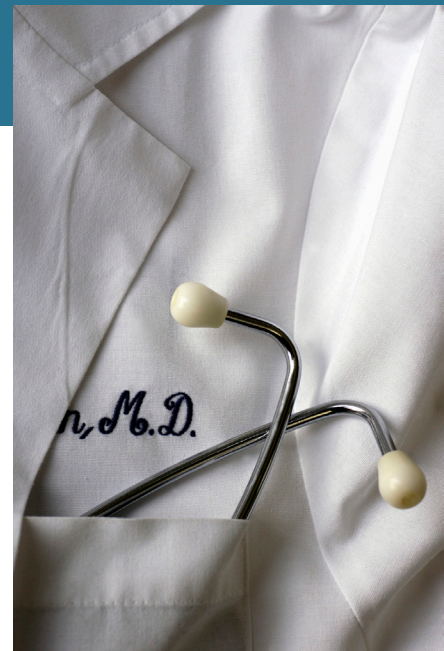
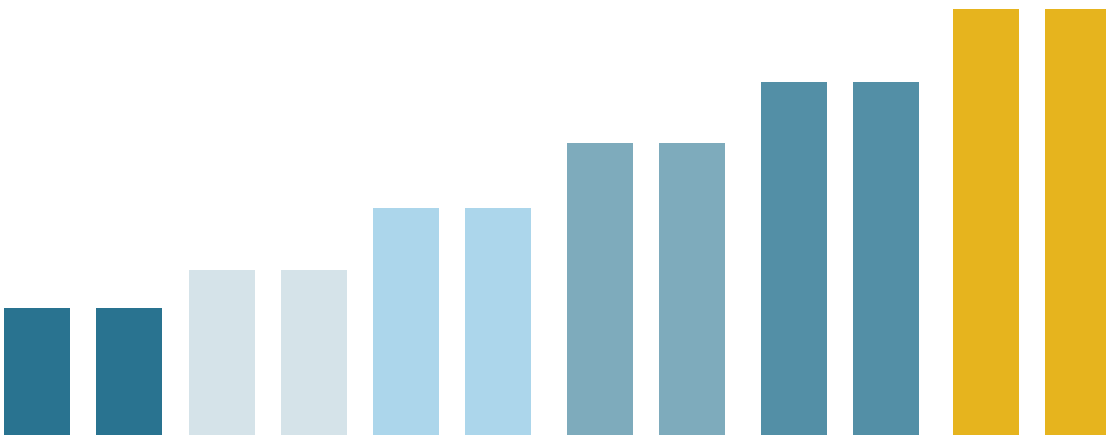




The Physician Workforce in South Carolina

October 2011



The Office for Healthcare Workforce Analysis and Planning (OHW) is a collaborative partnership of the South Carolina Area Health Education Consortium (AHEC), the South Carolina Budget and Control Board Office of Research and Statistics Health and Demographics Section, and the University of South Carolina College of Nursing Office of Healthcare Workforce Research for Nursing. We are dedicated to studying supply and demand issues affecting a wide variety of healthcare professions and occupations in South Carolina. Our primary purpose is the development and analysis of accurate, reliable data on the supply of healthcare professionals and the demand for health services, in order to support workforce planning efforts. Those efforts will help to ensure that the citizens of South Carolina will have the number and types of healthcare providers they will need in the future.

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A full text copy of this report and others
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Any errors or omissions are the full responsibility of the author.

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Background

Physicians are perhaps the most critical element in our healthcare system. Having good information about the number and types of physicians available in our state is essential to effective planning for the healthcare needs of our citizens. South Carolina collects information from physicians every two years when they renew their license to practice medicine. The information they provide permits a description of their overall number, characteristics, and workforce participation rates. Our analysis of the physician workforce in South Carolina is based on data collected from physicians who renewed their license to practice during the period April 15 - June 30, 2009. We have limited the analysis to only those physicians who were actively practicing medicine within the state of South Carolina at the time they renewed their license. More recent information will become available sometime during 2012.

Several limitations apply to our analysis of the physician workforce. The following groups are not included in the figures presented in this report:

- newly trained physicians who began their medical career in South Carolina after June 2009
- experienced physicians who moved to South Carolina after June 2009
- physicians who were previously licensed in South Carolina but did not renew their license during the April 15 - June 30, 2009 renewal period
- physicians with an active license to practice in South Carolina but whose primary practice was located within a military facility.

Physicians who are still in residency training are included in the data we use in this report, but are generally examined separately, unless otherwise noted.

Physician Education in South Carolina

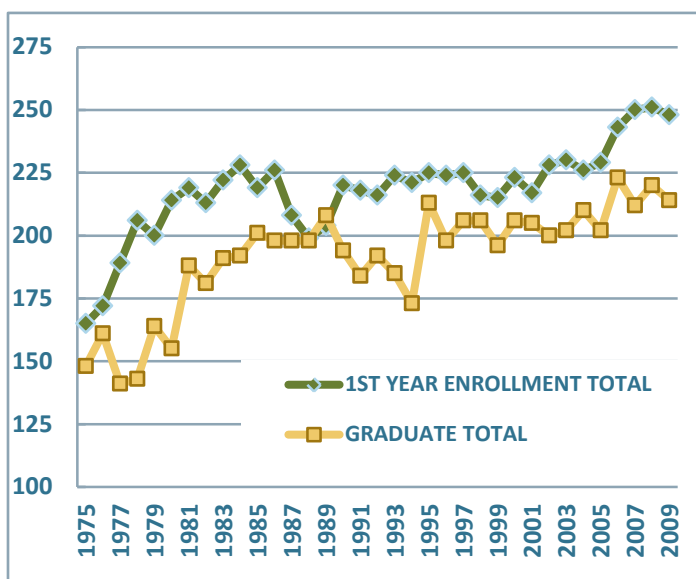


Figure 1. Trends in Medical School Enrollments and Graduations

Based on data reported by the Association of American Medical Colleges (AAMC), a total of 982 students were enrolled in South Carolina medical schools in the 2008-09 academic year. In that same academic year, 245 South Carolinians enrolled as a first-year student in an MD-degree granting medical school somewhere in the United States: 217 (88.6%) of them in a South Carolina school.¹ This was the highest in-state matriculation rate in the country in the 2008-09 academic year.²

The total number of students enrolled in South Carolina medical schools increased by 11.2% between 1999 and 2008: from 883 to 982.³ First year enrollments increased 16.7% from 215 in 1999 to 251 in 2008 and have remained at

similarly high levels: 248 in 2009 and 254 in 2010. In 2008, a total of 220 students graduated from South Carolina medical schools.⁴ In 2010 the total number of graduates was 214.⁵

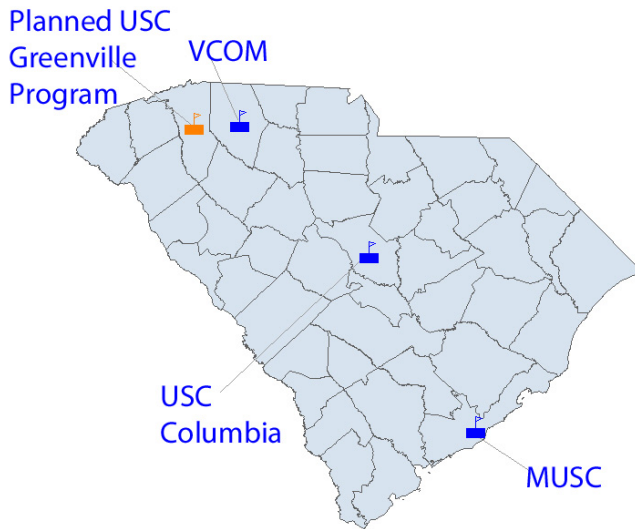


Figure 2. South Carolina Medical Schools

As of January 1, 2011, South Carolina was being served by a medical school in the central region of the state at the University of South Carolina (USC) in Columbia and in the eastern region by the Medical University of South Carolina (MUSC) in Charleston. Beginning in the Fall semester of 2011, the Edward Via College of Osteopathic Medicine (VCOM) opened a satellite campus in Spartanburg, South Carolina.⁶ The VCOM program, whose mission is "to prepare globally minded, community-focused physicians for the rural and medically underserved areas of Virginia, North Carolina, South Carolina and the Appalachian Region," in partnership with the Spartanburg Regional Healthcare System and Wofford College, offers a Doctor of Osteopathic Medicine (DO) degree. An expansion of the MD-degree program at USC is also planned, with

the new campus to be associated with the Greenville Hospital System.

One question raised during discussions about the need for additional medical schools is whether an adequate number of qualified applicants exist in the state to fill new programs. To address that question, we examined trends in the number of applications received by the MUSC and USC Colleges of Medicine over the past 5 years, along with the number of those applications deemed qualified by the schools, the number of applicants admitted, and the number who actually enrolled. These figures were provided by the admissions offices at MUSC and USC.

Readers should note two important limitations in the application data and this analysis: the definition of a "qualified applicant" is determined independently by the admissions committee in each school based on program requirements, GPA, and standardized test scores; and the pool of applications deemed "qualified" by the two existing programs undoubtedly contain some duplication. Some students interested in attending medical school in South Carolina most likely apply to both USC and MUSC.⁷ However, the exact amount of duplication in these numbers is currently unknown. One anecdotal estimate suggests the duplication rate may be as high as 80%.⁸ For that reason, we use the term "applications" rather than "applicants" when talking about the quantity of "qualified" applications received.

There has been a 57% increase in the total number

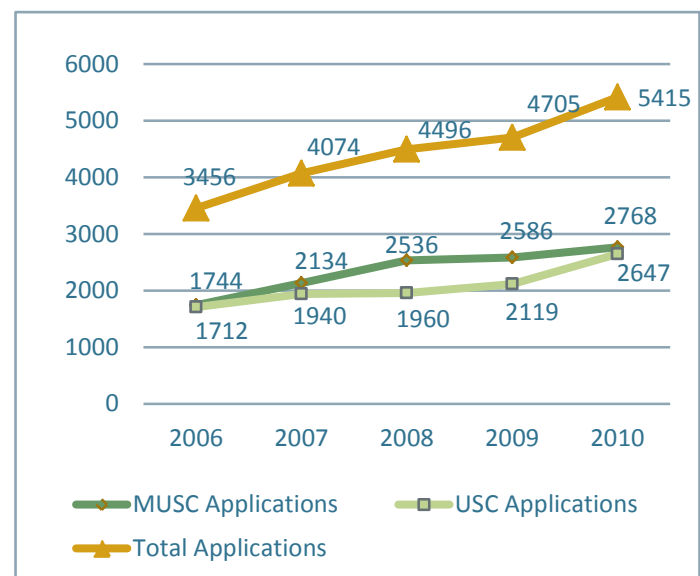


Figure 3. Trends in Total Applications to SC Medical Schools

of applications received by the medical schools at MUSC and USC over the past 5 years, indicating an increased interest in medical education in South Carolina (see Fig. 3). However, the number of applications deemed 'qualified' has increased by only 20% overall - from 728 in 2006 to 875 in 2010. Without knowing the true amount of duplication in these figures, or whether that rate has been consistent over the past 5 years, it is difficult to assess the true size of the pool of qualified students eligible for admission each year.

The number of students admitted each year to the state's two medical schools has increased by 23% from 327 in 2006 to 402 in 2010. However, the total number who actually enroll has increased by only 10%: from 231 in 2006 to 254 in 2010.

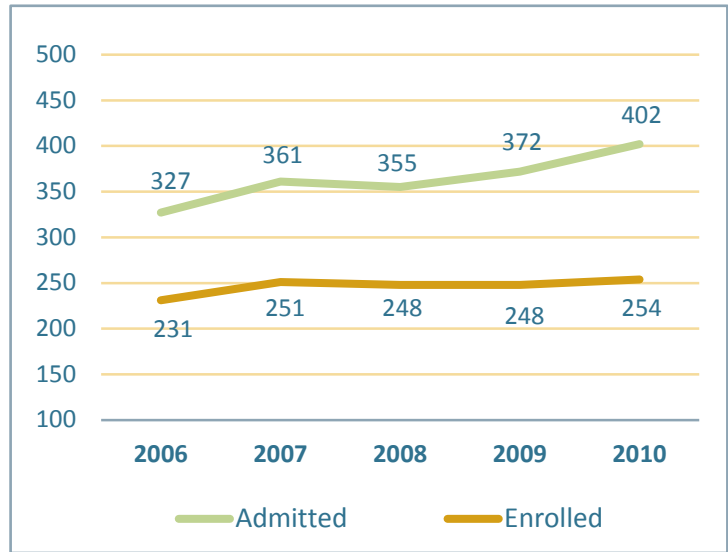


Figure 4. Trend in Student Admissions and Enrollments

The difference between the admissions numbers and the actual enrollment numbers each year is likely influenced by the amount of duplication among the admitted applicants.

In 2010, a total of 473 "qualified" applications did not receive an admission invitation from a South Carolina medical school; as noted earlier, how many of those applications represent unduplicated students is unknown. Applying an 80% duplication rate to the 2010 qualified application pool results in an estimate of approximately 95 qualified applicants over and above the number accepted that year by MUSC and USC.

The map in Fig. 2 shows the geographic locations of the existing, new and planned medical schools. The newest program in the state, the VCOM satellite campus, expects to enroll and graduate 150 osteopathic physicians each year. The first freshman class of 150 was enrolled in the Fall of 2011. The first graduating class is expected in 2015.

The expansion of the USC School of Medicine program received preliminary accreditation in October 2011 from the accrediting body for medical schools in Canada and the United States. According to the Office of Media Relations at the USC School of Medicine, "approximately 40 students annually will be able to spend all four years of their medical training at the Greenville Hospital System as early as 2012." Another source says that the goal for this new program is to increase enrollment to 100 first year students by 2015.⁹

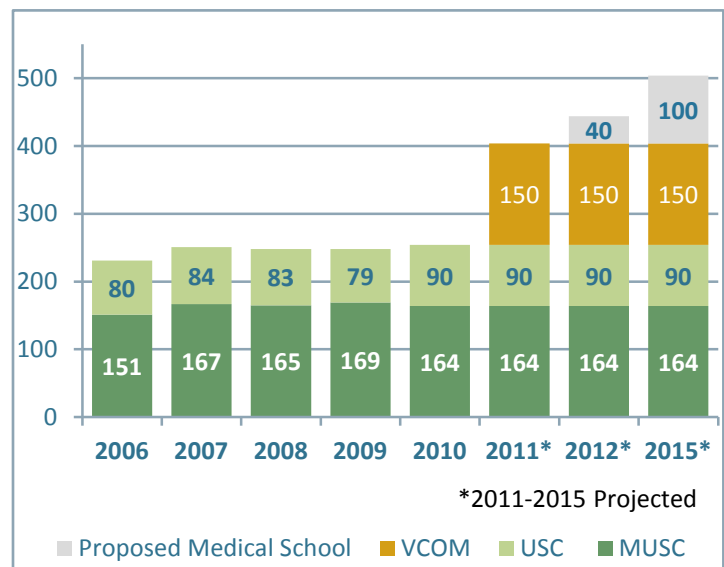


Figure 5. Trends in First Year Enrollments: Past and Future

The chart to the right¹⁰ illustrates that in 2011 the VCOM program will increase annual first year medical school enrollments in South Carolina by approximately 60% over 2010 levels, bringing the state close to 400 new enrollees each year. Assuming the new USC expansion being planned for the Greenville area opens as

scheduled in 2012, the total first year medical school enrollments could increase by another 25% to approximately 500 per year in 2015, as long as there is a sufficient number of qualified applicants available.

Medical education takes place in two phases: four years of undergraduate medical education (UME) consisting of classroom learning and brief exposure to a range of clinical areas of practice, followed by post-graduate level intensive hands-on clinical training in a specific medical specialty that lasts a minimum of 3 years. This graduate-level medical education (GME) is usually referred to as medical residency training. Completing a residency program qualifies the physician to apply for Board certification in their chosen specialty area.

Residency training programs take place in a variety of practice settings, depending on the clinical specialty being studied. In the United States the major source of funding for graduate medical education occurs through the Medicare program. In South Carolina additional support has been provided in the past by the state to develop or expand residency training programs. However, state support has been severely reduced over the past 5 years, federal Medicare funding levels have been frozen for the past 14 years, and federal deficit reduction efforts have targeted GME for further cuts in the future. This declining support for GME is occurring at the same time that medical schools are expanding in order to address an expected shortage of physicians.

This situation of expanding medical school graduates and stagnant or shrinking opportunities for graduate-level training is generating concern among those familiar with the problem. An associated concern is the way in which the existing GME training slots are allocated across the various specialties and whether those current allocations are in line with the type of physician workforce that will be needed in the future.¹¹

Having an adequate residency training pipeline in South Carolina has a direct influence on our ability to retain the physicians we educate in our public schools of medicine. Figure 6 illustrates the large increase in retention when physicians educated in South Carolina are also able to remain in state for their residency training.

As of August 1, 2008, there were a total of 1,127 physicians in medical residency or fellowship programs in South Carolina: 41.2% of them (n=464) in primary care programs; 58.8% of them (n=663) in other clinical specialty and subspecialty areas.¹² This balance of primary care to specialty care training opportunities in the state does not reflect our current physician workforce. In 2009, 48% of the workforce was made up of primary care physicians. (See the next section of this report for more information about the characteristics of the physician workforce in South Carolina.)

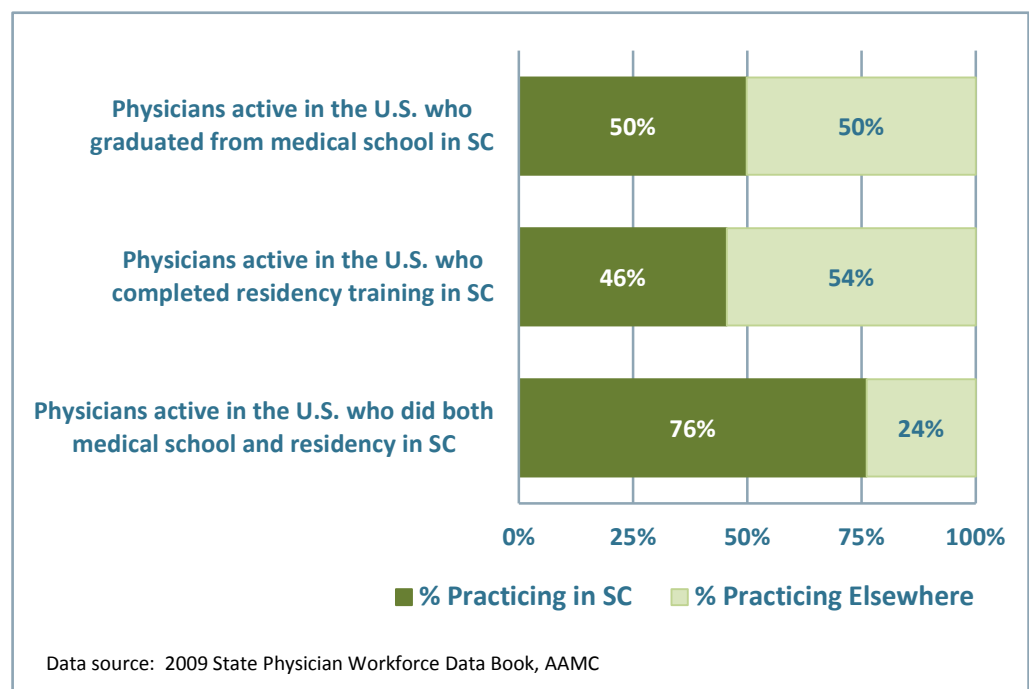


Figure 6. South Carolina Physician Retention Rates by Education Location

The Physician Workforce in South Carolina

The enumeration of the physician workforce presented here is based on information gathered during the 2009 license renewal period which occurred from April 15 through June 30, 2009. A small number of physicians who were actually practicing in the state as of June 20, 2009, may be excluded from this analysis if they received their initial license to practice shortly before the 2009 renewal period. This is the most recent data available. Information gathered during the 2011 renewal period will become available in 2012.

This report examines established physicians and residents in training separately when possible. However, when making comparisons with national-level physician workforce statistics generated by the American Medical Association, it is necessary to combine counts of residents in training with established physicians since the national statistics are based on all licensed physicians. Report table and chart titles, column headings and/or footnotes will clarify whether the figures include or exclude residents in training.

Table 1. Licensed Physicians by Practice Status

Licensed Physicians in South Carolina in 2009	Head counts
# with an active license to practice in South Carolina as of June 30, 2009	15,516
# who are actively practicing within South Carolina	10,163
Of those who practice in South Carolina:	
# who practice in military/federal facilities AND hold a South Carolina license ^a	259
# in residency training ^b	1,289
Total # of active SC physicians who are not military or in residency training (i.e. "established" physicians)	8,615
# established physicians involved in direct patient care	8,427

a Department of Defense and other federal healthcare facilities do not require that physician employees hold a license to practice in that state as long as they are actively licensed in another state. This is probably an under-count of the actual number of physicians practicing in military and federal facilities within South Carolina.

b Note that 8 residents in training were also employed in military facilities and are counted in both categories here.

Altogether, 15,516 physicians held an active license to practice in South Carolina as of June 30, 2009. Of that number, 10,163 reported themselves as actively practicing medicine within the borders of South Carolina. When those who reported their primary practice as being in a military facility are removed^a, the available workforce numbered 9,904 - a figure that includes both "established" physicians (those who have completed all of their entry-level training) and those who are still involved in graduate-level training in their chosen specialty (often referred to as "residents" or "residents in training"). Residents in training are fully licensed to practice medicine and made up approximately 13% of our physician workforce in 2009.

Not all established physicians are involved in direct patient care activities. Some devote their time entirely to research or to administrative tasks. Although the number is small in the South Carolina workforce (n = 188), it is important to be able to identify those involved in direct patient care activities when addressing patient care issues and so that group is identified in Table 1.

^a It is customary to exclude physicians whose primary practice is in a military or federal facility from workforce studies, since they are rarely available to provide services to the general public.

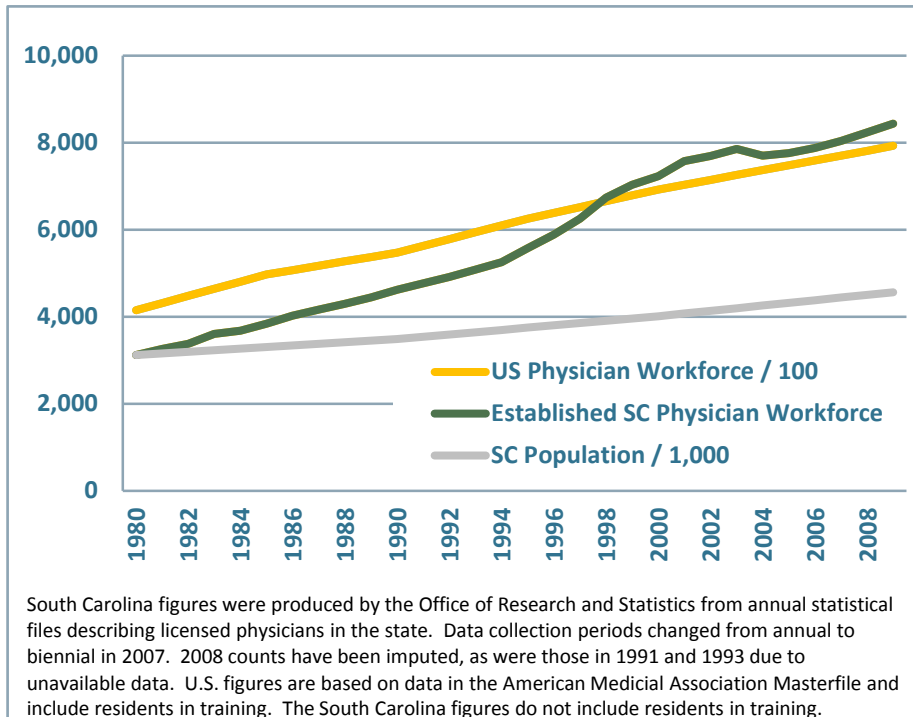


Figure 7. Growth in SC Population, State and National Physician Workforce

Over the last 30 years, the size of the established physician workforce in the state has more than doubled: from a little over 3,100 in 1980 to 8,615 in 2009. During that same period the size of the general population in South Carolina grew from a total of 3,121,820 to 4,561,242 - a growth rate of about 46%.

Figure 7 compares the growth trend in South Carolina to the national trend. It shows that from 1980 to the mid-1990s the growth of the physician workforce in South Carolina mirrored the national rates of growth. But in the decade between 1995 and 2004 the physician workforce in South Carolina grew at a faster rate

than the national trend. Since then our state rate appears to be reflecting the national trend again.

In spite of the strong growth in our physician workforce over the past 30 years, South Carolina still trails the rest of the United States in the balance between the number of actively practicing physicians and our population numbers. In 2009 South Carolina was ranked 34th in the nation in its supply of actively practicing physicians but only 43rd in the number of actively practicing primary care physicians.¹³ Not surprisingly given

these statistics, South Carolina was ranked 39th by The Commonwealth Fund in 2009 in terms of patient access to healthcare services.¹⁴ All but one county in the state is designated, in whole or in part, as a Health Professional Shortage Area for primary care physicians.

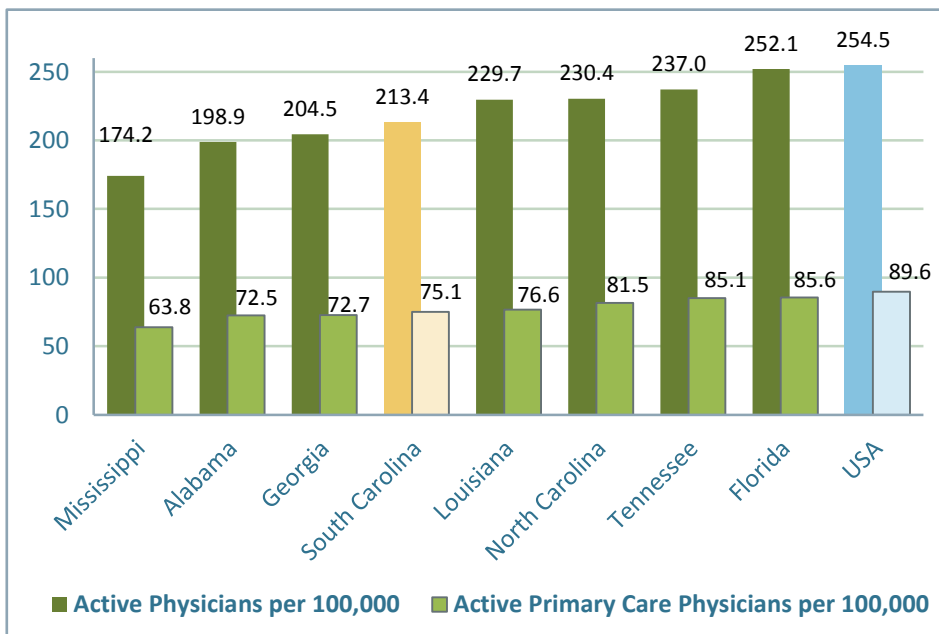


Figure 8. Active Physicians per 100,000 Population - Southeast United States 2009

In general, states in the Southeastern region of the United States tend to have relatively smaller physician supplies than is true of most other regions of the country. (See Figure 8.) Compared to our neighboring states in the Southeast, South Carolina

falls in the middle of the range - both in terms of overall physician supply per 100,000 people and the supply of primary care physicians - and well below the national average.

Workforce Characteristics

Clinical Specialties in the Physician Workforce

During the license renewal process, physicians identify their clinical specialty area(s) from an extensive list of options - 146 in all. These specialties are linked to the geographic location(s) where each physician practices in the state. When more than one specialty or subspecialty is reported, the one associated with the physician's principle practice - the practice site where he or she spends the most time each week - is assumed to be the dominant specialty. We have organized these 146 different specialties and subspecialties into the same categories used by the American Medical Association (AMA) in their periodic description of all physicians in the United States. The national comparison statistics in the following table are taken from the 2011 edition of the AMA publication "Physician Characteristics and Distribution in the US" which profiles the national physician workforce in 2009. The AMA includes physicians in their reported statistics who are still in residency training; therefore, we have done the same for the South Carolina figures reported in Table 2.

Using the same clinical specialty categories employed by the AMA, Table 2 reports the distribution of those clinical specialties within the physician workforce in both South Carolina and across the United States, adjusted for the size of the population. By reporting the concentration of specific types of physicians for each 100,000 people, it is possible to see how the physician workforce in our state looks similar to or different from the physician workforce throughout the United States. The calculation of physician numbers per 100,000 people is based on the count of actively practicing physicians, including residents in training. The mathematical equation to determine the number of South Carolina physicians per 100,000 persons is:

$$\text{Physicians per 100,000 population} = \text{Active physicians} / (\text{population count} / 100,000)$$

$$\text{SC physicians per 100,000 population} = \frac{\text{total \# of actively practicing physicians in SC in 2009}}{2009 \text{ population} / 100,000}$$

$$217.1 = 9,904 / (4,561,242 / 100,000)$$

If residents in training are removed from this calculation and the computation is done using only established South Carolina physicians, the figure is 188.9 physicians per 100,000 persons.

Table 2. Comparison of Clinical Specialty Distributions in the South Carolina and National Physician Workforce, 2009

Clinical Specialty	Physician Workforce per 100,000 Population		Clinical Specialty	Physician Workforce per 100,000 Population	
	South Carolina	United States		South Carolina	United States
All Specialties	217.1	276.4			
Internal Medicine	36.3	55.2	General Practice	2.5	3.9
Family Medicine	34.5	33.2	Other Specialty	2.4	1.9
Pediatrics	19.5	25.7	Child/Adolescent Psychiatry	1.7	2.5
Emergency Medicine	13.0	11.8	Plastic Surgery	1.7	2.4
Obstetrics & Gynecology	12.9	14.7	Neurological Surgery	1.7	1.9
General Surgery	12.0	12.7	Physical Medicine & Rehabilitation	1.5	3.3
Psychiatry	10.4	13.7	Allergy and Immunology	1.2	1.4
Anesthesiology	10.1	14.8	Radiation Oncology	1.1	1.5
Orthopedic Surgery	8.3	8.6	Occupational Medicine	0.9	0.9
Cardiovascular Disease	5.8	7.7	Thoracic Surgery	0.7	1.5
Ophthalmology	5.7	6.1	Pediatric Cardiology	0.7	0.7
Diagnostic Radiology	4.2	8.6	Colon & Rectal Surgery	0.4	0.5
Anatomic/Clinical Pathology	4.1	6.4	Public Health/Preventive Medicine	0.4	0.4
Radiology	3.7	3.1	Medical Genetics	0.4	0.2
Gastroenterology	3.5	4.4	General Preventive Medicine	0.2	0.8
Urology	3.5	3.5	Forensic Pathology	0.2	0.2
Neurology	3.3	5.3	Transplant Surgery	0.2	0.1
Dermatology	2.9	3.8	Nuclear Medicine	0.1	0.5
Otolaryngology	2.8	3.5	Aerospace Medicine	0.1	0.2
Pulmonary Diseases	2.5	3.7	Unspecified Specialty	0.2	5.2

Note: The South Carolina figures in this table include both established physicians and residents in training in order to be directly comparable to the national statistics.

Compared to the United States as a whole, the total number of physicians actively practicing in South Carolina for each 100,000 citizens is substantially less: 217.1 physicians for every 100,000 persons in South Carolina versus a national supply of 276.4 across the United States. Given this general disparity, it is not surprising that the South Carolina figures for different clinical specialties and subspecialties tend to be lower than the national ratios in most cases.

One area in which the South Carolina physician workforce looks substantially different from the national profile is in the ratio of Internal Medicine physicians per 100,000 persons: 36.3 in South Carolina versus 55.2 across the United States. Another is a substantially lower ratio of Pediatricians to population than is seen at the national level (19.5 in South Carolina vs. 25.7 across the U.S.). Other clinical specialties and

subspecialties include much smaller absolute numbers of physicians and thus their "per 100,000" ratios are much smaller numbers, making it more difficult to see where South Carolina's workforce is substantially different from the national picture.

Clinical specialties where the supply of South Carolina physicians appears to be significantly smaller than the national profile would be: Anesthesiology, Diagnostic Radiology, Physical Medicine and Rehabilitation, Thoracic Surgery, and General Preventive Medicine. There are a few clinical areas in which South Carolina has a larger supply of physicians for each 100,000 persons than is true at the national level: Emergency Medicine, Radiology, Gastroenterology, and Medical Genetics.

To make the size of the South Carolina physician workforce equivalent to the national measure of 276.4 physicians for every 100,000 persons would require an addition of approximately 2,700 physicians to our current workforce, an increase of 27% over our 2009 supply. However, matching the national levels may not be a meaningful goal. Research has shown that how the workforce is distributed in terms of primary care versus specialist physicians is more important for population health than the sheer numbers. When primary care physicians make up the largest portion of the workforce, population health outcomes tend to be better.¹⁵ Where those physicians practice also makes a difference since sheer numbers do not necessarily translate into better access to services.

Measuring the Size of the Physician Workforce

The comparison of the size of the South Carolina physician workforce with the national profile for each 100,000 persons uses a head count of the physicians who reported in 2009 that they were actively practicing medicine. However, not all physicians are involved in the workforce to the same extent. Another way of measuring the size of the workforce is to focus on the number of hours worked and use that information to translate head counts into full-time equivalent (FTE) personnel. Doing so produces a standardized measure of effort for the workforce as a whole that can be obscured by the variation in work habits that occur at the individual level. Having such a standardized measure of effort is also valuable when trying to forecast future changes in the available supply of physicians and/or in matching physician supply to the demand for services.

We use a 40 hour work week to measure full-time equivalence in Table 3 and in subsequent analyses reporting FTEs. Although many physicians work more than 40 hours in a week, the trend is toward a 40 hour work week among younger physicians and those who are employed by groups or health systems rather than self-employed. A physician who works 40 hours in a typical week is counted as 1 FTE. A physician who works 60 hours in a typical week is counted as 1.5 FTE, etc.

Recent research which found that the size of the primary care workforce in a geographic area is associated with better health outcomes among Medicare beneficiaries also noted the importance of measuring the workforce in ways that make clear the amount of time that primary care physicians actually spend in delivering care.¹⁶ Table 3 measures the size of the established South Carolina physician workforce in several different ways: by head count; by summing the FTE values for all physicians based on the total number of hours they report working in a typical week; and by summarizing the FTE values for the number of hours they report being engaged in patient care activities.

Table 3. Size of the Established South Carolina Physician Workforce by Clinical Area in 2009

Clinical Specialty	Established SC Physician Workforce	Total Full Time Equivalents (FTEs) in the Workforce	Patient Care FTEs in the Workforce
All Specialties Total:	8,615	10,973.1	9,319.0
Internal Medicine	1,410	1,836.7	1,570.3
Family Medicine	1,343	1,623.1	1,393.4
Pediatrics	730	880.9	722.9
Emergency Medicine	533	587.4	514.6
Obstetrics & Gynecology	516	725.6	628.6
General Surgery	389	583.1	483.9
Psychiatry	380	403.8	314.5
Anesthesiology	417	581.5	529.2
Orthopedic Surgery	329	452.9	392.9
Cardiovascular Disease	260	386.8	343.2
Ophthalmology	243	282.5	241.3
Diagnostic Radiology	185	223.3	207.5
Anatomic / Clinical Pathology	163	200.0	161.5
Radiology	150	189.6	172.7
Gastroenterology	158	225.6	200.3
Urology	152	220.6	199.2
Neurology	129	175.3	145.0
Dermatology	125	131.1	108.1
Otolaryngology	114	153.9	129.9
Pulmonary Diseases	110	167.7	139.9
General Practice	110	114.5	104.0
Other Specialties	109	130.4	67.8
Plastic Surgery	76	111.4	89.6
Child/Adolescent Psychiatry	66	71.7	57.7
Neurological Surgery	72	92.8	80.4
Physical Medicine & Rehabilitation	66	80.5	67.2
Allergy and Immunology	56	59.5	49.6
Radiation Oncology	44	51.7	46.5
Occupational Medicine	40	41.3	33.1
Thoracic Surgery	27	42.6	35.7
Pediatric Cardiology	27	37.1	21.7
Public Health/Preventive Medicine	18	17.9	3.6
Colon & Rectal Surgery	18	30.9	27.2
Medical Genetics	16	21.0	13.7

Table 3. continued - Size of the Established Physician Workforce by Clinical Area in 2009

Clinical Specialty	Established SC Physician Workforce	Total Full Time Equivalents (FTEs)	Patient Care FTEs
Forensic Pathology	11	12.4	7.9
Transplant Surgery	8	13.1	7.8
General Preventive Medicine	8	7.4	2.6
Aerospace Medicine	3	1.8	1.5
Nuclear Medicine	3	3.7	2.5

Primary Care Physicians in South Carolina

The clinical specialties that are generally recognized as making up the primary care physician workforce are: Family Medicine, General Practice, Internal Medicine, Obstetrics/Gynecology (Ob/Gyns), and Pediatrics. Between 1975 and 2009, the fastest growing of these specialties was Family Medicine which increased by more than 600% nationally. The field we now know as Family Medicine grew out of a desire to strengthen the preparation of generalist physicians after World War II. This new specialty has essentially replaced the group of physicians known as General Practitioners whose numbers in the national workforce have decreased by 78% since 1975.¹⁷

In general, however, the overall growth of the primary care specialties in medicine has been relatively slight: as a group they comprised 42% of the entire United States physician workforce in 1975, but had grown to only 45% of the total physician workforce by 2009.¹⁸ In South Carolina we have done a little better. Primary care physicians made up approximately 48% of the active, established physician workforce in the state in 2009.

Some physicians in the primary care specialties may focus their practice on more narrowly defined specialized care within their field, and thus may not be as available to deliver primary care services as we assume. This is especially true in the fields of Internal Medicine and Pediatrics. The AMA differentiates between physicians in general primary care specialties and those in primary care subspecialties in the 2011 edition of their "Physician Characteristics and Distribution in the US" publication. We use the AMA definitions of generalist and subspecialist in Table 4 to identify the percent of physicians in South Carolina's primary care workforce who report that their primary practice is in a subspecialty area of care rather than general primary care. The result is a better reflection of the true size of the primary care physician workforce.

Table 4 presents the number of physicians in the primary care workforce in South Carolina in 2009, both by head counts and by the number of FTEs those physicians represent, based on a 40 hour work week. Two different FTE sums are provided: one based on the total number of hours worked in a typical week and one based on the number of hours devoted to patient care activities in a typical week. All of the workforce counts presented in Table 4 are based on the 'established' physician workforce which excludes physicians in residency training in 2009. In addition, the FTE counts based on total hours worked per week were used to calculate the number of physician FTEs per 100,000 persons in the state.

Within the primary care specialties, the fields of Family Medicine and General Practice make up 33% of the total head count and the FTE measures of the workforce. Internal Medicine accounts for 35%; Pediatricians make up about 17%; and Ob/Gyns are approximately 14%.

Table 4. Size of the Primary Care Physician Workforce in South Carolina, 2009: Generalists and Sub-Specialists

Primary Care Clinical Area	Established Physician Workforce 2009 (Residents Removed)			Primary Care Physician FTEs per 100,000 Persons in South Carolina
	Head Count	Total FTEs	Patient Care FTEs	
Total Primary Care Physician Workforce:	4,109	5,180.8	4419.1	113.6
General Practice	110	114.5	104.0	2.5
Family Medicine	1,343	1,623.1	1,393.3	35.6
Internal Medicine	1,410	1,836.7	1,570.3	40.3
Pediatrics	730	880.9	722.9	19.3
Obstetrics / Gynecology	516	725.6	628.6	15.9
Primary Care Workforce - Generalists	3,469	4,304.3	3736.0	94.4
General Practice	110	114.5	104.0	2.5
Family Medicine- Generalists	1,314	1,586.5	1,363.2	34.8
Internal Medicine - Generalists	992	1,255.2	1,105.5	27.5
Pediatrics - Generalists	625	732.2	618.2	16.1
Obstetrics / Gynecology - Generalists	428	615.9	545.1	13.5
Primary Care Workforce - Subspecialists	640	876.5	683.1	19.2
Family Medicine - Subspecialists	29	36.6	30.1	0.8
Internal Medicine - Subspecialists	418	581.5	464.8	12.7
Pediatrics - Subspecialists	105	148.7	104.7	3.3
Obstetrics / Gynecology - Subspecialists	88	109.7	83.5	2.4

Note: Full time equivalents are based on the number of hours worked per week. 1 FTE = 40 hours per week. The last column in this table uses the total FTE values, based on the total hours worked per week as the numerator in the per 100,000 calculation.

When primary care physicians are identified as generalists or specialists, the figures in Table 4 reveal that about 16% of the physicians we generally consider as being part of the primary care workforce are actually engaged in a subspecialty area of practice. However, that proportion differs widely across the specialty groups involved. Only 2.2% of Family Medicine physicians practice in a subspecialty field, compared to 29.7% of Internal Medicine physicians. Among Pediatricians, 14.4% report that their principle practice is in a subspecialty field. The percentage of Ob/Gyns practicing in a subspecialty area is 17.1%. All of these percentages are based on the actual number of physicians (i.e. head counts).

When percentages are based on FTEs in the workforce, the proportions who report their principle practice is in a subspecialty area do not change substantially: 2.3% of Family Medicine physicians, 31.7% of Internal Medicine physicians, 16.9% of Pediatricians, and 15.1% of Ob/Gyns.

When examining the concentration of the different types of primary care physicians in the workforce (see the far right column in Table 4) it is clear that, among those considered to be generalists, Family Medicine physicians make up the largest segment of the primary care physician workforce in South Carolina with a density of 34.8 FTEs for each 100,000 citizens.

Physician Work Hours and Activities^b

When physicians renew their licenses, they report the ways in which their work time is distributed during a typical week: direct patient care, administrative activities, research, teaching, training, or other tasks. They also report the number of hours devoted to each type of activity in a week. This information is the basis of the figures presented in this section.

Table 5. Hours Worked per Week by Activity Type in the Established Physician Workforce, 2009

Activity Types	# of physicians reporting hours > 0	Range of Hours Reported	Average Hours per Week	Total Sum of Weekly Hours Reported
Patient Care	8,426	1 - 99	44.3	372,734
Administration	4192	1 - 80	8.1	33,870
Research	914	1 - 65	7.6	6,931
Teaching	2152	1 - 57	7.5	16,047
Training	601	1 - 80	10.1	6,049
Other	464	1 - 55	7.1	3,299
Totals	8,614	1 - 99	51.0	438,910

Note: The total sum of weekly hours reported is the sum of hours across each specified activity type. Residents in training are excluded from these figures.

Within the established physician workforce, the average number of hours worked during a typical week was 51 in 2009.¹⁹ However, the information in Table 5 makes clear that there is wide variation in physician work patterns: values ranged from a low of 1 to a high of 99 hours per week. Only a very small percentage (2.7%) work fewer than 20 hours in a week. Another 9.5% work between 21 and 39 hours in a typical week. Twenty-five percent of the physician workforce said they usually work 40 hours per week, another 12% reported 50 hours per week, and 18% reported a typical work week as being 60 hours long.

^b The analyses in this section of the report focus on the work habits of the "established" physician workforce - those physicians who have completed their residency training and are actively engaged in the practice of medicine within the state of South Carolina. In 2009 that definition applied to 8,615 physicians licensed to practice in the state.

Almost all (97.8%) physicians in the established workforce are involved in patient care activities. Among that group, patient care hours accounted for 85% of a typical work week in 2009, and amounted to a total of 372,734 hours devoted to patient care activities each week in the state. About half (48.7%) of the established physicians devote some time each week to administrative activities; 10.6% are involved with research; 25% have teaching responsibilities; and 7% report being involved in some type of training activity in a typical week.

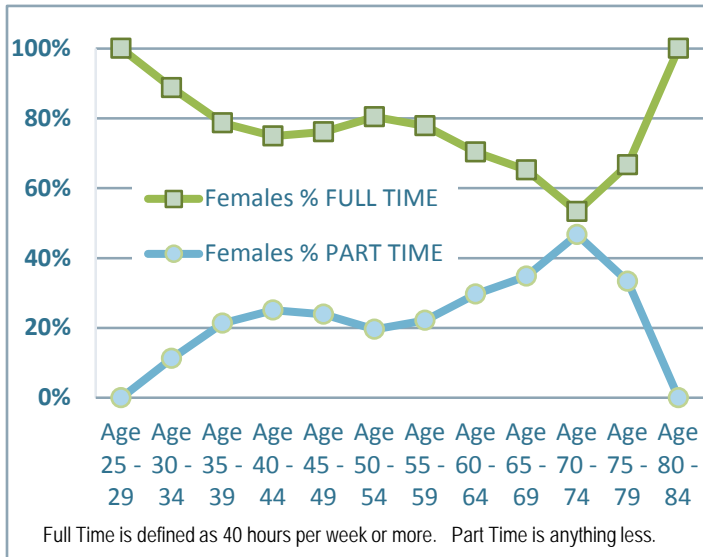


Figure 9. Female Physician Work Patterns by Age

The information in Table 6 (see next page) suggests that several factors influence the number of hours worked by physicians in a typical week: gender, age, employment status, geographic location, and clinical specialty. Established physicians under the age of 45 tend to work fewer hours per week than those age 45 to 64. And those who are age 65 and older work fewer hours, on average.

Female physicians tend to work 6 or 7 fewer hours per week than their male colleagues, on average. However, age is also an influential factor and, as a group, female physicians are younger than their male colleagues: the average age among females in 2009 was 44.8 compared to an average age of 51.2 for males. Male and female physicians tend to have different work

characteristics in terms of hours worked per week at different points in their lives. Figures 9 and 10 illustrate how full- and part-time work schedules differ by age and gender. The pattern for female physicians suggests that part-time schedules (less than 40 hours per week) are more likely during the years when children might be in the home (see Fig. 9). Male physicians are more likely to report working a full-time schedule (40 hours or more per week) until they reach traditional retirement ages (see Fig. 10).

Self-employed physicians tend to work more hours per week than those who are employed by others. The business/employment model under which physicians work is also something that has been changing in recent years and is likely confounded with age and gender influences. Perhaps surprising is the fact that practicing in a rural location is not associated with a longer work week. (See Table 6.) Physicians practicing in rural areas reported an average work week of 51.3 hours, compared to 50.9 hours for those in urban areas, a difference of less than half an hour. However, the amount of time spent in patient care activities did differ: it was lower for physicians in urban areas than for those in rural areas. (See Table 6.)

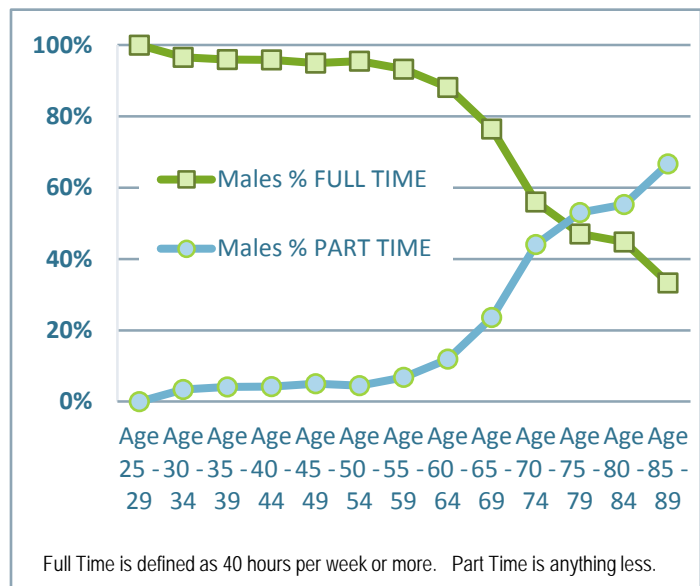


Figure 10. Male Physician Work Patterns by Age

Table 6. Average Weekly Work Hours by Physician Demographics, Practice Characteristics and Clinical Specialty

Physician Characteristic	Average Total Hours Worked per Week	Average Patient Care Hours per Week
Gender:		
Male	52.5	44.9
Female	45.9	37.8
Age		
Under Age 45	49.7	42.3
Age 45 - 64	53.8	45.8
Age 65 or older	46.0	38.4
Employment Status		
Self-Employed	52.3	47.0
Employed by Others	48.0	34.9
Geographic Location		
Rural	51.3	46.6
Urban	50.9	42.7
Clinical Specialty or Subspecialty		
Family Medicine	48.3	41.5
Internal Medicine	52.1	44.5
Pediatrics	48.3	39.6
Obstetrics / Gynecology	56.2	48.7
General Surgery	60.0	49.8
Anesthesiology	55.8	50.8
Emergency Medicine	44.1	38.6
Psychiatry	42.5	33.1
Cardiovascular Disease	59.5	52.8

Note: The clinical specialty areas included in this table are the 10 largest clinical specialty groups in terms of the number of actively practicing, established physicians in 2009.

Finally, the average number of hours worked during a typical week varies widely by clinical specialty or subspecialty. For the ten largest clinical groupings (see Table 6) average total hours per week ranged from a low of 42.5 for physicians in Psychiatry to a high of 60 hours for physicians in General Surgery. The average number of patient care hours per week also showed similar diversity across these specialty groups.

Physician Practice Settings and Employment Types

Figure 11 shows the various types of employers that physicians reported having in 2009. The traditional business model for physicians has been one in which they act as entrepreneurs and establish a small business to support their practice. Slightly more than two-thirds (69.3%) of the physicians practicing in the state in 2009 reported being self-employed, either in solo practice (11.8%) or as part of a group practice (see Figure 11 for the percentages). However, that self-employment model is beginning to change as hospital systems and other healthcare entities develop outpatient service facilities and build group practice businesses that assume the financial and administrative responsibilities associated with the practice of medicine, and hire physicians to provide those services.

About 15% of the established physicians were employed by some level of government, (see Fig. 11 for the percentages by level) which would include those employed in our schools of medicine, in federally-funded health clinics, and in county or state-supported hospitals and health departments.

The “other private employer” cited by 13.7% of physicians could include for-profit hospitals, pharmaceutical companies, businesses involved in medical research or service delivery, or some other type of privately held business. Physicians’ broad knowledge of medicine and healthcare issues make them a valuable addition to any business involved with those matters.

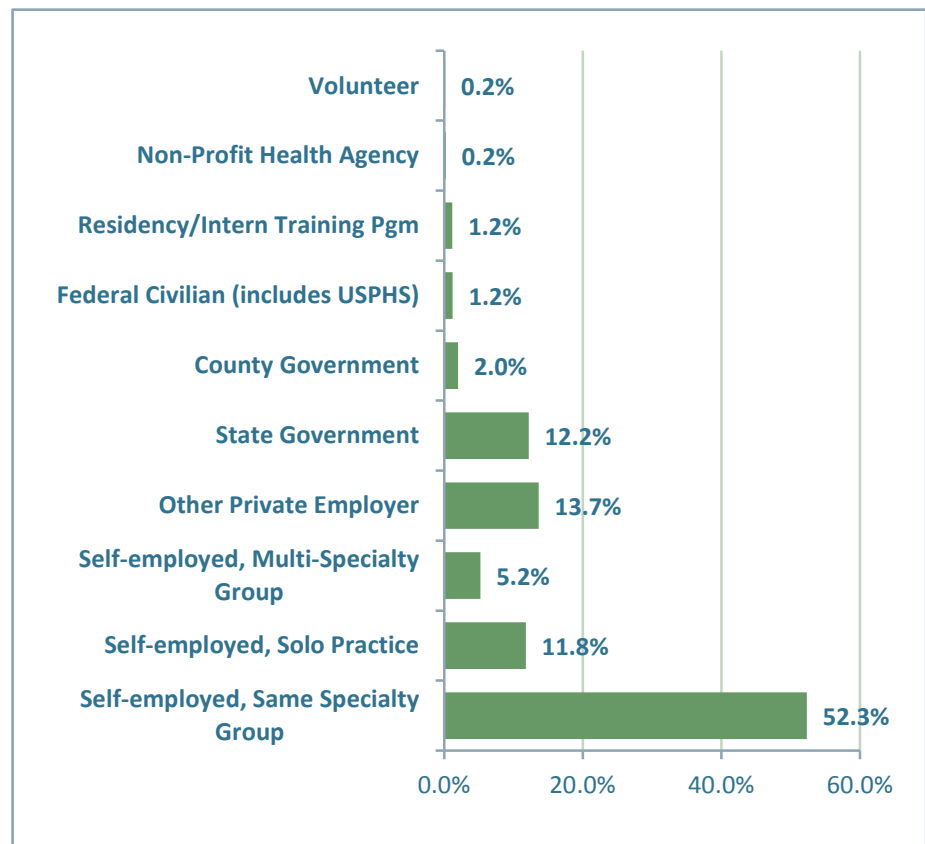


Figure 11. Employer Types Among Established South Carolina Physicians, 2009

Physicians also practice in a wide variety of practice settings and facilities. These are profiled in Figure 12, based on the principle practice location (i.e. the location where they spend the most time each week if they have more than one practice location) reported by each physician. The majority of physicians in South Carolina (63.8%) provided services in a private office setting in 2009. Of those, a separate analysis shows that 91.5% were self-employed in one form or another: 17.8% as solo practitioners; 8.0% were part of a multi-specialty group practice; and 65.7% were self-employed within a shared group practice with other physicians who practice the same clinical specialty. The remainder of the private office-based physicians were employed by some other type of private employer (5.6%), by state government (2.5%) or by county government (0.4%).

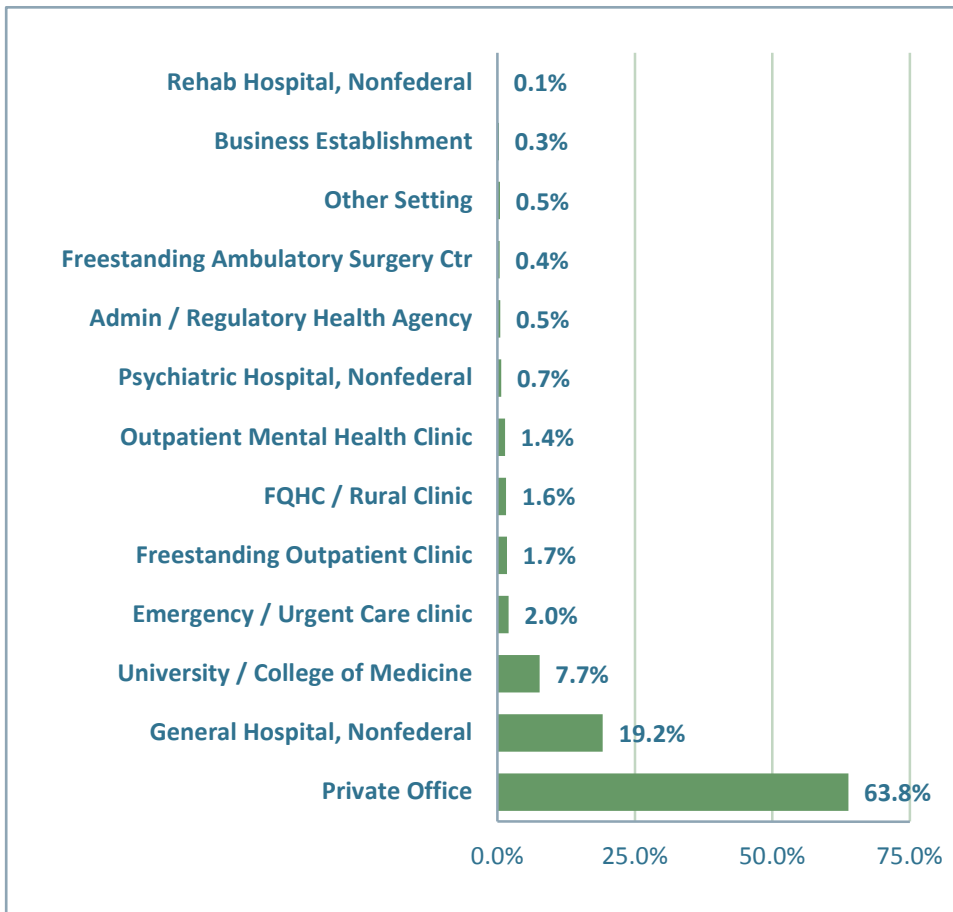


Figure 12. Principle Practice Settings for Established Physicians in 2009

Physicians who reported a hospital as their principle practice location were also likely to be self-employed: 54.3% of them within a same-specialty group practice structure; 2.1% as solo practitioners; and 0.7% as part of a multi-specialty group practice. The remaining hospital-based physicians reported a variety of ownership types: 29.4% were paid by a "private employer" which suggests a for-profit hospital; 8.1% were employed in hospitals supported by county governments; 2.1% were supported by state government; 2.1% were employed by residency training programs located within a hospital; and 0.2% reported practicing in a non-profit hospital.

Physician Demographic Characteristics

Racial Demographics

The racial demographics of the physician workforce do not reflect the racial composition of South Carolina's population. Table 7 makes clear that African Americans are severely under-represented in the existing physician workforce, relative to the general population. Note that physicians currently in residency training are slightly more diverse in terms of race, but African Americans are still too few to be on par with the population.

Table 7. Race and Ethnicity: Physicians and South Carolina Population

Racial Characteristics	South Carolina Population 2008	Established Physician Workforce 2009		Residents in Training 2009		National Physician Workforce 2009
	%	%	#	%	#	%
Caucasian	69.3	84.2	7,254	78.9	1,017	52.3
African-American	28.9	5.8	500	6.6	85	3.6
Asian / Pacific Islander	1.4	6.5	563	8.1	105	12.1
American Indian	0.5	0.1	11	0.9	11	0.2
Hispanic	4.0 *	1.3	110	3.0	39	4.6
Other	0	2.0	169	2.0	26	1.4
Unknown	0	0.1	8	0.5	6	25.8
Totals:	104.1%*	100%	8,615	100%	1,289	100%

* Note that "Hispanic" is not a racial identity, but an ethnic one. State population figures do not combine race and ethnicity - each is measured separately. In the physician data race and ethnicity are combined into a single question. As a result, the percentages in this table for the population, established physicians and residents are not directly comparable.

It is difficult to compare the racial composition of the physician workforce in South Carolina to the national profile, given the large amount of missing data (25.8%) in the national figures (see the last column in Table 7).

Research has shown that people from minority groups generally prefer to see providers who share their racial or ethnic background.²⁰ Thus, having too few African Americans in our physician workforce has implications for access to care for the Black community in South Carolina.

Minority physicians in South Carolina make up a larger share of the physician workforce in rural areas of the state than in urban areas (see Figure 13). Approximately 34% of the minority population in South Carolina lives in rural areas, the majority of whom are African American.

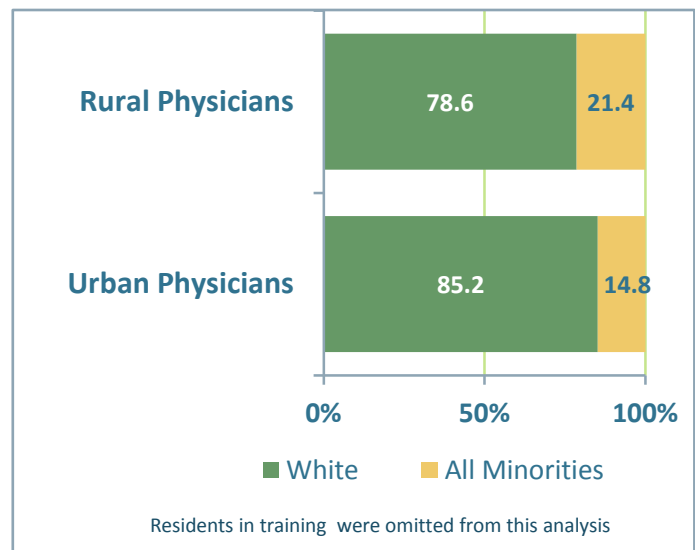


Figure 13. Physician Race and Practice Location

Gender Demographics

Most of the physicians in South Carolina are male, but recent increases in the number of females attending medical school are changing the gender profile of the profession. This increase in the number of females in medicine is reflected in the large proportion of females among the residents in training in the state in 2009. (See Table 8.)

Table 8. Gender in the Physician Workforce

Gender Characteristics	Established Physician Workforce 2009		Residents in Training 2009	
	#	%	#	%
Male	6,596	76.6	711	55.2
Female	2,013	23.4	578	44.8
Gender Unknown	6	0.1	0	0
Total:	8,615	100.1	1,289	100

Note: Percentage totals may not equal 100 due to rounding.

Age Demographics

The average age in the state's physician workforce in 2009 was 47.3 when including residents in training, and 49.7 when residents were excluded from the analysis. Figure 14 shows the shape of the age distribution among physicians actively practicing in South Carolina in 2009. Table 9 reports the percentages in different age groups.

Although physicians tend to start their careers at later ages than most other professionals, and remain in the workforce at older ages, it is important to note that 19.4% of the established physician workforce (residents excluded) in South Carolina were age 60 or older in 2009. As the current decade progresses we can expect to see the great majority of those physicians scale back their work hours or leave the workforce altogether.

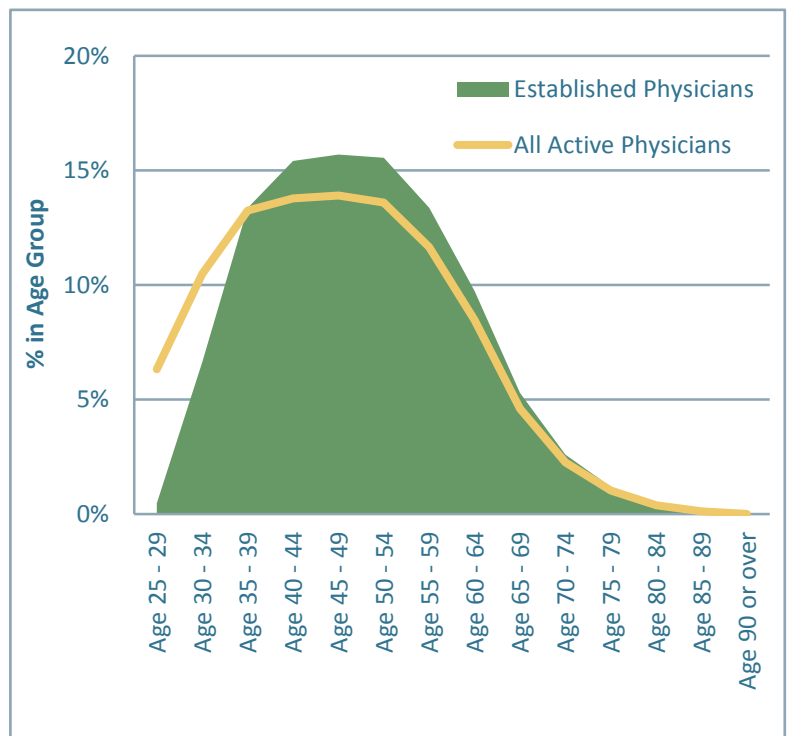


Figure 14. Age Profile of the Physician Workforce in 2009

Of course, younger physicians currently in residency training, and those who graduate from medical school in the next 5 years, will be moving into the workforce at the same time.

Table 9. Age Distribution in the South Carolina Physician Workforce

Age Group:	Established Physicians 2009		Residents in Training 2009	
	#	%	#	%
Age 25 - 29	41	0.5%	585	45.4%
Age 30 - 39	1,722	20.0%	629	48.8%
Age 40 - 49	2,680	31.1%	62	4.8%
Age 50 - 59	2,492	28.9%	10	0.8%
Age 60 - 69	1,295	15.0%	1	0.1%
Age 70 - 79	327	3.8%	0	0.0%
Age 80 +	53	0.6%	0	0.0%
Age unknown	5	0.1%	2	0.2%
Total:	8,615	100%	1,289	100%

Figure 15 suggests that the physician workforce in South Carolina is slightly younger than the national workforce. However, the data used by the American Medical Association to create these national statistics has recently been shown to overestimate the number of older physicians in the workforce.²¹

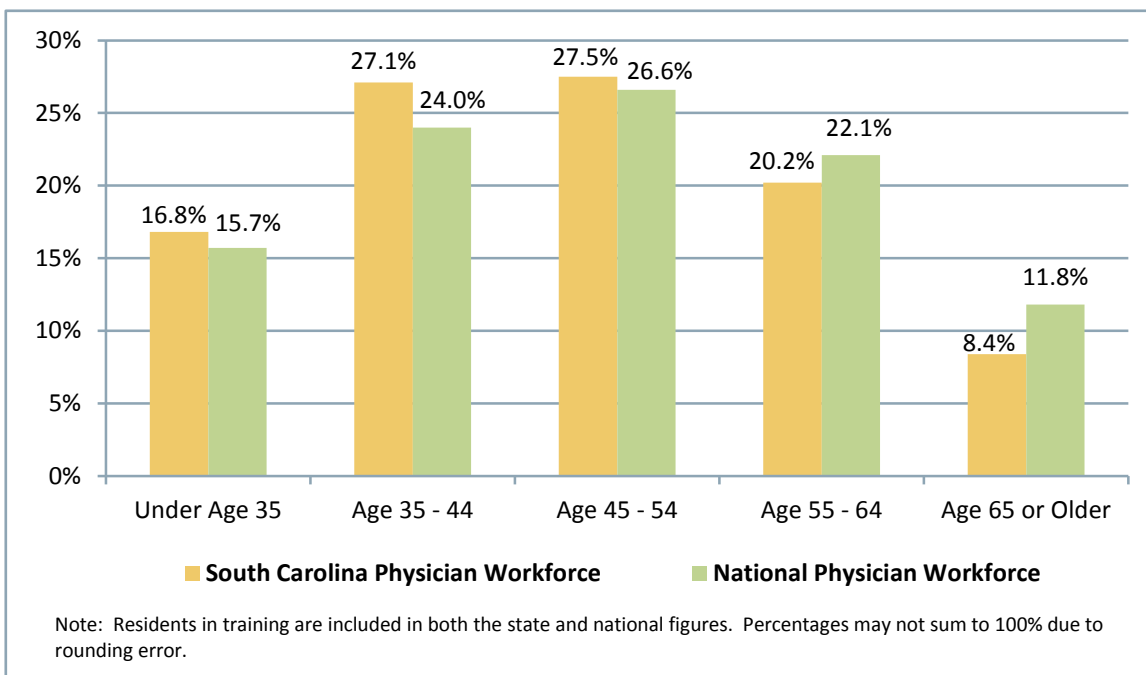


Figure 15. Age Distributions in the South Carolina and National Physician Workforce, 2009

Physician age profiles also differ by gender and racial characteristics (see Table 10). The average age of female physicians in 2009 was 44.8 while for males it was 51.2. Physicians from minority groups tend to be younger, as a group, than Caucasian physicians whose average age in 2009 was 50.4 years. Among African American physicians the average age was 46.5 years; it was 45.3 for those with an Asian background; Hispanics had an average age of 41.7; and those of American Indian descent were 38.6 years of age on average. These racial and gender differences in the South Carolina physician workforce reflect the increasing diversity within the profession.

Table 10. Age Distribution in 2009 of Established South Carolina Physicians by Race and Gender

Age Categories	Caucasian		African American		Asian / Pacific Islander		Hispanic		All Other Racial Groups	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
N =	5,710	1,541	287	213	385	176	77	33	132	47
% Under 35	4.6	12.6	6.6	14.1	7.8	18.8	11.7	27.3	15.9	10.6
% Age 35 - 44	23.9	37.5	31.4	41.8	40.3	48.3	52.0	51.5	29.6	36.2
% Age 45 - 54	31.3	32.4	31.0	32.9	34.0	20.5	29.9	21.2	28.0	27.7
% Age 55 - 64	27.6	15.6	25.4	11.3	9.1	8.0	5.2	0	15.9	14.9
% Age 65 +	12.8	2.0	5.6	0	8.8	4.6	1.3	0	10.6	10.6

Note: Percentages may not sum to 100% due to rounding error.

One of the most common workforce policy issues related to physician demographics concerns the aging of the physician workforce. Another is the extent to which the physician workforce reflects the racial composition of the population being served. Table 11 on the following page addresses both of these questions by summarizing the percentage of physicians who were age 60 or older in 2009 and the percentage of physicians who were from under-represented minority groups, broken down by the physicians' dominant clinical specialties. The rows in Table 11 are organized according to the absolute size of each clinical specialty group, as in Table 3. As a result, it should be expected that the clinical specialties and subspecialties found in the lower right side of the table might have large percentage values because the actual number of physicians on which those percentages are based is small.

The findings in Table 11 suggest that several clinical fields in our state's physician workforce might be severely impacted by a large number of retirements in the next decade: Psychiatry, Diagnostic Radiology, Pathology, Urology, Occupational Medicine, Public Health and General Preventive Medicine, Medical

Genetics, and Nuclear Medicine are likely to be hit hardest. It also suggests which clinical fields have been more or less attractive to physicians from under-represented minority groups. Because physicians from Asian or Pacific Island backgrounds are represented at a higher rate in medicine than in the general population, they are not considered to be an "under-represented" minority group. (See the footnote to Table 11 for more information.)

Table 11. Age and Racial Characteristics of Established South Carolina Physicians by Clinical Specialty Area, 2009

Clinical Specialty	Age and Race Characteristics			Clinical Specialty	Age and Race Characteristics		
	age 60 or older	under-represented minority groups			age 60 or older	under-represented minority groups	
	%	n	%		%	n	%
All Specialties	19.5	1,675	9.2				
Internal Medicine	16.6	233	15.6	General Practice	54.6	60	9.1
Family Medicine	17.7	238	10.9	Other Specialty	39.5	43	5.5
Pediatrics	14.3	104	11.8	Child/Adolescent Psychiatry	16.7	11	9.1
Emergency Medicine	11.5	61	5.5	Plastic Surgery	23.7	18	6.6
Obstetrics & Gynecology	21.3	110	9.9	Neurological Surgery	15.3	11	11.1
General Surgery	23.7	92	6.7	Physical Medicine & Rehabilitation	4.6	3	10.6
Psychiatry	30.8	117	12.1	Allergy and Immunology	17.9	10	3.6
Anesthesiology	12.0	50	4.1	Radiation Oncology	22.7	10	6.8
Orthopedic Surgery	17.9	59	4.3	Occupational Medicine	35.0	14	2.5
Cardiovascular Disease	21.2	55	8.9	Thoracic Surgery	14.8	4	0
Ophthalmology	24.3	59	2.5	Pediatric Cardiology	7.4	2	3.7
Diagnostic Radiology	26.5	49	2.2	Colon & Rectal Surgery	11.1	2	0
Anatomic / Clinical Pathology	25.8	42	4.9	Public Health/Preventive Medicine	44.4	8	22.2
Radiology	11.3	17	3.3	Medical Genetics	31.3	5	6.3
Gastroenterology	19.0	30	9.5	General Preventive Medicine	62.5	5	12.5
Urology	32.2	49	2.6	Forensic Pathology	20.0	2	9.1
Neurology	14.7	19	12.4	Transplant Surgery	12.5	1	12.5
Dermatology	30.4	38	2.4	Nuclear Medicine	66.7	2	0
Otolaryngology	22.8	26	2.6	Aerospace Medicine	100	3	0
Pulmonary Diseases	11.9	13	9.2	Unspecified Specialty	0	0	0

Note: Physicians in residency training are not included in these figures. Under-represented minority groups include African-Americans, Hispanics, Native Americans and those who identify themselves as belonging to an 'other' racial category. The groups excluded from the race percentages are those who identify themselves as Caucasian or Asian/Pacific Islander.

The potential for significant losses due to retirements during the next decade was also examined in a separate analysis by the rural or urban location of physicians and by the clinical specialties and subspecialties listed in Table 11. The result of that analysis shows that, in general, the age profile of physicians in rural areas is not very different from those in urban areas. However, rural areas of the state may experience a disproportionate loss of physicians in several clinical fields. Fifty percent of the Psychiatrists in rural areas who specialize in treating children and adolescents were age 60 or older in 2009, compared to 14.5% practicing in urban areas. Forty-two percent of the rural-based Diagnostic Radiologists were age 60 or older in 2009, compared to 24% in urban areas. There are only a very few Radiation Oncologists practicing in rural communities, and of those few 67% can be expected to retire within the next decade.

Two clinical areas in particular stand out as potential crisis points for the state as a whole when the aging of the physician workforce is considered: public health and mental health. Fifty percent of the established physicians practicing in specialties related to public health in 2009 (i.e. General Preventive Medicine and Public Health / Preventive Medicine) were age 60 or older. Among established Psychiatrists, one-third of those practicing in rural areas were age 60 or older in 2009, as were 30% of those in urban areas. And as noted earlier, 50% of the rural Psychiatrists who specialize in treating children and adolescents were aged 60 or older in 2009. Altogether, 117 of the 380 psychiatrists (30.8%) with an established practice in the state - regardless of practice location - are likely to retire within the next 10 years.

What Might the Future Hold?

The population in South Carolina has been growing at a rate of about 10% per decade over the past 40 years. Preliminary figures from the 2010 census show a growth rate of 15% over the last ten years. It seems clear

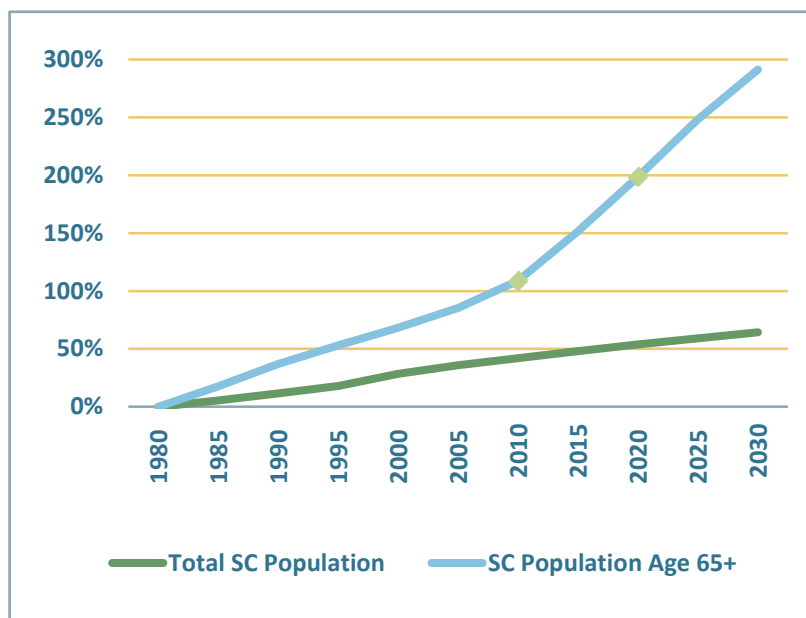


Figure 16. Population Growth Trends in South Carolina: 1980 - 2030

that our population is likely to continue to increase into the future, and along with it the need for physicians. Perhaps more influential than the growth of the general population is the rapid growth in the number of people aged 65 and older in the state. Figure 16 illustrates that this segment of the population increased by more than 100% between 1980 and 2010 and is expected to increase by that amount again within the next 10 years. Because the need for medical services tends to increase with age, we can expect that an increase in the number of older citizens will be accompanied by an increase in the demand for physicians.

Yet, the rate at which our state is currently producing and/or attracting new physicians into the state may not

be enough to meet those growing needs. Based on an analysis of the gains and losses to the physician workforce that occurred between 2007 and 2009, South Carolina was successful in attracting a larger number of physicians into the state to practice than we lost during that period: a net gain of 330 established physicians. About 30% of that gain was composed of new physicians within 5 years of graduation from medical school who had completed residency training; another 30% were in the early stages of their careers, and another 30% had been in practice for more than 10 years. The remaining 10% had graduated from medical school more than 30 years ago. All of these physicians were new additions to our active and established workforce. During that same period the state experienced a net gain of 372 physicians in different stages of their residency training who also contribute to our active supply of physicians, but are more transient than physicians who have completed residency training. Altogether, gains have exceeded losses to our supply of actively practicing physicians in recent years.

That situation may change in the next decade as a large percentage of our physicians reach retirement age. As noted earlier, 19% of our physician workforce in 2009 was aged 60 or older. If we assume that all physicians will leave the workforce by age 70, we can expect, based on the current age profile, that approximately 200 physicians will retire each year between now and 2020. After 2020 the number will increase to about 240 each year through 2030. Those estimates are probably conservative, since some physicians may choose to retire before the age of 70.

Over the past 5 years, from 2006 through 2010, our medical schools have averaged 249 graduates each year. Our retention rate for students educated in South Carolina has traditionally been 50%.²² This results in an expected retention of approximately 125 graduates annually, once they have completed their residency training. The Edward Via College of Osteopathic Medicine expects to produce about 150 graduates each year, starting in 2015. It is unlikely that we will retain 50% of their graduates, given that school's broad focus on supplying physicians to the Appalachian region. It may be more reasonable to assume we will keep 30% which equates to an additional 45 new physicians per year. Additional graduates may be expected to result from the expansion of the University of South Carolina College of Medicine in partnership with the Greenville Hospital System, but will most likely be subject to the same 50% retention rate as seen in current graduates. Altogether, that would bring our annual production of new physicians likely to practice in South Carolina to somewhere between 170 to 200 each year. Yet, based on the age analysis of our current workforce we can expect to lose about 200 or more to retirement alone each year during the next decade.

Conclusions

Although the physician workforce in South Carolina has grown substantially over the past 30 years, the state still ranks below the national average in terms of the total size of the workforce relative to the population being served, and the number and proportion of physicians in the primary care specialties. Strong population growth in South Carolina, especially among those age 65 and older, suggests that the demand for physicians and medical services will continue to grow and may grow very rapidly over the next two decades.

The aging of the physician workforce during the next decade is expected to result in the loss of 200 or more physicians each year just to retirement. Our current physician education system may be able to produce replacements if we maintain current graduation levels and new programs come on line as expected in the next 5 years. However, simply maintaining our current supply numbers will not be enough to maintain the current status quo in terms of the number of physicians for each 100,000 people in the state, given our population aging and growth trends. Nor will it improve our relatively poor standing in the national statistics for access to care.

As we move into the future, a number of issues related to the physician workforce deserve attention:

- The number of available placements for graduate-level residency training in our state is stagnant or shrinking at the same time that we are expanding the number of students in our medical schools. Being able to keep medical students in state for their residency training has been shown to have a substantial impact on retaining those physicians in state to practice.²³ Aligning the number and type of residency training slots with the number and types of physicians needed in the state is critical.
- In order to meet the needs of a growing and aging population, it may become necessary to develop recruitment and retention policies and programs that will increase the number of physicians coming into the state to practice, above and beyond the number we are able to educate here.
- It will be important to address the way in which our physician workforce is distributed both geographically and in terms of the balance between primary care and specialty care in order to meet the needs of South Carolinians and improve the health of our communities. Policies or programs that encourage physicians to practice in underserved areas and/or in specific clinical areas may be needed.
- It is unclear to what extent the 700,000 South Carolinians currently without health insurance will become eligible for insurance coverage under the terms of the Affordable Care Act and/or an available insurance exchange program. If even half of them obtain affordable insurance coverage in the next 5 years, the result will be a significant increase in the demand for physicians - especially those in the primary care specialties.

The information summarized in this report is intended to inform the discussions and policy decisions that will take place around these issues in South Carolina.

End Notes and References

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- ¹ 2009 State Physician Workforce Data Book. Center for Workforce Studies, Association of American Medical Colleges, November, 2009.
 - ² *ibid.*
 - ³ *ibid.*
 - ⁴ Unpublished data from the South Carolina Office of Research and Statistics, Health and Demographics section, annual survey of medical schools.
 - ⁵ National Center for Educational Statistics, College Navigator website. Graduation counts were downloaded August 8, 2011 separately for MUSC and USC and summed together.
 - ⁶ The main campus of the Edward Via College of Osteopathic Medicine is located in Blacksburg, Virginia,
 - ⁷ The in-state matriculation rate (the number of students entering any medical school who attend a school within their home state) in South Carolina was the highest in the nation in the 2008-09 academic year according to the Association of American Medical Colleges, 2009 State Physician Workforce Data Book, November 2009.
 - ⁸ Private conversation with a USC School of Medicine faculty member familiar with the admissions process and applicant characteristics.
 - ⁹ Post and Courier "USC eyes med school expansion" (05Aug2010). Downloaded August 25, 2010 from: <http://www.oistabdcyruer.cin/news/2010/aug/05/usc-eyes-med-school-expansion/>
 - ¹⁰ Sources used to create this chart include: MUSC admissions office, USC admission office, Greenville Online.com, (26Feb2010) "Edward Via College of Osteopathic Medicine could help fill doctor shortage;" USC Office of Media Relations "USC, GHS boards approve program expansion" (06Aug2010), and Post and Courier "USC eyes med school expansion" (05Aug2010).
 - ¹¹ Michael M.W. Johns, Chair, Ensuring an Effective Physician Workforce for America, Proceedings of a Conference Sponsored by the Josiah Macy Jr. Foundation, held in Atlanta, GA, Oct. 24-25, 2010; New York: Josiah Macy Jr. Foundation; 2010. Accessible at www.macyfoundation.org.
 - ¹² 2009 State Physician Workforce Data Book. Center for Workforce Studies, Association of American Medical Colleges, November, 2009.
 - ¹³ 2009 State Physician Workforce Data Book, Center for Workforce Studies, Association of American Medical Colleges, November 2009. All data from this source was compiled as of December 31, 2009, from the American Medical Association's Physician Masterfile.
 - ¹⁴ The Commonwealth Fund, 2009 State Scorecard interactive website accessed July 11, 2010 at <http://www.commonwealthfund.org/Maps-and-Data/State-Scorecard-2009/DataByState/State.aspx?state=SC>
 - ¹⁵ Barbara Starfield, Leiyu Shi, and James Macinko. "Contribution of Primary Care to Health Systems and Health." *The Milbank Quarterly*, Vol 83, No. 3, 2005.
 - ¹⁶ Chiang-Hua Chang, Therese A. Stukel, Ann Barry Flood, and David C. Goodman. "Primary Care Physician Workforce and Medicare Beneficiaries' Health Outcomes." *JAMA* May 25, 2011. Vol 305, No. 20.
 - ¹⁷ Physician Characteristics and Distribution in the US, 2011 Edition. Division of Survey and Data Resources, American Medical Association, 2011.
 - ¹⁸ *ibid.*
 - ¹⁸ Gray, B. and Stoddard, J.J. "Patient - Physician Pairing: Does Racial and Ethnic Congruity Influence Selection of a Regular Physician? *Journal of Community Health*, Vol. 22, No. 4, August 1997.
 - ¹⁸ Staiger, Douglas O. David I. Auerbach Peter I. Buerhaus. "Comparison of Physician Workforce Estimates and Supply Projections." *JAMA*, Vol 302, No. 15, October 21, 2009.

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- ¹⁹ The question about hours worked per week did not specify whether on-call hours should be included in the total reported. It is possible that some physicians included on-call hours while others did not.
- ²⁰ Gray, B. and Stoddard, J.J. "Patient - Physician Pairing: Does Racial and Ethnic Congruity Influence Selection of a Regular Physician? *Journal of Community Health*, Vol. 22, No. 4, August 1997.
- ²¹ Staiger, Douglas O. David I. Auerbach Peter I. Buerhaus. "Comparison of Physician Workforce Estimates and Supply Projections." *JAMA*, Vol. 302, No. 15, October 21, 2009.
- ²² 2009 State Physician Workforce Data Book. Center for Workforce Studies, Association of American Medical Colleges, November, 2009.
- ²³ Retaining Physicians Educated in South Carolina. Office for Healthcare Workforce Analysis and Planning Data Brief, March 2011. Downloaded Aug. 22, 2010 from:
<http://www.officeforhealthcareworkforce.org/docs/Retaining%20Physicians%20Educated%20in%20South%20Carolina.pdf>

APPENDIX A - Clinical Specialty Groupings Defined

Clinical specialties and subspecialties are self-designated by physicians. In the American Medical Association (AMA) data referenced in this report, physicians choose from a list of codes included in the survey questionnaire used by the AMA to populate their Masterfile. A similar process occurs among South Carolina physicians when they renew their license to practice with the South Carolina Board of Medicine, using a list of codes very similar to those used by the AMA.

The AMA publication "Physician Characteristics and Distribution in the US, 2011 Edition" reports statistics on 40 different clinical specialty groups, created by aggregating the individual clinical codes used in their survey questionnaire. In order to be able to compare the South Carolina physician workforce with national statistics we have used the same grouping technique as the AMA. The specific definitions of which detailed specialty codes are included in each of the 40 major clinical categories are reported below. The abbreviations in parentheses are the code abbreviations used in conjunction with the South Carolina physician data file. This list omits any subspecialties used by the AMA but not by the South Carolina Board of Medicine.

Classifications for Physician Practice Specialties

Allergy & Immunology (AI)

Allergy (A)
Allergy & Immunology/Clinical & Laboratory
Immunology (ALI)
Diagnostic Laboratory/Immunology (DLI)
Immunology (IG)

Aerospace Medicine (AM)

Anesthesiology (AN)

Pain Medicine (Anesthesiology; APM)
Critical Care (Anesthesiology; CCA)

Cardiovascular Disease (CD)

Child & Adolescent Psychiatry (CHP)

Colon & Rectal Surgery (CRS)

Proctology (PRO)

Dermatology (D)

Clinical & Laboratory Dermatological
Immunology (DDL)
Procedural Dermatology (PRD)

Diagnostic Radiology (DR)

Cardiothoracic Radiology (CTR)

Emergency Medicine (EM)

Sports Medicine (Emergency Medicine; ESM)
Medical Toxicology (Emergency Medicine; ETX)
Pediatric Emergency Medicine (Emergency
Medicine; PE)
Urgent Care Medicine (UCM)
Underseas Medicine (Emergency Medicine; UME)

Forensic Pathology (FOP)

Family Medicine (FM or FP)

Geriatric Medicine (Family Medicine; FPG)
Family Medicine/Psychiatry (FPP)
Internal Medicine/Family Medicine (IFP)
Sports Medicine (Family Medicine; FSM)
Student Health (SH)

Gastroenterology (GE)

General Practice (GP)

General Preventive Medicine (GPM)

Medical Toxicology (Preventive Medicine; PTX)
Undersea Medicine (Preventive Medicine; UM)

General Surgery (GS)

Abdominal Surgery (AS)
Surgical Critical Care (Surgery; CCS)
Craniofacial Surgery (CFS)
Cardiovascular Surgery (CDS)
Dermatologic Surgery (DS)
Head & Neck Surgery (HNS)
Hand Surgery (HS)
Hand Surgery (Surgery; HSS)
Oral & Maxillofacial Surgery (OMF)
Pediatric Cardiothoracic Surgery (PCS)
Pediatric Surgery (Surgery; PDS)
Surgical Oncology (SO)
Trauma Surgery (TRS)
Vascular Surgery (VS)

Internal Medicine (IM)

Adolescent Medicine (AMI)
Critical Care Medicine (Internal Medicine; CCM)
Diabetes (DIA)
Endocrinology, Diabetes & Metabolism (END)
Geriatrics (GER)
Hematology (Internal Medicine; HEM)
Hepatology (HEP)
Hematology/Oncology (HO)
Hospitalist (HOS)
Interventional Cardiology (IC)
Cardiac Electrophysiology (ICE)
Infectious Disease (ID)
Clinical & Laboratory Immunology (Internal
Medicine; ILI)
Internal Medicine/Dermatology (IMD)
Geriatric Medicine (IMG)
Internal Medicine (Preventive Medicine; IPM)
Sports Medicine (Internal Medicine; ISM)
Internal Medicine (Emergency Medicine; MEM)
Internal Medicine & Neurology (MN)
Internal Medicine/Psychiatry (MP)
Nuclear Cardiology (NC)
Nephrology (NEP)
Nutrition (NTR)
Medical Oncology (ON)
Rheumatology (RHU)

Medical Genetics (MG)

Clinical Biochemical Genetics (CBG)
Clinical Cytogenetics (CCG)
Clinical Genetics (CG)
Clinical Molecular Genetics (CMG)

Neurology (N)

Child Neurology (CHN)
Clinical Neurophysiology (CN)
Vascular Neurology (VN)

Nuclear Medicine (NM)**Neurological Surgery (NS)**

Endovascular Surgical Neuroradiology (ESN)
Critical Care Medicine (Neurological Surgery;
NCC)
Neurology/Diagnostic Radiology/Neuroradiology
(NRN)
Pediatric Surgery (Neurology; NSP)

Obstetrics & Gynecology (OBG)

Gynecological Oncology (GO)
Gynecology (GYN)
Maternal & Fetal Medicine (MFM)
Obstetrics (OBS)
Critical Care Medicine (Obstetrics & Gynecology;
OCC)
Reproductive Endocrinology (REN)

Occupational Medicine (OM)**Ophthalmology (OPH)**

Pediatric Ophthalmology (PO)

Orthopedic Surgery (ORS)

Hand Surgery (Orthopedic Surgery; HSO)
Adult Reconstructive Orthopedics (OAR)
Orthopedics, Foot & Ankle (OFA)
Osteopathic Manipulative Medicine (OMM)
Musculoskeletal Oncology (OMO)
Pediatric Orthopedics (OP)
Sports Medicine (Orthopedic Surgery; OSM)
Orthopedic Surgery of the Spine (OSS)
Orthopedic Trauma (OTR)

Other Specialty (OS)

Administrative Medicine (AD)
Addiction Medicine (ADM)
Epidemiology (EP)
Legal Medicine (LM)
Medical Management (MDM)
Clinical Pharmacology (PA)
Phlebology (PHL)
Pharmaceutical Medicine (PHM)
Palliative Medicine (PLM)
Sleep Medicine (SME)

Otolaryngology (OTO)

Otology/Neurotology (NO)
Pediatric Otolaryngology (PDO)
Otology (OT)

Psychiatry (P)

Addiction Psychiatry (ADP)
Pediatric Psychiatry/Child Psychiatry (CPP)
Neurodevelopmental Disabilities (Psychiatry & Neurology; NDN)
Neuropsychiatry (NUP)
Forensic Psychiatry (PFP)
Psychoanalysis (PYA)
Geriatric Psychiatry (PYG)
Psychosomatic Medicine (PYM)
Psychiatry/Neurology (PYN)

Pediatrics (PD)

Adolescent Medicine (ADL)
Pediatric Critical Care Medicine (CCP)
Developmental/Behavioral Pediatrics (DBP)
Pediatrics/Emergency Medicine (EMP)
Internal Medicine/Pediatrics (MPD)
Neurodevelopmental Disabilities (Pediatrics; NDP)
Neonatal (NEO)
Neonatal Perinatal Medicine (NPM)
Pediatric Anesthesiology (PAN)
Pediatric Allergy (PDA)
Pediatric Endocrinology (PDE)
Pediatric Infectious Disease (PDI)
Pediatrics/Dermatology (PDM)
Pediatric Pulmonology (PDP)
Medical Toxicology (Pediatrics; PDT)
Pediatric Emergency Medicine (Pediatrics; PEM)
Pediatric Gastroenterology (PG)
Pediatric Hematology/Oncology (PHO)
Clinical & Laboratory Immunology (Pediatrics; PLI)

Pediatrics/Medical Genetics (PMG)
Pediatric Nephrology (PN)
Pediatrics/Physical Medicine & Rehabilitation (PPM)
Pediatric Rheumatology (PPR)
Sports Medicine (Pediatrics; PSM)
Pediatric Rehabilitation Medicine (RPM)

Pediatric Cardiology (PDC)

Public Health & General Preventive Medicine (PHP)
US Public Health Service (PHS)

Physical Medicine & Rehabilitation (PM)

Neuromuscular Medicine (NMN)
Pain Management (Physical Medicine & Rehabilitation; PMP)
Sports Medicine (Physical Medicine & Rehabilitation; PMM)
Spinal Cord Injury (SCI)

Plastic Surgery (PS)

Cosmetic Surgery (CS)
Facial Plastic Surgery (FPS)
Surgery of the Hand (Plastic Surgery; HSP)
Plastic Surgery within the Head & Neck (PSH)

Anatomic/Clinical Pathology (PTH)

Anatomic Pathology (ATP)
Blood Banking/Transfusion Medicine (BBK)
Clinical Pathology (CLP)
Dermatopathology (DMP)
Hematology (HMP)
Molecular Genetic Pathology (MGP)
Medical Microbiology (MM)
Neuropathology (NP)
Chemical Pathology (PCH)
Cytopathology (PCP)
Immunopathology (PIP)
Pediatric Pathology (PP)
Radioisotopic Pathology (RIP)
Selective Pathology (SP)

Pulmonary Disease (PUD)

Pulmonary Critical Care Medicine (PCC)

Radiology (R)

Abdominal Radiology (AR)

Musculoskeletal Radiology (MSR)

Nuclear Radiology (NR)

Pediatric Radiology (PDR)

Neuroradiology (RNR)

Radiological Physics (RP)

Therapeutic Radiation (TR)

Vascular & Interventional Radiology (VIR)

Radiation Oncology (RO)**Thoracic Surgery (TS)**

Cardiothoracic Surgery (CTS)

Transplant Surgery (TTS)**Urology (U)**

Pediatric Urology (UP)

Vascular Medicine (VM)**Unspecified (US)**

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