

THE ECONOMIC IMPACT OF MUSC 2024



musc
Shawn
Jenkins
Children's
Hospital



MUSC
Medical University
of South Carolina



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EXECUTIVE SUMMARY

Since its founding in 1824, the Medical University of South Carolina (MUSC) has become a major economic driver for the state of South Carolina. Focusing on education, research and patient care, MUSC is the state's only comprehensive academic health system, which supports a direct employment base of more than 23,000 and an extensive in-state supply chain network that generates sizable economic ripple effects across many industries. In addition, MUSC plays a key role in educating future health care providers, supporting the health care needs of the community and driving cutting-edge innovation and research. With South Carolina projected to experience among the highest population growth rates over the next decade, the demand for health care will continue to rise. As such, MUSC will play an increasingly critical role in the economic and physical health of South Carolina in the coming years. The purpose of this study is to quantify these benefits specifically.

The key findings are as follows:

- The total annual economic impact of MUSC on South Carolina is approximately \$10.1 billion. This figure reflects the dollar value representing all final goods and services produced in the state that can be attributed, directly or indirectly, to MUSC. This level of economic activity also supports more than 52,000 jobs each year. Few organizations have an economic impact of this magnitude on South Carolina's economy.

- The majority of MUSC's statewide impact occurs within the Charleston Tri-county region, where MUSC maintains an annual economic impact of approximately \$7.5 billion. This corresponds to 38,380 jobs and more than \$2.8 billion in labor income that would not exist in the Tri-county region otherwise. The Medical University itself, including its six colleges and associated research endeavors, contribute about 27% of this impact – or roughly \$2.0 billion annually.

- MUSC's total economic impact also facilitates an employment multiplier of 2.2. For every 10 jobs created by MUSC, another 12 jobs, on average, are created elsewhere in South Carolina. This multiplier effect, which is normal for the health care industry, is significantly higher than that of the average industry in South Carolina.

- The combination of MUSC's large employment base combined with an employment multiplier that is higher than that of the average industry makes MUSC a powerful economic engine for the Charleston economy. MUSC supports approximately 11% of the total employment base in Charleston and 45% of Charleston's health care industry. In addition, MUSC's expansion efforts in recent years have helped to drive the strong economic growth that Charleston has experienced – and which have been the highest growth rates among all South Carolina regions for much of the last decade.

EXECUTIVE SUMMARY

- In addition to its impact in the Charleston Tri-county region, MUSC also maintains a large Regional Health Network (RHN) that includes RHN facilities located in Florence, Lancaster, the Midlands and Orangeburg. The MUSC RHN facilities in the Midlands and in Orangeburg specifically represents the recent acquisition of multiple community hospitals, which has both increased the number of employees working for MUSC by nearly 20% since 2021 and increased the capacity of the entire MUSC Health network.

- As a premier health organization focused on education, research and patient care, a sizable majority of MUSC's employment base encompasses highly skilled, highly educated health professionals that are an integral part of the state's knowledge economy. As a result, the average wage across all jobs created directly by MUSC is \$92,408, which is about 67% higher than that of the average job in South Carolina.

- The net annual contribution that MUSC makes to the South Carolina gross state product is approximately \$5.3 billion. This implies that MUSC generates economic activity, directly and indirectly, which brings in about \$237.3 million in tax revenue annually for the state of South Carolina.

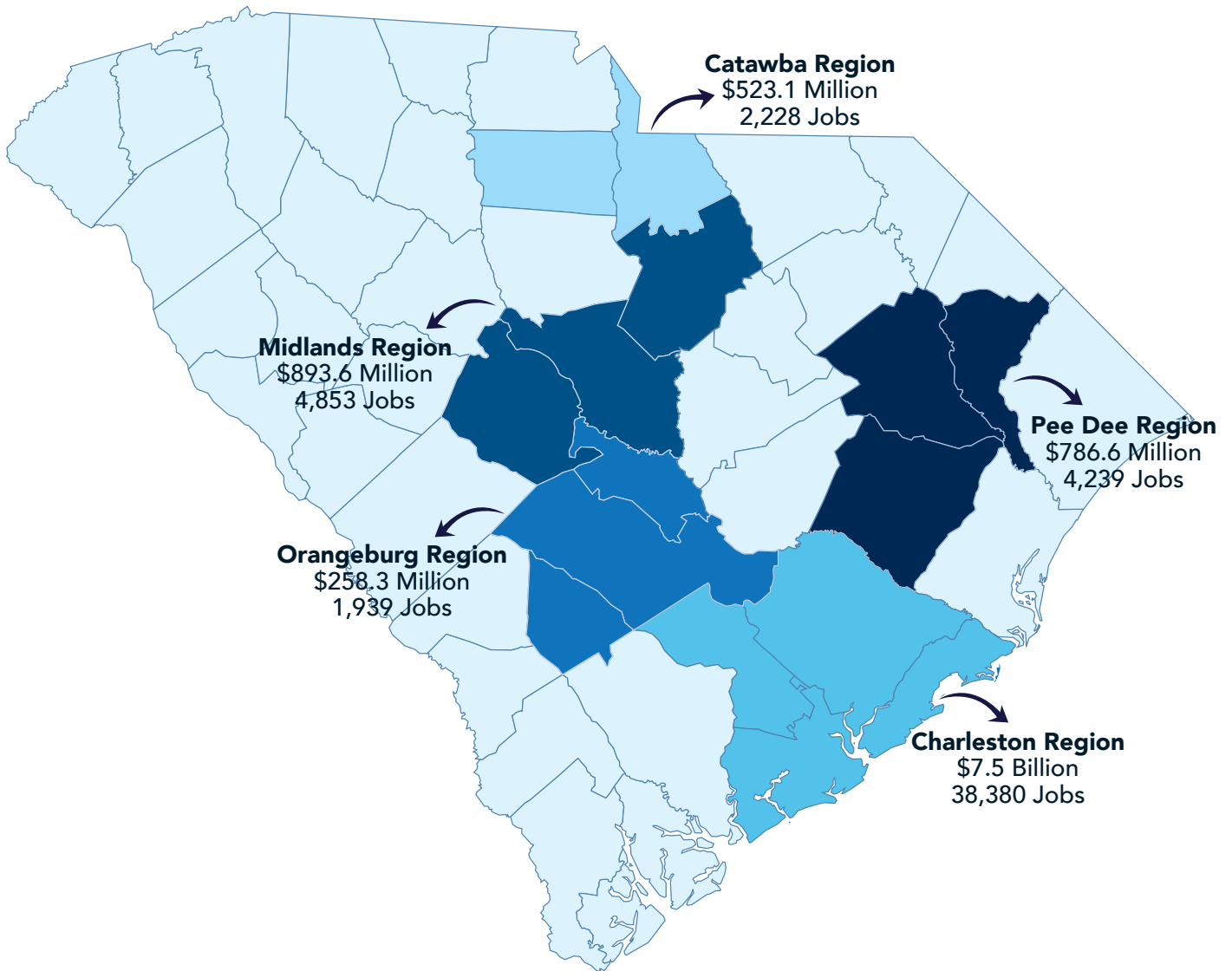
- MUSC has a strong record of matching students with in-state employers. The Medical University ranks 1st among South Carolina's research universities in retaining high-skilled graduates and is the only in-state research university in which the majority of its students remain in South Carolina to work for at least five years after graduation. Given that both South Carolina and the United States face a significant labor shortage that is likely to persist throughout the 2020's, such talent retention is an especially important and unique component of MUSC's contribution to South Carolina's economy.

- The demand for health care has been steadily rising in South Carolina throughout the 21st century, increasing from a 4.9% share of the state's economy in 2000 to 6.8% by 2022. This implies that the importance of the availability of high-quality medical care, like that provided by MUSC Health, will increase in the coming years. In anticipation of this growing demand, MUSC is developing expansion plans that will increase its statewide economic footprint by more than 32% over the next four years. This would increase MUSC's statewide economic impact from \$10.1 billion to more than \$13.4 billion annually by the year 2027.

- Between hospital care, emergency room visits and physician office visits, MUSC serves residents from every county in the state. Nearly half of its 2.4 million patient encounters each year occur in the Charleston region and the remainder occur in the RHN. Moreover, the highest intensity of usage of the MUSC RHN is in South Carolina's smaller, rural counties, which highlights the acute need for medical care in these regions, which MUSC is able to provide. For example, in 2022 MUSC served nearly 49% of the Marion County population base, higher than in any other county. This was followed by Kershaw (43%), Fairfield (35%) and Williamsburg (29%).

- High quality and timely medical care not only enhance health but also yield substantial cost savings for patients, the health care system, and the state of South Carolina. MUSC plays a pivotal role in improving access and care quality for South Carolinians; a prime example is the MUSC telestroke program that began in 2008. In collaboration with the SC Telehealth Alliance (SCTA), this initiative delivers remote acute consultations and treatment recommendations for suspected stroke patients in 37 rural and community hospitals throughout South Carolina. The program's impact is noteworthy: it is estimated to save approximately \$26 million annually through early intervention and improved outcomes.

The Economic Impact of MUSC SOUTH CAROLINA



Total Impact on South Carolina:

\$10.1 Billion

Total Employment:
52,698

Total Labor Income:
\$3.7 BILLION

Section I

Introduction

Since its founding in 1824, the Medical University of South Carolina (MUSC) has become a major economic driver for the state of South Carolina. Focusing on education, research and patient care, MUSC is the state's only comprehensive academic health system, educating and training more than 4,100 students and residents across six colleges. Comprising some 2,700 beds, more than 350 telehealth sites and nearly 750 care locations, MUSC Health owns and operates 16 hospitals and provides care in all 46 counties of South Carolina. The more than 23,000 MUSC team members include world-class faculty, physicians, specialty providers and scientists who deliver groundbreaking education, research, technology and patient care.

As South Carolina's No. 1 ranked hospital by U.S. News & World Report, MUSC's impact results not only from its large workforce and student/resident base but also through the economic activity that emerges from the extensive supply chain network that MUSC supports throughout South Carolina. This generates sizable economic ripple effects across many industries, including additional indirect job creation that supports higher incomes for state residents and a substantial increase in overall economic activity. Because of its ongoing growth and expansion, MUSC serves as one of the primary anchors for South Carolina's economy.

In addition, MUSC provides significant contributions to the state's knowledge economy, defined as the set of industrial sectors engaged in innovation and the commercialization of new ideas. For example, highly specialized medical professionals working at MUSC often combine the creative skills necessary for research and innovation with the practical applications of patient care. The intellectual talent required for jobs in these fields is highly sought-after across the world. Regions with high concentrations of professionals working in the knowledge economy generate enormous human capital resources and knowledge spillover effects. Moreover, regions in the U.S. with a large knowledge economy have typically grown at the fastest rates throughout the 21st century.

Yet the impact of MUSC goes beyond economics. MUSC's footprint in South Carolina is unique in that it offers both economic and social benefits throughout the state in ways that most other organizations do not. MUSC not only supports a sizable volume of economic activity as a major employer that invests heavily in the local communities in which it operates, but it also provides medical care, educates future health care workers, invests in the latest cutting-edge medical research initiatives that save lives and engages in significant philanthropic efforts. Thus, MUSC is one of the few organizations that improves the quality of life for its communities on multiple levels – enhancing both the health of the local economy and that of local residents. In recent years, MUSC has further increased its statewide footprint through multiple hospital expansions, which allows MUSC to reach traditionally underserved and rural communities more effectively.

The purpose of this study is to quantify both the economic and social impacts of MUSC on the state of South Carolina and on five specific regions: Charleston, Catawba, the Midlands, the Pee Dee and Orangeburg.¹

¹ In this study, the Charleston region is defined as the counties of Berkeley, Charleston, and Dorchester. The Catawba region is defined as the counties of Lancaster and Chester. The Midlands region is defined as the counties of Kershaw, Lexington and Richland. The Pee Dee region is defined as the counties of Florence, Marion and Williamsburg. The Orangeburg region is defined as the counties of Orangeburg, Calhoun and Bamberg.

Section II

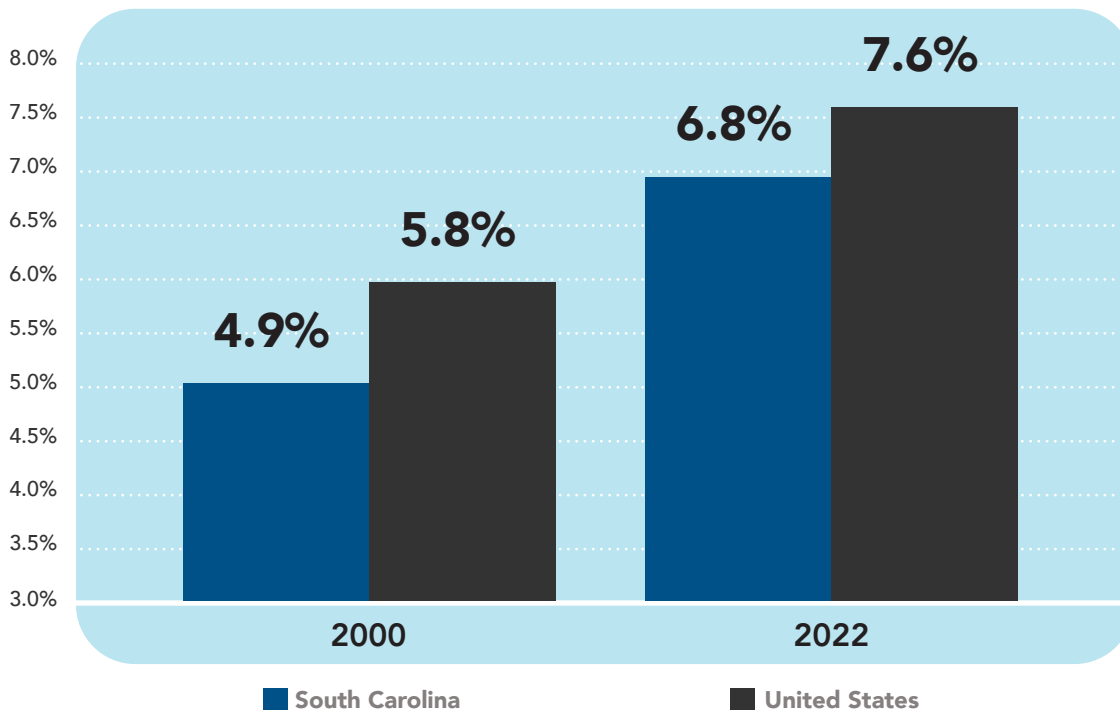
An Overview of the Health Care Industry in South Carolina

Increases in demand in the 21st Century

Health care is one of the largest industries in the economy both at the state and national levels. In South Carolina, for example, health care is a \$17 billion industry that currently accounts for approximately 6.8% of the state's economy. At the national level, health care is an even larger presence with a 7.6% share of the U.S. economy. Further, health care has been steadily rising as a share of state and national economies throughout the 21st century. **Figure 1** specifically highlights this increase. Note that these percentages reflect real (inflation-adjusted) gross domestic product (GDP). This implies that the observed increases are the result of a steady increase in demand for health care-related services.

Figure 1 – Health Care as a Percentage of the S.C. and U.S. Economies

Source: U.S. Bureau of Economic Analysis

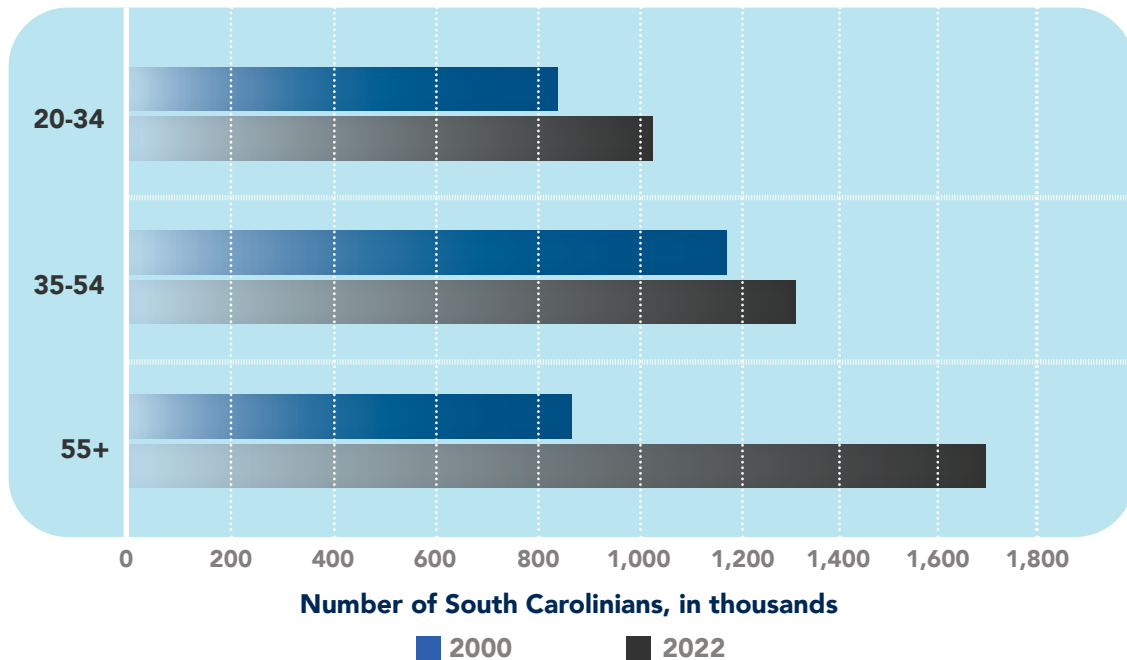


Section II - An Overview of the Health care Industry in South Carolina —

The increase in health care demand across South Carolina has been due primarily to two factors: (1) the aging of South Carolina's population base and (2) the increasing size of the state's population base. South Carolina's aging population is part of a broader national demographic trend toward an older population and the accompanying retirement of the baby-boomer generation. As **Figure 2** illustrates, the number of South Carolinians ages 55 and older increased by approximately 845,000 from 2000 to 2022, and this age group now represents 16% of the total population. To put this increase into perspective, consider that the number of South Carolinians between 20 and 54 increased by just 295,000 over the same period. This implies that **the number of South Carolina residents ages 55 and above is increasing nearly three times faster than the number of residents between 20 and 54**. An older population base generally requires added health care services and thus increases the demand for local health care providers.

Figure 2 – Age Distribution of South Carolina Population

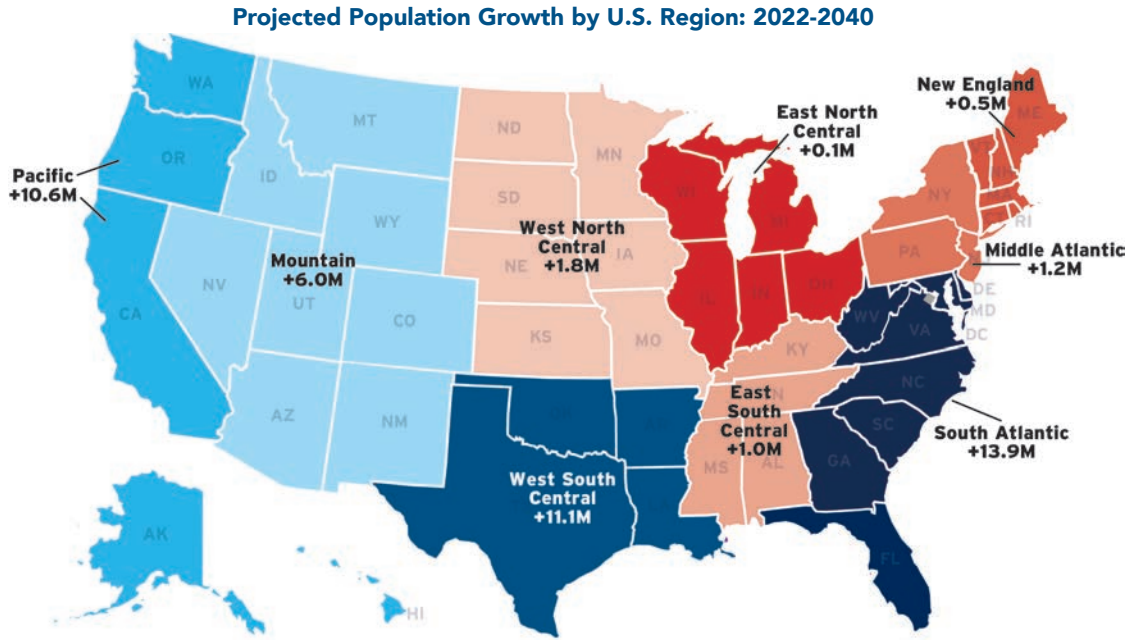
Source: U.S. Census Bureau



In addition, following the onset of the COVID-19 pandemic in February 2020, there has been a major shift in national migration patterns in which more people are relocating to the Southeastern United States. More specifically, through the year 2040, this region is projected to experience more population growth than any other U.S. region, with gains especially concentrated in the South Atlantic region. Moreover, South Carolina's rate of population growth has accelerated faster than any other state since February 2020. These trends are summarized in **Figure 3**. As with an older population base, a larger population base also leads to a rise in the demand for health care.

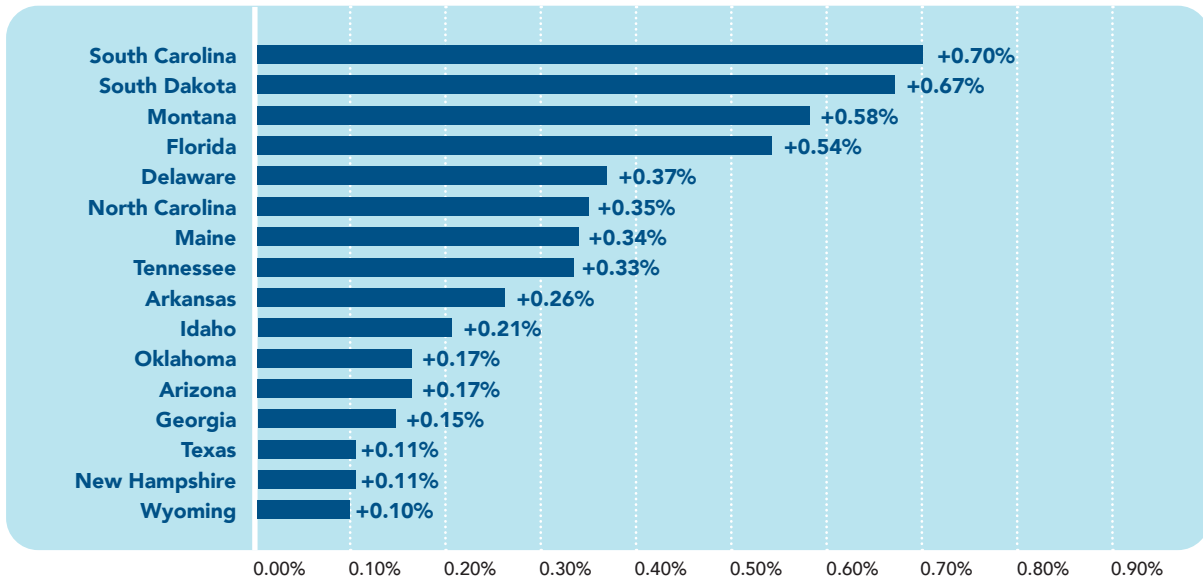
— Section II - An Overview of the Health care Industry in South Carolina

Figure 3 – Population Growth Trends in the United States



Change in Population Growth Rate: 2022 vs. 2019

Note: Only states with positive changes in their growth rates are listed

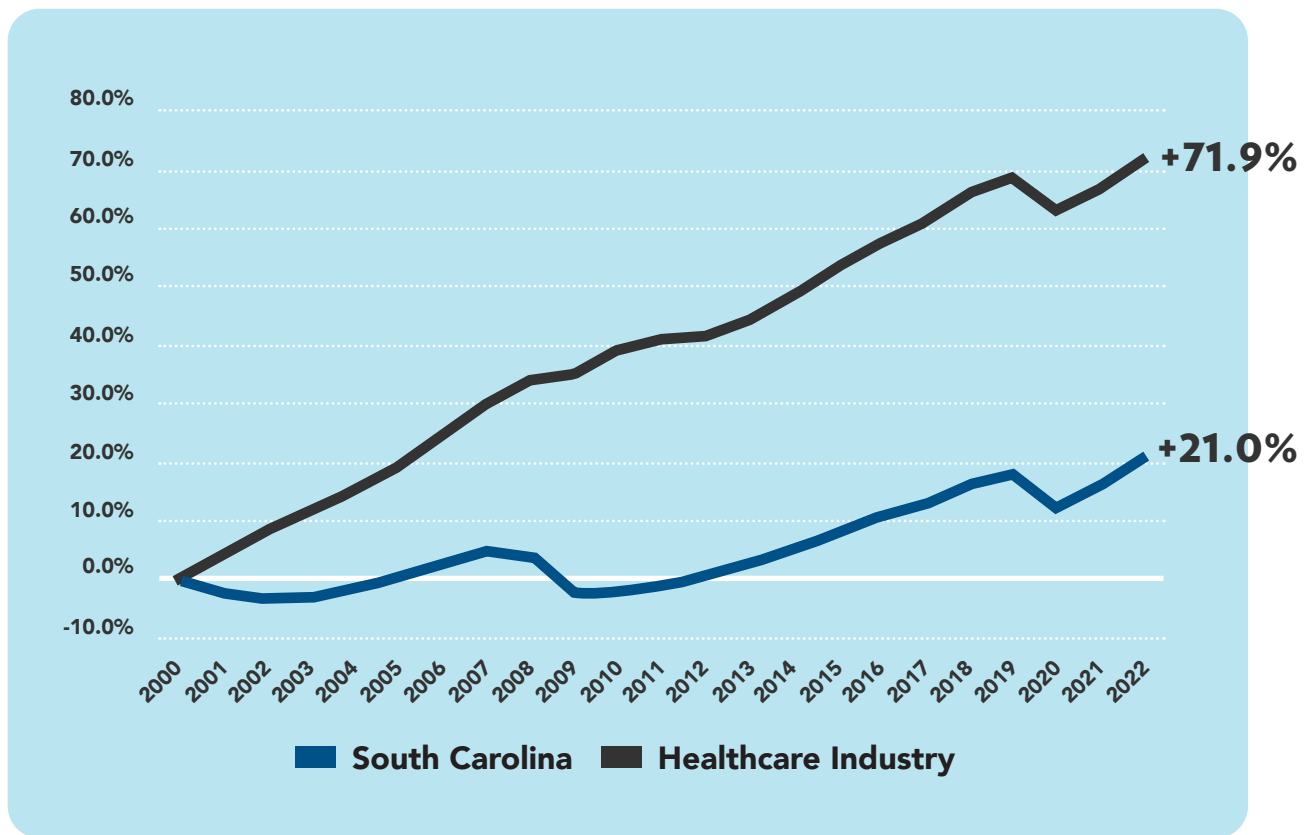


A Workforce Profile of the South Carolina Health Care Industry

The increase in demand for health care-related services in South Carolina has also led to an accompanying increase in demand for health care workers across a variety of occupations. **Figure 4** illustrates the extent to which overall employment growth in the health care industry has consistently outpaced that of South Carolina. This increase is significant and accompanies the broader statewide population changes. Total growth in health care employment between 2000 and 2022 increased more than three times faster than the state’s employment base overall (+71.9% vs. +21.0%).

Figure 4 – South Carolina Cumulative Employment Growth Since 2000

Source: U.S. Bureau of Labor Statistics, CES



Further, health care-related occupations are projected to have some of the highest growth rates through the year 2030. It is striking that while health care-related occupations represent roughly 9.8% of the state’s workforce, they represent one-third of the top 30 occupations projected to grow at the fastest rates through the year 2030, as shown in **Table 1**. In addition, a majority of these fast-growing health care occupations pay wages that are significantly above the average for South Carolina.

Table 1 – Top 30 South Carolina Occupations by Projected Growth Rate: 2020-2030

***Denotes health care-related occupations

Occupation Description	Avg. Annual Growth Rate	Avg. Annual Wage
Ushers, Lobby Attendants, and Ticket Takers	5.2%	\$23,670
Nurse Practitioners***	4.5%	\$109,130
Cooks, Restaurant	4.1%	\$30,900
Physician Assistants***	3.3%	\$106,200
Information Security Analysts	3.3%	\$102,270
Logisticians	3.2%	\$73,540
Medical and Health Services Managers***	3.1%	\$114,970
Physical Therapist Assistants***	3.0%	\$63,330
Musicians and Singers	3.0%	\$55,254
Medical Assistants***	3.0%	\$43,050
Speech-Language Pathologists***	3.0%	\$79,800
Nonfarm Animal Caretakers	2.9%	\$28,040
Fitness Trainers and Aerobics Instructors	2.8%	\$37,650
Home Health and Personal Care Aides***	2.8%	\$25,730
Bartenders	2.8%	\$24,630
Operations Research Analysts	2.8%	\$83,380
Skincare Specialists	2.7%	\$32,970
Baggage Porters and Bellhops	2.7%	\$24,220
Software Developers and Software Quality Assurance Analysts and Testers	2.7%	\$105,360
Manicurists and Pedicurists	2.7%	\$28,590
Industrial Machinery Mechanics	2.7%	\$56,250
Market Research Analysts and Marketing Specialists	2.5%	\$67,670
Phlebotomists***	2.5%	\$36,860
Self-Enrichment Education Teachers	2.5%	\$42,750
Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	2.4%	\$25,430
Health Specialties Teachers, Postsecondary***	2.4%	\$81,760
Amusement and Recreation Attendants	2.4%	\$23,600
Chefs and Head Cooks	2.3%	\$53,970
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	2.3%	\$23,390
Physical Therapist Aides***	2.3%	\$30,830
Average Across All Occupations	1.1%	\$55,254

Given the current and projected growth trends for health care demand in South Carolina, the importance of MUSC will continue to grow in the coming years – both as a major economic driver as well as one of the primary health care providers servicing the local and statewide population.

Section III

Economic Impact Methodology

As a comprehensive academic health system and leading medical institution, MUSC employs a large workforce and supports an extensive supply chain network throughout the local regions in which it is located and across the state of South Carolina in order to facilitate its ongoing operations. The purchases made by MUSC through various expenditures with local businesses and through wages and salaries paid to employees introduce new spending activity to the local regions and to South Carolina that would not exist otherwise. As a result, the presence of MUSC provides a stable base of activity that also helps contribute to long-run economic growth.

Yet these activities do not provide a complete picture of the impact of MUSC to the economy. The expenditures that occur as part of the ongoing operations of MUSC represent direct economic activity within the regions where they are made. However, these expenditures also lead to additional job creation and economic activity throughout the local area by way of the economic multiplier effect (or economic ripple effect).

Economic multiplier effects can be divided into direct, indirect and induced impacts. The direct effect represents any initial change in economic activity. This would include, for example, the dollars that MUSC injects directly into a local region that are associated with operational expenses. This would include any employee wages and benefits, medical devices or equipment, office supplies or other overhead and administrative costs. This spending increases demand for goods and services and leads to the creation of new jobs and more income for employees and suppliers of MUSC.

The indirect effect reflects all of the additional economic impacts resulting from inter-industry linkages between other local businesses in the region. For example, consider a medical equipment purchase that is made by MUSC for an on-campus lab. In this situation, the medical equipment provider would, as a result of MUSC's purchase, experience an increase in demand. This would require this medical equipment provider to purchase additional raw materials to accommodate the new increase in demand and, potentially, to hire additional employees if the increase in demand were sufficiently high. The vendors of the medical equipment providers would then experience an increase in demand and have to purchase additional inputs as well, and so on. These indirect effects would thus ripple across the economy of South Carolina.

The induced effect reflects additional economic activity that results from increases in the spending of household income. For example, when the aforementioned medical equipment provider hires new workers to satisfy an increase in demand, these workers will earn incomes. They will then spend part of this new income locally on, for example, food, entertainment or housing. These industries will then see an increase in demand for their goods and services, which will lead to higher incomes for some of their employees, part of which will also be spent locally.



These successive rounds of indirect and induced spending do not go on indefinitely, which is why a specific value can be calculated for each of them. In each round, money is “leaked out” for a variety of reasons. For example, firms may purchase some of their supplies from vendors located outside of the local region. In addition, employees may save part of their income or spend part of it with firms located elsewhere. In order to determine the total economic impact that will result from an initial direct impact, economic multipliers are used. An economic multiplier can be used to determine the total impact (the sum of direct, indirect and induced) that results from an initial change in economic activity (the direct impact). Multipliers are different in each sector of the economy and are largely determined by the size of the local supplier network as well as the particular region being examined. In addition, economic multipliers are available to calculate not just the total impact but also the total employment and income levels associated with the total impact.

To estimate the economic impacts in this study, a detailed structural model (known as an input-output model) of the South Carolina economy was used, which contains specific information on economic linkages between different industries at the county level. The input-output modeling software IMPLAN was utilized in combination with other customized regional forecasting models that were developed. This allowed for the inclusion of additional local data, industry knowledge and ongoing economic growth trends.

Section IV

The Economic Impact of MUSC

The Economic Impact of MUSC on South Carolina

MUSC generates a significant economic footprint that extends across all of South Carolina’s 46 counties. In order to complete a comprehensive assessment of MUSC’s total economic impact, for the purposes of this report MUSC is divided into six separate segments:

- MUSC Health—University Health Network (UHN)—Charleston
- The Medical University
- MUSC Regional Health Network (RHN) – Florence (“Pee Dee”)
- MUSC Regional Health Network (RHN) – Lancaster (“Catawba”)
- MUSC Regional Health Network (RHN) – Midlands
- MUSC Regional Health Network (RHN) – Orangeburg

Table 2 highlights the 14 counties in which the MUSC facilities associated with each segment are located.

Table 2 – Counties in which MUSC Maintains a Direct Presence

MUSC Segment	Direct FTE Employment	South Carolina Counties
MUSC Health	10,658	Berkeley, Charleston, Dorchester
Medical University	6,003	Berkeley, Charleston, Dorchester
RHN Florence	2,173	Florence, Marion, Williamsburg
RHN Lancaster	1,251	Lancaster, Chester
RHN Midlands	2,273	Lexington, Richland, Kershaw
RHN Orangeburg	1,247	Orangeburg, Calhoun, Bamberg

MUSC currently maintains an annual operating budget of more than \$5.3 billion. This level of economic activity not only represents the employment of a workforce of 23,605 FTEs but also supports a large volume of non-labor expenditures, including capital equipment purchases, professional services, construction/remodeling efforts, temporary employees and other general operating expenses.² Many of these non-labor expenditures occur within the 14 counties in which the MUSC facilities are located as denoted in **Table 2**.

² FTE refers to the number of “full-time equivalent” employees.

Section IV - The Economic Impact of MUSC

The structural input-output models estimate economic impacts in terms of three specific measures: economic output, employment, and labor income. Economic output is defined as the dollar value of the final goods and services purchased that can be attributed (directly or indirectly) to all ongoing operations associated with MUSC. It can also be thought of as an aggregate measure of total spending resulting from an initial direct expenditure. Because it includes all spending by consumers and businesses on both goods and services, it is an all-inclusive measure of the impact on total economic activity. Employment measures the impact on jobs in terms of the total number of FTE positions. Labor income represents total employee compensation, including wages, salaries and benefits.

As described above, MUSC employs 23,605 FTE employees with an accompanying \$5.3 billion annual operating budget across all facilities in South Carolina. These direct economic impacts also lead to indirect and induced impacts through increases in demand for goods and services in other related industries and through increases in household spending activity – all of which are estimated using economic multipliers. Each impact is reported in **Table 3**, along with the accompanying totals. These totals represent the overall impact of MUSC on the state of South Carolina.

Table 3 – Economic Impact of MUSC on South Carolina

	Employment	Labor Income	Economic Output
Direct Impact	23,605	\$2,181,301,200	\$5,341,579,487
Indirect Impact	15,776	\$874,352,546	\$2,599,080,743
Induced Impact	13,317	\$650,127,012	\$2,198,139,769
Total Impact	52,698	\$3,705,780,758	\$10,138,799,999





The 23,605 FTE employees that live and work in South Carolina, along with all associated non-labor expenditures, generate approximately \$5.3 billion in annual economic output. This level of direct economic activity leads to indirect effects totaling approximately \$2.6 billion in economic output and 15,776 jobs. These estimates reflect the increased demand for goods and services of local suppliers resulting from in-state expenditures on the part of MUSC. The direct economic activity also leads to induced effects totaling another \$2.2 billion in economic output and 13,317 jobs. This is a reflection of economic activity in South Carolina generated across all industries that is the result of increased household spending. The combination of the direct, indirect, and induced effects leads to a total economic impact of approximately \$10.1 billion, which is associated with 52,698 jobs across South Carolina.

One primary takeaway from the results of **Table 3** is to note the sheer volume of economic activity that MUSC supports as one of the state's largest employers. Additionally, **Table 3** also reveals that MUSC's total impact is associated with a statewide employment multiplier of 2.2. This implies that for every 10 jobs that are supported directly by MUSC, an additional 12 jobs are created elsewhere in South Carolina. This multiplier effect, which is normal for the health care industry, is significantly higher than that of the average industry in South Carolina.³ This combination of a large direct employment base accompanied by an employment multiplier above that of the average industry makes MUSC a powerful economic engine in South Carolina. MUSC supports \$10.1 billion in annual economic activity and more than 52,000 jobs each year. Few organizations have an economic impact of this magnitude on South Carolina's economy.

³ The average employment multiplier across all industries in South Carolina is 1.7.

Economic Contributions to State Tax Revenue

Another major impact of MUSC comes from the increase in state tax revenue that results from the economic activity it supports. As summarized in **Table 3**, the total economic impact of MUSC on the state of South Carolina approximates \$10.1 billion annually.

Historically, every additional dollar that is generated in economic activity (i.e., nominal gross state product) within South Carolina also generates 4.5 cents in new state tax revenue.⁴ By applying this figure to the economic activity generated by MUSC, the tax revenue from this total volume of activity can be estimated.⁵ **Table 4** displays these results, which show that the annual total estimated tax revenue that arises from MUSC is approximately \$237.3 million.

Table 4 – Annual state tax revenue derived from MUSC

Category	Dollar Value
Estimated Economic Output for South Carolina	\$10,138,799,999
Estimated Tax Revenue Generated for South Carolina	\$237,337,265

The Economic Impact of MUSC on Charleston

The majority of MUSC's \$10.1 billion economic impact on South Carolina is concentrated within the Charleston Tri-county region. MUSC Health and University Hospital includes world class research and education facilities, a 790-bed medical center, a nationally recognized children's hospital with an 82-bed neonatal intensive care unit (NICU), the NCI-designated Hollings Cancer Center, a Level 1 trauma center, the Institute of Psychiatry, and South Carolina's only transplant center. **Table 5** documents the total economic impact of MUSC, including MUSC Health and the Medical University, on the Charleston Tri-county region while **Tables 6 and 7** break down each segment separately.

⁴ The historical relationship between South Carolina nominal gross state product and the South Carolina general funds revenue (as measured and tracked by the South Carolina Board of Economic Advisors) was estimated by the Division of Research using industry-standard time-series regression techniques.

⁵ Economic output represents the value of industry production and is therefore not synonymous with gross state product. As such, the dollar value of all intermediate inputs was subtracted from economic output before the 4.5-cent estimate was applied to estimate total tax revenue.

Section IV - The Economic Impact of MUSC

Table 5 – Economic Impact of the MUSC Enterprise on the Charleston Tri-County Region

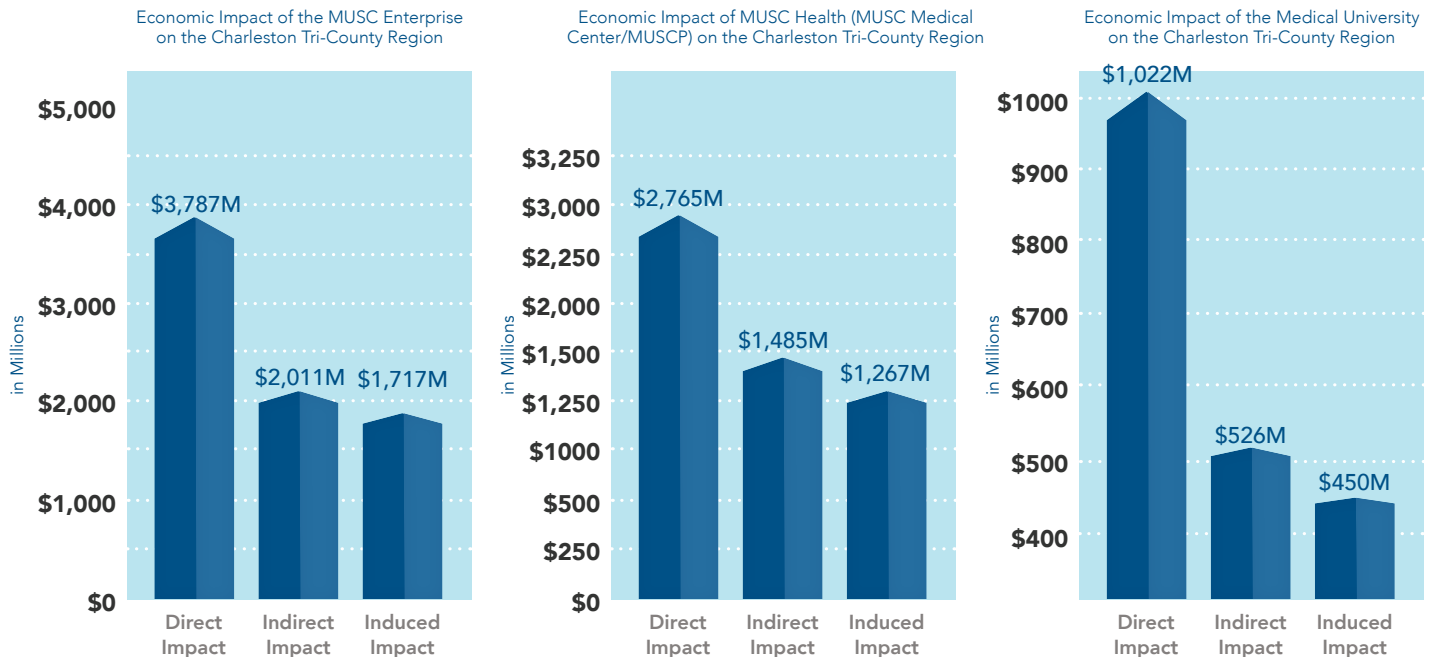
	Employment	Labor Income	Economic Output
Direct Impact	16,661	\$1,585,107,544	\$3,786,766,924
Indirect Impact	11,904	\$681,836,712	\$2,010,880,289
Induced Impact	9,815	\$543,401,291	\$1,716,767,108
Total Impact	38,380	\$2,810,345,547	\$7,514,414,321

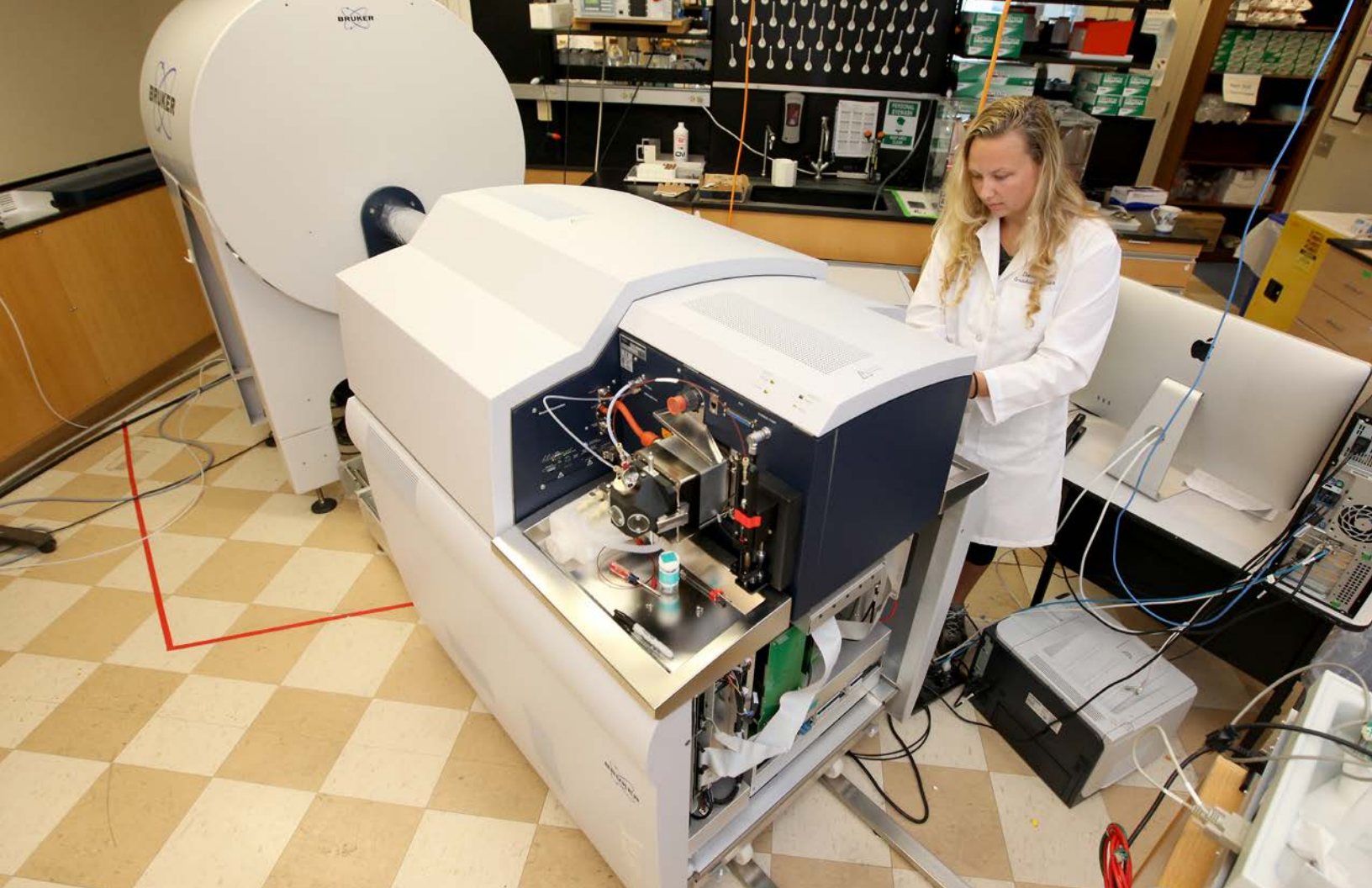
Table 6 – Economic Impact of MUSC Health (MUSC Medical Center/MUSCP) on the Charleston Tri-County Region

	Employment	Labor Income	Economic Output
Direct Impact	10,658	\$1,180,322,264	\$2,764,849,185
Indirect Impact	8,952	\$496,380,977	\$1,484,613,827
Induced Impact	7,241	\$400,915,477	\$1,266,610,721
Total Impact	26,851	\$2,077,618,718	\$5,516,073,733

Table 7 – Economic Impact of the Medical University on the Charleston Tri-County Region

	Employment	Labor Income	Economic Output
Direct Impact	6,003	\$404,785,280	\$1,021,917,739
Indirect Impact	2,952	\$185,455,735	\$526,266,462
Induced Impact	2,574	\$142,485,814	\$450,156,387
Total Impact	11,529	\$732,726,829	\$1,998,340,588





Each year, as **Table 5** shows, MUSC generates a total economic impact of approximately \$7.5 billion within the Charleston Tri-county region. This reflects the dollar value representing all final goods and services produced in Charleston that can be attributed (directly or indirectly) to the ongoing activities of MUSC, including both MUSC Health and the Medical University. This is associated with approximately 38,380 jobs and more than \$2.8 billion in labor income for Charleston residents.

The approximately \$3.8 billion in direct economic output leads to an additional \$3.7 billion through the economic multiplier effect. This multiplier effect is the estimated total dollar value of the increased demand for goods and services of local suppliers as well as the total increase in household spending that occurs across a variety of industries in the area. The combination of these impacts leads to a total impact of \$7.5 billion on Charleston. **Table 5** also details the multiplier effects associated with all labor income and employment impacts. The \$3.7 billion in additional economic output associated with all indirect and induced effects is estimated to generate 21,719 additional jobs in Charleston, working to fill the increased demand for industry-related local suppliers and for increased household spending, which also supports an additional \$1.2 billion in labor income.

In a similar fashion, **Tables 6 and 7** break down the direct, indirect and induced effects of MUSC Health and the Medical University independently. Of MUSC's total impact on Charleston, approximately 73% – or roughly \$5.5 billion in annual economic output – comes from the activities of MUSC Health.

Employment Quantity and Employment Quality

The primary means by which economists measure the strength of a local region (or state) is through its rate of employment growth and income growth. Simply put, a regional economy does well when it is producing new jobs and generating wage gains for existing jobs at a relatively rapid pace. Thus, both job quantity and job quality matter if the goal is to produce healthy, long-run economic growth.

By these measures, the economic impact of MUSC on the Charleston economy cannot be overstated. The estimates documented in **Tables 5 through 7** imply that **MUSC supports approximately 11% of the total employment base in Charleston and 45% of Charleston's health care industry**, as **Figure 5** highlights. In addition, MUSC's expansion efforts in recent years have helped to drive the strong economic growth rates that Charleston has experienced – and which have been the highest growth rates among all South Carolina regions for much of the last decade. For example, MUSC's total employment impact has increased by an average of 5.3% per year between 2020 and 2023, while the Charleston economy and South Carolina as a whole have experienced 2.8% and 2.2% employment growth during this same time period, respectively.

Figure 5 – MUSC Contributions to Employment Quantity



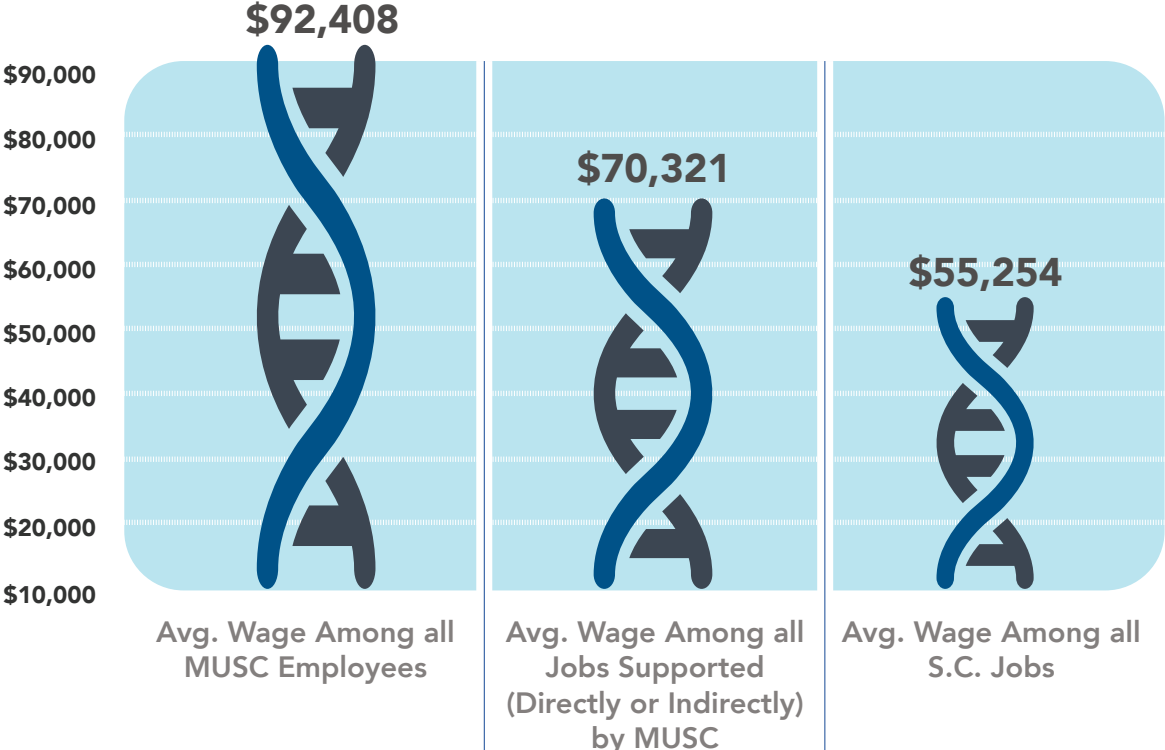
➔ **11%** of all jobs in Charleston

➔ **45%** of all jobs in the Charleston health care industry



MUSC’s contribution to high employment quality can be observed by examining the wage levels among all jobs supported (both directly and indirectly) by MUSC throughout South Carolina. As a premier health care organization focused on education, research and patient care, a sizable majority of the employment base at MUSC encompasses highly skilled, highly educated medical professionals. As such, the average annual wage of all MUSC employees greatly exceeds that of South Carolina as a whole – by approximately 67%. Put another way, MUSC creates jobs that pay workers about 67% more than that of the average job in South Carolina. Moreover, this wage premium is not just limited to the direct employees of MUSC. **The average wage across all 52,698 jobs that are created directly and indirectly by MUSC statewide is approximately 27% higher than that of the average job in South Carolina.** Figure 6 illustrates these wage comparisons.

Figure 6 –MUSC Contributions to Employment Quality





The Economic Impact of the MUSC Regional Health Network

In addition to its impact in the Charleston Tri-county region, MUSC also maintains a large Regional Health Network that includes RHN facilities located in Florence, Lancaster, the Midlands and Orangeburg. The RHN locations in the Midlands and Orangeburg specifically represent the recent acquisition of multiple community hospitals, which has increased the number of employees working for MUSC by nearly 20% since 2021 and also increased the capacity of the entire MUSC Health network.

One of the advantages of the RHN is that it allows MUSC to make major economic contributions to the more rural areas of South Carolina, where many of these hospitals are located. These contributions can occur in two ways. First, any given physical or human capital investment in a rural region is likely to provide a disproportionately large impact to that region because of the relatively small size of its local economy. Or put another way, any expansion of a medical facility in a rural area of South Carolina will have a larger positive impact on that region than a similar expansion in one of the major metropolitan regions of the state. Second, there are more opportunities in rural areas of South Carolina to provide additional specialized services and care to the local population that did not previously exist.

For the purposes of this report, the economic impact of this Regional Health Network is broken down into four regions – RHN-Florence, RHN-Lancaster, RHN-Midlands, and RHN-Orangeburg. These estimates are displayed in **Tables 8 through 11**.

Section IV - The Economic Impact of MUSC

Table 8 – Economic Impact of RHN Florence on Florence, Marion and Williamsburg Counties

	Employment	Labor Income	Economic Output
Direct Impact	2,173	\$200,379,960	\$481,532,434
Indirect Impact	1,307	\$56,701,246	\$187,784,314
Induced Impact	759	\$33,777,645	\$117,330,315
Total Impact	4,239	\$290,858,851	\$786,647,063

Table 9 – Economic Impact of RHN Lancaster on Lancaster and Chester Counties

	Employment	Labor Income	Economic Output
Direct Impact	1,251	\$114,034,024	\$365,750,857
Indirect Impact	713	\$42,538,723	\$109,516,109
Induced Impact	264	\$13,208,012	\$47,819,573
Total Impact	2,228	\$169,780,759	\$523,086,539

Table 10 – Economic Impact of RHN Midlands on Lexington, Richland and Kershaw Counties

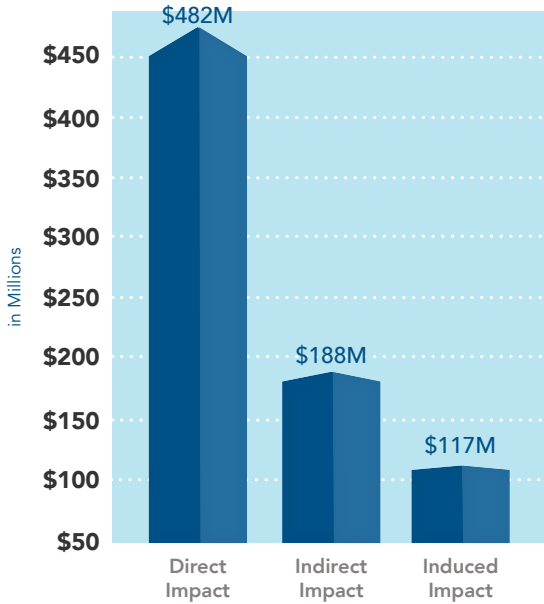
	Employment	Labor Income	Economic Output
Direct Impact	2,273	\$218,881,272	\$476,288,069
Indirect Impact	1,339	\$70,161,209	\$214,511,095
Induced Impact	1,241	\$62,759,104	\$202,825,273
Total Impact	4,853	\$351,801,585	\$893,624,437

Table 11 – Economic Impact of RHN Orangeburg on Orangeburg, Calhoun and Bamberg Counties

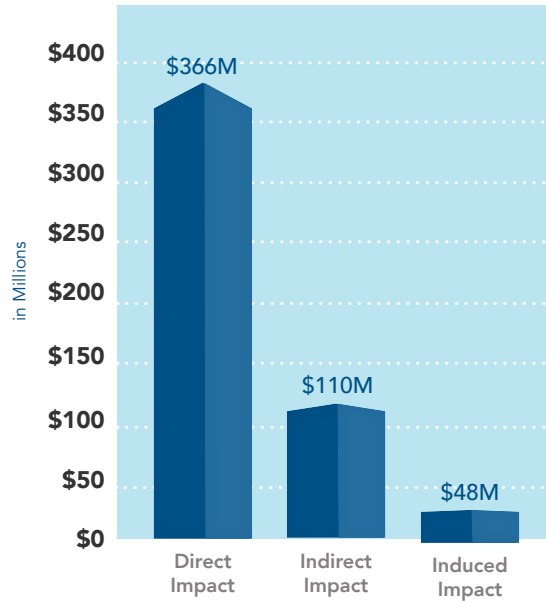
	Employment	Labor Income	Economic Output
Direct Impact	1,247	\$62,898,400	\$182,040,662
Indirect Impact	490	\$13,308,339	\$49,021,147
Induced Impact	202	\$6,899,780	\$27,207,642
Total Impact	1,939	\$83,106,519	\$258,269,451

Section IV - The Economic Impact of MUSC

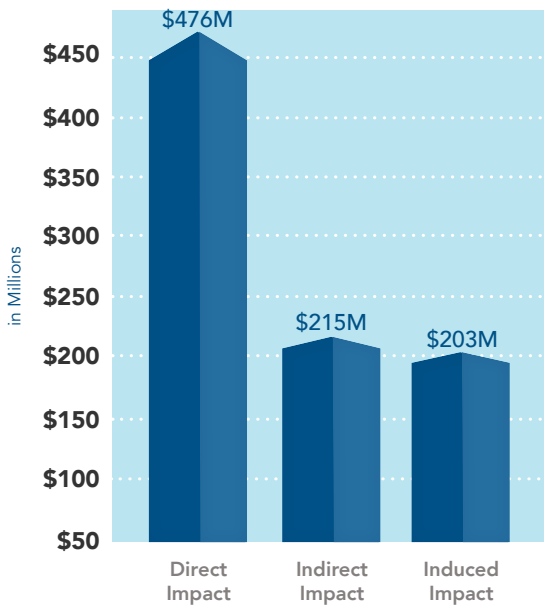
Economic Impact of RHN Florence on Florence, Marion and Williamsburg Counties



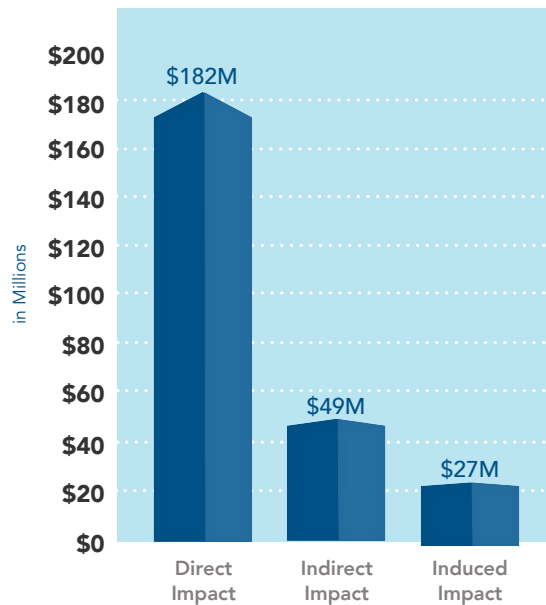
Economic Impact of RHN Lancaster on Lancaster and Chester Counties



Economic Impact of RHN Midlands on Lexington, Richland, and Kershaw Counties



Economic Impact of RHN Orangeburg on Orangeburg, Calhoun, and Bamberg Counties



Section IV - The Economic Impact of MUSC

RHN-Florence – that is – the MUSC Health Medical Centers in Florence, Marion and Williamsburg counties – generates a total economic impact of approximately \$786.6 million within the three-county region each year. This is associated with approximately 4,239 jobs and more than \$290 million in labor income for local residents. Similarly, RHN-Lancaster generates a total economic impact of roughly \$523.1 million within the two-county region of Lancaster and Chester counties each year. This is associated with approximately 2,228 jobs and \$169.8 million in labor income for local residents. RHN-Midlands generates a total economic impact of roughly \$893.6 million within the three-county region of Lexington, Richland and Kershaw counties each year. This is associated with approximately 4,853 jobs and \$351.8 million in labor income for local residents. Lastly, RHN-Orangeburg generates a total economic impact of roughly \$258.3 million within the three-county region of Orangeburg, Calhoun and Bamberg counties each year. This is associated with approximately 1,939 jobs and \$83.1 million in labor income for local residents.

Just as MUSC provides a substantial contribution to the Charleston economy, as previously outlined, so, too, does the Regional Health Network support the economies of Florence, Lancaster, the Midlands and Orangeburg. These contributions are especially pronounced in the more rural counties of Florence, Marion, Lancaster, Chester, Orangeburg, Calhoun and Bamberg. More specifically, MUSC supports (directly or indirectly) approximately 5% of the total employment base – or roughly 1 in every 20 jobs – across these seven counties.

The Future Growth of MUSC: 2024-2027

As previously noted, one of the unique aspects of South Carolina in the 2020s is the fact that its population is both increasing and aging. This combination implies that the number of South Carolina residents ages 55 or older is increasing nearly three times faster than the number of residents between 20 and 54. Consequently, such a dramatic demographic shift implies that MUSC will have the potential to continue its recent expansion into the coming years. MUSC currently anticipates that it will grow by a total of 32% between 2024 and 2027, which translates to approximately 7.3% annually. This growth rate would increase MUSC’s current statewide economic impact from \$10.1 billion to more than \$13.4 billion annually, as **Table 12** reveals. This increase would also scale up the total number of jobs supported (directly or indirectly) by MUSC to 69,767, generating more than \$4.9 billion in labor income.

Table 12 – Projected Economic Impact of MUSC on South Carolina in 2027

	Employment	Labor Income	Economic Output
Direct Impact	31,251	\$2,887,813,074	\$7,071,688,714
Indirect Impact	20,886	\$1,157,550,692	\$3,440,909,192
Induced Impact	17,630	\$860,699,698	\$2,910,105,566
Total Impact	69,767	\$4,906,063,464	\$13,422,703,472

Section V

MUSC and the Knowledge Economy

MUSC offers a number of economic advantages to the regions in which it operates and to the state of South Carolina as a whole that go well beyond traditional impact measures such as job and income creation, total economic output and state tax revenue. First, MUSC introduces a significant demand for high-wage, high-skill jobs in various health care-related fields. Much of this impact has already been documented in Section IV.

Second, MUSC is contributing to the development of the state's knowledge economy, which generally consists of industrial sectors that require innovation and technological development along with the commercialization of new ideas. This process – innovation and commercialization – is what leads to long-run economic growth and development. Regions with high concentrations of workers in the knowledge economy generate large volumes of human capital resources and knowledge spillover effects. In the United States, regions with a well-educated workforce and a strong innovation sector are growing the fastest and have workers who are among the most productive, creative, innovative and well-paid in the country.⁶

Moreover, the knowledge economy is a primary factor in improving a region's rate of productivity growth, of which MUSC is a key driver. Regional economies have two primary ways of boosting long-run economic growth: increasing labor force growth and increasing productivity growth. Because of current demographic trends in the United States, any attempt to boost economic growth significantly by increasing the size of the labor force will likely have minimal effects.⁷ This implies that the primary strategy for increasing long-run economic growth should be boosting productivity. This, in turn, implies that growth in the knowledge economy should be at the forefront of economic development efforts.

The contributions that MUSC makes to the knowledge economy in South Carolina can be observed directly in three primary ways: (1) MUSC currently supports a disproportionately large volume of high-skilled workers; (2) MUSC actively expands the number of high-skilled workers in South Carolina through education and talent retention (local job placement for graduates); (3) MUSC maintains a large and growing research and development (R&D) portfolio that increases innovation in the health care industry, expands the broader life science industry and further aids in talent retention.

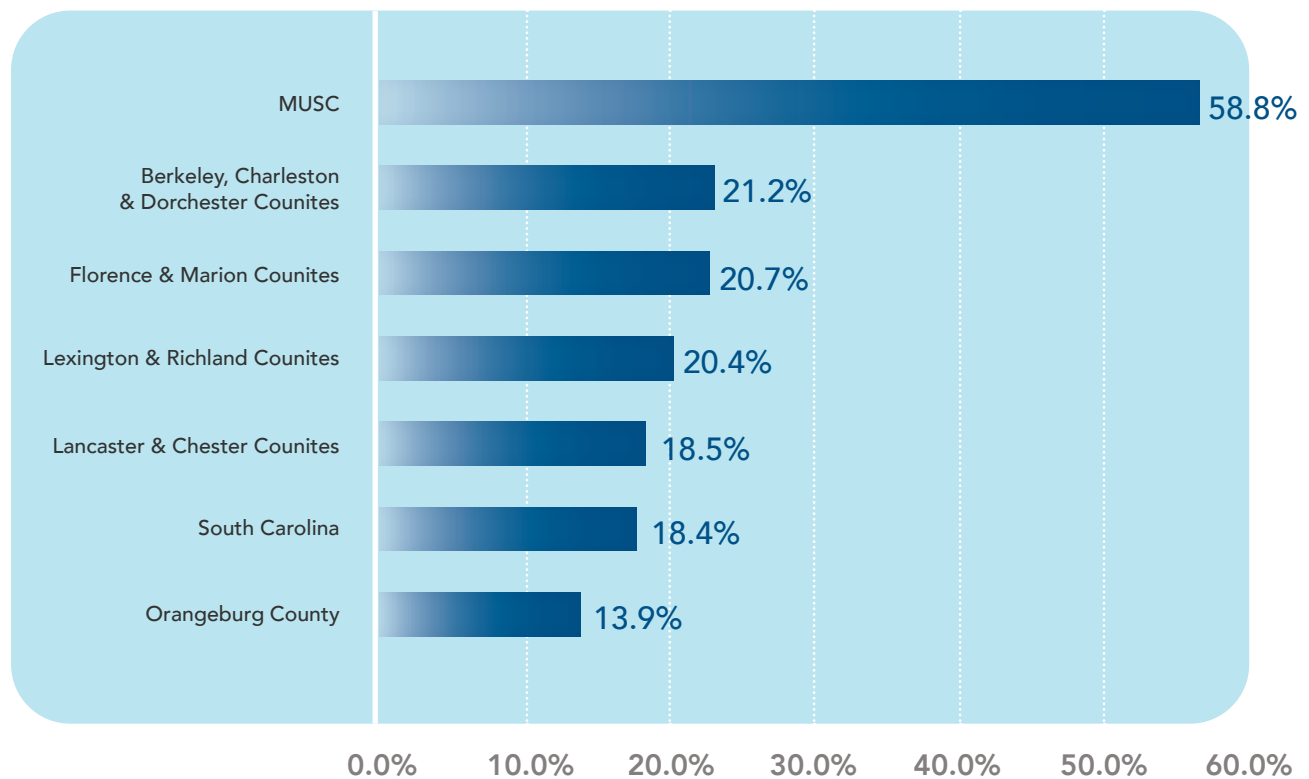
⁶ For a full discussion on the benefits of knowledge economies in the United States, see Moretti, E., (2012). "The New Geography of Jobs." New York: Houghton Mifflin Harcourt.

⁷ These demographic trends include, among other things, the aging and retiring of the baby-boom generation.

Supporting a High-Skilled Workforce

The degree to which MUSC currently supports a high-skilled workforce can be observed in **Figure 7**, which reveals that approximately 58.8% of all jobs directly supported by MUSC are considered part of the knowledge economy. By contrast, this percentage ranges from 21.2% in the Charleston Tri-county region to 13.9% in the Orangeburg region and stands at 18.4% for South Carolina as a whole. MUSC, therefore, not only represents a sizable portion of the knowledge economy base but is also helping to increase the knowledge economy in each of the regions in which it maintains a presence.

Figure 7 – Percentage of Workers in the Knowledge Economy

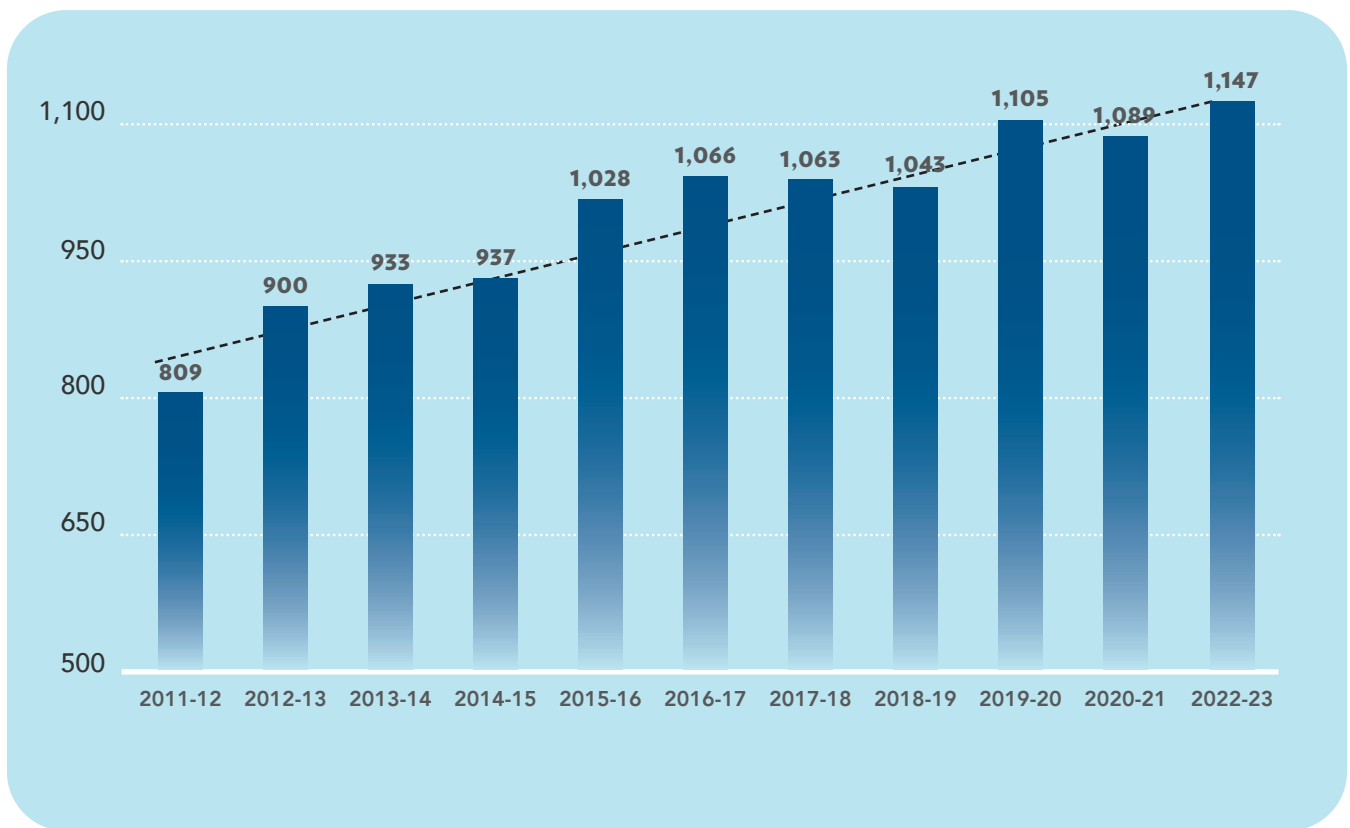


⁸ Although the knowledge economy is typically defined as a specific set of occupations, occupational data are not available for analysis at the county level. As a result, this study defines the knowledge economy by the industry-level North American Industry Classification System (NAICS) codes 54 and 62, which approximate the occupational definitions that are normally used.

Growing the Knowledge Economy through Education and Talent Retention

One of the most unique contributions that MUSC makes to South Carolina is that it is the only comprehensive academic health system in the Palmetto State. Each year, MUSC awards degrees to approximately 1,100 students, with this number having grown by roughly 30% since the 2011-2012 academic year. **Figure 8** highlights this trend.

Figure 8 – Number of Degrees Awarded at MUSC by Academic Year⁹



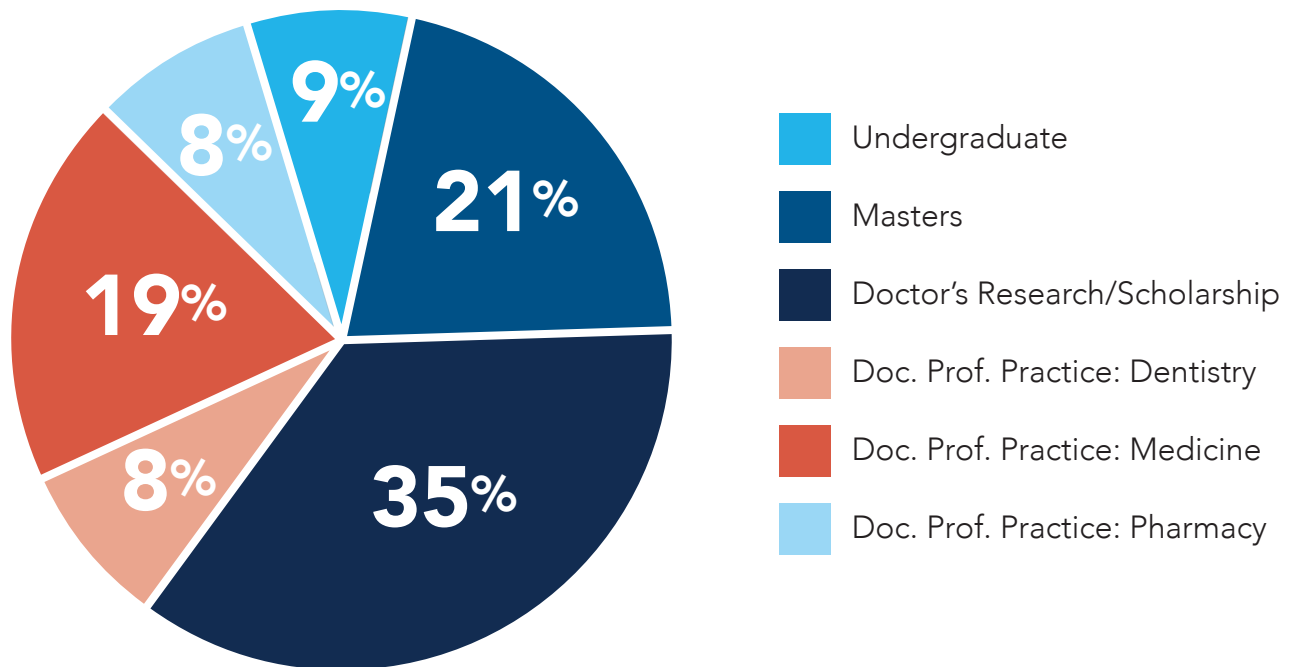
⁹ South Carolina Commission on Higher Education's 2022 Statistical Abstract Table 2.1

Section V - MUSC and the Knowledge Economy



Over 93% of the students enrolled in in the 2020-2021 academic year were graduate-level students completing degrees across many health professions, including students in medicine, dental medicine, nursing and pharmacy. The distribution of this student talent is displayed in **Figure 9**.

Figure 9 – Distribution of MUSC Enrollment in 2021-22 Academic Year¹⁰

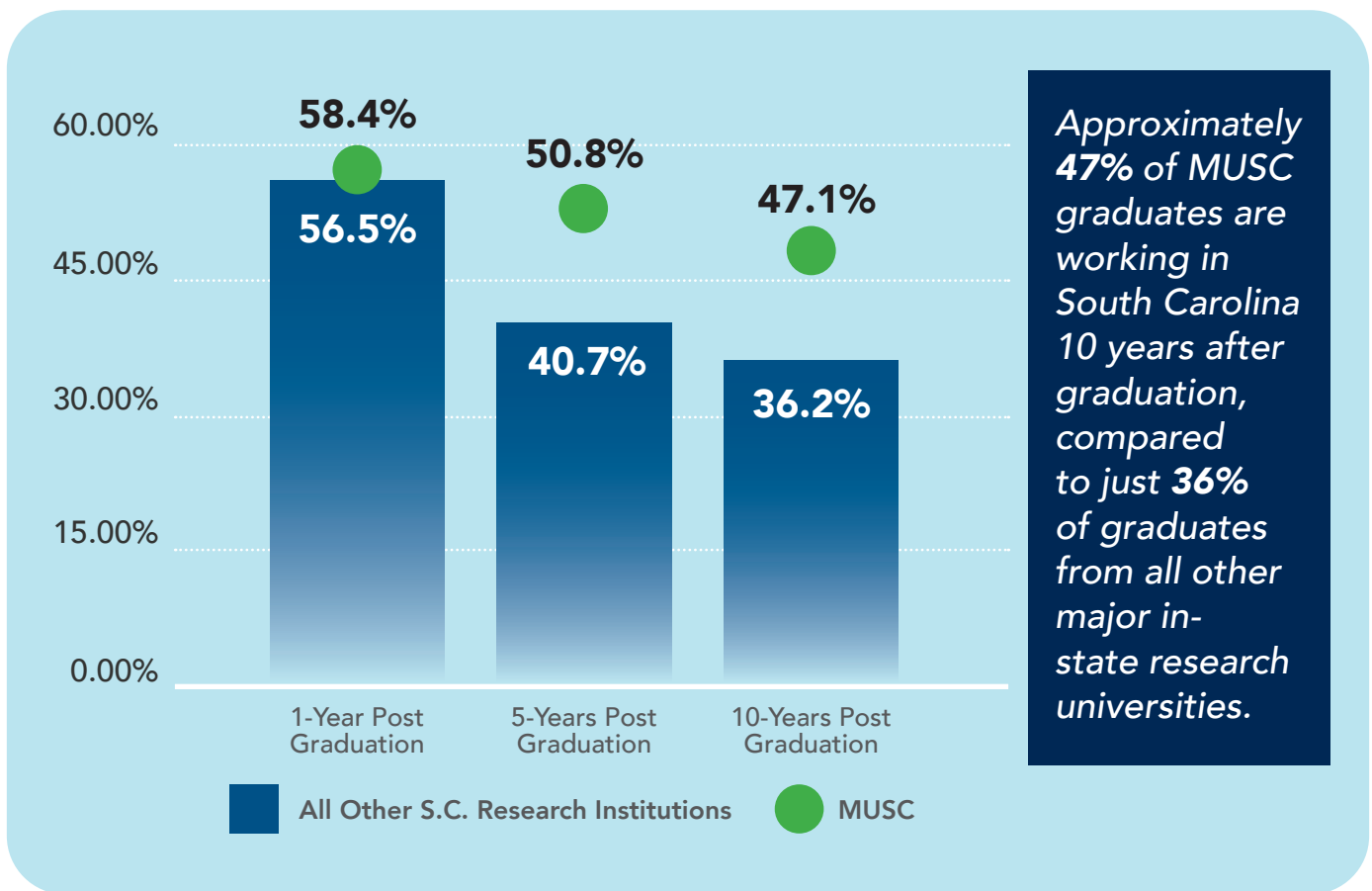


¹⁰ South Carolina Commission on Higher Education's 2022 Statistical Abstract Table 1.2 – Table 1.5

Section V - MUSC and the Knowledge Economy

In addition to this broad-based education that MUSC offers students across health professions, the University also has a strong record of matching students with in-state employers. Given the rise in the demand for health care in South Carolina, educating future local health care providers is an essential function of the University, and MUSC has been consistently successful in retaining its student talent base. This can be directly observed by tracking the percentage of MUSC graduates who remain in South Carolina over time. This study specifically examined in-state retention rates for students who graduated in the 2010 fiscal year by tracking their employment location one, five and 10 years following their graduations. These retention rates were then compared with South Carolina's two other major research universities, the results of which are shown in **Figure 10**.

Figure 10: Percentage of MUSC Graduates Working in South Carolina¹¹



¹¹ Source: South Carolina Department of Employment and Workforce; note that these percentages reflect the number of graduates found in South Carolina's wage records, which do not include self-employment, federal employment, military service or work as an independent contractor.

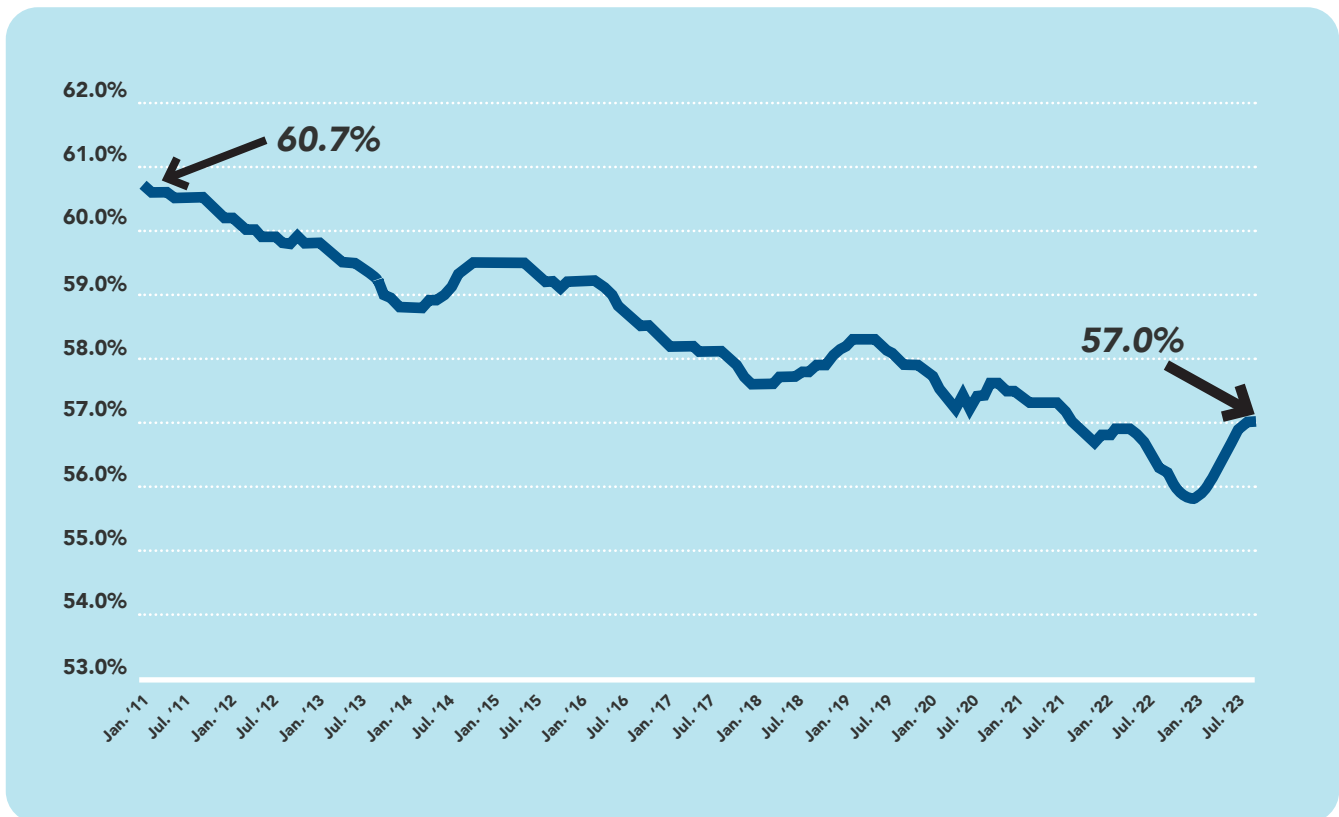
Section V - MUSC and the Knowledge Economy

What is most striking about these results is the fact that MUSC not only retains more talent than the other major research universities in South Carolina but the attrition rate over time is also much lower for MUSC. In other words, **MUSC ranks 1st among South Carolina’s research universities in retaining high-skilled graduates. MUSC is the only research university in South Carolina in which the majority of MUSC students remain in South Carolina to work for at least five years after graduation.** And while MUSC’s one-year graduate retention rate is just 2 percentage points higher than other in-state research universities, this difference increases to 11 percentage points for the 10-year graduate retention rate.

Talent retention is a key component of expanding the local knowledge economy. And more broadly, talent retention also helps to mitigate the ongoing labor shortage facing South Carolina that has been growing over the past decade and that was exacerbated by the COVID-19 pandemic. For example, as **Figure 11** shows, the labor force participation rate in South Carolina has been steadily declining over the past decade – falling from 60.7% in 2011 to its current level of 57%. The labor force participation rate represents the percentage of South Carolina’s working-age population that is either employed or actively seeking employment. Such a decline implies that there are currently more than 120,000 workers who are “missing.” Or put another way, if the labor force participation rate had not declined over the previous decade, South Carolina’s labor force would have another 120,000 people, which is an increase of approximately 5%.

Figure 11: South Carolina Labor Force Participation Rate

Source: U.S. Bureau of Labor Statistics



Section V - MUSC and the Knowledge Economy

To address existing physician shortages in South Carolina and to create a sustainable workforce physician pipeline, MUSC developed a strategic plan to establish residency programs throughout the MUSC Health system in multiyear stages. In October 2022, MUSC Health established its MUSC-Regional Network (MUSC-RN), a new Accreditation Council for Graduate Medical Education (ACGME) - accredited sponsoring institution that oversees the design and accreditation of the residency programs at MUSC Health hospitals across the state. Subsequently, the MUSC Health Graduate Medical Education (GME) office conducted feasibility assessments for Florence Medical Center (FMC) and for Lancaster and Chester Medical centers (LMC/CMC).

MUSC Health Florence Medical Center was the first facility ready to begin programs. A General Internal Medicine residency program application was submitted to the ACGME for approval in February 2023, receiving initial accreditation in September 2023, with a first cohort anticipated to start July 2024. MUSC is in the planning stages for a Family Medicine program at FMC and an Internal Medicine program at LMC, starting in July 2025.

Over the next five years, MUSC also plans to launch residency programs or rural tracks in the areas of Internal Medicine, OB-GYN, Psychiatry, General Surgery, Emergency Medicine, Sports Medicine and Dental General Practice, totaling approximately 160 new positions..

These programs allow MUSC Health to:

- Demonstrate better access to high-quality care.
- Retain graduates in the Pee Dee and Catawba regions.
- Increase economic impact to the region and the community.
- Reduce attending physician burnout and turnover.
- Integrate medical research, cutting-edge care and collaboration with other teaching hospitals.
- Attract physicians to community-teaching hospitals, as GME programs often serve as an incentive to consider community or rural practice settings.
- Provide a clinical classroom space for other learners and interprofessional education.

MUSC Health is also developing strong partnerships with the local technical colleges, which is critical for addressing mounting health care workforce issues. As the state's largest higher education system, the South Carolina Technical College System serves more than 134,000 South Carolinians each year and plays a key role in educating and training the state's workforce for in-demand, high-skilled jobs.

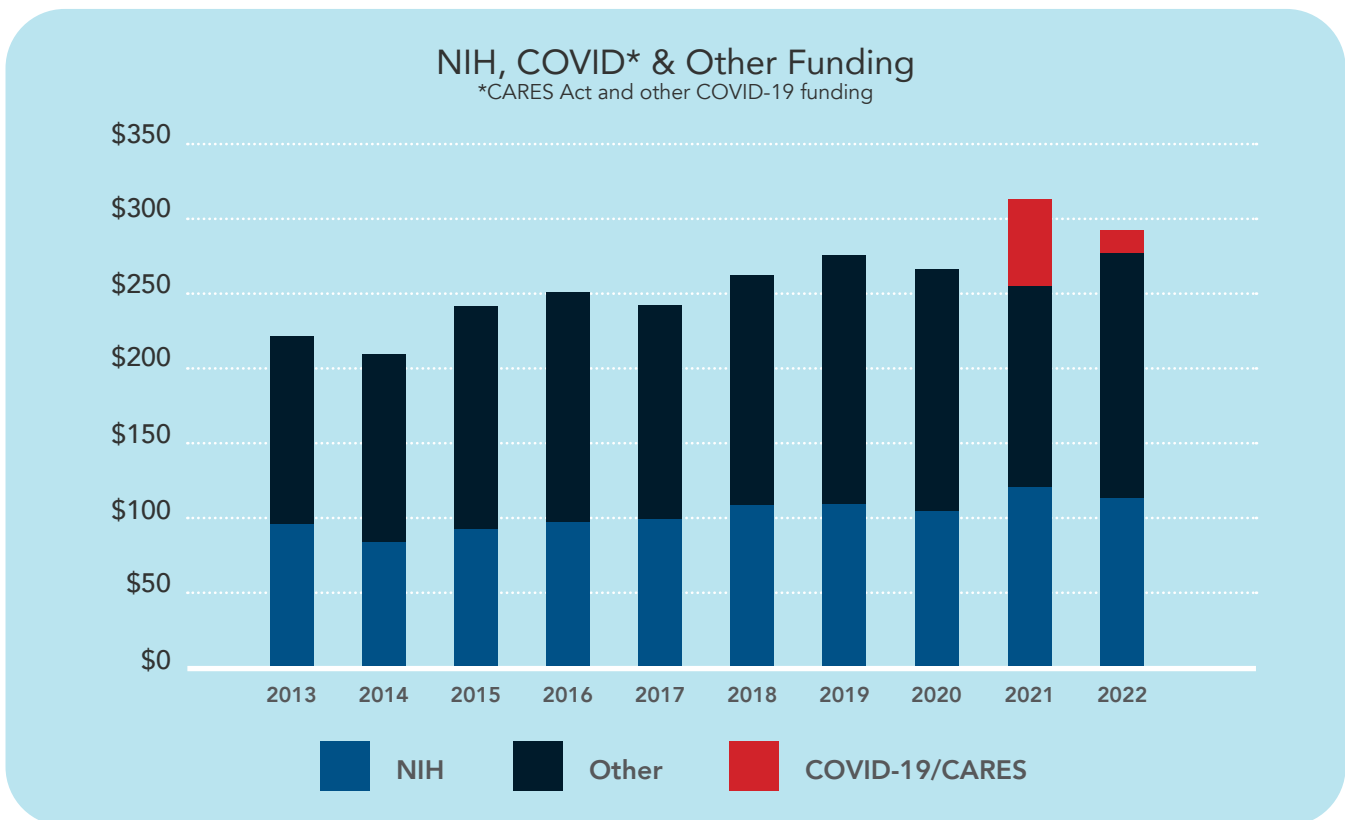
Over the last few years, MUSC Health established formal collaborations with several South Carolina technical colleges, regionally located in geographic areas near RHN facilities to address health care professional shortages for technicians and related certificate programs. These include partnerships between (1) Trident Technical College and MUSC Health-Charleston Division, (2) Florence Darlington Technical College and MUSC Health-Pee Dee Division and (3) Orangeburg-Calhoun Technical College, Orangeburg High School for Health Professions and MUSC Health-Orangeburg.

The health care industry represents some of the region's largest employers. Long-term revitalization of the health care workforce must involve creative strategies and investment to retain clinicians and stabilize the industry. MUSC Health partnering with the SC Technical College System can provide targeted solutions for job opportunities and amplify economic impact to the communities.

An Expanding Research and Development Portfolio

R&D is an essential component to MUSC’s overall mission to “...preserve and optimize human life in South Carolina and beyond.”¹² It is a catalyst for innovation and economic development. Advancing new knowledge and scientific discoveries helps to improve the health of patients as well as their communities. Each year, MUSC receives nearly \$300 million in sponsored research awards that includes federal funding, state funding, corporate funding and foundations. This makes MUSC among the largest biomedical research institutions in South Carolina. Between July 1, 2021 and June 30, 2022, alone, MUSC received nearly \$200 million in federal funding primarily through awards from the National Institutes of Health (NIH). Over the past decade, total sponsored research has grown by nearly 30% percent, as illustrated in **Figure 12**. This funding has supported research projects spanning the translational science spectrum, encompassing basic fundamental science that investigates the mechanisms of biology, disease or behavior as well as clinical science aimed at enhancing patient care through novel treatments and medical innovations.

Figure 12: MUSC Annual Sponsored Research Funding (in Millions)



¹² Source: <https://web.musc.edu/about/mission>

Section V - MUSC and the Knowledge Economy

These research dollars have helped MUSC personnel to develop new medical products that have generated hundreds of patents over the previous decade both in the United States and globally. In addition, MUSC has facilitated the launch of 51 companies in the life science industry statewide. Prominent examples of these startups include Blink TBI, Glycopath Inc., Mitochem Therapeutics Inc. and Gruthan Biosciences. To be counted, the MUSC-based startups must have received acceptance into the South Carolina Research Authority and/or received federal Small Business Innovation Research /Small Business Technology Transfer funding during a specified time frame.

Overall, MUSC has received 404 patents between July 1, 2013 and August 11, 2023, with 139 from the U.S. and 265 from other countries. These activities demonstrate a clear and substantial contribution to the life sciences industry within the state. In total, South Carolina's life science industry has expanded by more than 61% over the past five years and is one of the state's fastest growing clusters.¹³

The Direct Economic Impact of Research and Development at MUSC



\$300 million in annual sponsored research awards



51 active South Carolina-based company startups



400+ patents received since 2013

¹³ Source: The Economic Impact of South Carolina's Life Science Industry, SCBIO, 2022

MUSC: CASE STUDY

Enterprise Innovation



MUSC encourages its care team members at all levels to participate in innovation. MUSC has established an annual Innovation Week event geared toward empowering the enterprise to imagine creative solutions for a variety of health care challenges. In addition, innovation is fostered through Health Solutions, strategic partnerships and joint ventures.

One way that MUSC encourages innovation in its enterprise is by encouraging its teams to identify and solve problems that present barriers to patient care. MUSC Health Solutions division was founded in 2019 in order to identify, evaluate and develop innovative health care delivery solutions and products. The mission of Health Solutions is to leverage technology, data and user-centric design to transform the health care experience of all South Carolinians. In the most recent 12 months, 104 solutions have come through its pipeline.

Innovation is also nurtured at MUSC through partnerships with industry leaders that enable cross-industry knowledge exchange. Through its Office of Strategy and External Affairs, MUSC has engaged in more than 15 strategic partnerships with external partners, including Siemens, Medtronic, Synaptive, Helix and Notable. Strategic partnerships are intended to be collaborative rather than transactional and have at their heart MUSC's established partnership principles:

- Shares risk and reward.
- Affects all three areas of its mission (education, research, patient care).
- Ensures access to the best tools and technologies.
- Evolves as opportunities and collaborations develop.

Finally, MUSC invests in innovation through joint ventures. MUSC Strategic Ventures (MSV) supports and advances the mission and programs of MUSC and its affiliates by investing strategically in innovative joint ventures. Joint ventures include home health services, oncology services, durable medical equipment, ambulatory surgery centers and clinical laboratories, among others. For example, MSV is a founding member, along with Beemok Family Foundation, of Modern Minds, which operates a mental health and wellness clinic in the Charleston area to promote the mental health and wellness of the surrounding communities.



Section VI

The Social Impacts of MUSC

MUSC's contribution to South Carolina is truly unique. In addition to supporting a sizable volume of economic activity as a major employer that invests heavily in the local communities in which it operates, the presence of MUSC also offers wider societal benefits for the surrounding communities. MUSC provides statewide patient care – including access to clinical trials in rural areas, engaging in significant philanthropic efforts and fostering community investment. Moreover, it is widely recognized within economics literature that health performance and economic performance are interconnected. Since health is a fundamental component of human capital, and human capital contributes to economic growth, having a healthy workforce is essential for economic growth. The Centers for Disease Control and Prevention (CDC) estimates that the indirect costs associated with chronic health conditions and unhealthy behaviors reduce worker productivity and cost U.S. employers more than \$36 billion per year.¹⁴

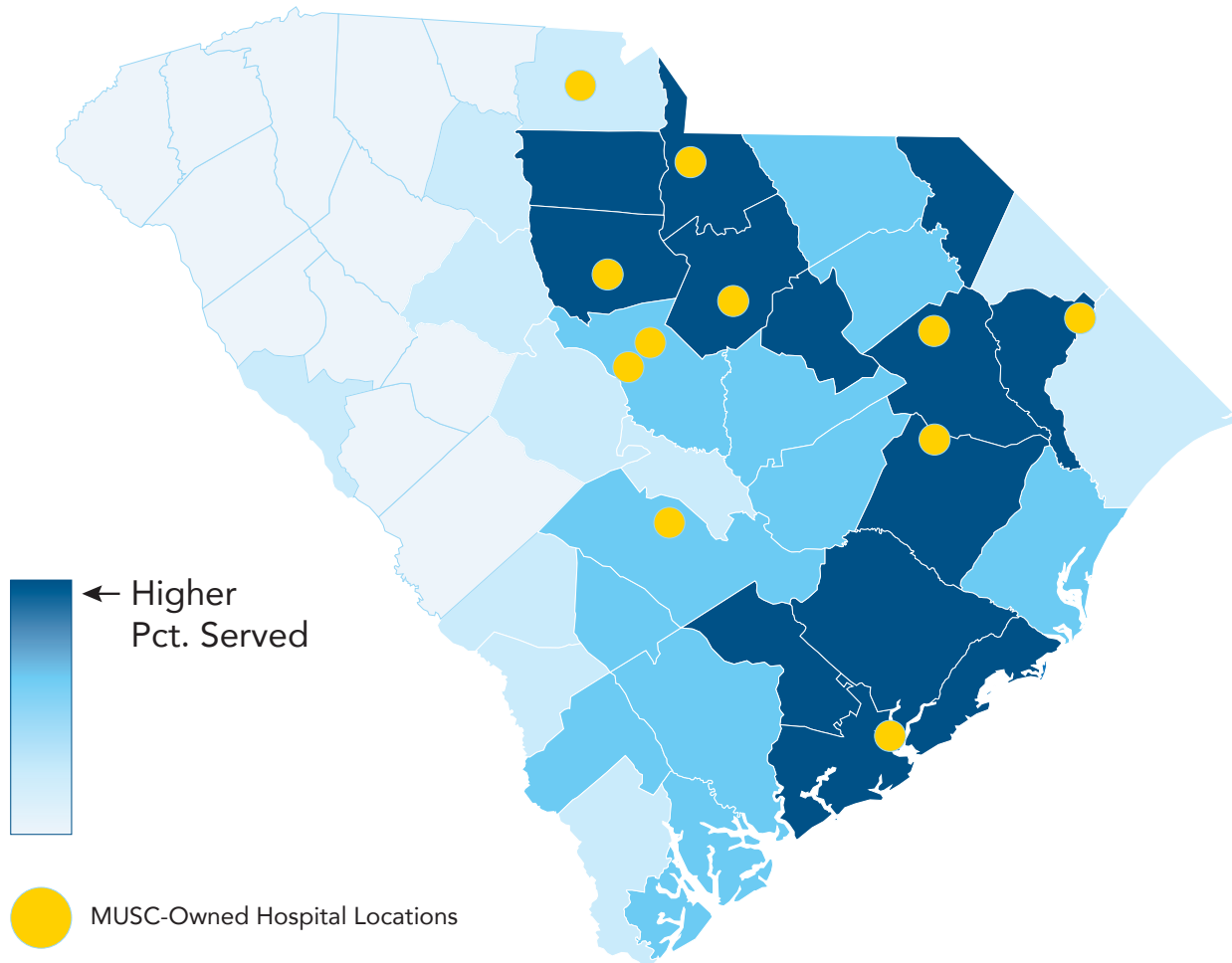
Statewide Patient Care

Between hospital care, emergency room visits and physician office visits, MUSC services nearly 2.4 million patient encounters each year. Approximately 68% of patients are seen in outpatient settings with another 22% served in an emergency room and 10% served as part of inpatient care. While over half of all patients are seen in the Charleston service region, the MUSC network serves residents from every county in the state. **Figure 13** highlights the number of unique patients served per capita in each of the state's 46 counties.



¹⁴ <https://www.cdc.gov/chronicdisease/resources/publications/factsheets/workplace-health.htm>

Figure 13: Unique Patients Served per 1,000 Residents, August 2022-July 2023



Although Charleston and Berkeley counties had the highest number of unique patients served (137,000 and 53,500, respectively), it is important to recognize that the highest intensity of use of the MUSC network was in South Carolina's smaller, rural counties. For example, MUSC reported serving over 13,600 unique patients in Marion County, which represents about 49% percent of the county population. Similarly, MUSC served nearly 7,000 unique patients from Fairfield County, or about 35% of the county population. These estimates clearly show that the network of MUSC hospitals, outpatient facilities and telehealth locations serve not just the metropolitan areas of the state but also represent an important part of the rural health care delivery system in South Carolina.

Section VI - The Social Impacts of MUSC

In addition to the patients served at its own hospitals and clinics, MUSC provides access to care through its partnerships with universities for student health as well as its affiliations with health care systems across the state. At the College of Charleston and Clemson, MUSC provides onsite clinic management expertise as well as telehealth services, including Virtual Urgent Care (approximately 4,900 encounters/year) and telepsychiatry services. At the Citadel, the MUSC Health at the Citadel clinic provides a full complement of medical services to cadets on The Citadel's campus, which included more than 7,900 visits between July 1, 2022 and June 30, 2023. MUSC Health at The Citadel offers advanced medical management and diagnostic imaging with integrative techniques to deliver care in the least invasive manner while allowing the cadets to return quickly to activity, sports and duty.

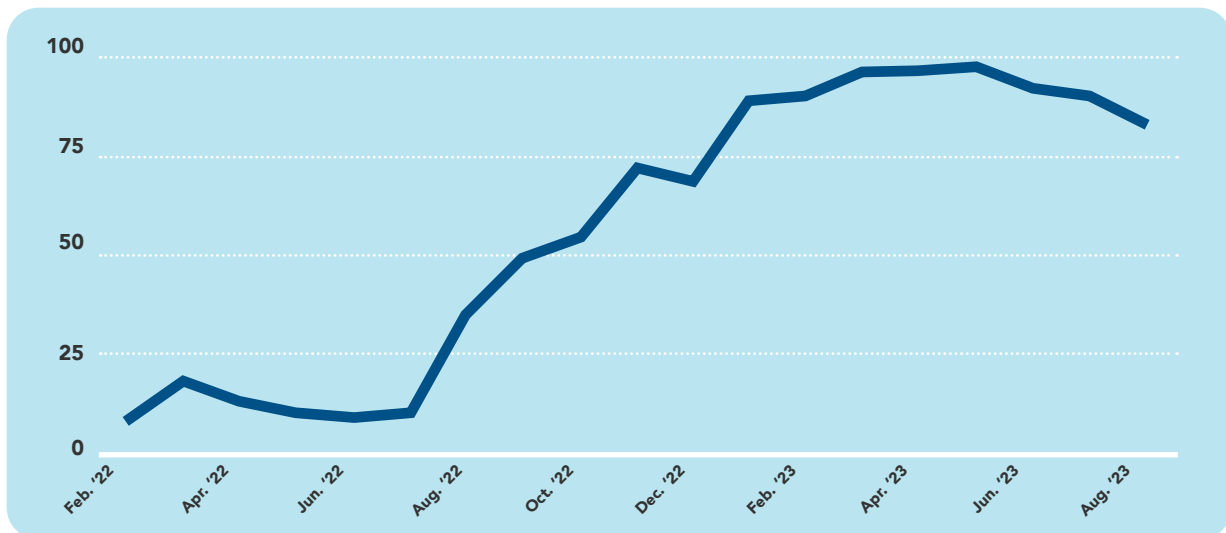
MUSC Health has strategically forged extensive affiliation relationships statewide, establishing a robust network of access points for patients through collaborations with various organizations. This includes relationships with entities such as Tidelands Health, MUSC Health Rehabilitation Hospital, AnMed Health, Beaufort Memorial Hospital, Carolina Pines Regional Medical Center, Hampton Regional Medical Center, Lexington Medical Center, Self Regional Medical Center, Tribe 513 and others, which demonstrates the breadth of MUSC Health's commitment to comprehensive health care. These affiliations span clinical care delivery, education and research, demonstrating a holistic approach to improving health care accessibility and advancing medical knowledge across diverse communities. Through these collaborative efforts, MUSC Health aims to create a health care ecosystem that addresses the varied needs of patients while fostering innovation and excellence in health care delivery. For example, at Tidelands Health, MUSC and Tidelands are collaborating in meeting the needs of the rapidly growing coastal population and work is progressing on fronts that include clinical care development/coordination, clinical workforce education and medical research.

As part of its efforts to improve the health of all South Carolinians, MUSC has expanded research and clinical trials beyond the Charleston Tri-county area. Participation in active studies by region is as follows:

- Pee Dee Region: 19 active studies.
- Catawba Region: 10 active studies.
- Midlands Region: 10 active studies.
- Orangeburg Region: 9 active studies.

Expansion of research into these regions means that patients across the state have access to novel and innovative treatments that they may not have had access to otherwise; it also ensures that new therapies coming to market have been studied and proved to be effective on a wider range of patient demographics and clinical characteristics.

Figure 14: Research Subject Recruitment from RHN Over Time



MUSC: CASE STUDY

South Carolina Telehealth Alliance - Telestroke



MUSC developed South Carolina's first telestroke program in 2008 with grant funding from The Duke Endowment and support from MUSC's Department of Neurology. The program was launched to provide remote acute consultations and treatment recommendations for patients with suspected strokes in rural and community hospitals.

In 2013, the South Carolina Legislature appropriated funding to support the growth of the telestroke program through the SC Telehealth Alliance (SCTA). With this funding, MUSC was able to grow its stroke program to include 37 hospitals across the state. Under MUSC's leadership, the SCTA has facilitated coordinated care and shared learning across telestroke programs and among participating hospitals. This has included forming collaborative telestroke workgroups, offering continuing education opportunities and reporting common data metrics.

Stroke patients who receive timely care are more likely to recover fully or have less disability. Prior to the launch of these statewide telestroke programs, only 38% of South Carolina residents lived within 60 minutes of expert stroke care. Now, as a result of MUSC's leadership, collaboration with SCTA partners and the investment from the state legislature, all state residents live within 60 minutes of such care.

Living less than 60 minutes from expert stroke care makes a significant difference in survival and the disability and economic burden imposed on patients, families and society by strokes. For stroke patients, "time is brain." Treatment must be started as quickly as possible. The telestroke program facilitates timely access to the two potentially curative stroke interventions: clot-busting tPA infusions and embolectomies. For both interventions, patients require a CT scan and assessment by a stroke specialist prior to receiving the appropriate treatment.

Since 2008, the rate of admission for acute ischemic stroke in South Carolina has decreased by 42% due to South Carolina's Stroke Prevention programs. Furthermore, through the telestroke program, tPA administration rates for acute ischemic stroke patients have improved from 2.5% to 18%. Currently, nearly 5% of patients receive embolectomies; prior to the initiation of the telestroke program, embolectomies were not performed.

The estimated cost savings from increased tPA use amount to \$22 million annually. Improved embolectomy access is associated with \$1.4 million in medical care cost savings and \$2.4 million in Social Security and disability payment savings annually, totaling \$25.8 million in conservative estimated savings. These figures exclude the value of enhanced quality of life and retained employment earnings for patients and caretakers.

Section VI - The Social Impacts of MUSC

Philanthropy

MUSC engages in significant philanthropic efforts to provide care to patients across South Carolina.

MUSC’s CARES Clinic initiatives provide free care for uninsured patients and those experiencing homelessness. The CARES clinic for uninsured patients provided 446 free visits in FY 2023 through its clinic site in Mount Pleasant, rural events and the Pediatric Prevention Program, which provides vaccinations for children. CARES for the Unhoused provides over 500 visits per year for more than 250 unique patients experiencing homelessness, by leveraging a blended in-person and telehealth model in which volunteer medical students and residents from a variety of clinical specialties are in person, and an attending physician is present virtually. Care is provided in partnership with The Navigation Center at a clinic on-site and via street medicine outreach. Feedback from both patients and health care providers has been overwhelmingly positive with 95.2% of patients reporting overall visit satisfaction and 92.2% of providers agreeing or strongly agreeing that they made a positive impact on their patients’ health.

The College of Dental Medicine provides free and reduced-price dental screening and procedures to over 2,500 patients per year through College of Dental Medicine clinics as well as extramural outreach locations. The estimated cost of free care provided by the College of Dental Medicine is more than \$400,000 per year.

Through the Hollings Mobile Health Unit, which provides screenings for breast and cervical cancer, more than 400 cancer screenings were performed from July 1, 2022 through June 30, 2023. Patients visiting the Mobile Health Unit required follow up at nearly double the national average rate, indicating the importance of providing cancer screenings to communities across the state.

In addition to specific clinical programs intended to increase access to medical and dental care across the state, MUSC provides significant charity care to patients in need of financial assistance. In the 12 months from July 1, 2022 through June 30, 2023, MUSC Health provided \$219 million in charity care for more than 333,000 patient visits.

Table 13 - Total FY2023

Division:	Volume:	Value:
Charleston Total	248,853	\$139,916,534
Charleston	247,645	\$131,011,506
Orangeburg	1,208	\$8,905,029
Midlands	20,186	\$15,465,746
Catawba	15,639	\$26,632,378
Pee Dee	49,273	\$37,624,883
Total Impact	333,951	\$219,639,542

Section VI - The Social Impacts of MUSC

In addition, the MUSC Foundation supports the Medical University and MUSC Health's mission and strategic goals through donor contributions, investments, real estate and other gifts. Between July 1, 2021 and June 30, 2022, the Foundation received \$50 million in contributions and provided \$44 million in total support to the enterprise, which included scholarships and grants in addition to investment in valuable programs across the enterprise. Additionally, the Office of Institutional Advancement engages in significant fundraising efforts and partners with clinical and administrative leaders to develop programs and apply for grants from private and philanthropic organizations. One example is the Boeing Center for Children's Wellness, which provides opportunities for students and staff to participate in evidence-based universal wellness and diabetes prevention interventions in 59 schools, having received \$3.7 million in funding in just four months.

MUSC: CASE STUDY

Telehealth



The MUSC Health Center for Telehealth (the center) has more than 15 years of experience providing telehealth, offering over 100 unique telehealth services to nearly 280 sites across South Carolina. Care settings include over 45 hospitals, 100 schools, 100 community clinics and other facilities as well as directly at patients' homes. The majority of sites are in partially or fully medically underserved regions.

The center's agile organizational structure and structured telehealth service implementation model (TSIM) have allowed the center to build an impressive array of services across the domains of inpatient care, ambulatory care and population health with the overall goal of bringing strategic value to the state.

Additionally, the center is recognized as one of only two Telehealth Centers of Excellence in the country by the Health Resources and Services Administration (HRSA) due to its high-volume programs, substantial service to rural and medically underserved communities and financially sustainable telehealth models.

The center is also the headquarters of the South Carolina Telehealth Alliance (SCTA), a nationally recognized collaboration of health systems, state agencies and other organizations working together to advance telehealth across the state.



Community Engagement and Sponsorships

MUSC aims to engage with each of the local communities in which it operates to improve access to care and health outcomes. In 2022, community health needs assessments were completed in the Charleston, Pee Dee, Catawba and Midlands divisions to survey community stakeholders and organizations to identify the need for health care and services in each community. The needs assessments helped to drive division strategy and growth plans. In addition, multiple teams across MUSC, including the Office of Strategy and External Affairs, the Office of Community Engagement, Healthy Me Healthy SC, among others, have dedicated teams in each division to build relationships with community partners, which include school districts, technical colleges, universities, industry, food banks, foundations and charitable organizations. Through these partnerships, programs are developed to increase access to care, address social determinants for health and contribute to the development of the future health care workforce. Furthermore, community sponsorships through the MUSC Enterprise Sponsorship committee help to increase awareness of health care resources while supporting local organizations.

Table 14: Community Engagement and Sponsorship by Division

	Charleston (including Orangeburg)	Pee Dee	Catawba	Midlands
Community Health Needs Assessment: Areas of Concern	<ul style="list-style-type: none"> •Access to Care •Clinical Preventive Services •Behavioral Health •Obesity, Nutrition, Physical Activity •Maternal, Infant and Child Health 	<ul style="list-style-type: none"> •Access to Care •Clinical Preventive Services •Behavioral Health •Obesity, Nutrition, Physical Activity •Maternal, Infant, and Child Health 	<ul style="list-style-type: none"> •Access to Care •Mental Health •Obesity, Nutrition, Physical Activity •Maternal, Infant and Child Health •Oral Health 	<ul style="list-style-type: none"> •Access to Care •Clinical Preventive Services •Mental Health •Obesity, Nutrition, Physical Activity
Community Partners	31	15	37	22
Number of Sponsorships	59	35	11	10
Value of Sponsorships	\$1,053,000	\$58,000	\$24,000	\$176,000

Community Engagement

Catawba Division

In partnership with Siemens Healthineers, Carolina Radiology and nine other community partners, the MUSC Health-Catawba Division provided 128 free mammograms to un- and underinsured patients from Lancaster, Chester and surrounding areas. Of these, 48% were patients receiving a mammogram for the first time. Additionally, the mobile mammogram unit hosted more than 50 students from Lancaster County School District and many faculty and staff members from Chester County School District to tour the unit and interact with radiology professionals from MUSC and Siemens. These interactions increase exposure to the health professions and encourage students to explore a career in health care.

Pee Dee Division: Community Collaborations Provide Transportation

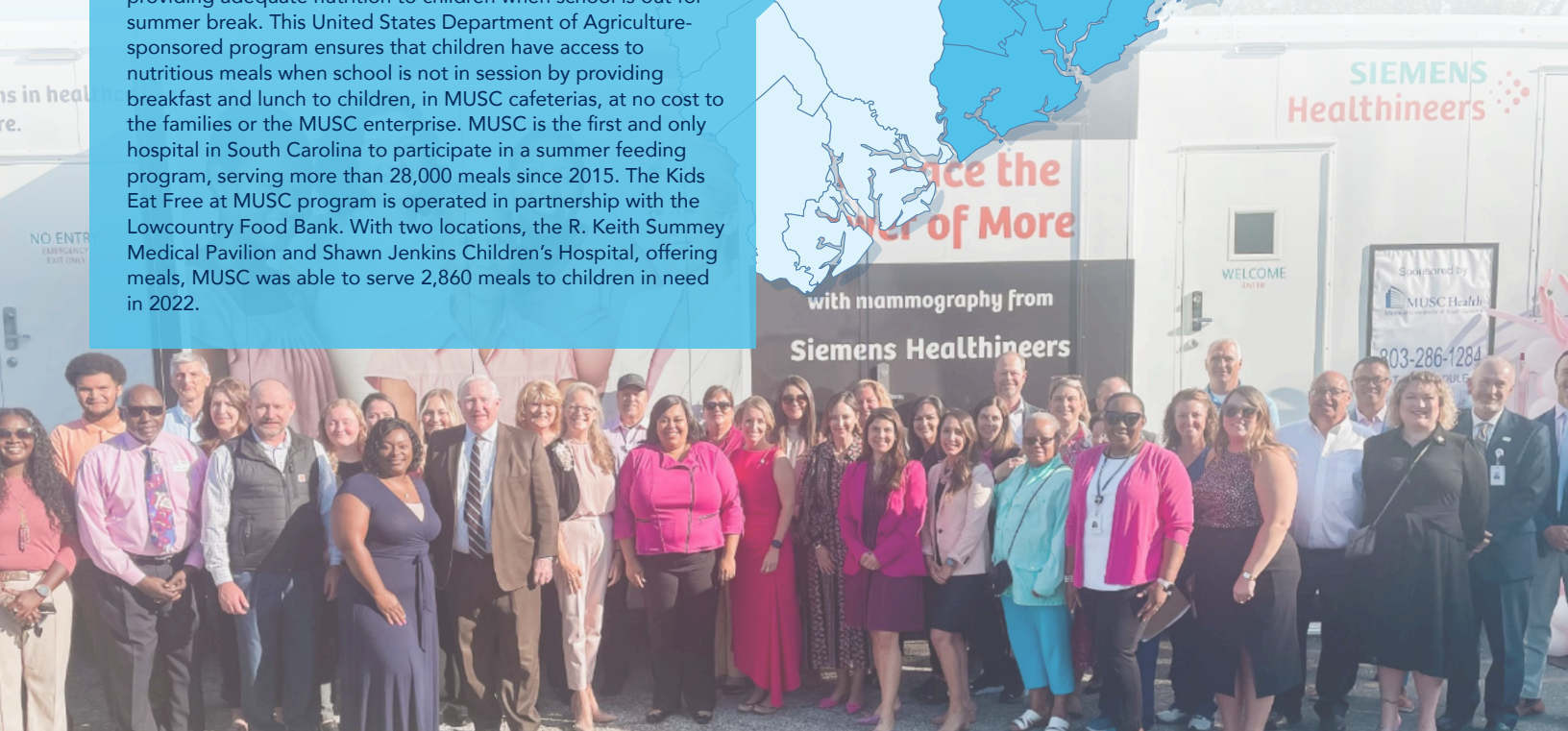
For both the Lake City and Williamsburg County communities, the top barrier to accessing health care services is transportation. MUSC Health Black River partnered with Pee Dee Regional Transit Authority, Williamsburg County Transit Authority and HopeHealth to ensure that reliable public transportation is available to all patients traveling to and from the hospital, with the establishment of new bus routes.

Midlands Division: Workforce Development

In collaboration with Richland School District Two's STEAMM Med Pro 21 Initiative, EdVenture Children's Museum worked with MUSC to highlight local health care professionals. Within the new exhibit, MedVenture, health care professionals share why they chose a health care and/or life science career, which allows for early exposure to students, building a pipeline for tomorrow's workforce.

Charleston Division: Kids Eat Free

The mission of Kids Eat Free at MUSC is to optimize health by providing adequate nutrition to children when school is out for summer break. This United States Department of Agriculture-sponsored program ensures that children have access to nutritious meals when school is not in session by providing breakfast and lunch to children, in MUSC cafeterias, at no cost to the families or the MUSC enterprise. MUSC is the first and only hospital in South Carolina to participate in a summer feeding program, serving more than 28,000 meals since 2015. The Kids Eat Free at MUSC program is operated in partnership with the Lowcountry Food Bank. With two locations, the R. Keith Summey Medical Pavilion and Shawn Jenkins Children's Hospital, offering meals, MUSC was able to serve 2,860 meals to children in need in 2022.



Section VII

Conclusion

MUSC has been a major contributor to South Carolina's economy since its founding in 1824. Not only does MUSC maintain a significant statewide economic footprint through its high employment base and local investments, it also provides the critical community need of quality medical care. This makes MUSC one of the few organizations that improves the quality of life within its communities on multiple levels – by enhancing the health of both the local economy and the health of local citizens.

This study estimates that the total annual economic impact of MUSC is approximately \$7.5 billion on the Charleston Tri-county region. This corresponds to 38,380 jobs and more than \$2.8 billion in labor income that would not exist otherwise. This impact increases to \$10.1 billion across more than 52,000 jobs when examining MUSC's impact on the state of South Carolina as a whole and accounting for the MUSC Regional Health Network that includes facilities in the Pee Dee, Catawba, Midlands and Orangeburg regions. Furthermore, MUSC's statewide economic impact is associated with an employment multiplier of 2.2, meaning that for every 10 jobs created by MUSC, an additional 12 jobs are created elsewhere in the state.

This combination of the size of MUSC and its employment multiplier effect makes it a powerful economic engine. MUSC supports approximately 11% of the total employment base in Charleston and 45% of Charleston's health care industry. This level of economic influence in a region is relatively unique. MUSC also supports high-quality jobs, with the average job at MUSC paying approximately 67% more than the average job in South Carolina.

Additionally, MUSC has a strong record of matching students with in-state employers, thereby helping to grow South Carolina's labor force by attracting and retaining talent over time. The Medical University ranks 1st among South Carolina's research universities in retaining high-skilled graduates and is the only in-state research university in which the majority of its students remain in South Carolina to work for at least five years after graduation.

Finally, MUSC logs nearly 2.4 million patient encounters each year – including hospital care, emergency room visits and physician office visits. Given the link between economic growth and the overall health of the workforce, MUSC plays a vital role in promoting a healthy, productive community.

As the demand for health care steadily rises in South Carolina as a result of a growing and aging population, access to quality medical facilities will become increasingly more important in the coming years. In light of these trends, the importance of MUSC is clear. MUSC serves not only as a sustainable economic engine for South Carolina by providing a sizable number of jobs and incomes for local residents but also through broader investments in more rural areas across the state in a proactive effort to expand its ability to continue to provide the highest-quality health care to South Carolinians.




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