who spend their earned wages and salaries in the local markets. We will also analyze the "multiplier effect" of how these direct impacts create additional spill-over benefits throughout the local economies as the initial dollars spent change hands from one person to another and from one industry to another.

The economic impacts estimated in this report include economic output (total sales) and the major individual components that comprise the total output of UTHSC and its affiliate organizations. Also included in the report are estimates of two additional important economic metrics of UTHSC's economic contributions. The first of these is the number of jobs supported by the money spent by UTHSC and its affiliates, their employees, and the patients and visitors who spend money in Memphis and other areas when they seek care at a UTHSC facility or affiliated clinic. The second includes the tax revenues collected by federal, state, and local taxing authorities that can be attributed to the educational and clinical activities associated with the presence of UTHSC to support government operations and public service programs such as education, public transportation, social and community services, and public safety programs.

II. METHODOLOGY AND STUDY

Design Data Sources

This impact report uses expenditure and employment data from various administrative sources to estimate the statewide economic impact of UTHSC and its affiliated organizations. These data were supplemented by relevant and publicly available data such as Consumer Price Index (CPI) data from the U.S. Department of Labor and hospital trends data from the Becker's Hospital CFO Report.

Most of the data were collected for fiscal year 2017 ending June 30, 2017. When data collected from an earlier period were used, they were adjusted to the FY2017 level by the medical care component of the CPI or, when appropriate, the estimated annual percentage increase in hospital expenditures reported by the Becker's Hospital CFO Report.

The IMPLAN Model

We estimated the economic impact of UTHSC using the IMPLAN Model initially developed by the U.S. Department of Interior and currently maintained by the Minnesota IMPLAN Group (MIG). The IMPLAN Model has been used by more than 500 universities, government agencies, and nonprofit organizations to estimate the economic and fiscal impacts of fresh investments and/or changes in economic activities.

We use a broad definition of economic impact; therefore, our analysis is not limited to the economic impacts of the main and satellite campuses of UTHSC. It also includes the economic impacts of affiliated organizations such as the many ambulatory care centers and physician practices fully or partially owned by UTHSC, and UTHSC's many community-based social services organizations and foundations that improve the well-being of residents in the communities they serve. Most important, this impact analysis includes the inpatient care revenues earned by local hospitals as a result of the ambulatory and sub-specialty services provided by UTHSC's clinical faculty. Though not earned explicitly by UTHSC, these enormous economic benefits would not have occurred without the patient-care services provided by UTHSC faculty to patients who are also treated by area hospitals.

As an input-output economic model, the IMPLAN Model reports three types of economic effects that comprise the total economic contributions that result from UTHSC's educational, clinical, and community-service activities:

- Direct effects, which are the initial changes in total economic output in the industry in question (e.g., in the health care markets and local communities served by UTHSC and its affiliates);
- Indirect effects, changes in inter-industry transactions when supplying industries (e.g., retail drug stores and nursing homes) respond to increased demands from the directly affected industries (the hospital inpatient care market); and
- Induced effects, which reflect changes in local spending that result from increases in business and individual incomes in the industries affected by the direct and indirect effects of UTHSC.

The first effect, or the direct effect, is derived from the total direct expenditures of UTHSC and its affiliates, their employees, and the patients and visitors who spend money in Memphis and other areas when they seek care at a UTHSC facility or affiliated clinic. This direct effect can be thought of as the economic "engine" that drives the total or overall economic impact. The second and third effects (i.e., the indirect and induced effects) are subsequent spill-over impacts that add to or "multiply" the direct economic impact of an initial increase in spending by UTHSC or one of its affiliates.

Impact Measures

To broaden the perspectives of how the contribution analysis is presented and to add greater detail to the analysis, UTHSC's economic contributions will be reported using three vital economic barometers estimated and reported by the IMPLAN Model:

1. **Total Output** – Output is the market value of total goods and services produced during a given period of time. It is the most inclusive measure of an economic activity. Following the design and logic of the IMPLAN Model, the total output estimated and reported in this study is measured and represented by the sum totals of the Direct Effect, Indirect Effect, and Induced Effect discussed in the previous section.
2. **Federal, State, and Local Tax Revenues** – These are federal, state, and local taxes collected by taxing authorities to support public programs as a result of the revenues created by the educational, clinical, and community-service activities of UTHSC and its affiliates.
3. **Jobs** – These are the number of jobs provided directly by UTHSC and its affiliates plus the additional jobs supported by the “multiplier effect” of upstream and downstream benefits of UTHSC's initial contributions.

III. MAJOR FINDINGS

This section presents the direct economic effects of UTHSC first, followed by additional presentations of a broad overview of the total economic impact as measured by, respectively, the dollar value of the total economic output produced, number of jobs supported, and tax revenues collected by federal, state, and local taxing authorities.

Direct Economic Impact of UTHSC

Table 1 summarizes the direct economic contributions of UTHSC and its affiliated organizations for FY2017 without taking into account the multiplier effects.

TABLE 1 - Total Economic Impact of UTHSC: Estimates of Federal, State, and Local Taxes Generated by Source of Tax Base, FY2017

	AMOUNT	AMOUNT	% OF TOTAL
1. University Operating Budget		\$513,032,877	23.9%
Tuition and Fees	\$84,880,471		
State Appropriations	\$229,395,628		
Reserve Funds	\$146,828,896		
Continuing Education Revenue	\$24,708,762		
Grants and Contracts	\$8,558,182		
Endowment Revenue	\$2,397,735		
Clinical Services	\$1,177,401		
Other Revenue	\$15,085,802		
2. University Capital Expenditures*		\$238,487,544	11.1%
3. Faculty Patient-Care Revenues		\$1,336,829,068	62.2%
Faculty Practice Plans	\$534,731,627		
Inpatient Care Revenues**	\$802,097,441		
4. Students, Families, Patients, and Visitors		\$60,156,529	2.8%
UTHSC TOTAL		\$2,148,506,018	100%

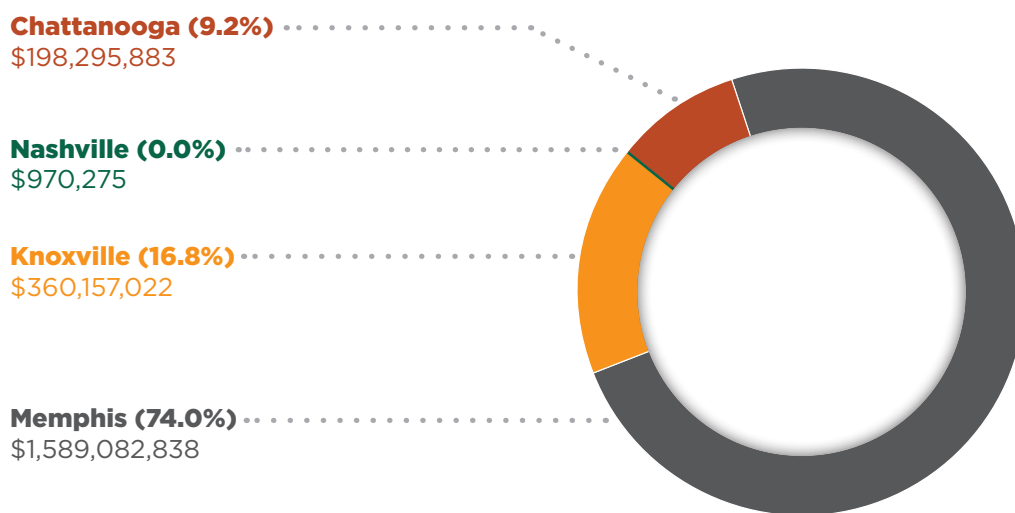
*These include capital outlays from previous years as capital projects typically last for multiple years.

**Inpatient care revenues were estimates of hospital revenues generated by the faculty practice plans.

- In FY2017, the total direct contribution of the four UTHSC campuses was \$2.2 billion dollars.
- Of this total, \$513.0 million (or 23.9% of total) was UTHSC's total operating revenue, and less than half of these operating funds (\$229.4 million) were state-appropriated (known locally as Orange Dollars).
- Capital outlays, at \$238.5 million, represent 11.1 percent of the total operating budget, while students, patients, and visitors added \$60.2 million (2.8% of total) to the total direct contribution of UTHSC for FY2017.
- In comparison, the largest share of the total direct economic contribution of UTHSC (more than \$1.3 billion or 62.2% of total) came from the patient-care activities of UTHSC's faculty practice plans and the inpatient care revenues earned by local hospitals as a result of the primary and sub-specialty care services provided by UTHSC's clinicians.

Along with the main campus in Memphis, UTHSC has satellite campuses and medical residency programs in three other major cities in Tennessee. Figure 1 shows the distribution of the total direct contribution of UTHSC among the four major cities.

FIGURE 1 - Direct Economic Contributions of UTHSC by Location, FY2017



- With \$1.6 billion, the Memphis campus accounted for the largest share (74.0% of total) of the total direct economic contribution for FY2017.
- Knoxville, Chattanooga, and Nashville, represented 16.8 percent, 9.2 percent, and less than 1.0 percent of the total direct contribution, respectively.

Estimates of Total Economic Impact

Table 2 summarizes the general findings of the total (overall) economic impact of UTHSC and its affiliated organizations on Tennessee for FY2017. This impact includes not only the “direct impact” of UTHSC reported in Table 1 and Figure 1 above, but also the indirect and induced effects that represent the multiplier effects of the additional economic contributions as a result of the initial direct contribution.

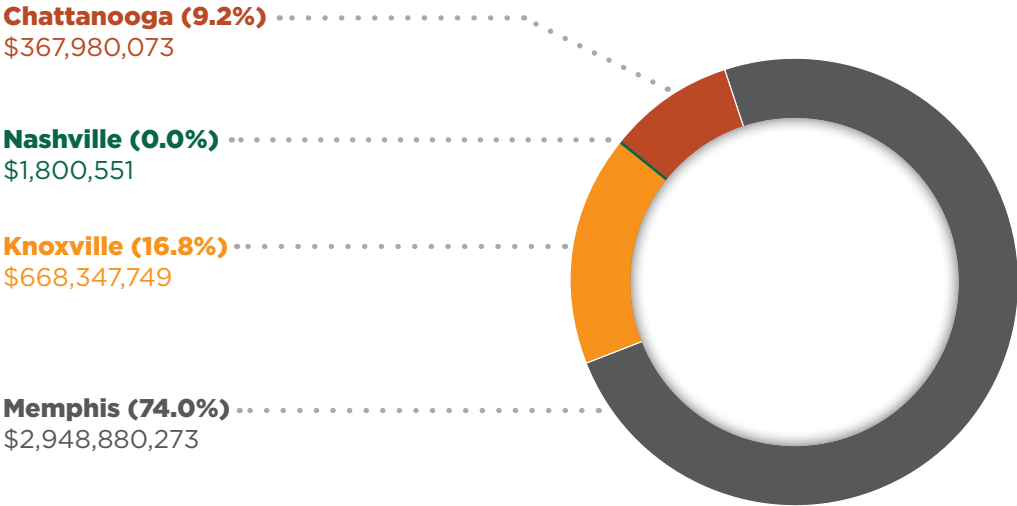
TABLE 2 - Total Economic Impact of University of Tennessee Health Science Center (UTHSC), FY2017

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% of UTHSC	35.0%	62.2%	2.8%	100.0%
Federal, State, and Local Tax Revenues	\$177,233,463	\$315,268,672	\$14,186,906	\$506,689,041
% of UTHSC	35.0%	62.2%	2.8%	100.0%
JOBS CREATED	11,310	20,118	905	32,333
% of UTHSC	35.0%	62.2%	2.8%	100.0%

- In terms of the market value of total output generated for the economy of Tennessee, the total economic impact of UTHSC was \$4.0 billion in FY2017.
- UTHSC’s total economic impact also generated \$506.7million of federal, state, and local tax revenues to support the operations of governments and their public service programs.
- In terms of job creation, UTHSC supported a total of 32,333 jobs in Tennessee in FY2017.
- UTHSC’s university operation was responsible for 35.0 percent (or \$1.4 billion) of the total economic impact, while the affiliated organizations, such as UTHSC- owned physician practices and other ambulatory care centers and clinics, contributed 62.2 percent (or \$2.5 billion) of the total. Students, patients, families, and visitors contributed the remaining 2.8 percent (\$111.6 million).

UTHSC has campuses and residency programs in four major cities across Tennessee. Figure 2 reports the distribution of the total economic impact of UTHSC by location.

FIGURE 2 - Distribution of Total Economic Impact of UTHSC by Location



- The total economic impact of UTHSC was concentrated primarily (74.0% of total) in the Memphis area where UTHSC’s main campus is located.
- The other three areas contributed 16.8 percent (Knoxville), 9.2 percent (Chattanooga), and less than 1.0 percent (Nashville) of the total economic impact for FY2017.
- Specifically, UTHSC generated approximately \$3.0 billion of total economic impact in the Memphis area and \$668.4 million, \$368.0 million, and \$1.8 million in Knoxville, Chattanooga, and Nashville, respectively.

Estimates of Direct, Indirect, and Induced Effects

As explained in the Methodology and Design section, the total economic impact of an economic activity in a local economy can be separated into three components: the direct effect, indirect effect, and induced effect. Table 3 presents estimates of these three separate layers of economic impact on the economy of Tennessee.

TABLE 3 - Total Economic Impact of UTHSC: Estimates of Total Economic Output Generated for Tennessee by Type of Impact Effect, FY2017

	SOURCES OF ECONOMIC IMPACT			UTHSC
	UNIVERSITY OPERATION - UTHSC	FACULTY PATIENT CARE ACTIVITIES	STUDENTS, FAMILIES, AND VISITORS	
Direct Effect	\$751,520,421	\$1,336,829,068	\$60,156,529	\$2,148,506,018
% of Total Impact	53.9%	53.9%	53.9%	53.9%
Indirect Effect	\$251,603,590	\$447,560,683	\$20,139,970	\$719,304,243
% of Total Impact	18.0%	18.0%	18.0%	18.0%
Induced Effect	\$391,481,539	\$696,380,146	\$31,336,701	\$1,119,198,385
% of Total Impact	28.1%	28.1%	28.1%	x 28.1%
TOTAL IMPACT	\$1,394,605,550	\$2,480,769,897	\$111,633,199	\$3,987,008,646
% of Total Impact	100.0%	100.0%	100.0%	100.0%

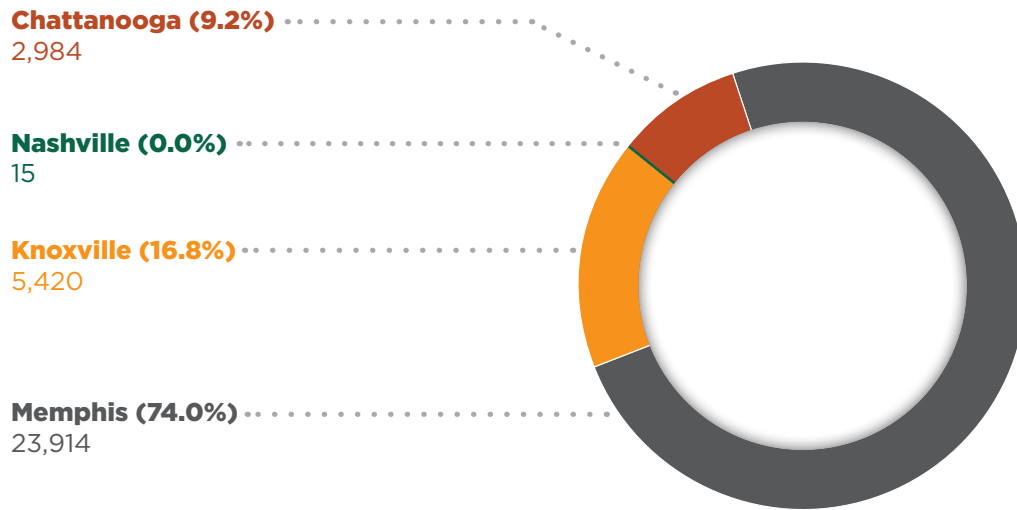
Specifically,

- The “direct effect” of UTHSC’s economic impact as measured by the market value of the total output produced in FY2017 was estimated to be \$2.2 billion (or 53.9% of total) for Tennessee.
- The “indirect effect” and “induced effect” were estimated to be \$719.3 million (18.0% of total) and \$1.1 billion (28.1% of total), respectively.

Estimates of Jobs Supported

Figure 3 shows the number of jobs supported for the four different locations where UTHSC campuses and facilities are located.

FIGURE 3 - Distribution of Jobs Supported by the Economic Impact of UTHSC by Location



- The educational activities of UTHSC and its many faculty practice affiliates were responsible for creating a total of 32,333 jobs for Tennessee in FY2017 as reported earlier in Table 2.
- Of this total, 23,914 jobs were generated in the Memphis area while 5,420, 2,984, and 15 jobs were generated in Knoxville, Chattanooga, and Nashville, respectively.

Estimates of Federal, State, and Local Tax Revenues

As a public institution of higher education, UTHSC and many of its nonprofit subsidiaries are exempted from federal income and excise taxes and local sales and property taxes. However, the unrelated businesses of UTHSC and its affiliates are not tax exempt. Neither are employees of a university nor a charitable, nonprofit organization exempt from paying income taxes or state and local taxes such as sales tax and property tax. In addition to these federal, state, and local taxes paid directly by UTHSC and its employees, the indirect and induced effects of UTHSC's economic impact generate additional federal, state, and local tax revenues when the affected industries and businesses pay their taxes. Table 4 presents our estimates of total federal, state, and local tax revenues that could be attributed to the presence of UTHSC and its affiliates in Tennessee and the four major cities where UTHSC is located.

TABLE 4 - Total Economic Impact of UTHSC: Estimates of Federal, State and Local Tax Revenues Generated for Tennessee, FY2017

	MEMPHIS	KNOXVILLE	NASHVILLE	CHATTANOOGA	TOTAL TAXES
Federal Tax Revenues	\$265,267,329	\$60,121,404	\$161,969	\$33,101,748	\$358,652,450
% of Total Tax Revenues					70.8%
State and local Tax Revenues	\$109,491,155	\$24,815,578	\$66,854	\$13,663,004	\$148,036,591
% of Total Tax Revenues					29.2%
TOTAL TAX REVENUES	\$374,758,484	\$84,936,982	\$228,823	\$46,764,752	\$506,689,041
% of Total Tax Revenues					100.0%

- Directly and indirectly, UTHSC's medical training, patient-care, and community-service activities contributed more than \$506.7 million of federal, state, and local taxes in FY2017.
- Of this total, \$358.7 million (70.8% of total taxes) was federal tax revenues, while approximately \$148.0 million (29.2% of total) was state and local tax revenues.
- Taxing authorities collected the largest share of total tax revenues (\$374.8 million or 74.0% of total taxes) in the Memphis area, followed by \$84.9 million in Knoxville, \$46.8 million in Chattanooga, and \$228,823 in Nashville.

Another way to examine the tax contributions of UTHSC is to examine the sources (tax bases) of federal, state, and local taxes collected as a result of the presence of UTHSC and its affiliates. Table 5 presents federal, state, and local tax revenues according to these major sources.

TABLE 5 - Total Economic Impact of UTHSC: Estimates of Federal, State, and Local Taxes
Generated by Source of Tax Base, FY2017

SOURCE	FEDERAL TAXES	PERCENT	STATE AND LOCAL TAXES	PERCENT	TOTAL TAXES	PERCENT
Employee Compensation	\$179,235,815	50.0%	\$1,934,505	1.3%	\$181,170,320	35.8%
Proprietor Income	\$6,350,408	1.8%	-	-	\$6,350,408	1.3%
Production and Imports	\$17,960,736	5.0%	\$128,177,199	86.6%	\$146,137,935	28.8%
Households	\$114,275,901	31.9%	\$9,143,447	6.2%	\$123,419,348	24.4%
Corporations	\$40,829,590	11.4%	\$8,781,440	5.9%	\$49,611,030	9.8%
ALL SOURCES	\$358,652,450	100.0%	\$148,036,591	100.0%	\$506,689,041	100.0%

- For federal tax revenues generated by the presence of UTHSC, the two largest sources of taxes — employee compensation and individual households — accounted for approximately 81.9 percent of total federal taxes collected in FY2017.
- The single largest source of state and local taxes was production and imports, accounting for 86.6% of the total state and local taxes collected in FY2017.

The Top Ten Affected Industries

Table 6 presents the ten industries that benefited the most from the presence of UTHSC and its many affiliated patient-care and community-service affiliates. Specifically,

- The top ten most affected businesses include such major industries as other institutions of higher education located in the same area, real estate owners and firms, hospitals, physician offices, full-service and limited-service restaurants, wholesale trade establishments, and local government enterprises.
- The distribution of the economic impact of UTHSC was uneven among the various industries, with the top ten affected industries receiving 73.9 percent of the total economic impact.

TABLE 6 - Top 10 Industries Affected by UTHSC’s Economic Impact, FY2017

AFFECTED INDUSTRIES	TOTAL OUTPUT
1. Other Institutions of Higher Education	\$2,159,295,323
2. Real Estate	\$281,707,106
3. Owner-occupied Dwellings	\$133,684,215
4. Wholesale Trade	\$77,087,290
5. Hospitals	\$70,649,099
6. Other Local Government Enterprises	\$69,521,985
7. Limited-service Restaurants	\$42,593,189
8. Wireless Telecommunications Carriers	\$41,828,075
9. Offices of Physicians	\$38,057,425
10. Full-service Restaurants	\$33,028,024
TOP 10 TOTAL	\$2,947,451,730
TOTAL IMPACT OF UTHSC	\$3,987,008,646
TO 10 AS % OF TOTAL	73.9%

IV. CONCLUSION

This report applied the IMPLAN Input-Output Economic Impact Model to financial and other administrative data to estimate the economic impact of the University of Tennessee Health Science Center. Health care and medical education have frequently been described as the engine that drives the local economy in many major cities and urban centers across the United States. The impact results presented in this report add weight to this claim, and UTHSC is a major component of that economic engine that drives the state and local economies in Tennessee.

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