



The State of the Physician Workforce in North Carolina: Overall Physician Supply Will Likely Be Sufficient but Is Maldistributed by Specialty and Geography

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August 2015

Executive Summary

The number of physicians in North Carolina currently meets the needs of the population, but there are problems with geographic and specialty distribution. The match of supply to demand is likely to remain in rough balance due to the rapid increase in the number of new medical schools in the nation, the expansion of medical school classes in North Carolina, and a similar, but smaller increase in the number of post-graduate residency programs in the US and NC. There has been a very rapid increase in the number of physician assistants (PAs) and nurse practitioners (NPs) actively practicing in the State.

The most pressing physician workforce issue facing NC is not a shortage of physicians, but rather the maldistribution of the workforce by geography and specialty. While increasing medical school enrollments is often cited as a way to address physician workforce needs, most medical students do not choose to practice

in the places and specialties facing the most critical workforce shortages.

Increasing medical school enrollments alone is unlikely to address the state's future health care needs because most medical students do not choose to practice in the communities and specialties facing the most critical workforce shortages. Instead, policy interventions need to focus on increasing support for, and targeting existing state funds toward community-based settings, shortage specialties, and underserved communities. Developing tracks that encourage NC medical students to complete a residency in NC will greatly increase retention and the return on investment. In addition, new care delivery and payment models that encourage team-based models of care rely on practitioners from multiple disciplines to best serve patient health care needs.

Program on Health Workforce Research & Policy

Introduction

North Carolina, like other US states, has a vested interest in ensuring that the state has the right number of physicians in the right specialties and geographies to provide care to meet population health needs. This policy brief describes the state of the physician workforce in North Carolina and identifies key points along a physician's career trajectory where interventions can be made to improve workforce outcomes.

North Carolina's Growth in Physician Supply Is Outpacing the National Average

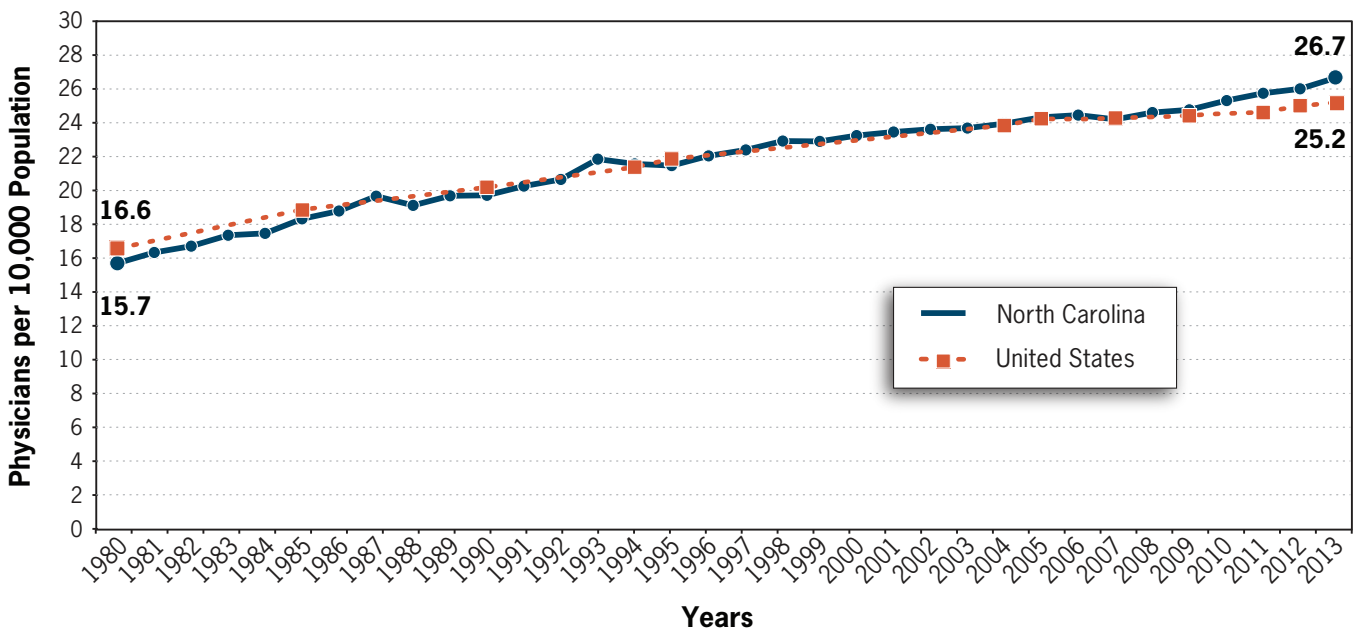
North Carolina's population has grown rapidly in recent years. Therefore, the physician-to-population ratio serves as a useful measure of how well physician supply has kept pace with population growth.

Figure 1 shows that North Carolina's physician-to-population ratio had increased from 16 physicians per 10,000 population in 1980 to 27 physicians per 10,000 in 2013. Historically NC's physician supply has tracked with the national average, but over the last five years the state's per capita supply has grown faster than the nation's.

The Most Pressing Workforce Issue Is the Maldistribution of Physicians

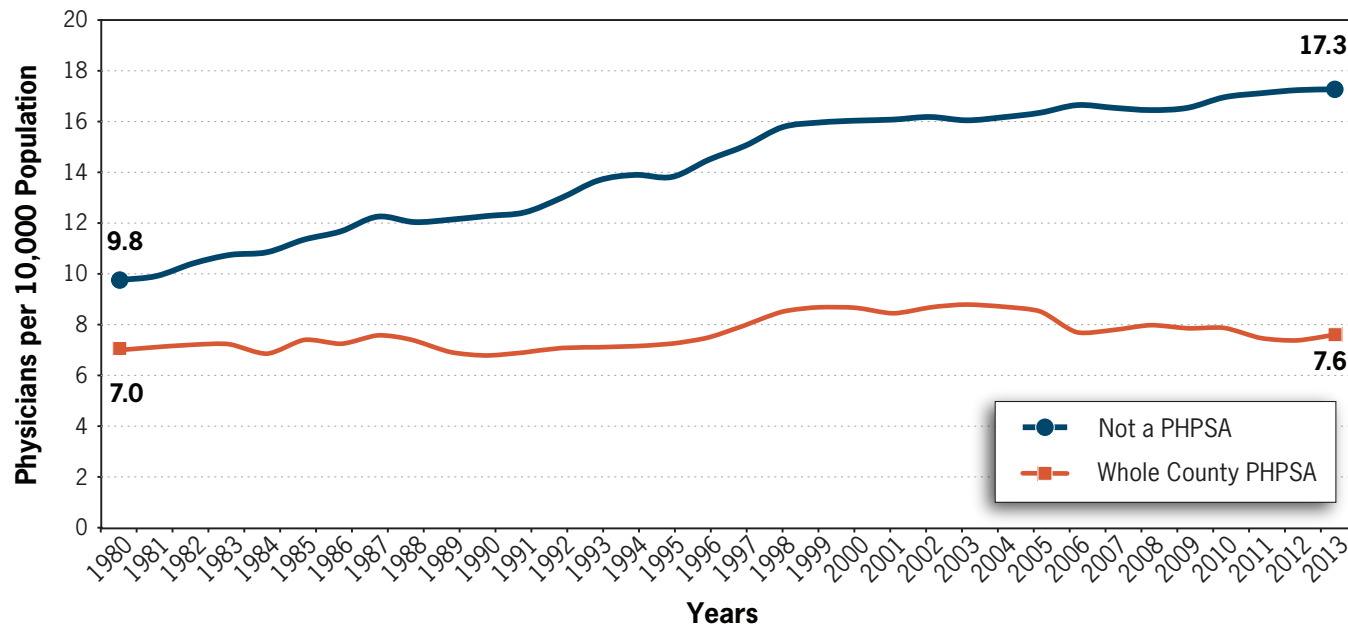
The most pressing physician workforce issue facing NC is not the total number of physicians, but the distribution of physicians by geography and specialty. Not surprisingly, NC's physician workforce is concentrated in counties where there are academic medical centers and in urban areas. Most underserved counties are located in the northeast and western parts of the state.

Figure 1. Physicians per 10,000 Population, North Carolina and United States, 1980 - 2013



Sources: North Carolina Health Professions Data System, 1979 to 2013; American Medical Association Physician Databook, selected years; US Census Bureau; North Carolina Office of State Planning. North Carolina physician data include all licensed, active, physicians practicing in-state, inclusive of residents in-training and federally employed physicians, US data includes total physicians in patient care, which is inclusive of residents-in-training and federally employed physicians. US physician data shown for 1980, 1985, 1990, 1994, 1995, 2004, 2005, 2007, 2009, 2011, 2012, 2013; all other years imputed.

Figure 2. Physicians per 10,000 Population by Persistent Health Professional Shortage Area (PHPSA) Status, North Carolina, 1980 - 2013



Notes: Figures include active, in-state, nonfederal, non-resident-in-training physicians licensed as of October 31st of the respective year. North Carolina population data are smoothed figures based on 1980, 1990, 2000 and 2010 Censuses. As of 2012, Primary Care PHPSA calculations updated with data from most recent AHRF release. Persistent HPSAs are those designated as HPSAs by HRSA using most recent 7 HPSA designations (2004, 2007-2012).
Sources: North Carolina Health Professions Data System, 1980 to 2013; North Carolina Office of State Planning; North Carolina State Data Center, Office of State Budget and Management; Area Health Resource File, HRSA, Department of Health and Human Services.

Annually, the federal government designates counties and sub-county regions as primary care Health Professional Shortage Areas (HPSAs) to identify geographic areas and special populations most in need of physicians. HPSA designations change over time as areas gain or lose physicians but 14 of NC’s countiesⁱ have been continuously designated as whole county HPSAs, meaning these 14 counties have experienced a persistent shortage of primary care physicians since 2004 or longer. **Figure 2** shows that while physician supply has increased steadily in well-supplied counties, the areas of North Carolina that have faced persistent shortages have seen little change in their physician supply over the past three decades.ⁱⁱ

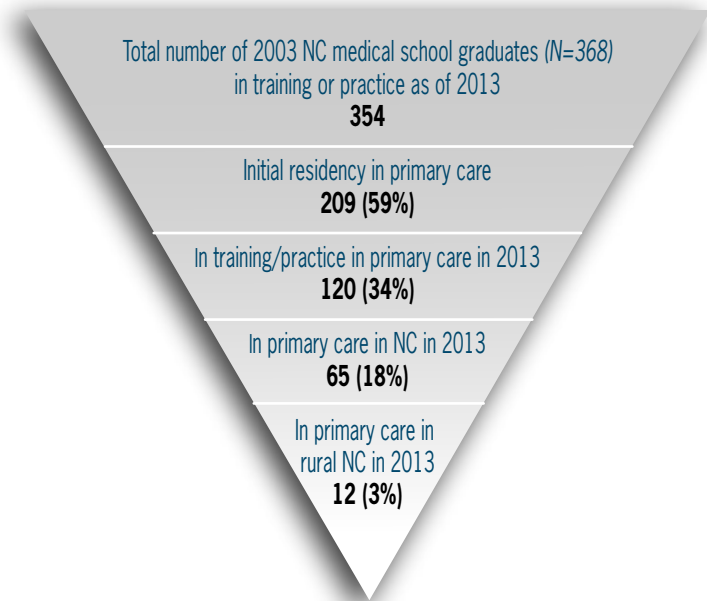
ⁱ Beaufort, Clay, Currituck, Dare, Gates, Graham, Hoke, Hyde, Lenoir, Montgomery, Northampton, Stokes, Tyrrell, Warren
ⁱⁱ In addition to these persistently under supplied counties, spread throughout the state there are also communities of underserved populations within counties that are otherwise

A related, and equally pressing issue, is the maldistribution of physicians by specialty. Two counties in the state—Camden and Tyrrell—had no physicians.ⁱⁱⁱ Half of NC’s counties qualify as mental health professional shortage areas. Nearly one-quarter of NC’s counties (24) had no general surgeons. Shortages of physicians in one specialty affect other specialties. For example, without general surgeons as backup, family practitioners cannot deliver babies, emergency rooms cannot take trauma cases, and most internists will not do complicated procedures such as colonoscopies.¹

well-supplied with physicians. For example, taken as a whole, the ratio of 50 physicians per 10,000 population in Forsyth County is the 3rd highest in the state, due to the presence of Wake Forest Baptist Health. However, this does not mean that all residents of Forsyth County are equally well-served: there are specific census tracts and low income populations in Forsyth County where residents face more barriers accessing health services than do the rest of the county’s residents. See: <http://datawarehouse.hrsa.gov/tools/analyzers/hpsafind.aspx>.

ⁱⁱⁱ Based on primary practice location in 2013.

Figure 3. North Carolina Medical Graduates: Retention in Primary Care in North Carolina’s Rural Areas Ten Years After Graduation



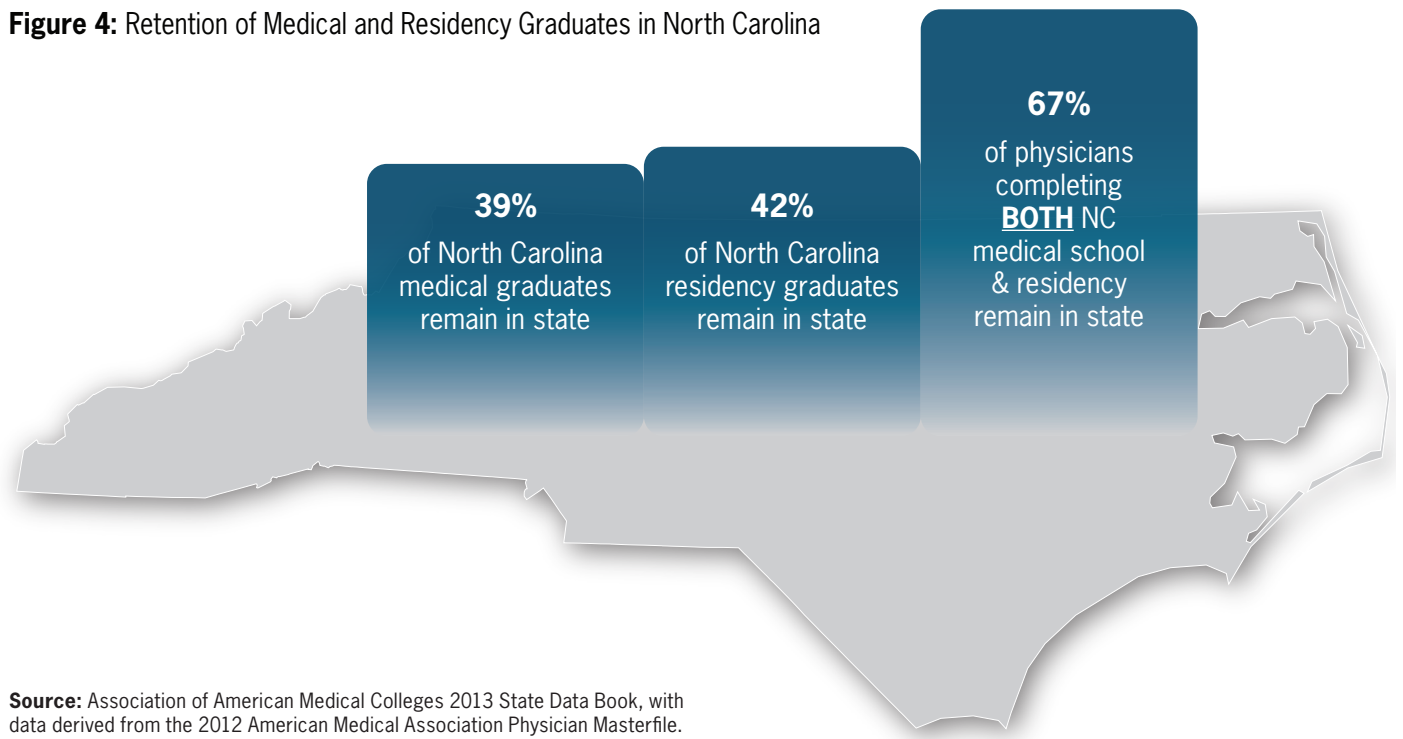
Sources: North Carolina Health Professions Data System with data derived from the Duke Office of Medical Education, UNC-CH Office of Student Affairs, ECU Office of Medical Education, Wake Forest University SOM Office of Student Affairs, Association of American Medical Colleges, and the NC Medical Board, 2014.
Produced by: Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Residency Is a Better Predictor of Practice Location than Medical School

While increasing the number of students enrolled in medical school is often cited as a way to address physician workforce needs, most medical students do not choose to practice in the geographies and specialties facing the most critical workforce shortages.² **Figure 3** shows the outcomes of medical students who graduated from the state’s four medical schools. Ten years after graduating, only 3% were in practice in primary care in rural North Carolina.

After graduation, physicians complete an additional three to seven years of graduate medical education (GME) or “residency” training in a specific medical specialty, such as family medicine, general surgery, or dermatology. North Carolina retains about 42% of physicians after residency, ranking

Figure 4: Retention of Medical and Residency Graduates in North Carolina



Source: Association of American Medical Colleges 2013 State Data Book, with data derived from the 2012 American Medical Association Physician Masterfile.

Table 1: Medical School First Year Class Sizes and First Year Medical Residency Positions in North Carolina, 2015

Medical School	Location (City, County)	Incoming Class Size
Campbell University Jerry M. Wallace School of Osteopathic Medicine	Buies Creek, Harnett County	150
Duke University School of Medicine	Durham, Durham County	115
East Carolina University Brody School of Medicine	Greenville, Pitt County	80
University of North Carolina School of Medicine	Chapel Hill, Orange County Charlotte Campus, Mecklenburg County Asheville Campus, Buncombe County	180
Wake Forest University School of Medicine	Winston-Salem, Forsyth County	120
Total first year medical students in North Carolina		645
First year residency positions in North Carolina, 2015 ⁱ		693

ⁱ **Source:** 2015 National Residency Matching Program Main Residency Match: Match Results by Specialty and State. Accessed 10 July 2015 at <http://www.nrmp.org/wp-content/uploads/2015/05/Main-Match-Results-by-State-and-Specialty-2015.pdf>.

the state 35th of the 50 states.³ However, 67% of physicians who complete both medical school and residency training in North Carolina are retained (**Figure 4**). This means the state recoups the highest return on investment by creating educational tracks that encourage students to complete both medical school and residency in state.

Some states have expanded medical school enrollments so quickly that they do not have enough residency slots to absorb the new graduates.^{4,5} This is not the case in North Carolina. **Table 1** shows that in 2015, 645 students entered medical training at one of the state's five medical schools and 693 first year residency positions were available through the National Residency Match Program (NRMP). (The number of first year residency positions available is greater than reflected in **Table 1** since the NRMP data do not include some specialties such as urology and plastic surgery and do not currently include osteopathic residencies.) In 2014, North Carolina added 72 osteopathic residency positions at Southeastern Health, Sampson Regional Medical Center, Harnett Health, and Novant Health Huntersville Medical Center.⁶ Neither

the American Osteopathic Association nor the American Association of Colleges of Osteopathic Medicine were able to share data on the number of first year osteopathic medical residency positions in North Carolina at the time of this report.⁷

The majority of residents in the state train in academic medical centers at Duke University Medical Center, Vidant Medical Center, University of North Carolina Health Care and Wake Forest Baptist Health. About 16% complete a North Carolina Area Health Education Centers (AHEC) residency program. AHEC residents are more likely than graduates from non-AHEC residency programs to remain in-state to practice (50% vs. 38%). Of those who practice in primary care specialties (family medicine, internal medicine, pediatrics, and obstetrics and gynecology), in-state retention of AHEC residents is greater than that of non-AHEC residents (57% vs. 42%). An emerging body of evidence suggests that moving residency training programs into community-based settings and out of academic health centers increases the number of physicians who subsequently choose to practice in underserved communities and specialties.^{8,9,10}

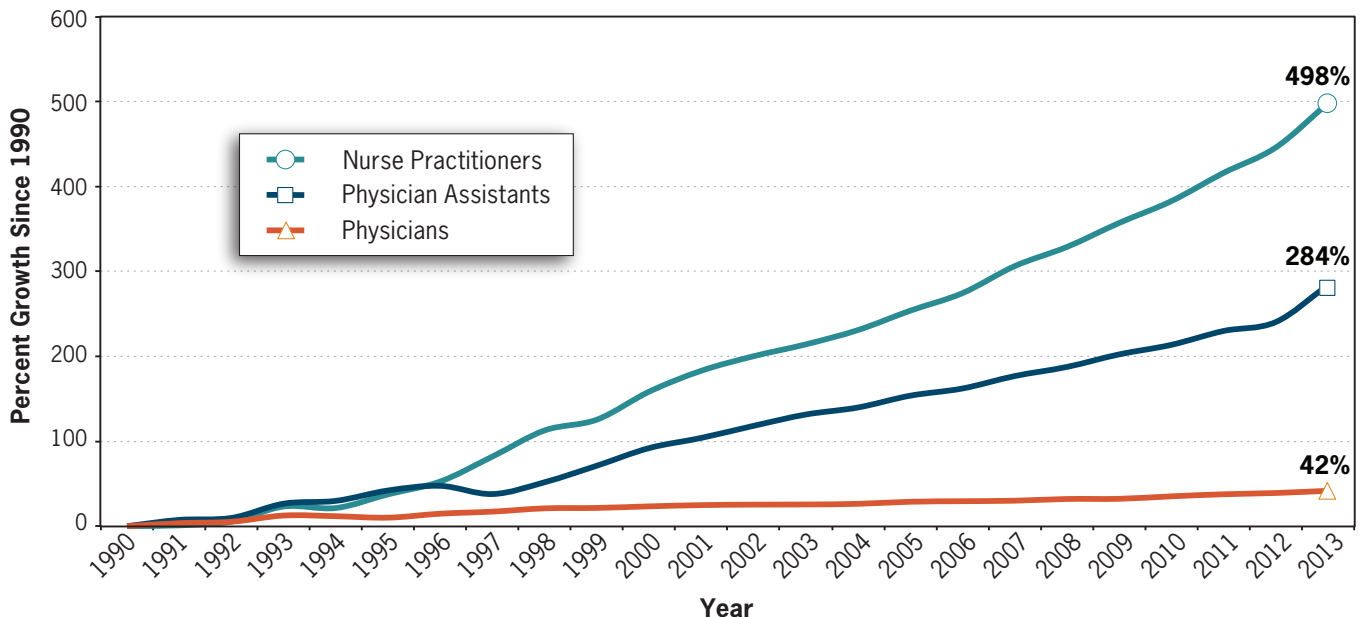
The Rapidly Changing Health Care System Is Making Greater Use of Non-Physician Clinicians

The move to patient-centered, team-based models of care and payment incentives that seek to reduce costs will likely increase the deployment of NPs, PAs, pharmacists and other health care providers in the future. Increasingly, NPs and PAs are caring for North Carolinians, including providing services that historically were provided only by physicians.¹¹ Between 1990 and 2013, the NP and PA workforce increased 498% and 284% respectively, compared to a 42% cumulative

growth rate for physicians during the same time period (Figure 5). While the extent to which NPs and PAs are substituting or complementing the role of physicians in NC is unclear, the data suggest that these professionals will continue to play an important role in NC's healthcare workforce.

Along with NPs and PAs, other types of providers are also taking on new roles in the healthcare system, from pharmacists providing medication management for patients with chronic disease¹² and nurses, social workers, and others leading in care coordination and health coaching.¹³

Figure 5. Cumulative Rate of Growth per 10,000 Population Since 1990: Physicians, Nurse Practitioners and Physician Assistants in North Carolina



Sources: North Carolina Health Professions Data System with data derived from the North Carolina Medical Board and North Carolina Board of Nursing, 1990 to 2013. Figures include all active, in-state, non-federal, non-resident-in-training physicians, PAs and NPs licensed as of October 31 of the respective year. Produced by: Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

A Multifaceted Strategic Approach Is Needed to Address NC’s Workforce Needs

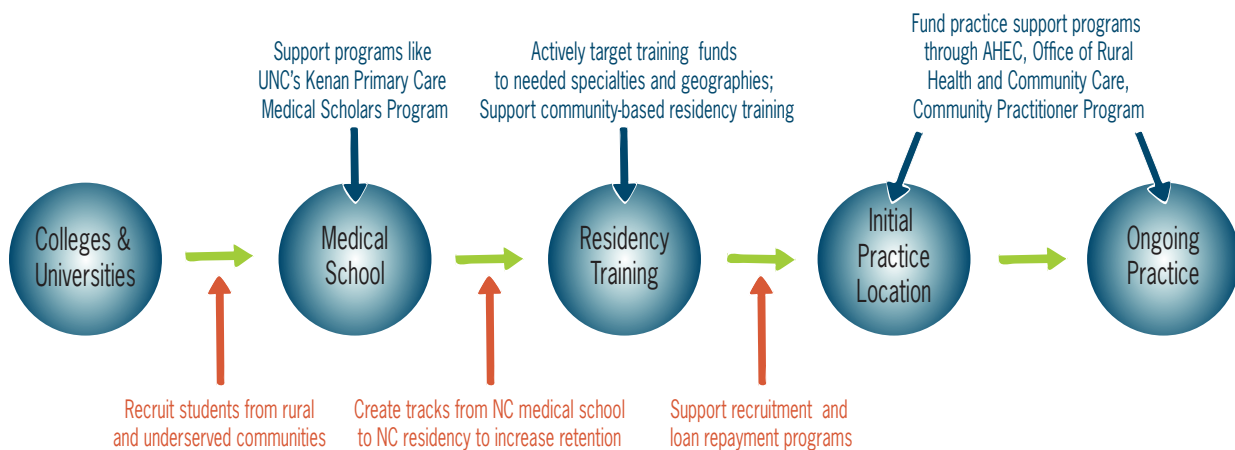
There is no “silver bullet” that will address North Carolina’s physician workforce needs. **Figure 6** shows some examples of how funding could be targeted to achieve the highest return on investment during different transition points of a physician’s career trajectory.

Medical School: The data in **Figures 3 and 4** suggest that simply increasing the number of physicians enrolled in medical school is not likely to increase supply in underserved communities. Evidence from North Carolina and other states indicates that medical schools that recruit students from rural and underserved areas are more likely to graduate a workforce that ultimately practices in shortage geographies and needed specialties.^{14,15,16} Admissions policies that seek applications from students in underserved communities and programs, like UNC’s Kenan Primary Care Medical Scholars Program, that provide financial support and

enrichment experiences to students seeking health careers in rural and underserved areas in North Carolina are needed early in the pipeline. **Figure 4** shows that to retain more of our medical students in the state, we need NC medical school graduates to track into NC residency programs.

Residency training: While the majority of public funding for residencies in NC comes from Medicare, North Carolina’s Medicaid program provides a greater amount of GME funding than most other states. While the 9th most populous state in the nation,¹⁷ North Carolina ranks 5th in the amount of GME funding provided by Medicaid, with a total of \$116 million in GME support.¹⁸ Medicaid GME dollars have been important in ensuring the stability of residency programs in North Carolina. With the growing number of students graduating from NC medical schools, the availability of in-state residency positions will continue to be needed to encourage retention of physicians trained in NC. Yet despite the relatively high investment of state funds in GME in NC,

Figure 6: Selected Examples of How Funding Might Be Targeted to Achieve the Highest Return on Investment At Different Transition Points in a Physician’s Career Trajectory



there are no accountability measures attached to these monies and it is not possible to determine the return on investment for these funds. The lack of transparency and accountability for public investments in GME is not unique to North Carolina; it has been identified as a major flaw in the system by numerous reports.^{19,20,21} Without accountability for funds, North Carolina will be unable to target GME investments to ensure the training pipeline produces the workforce needed to meet population health needs.

To remedy this, the state could enact legislation that increases:

- 1) the accountability and transparency of public funds spent on residency education so funds are targeted to needed geographies and specialties
- 2) support for community-based training opportunities such as those through AHEC.

In Georgia, South Carolina and other states, policy makers are considering how public funds—Medicaid dollars and other state appropriations—can be better targeted to address shortages in specific specialties (such as primary care or general surgery) and in specific geographic regions where healthcare needs are unmet.^{5,22}

From Residency Training to First Practice Location: State and federal programs that provide loan repayment support (or financial bonuses for those without loans) in exchange for service in underserved areas are an important way to attract physicians and other providers to the areas of the state in greatest need. Currently, NC’s state loan

repayment program, administered by the Office of Rural Health and Community Care, is open to primary care physicians, psychiatrists, nurse practitioners, physician assistants, nurse midwives, and dentists.²³ The Office of Rural Health and Community Care has asked for state loan repayment funds for general surgeons in Critical Access Hospitals and for funds to support any of the above health care professionals who provide telehealth. Permission to use existing funds for surgeons and telehealth providers is currently in the Governor’s, House and Senate budgets and will likely pass.

Supporting Physicians in Ongoing Practice:

Practice support plays a key role in retaining physicians in rural practice. The North Carolina Medical Society, through their Community Practitioner Program, provides consulting and expertise on quality improvement, implementing Patient Center Medical Homes (PCMHs) and Accountable Care Organizations (ACOs), practice management, financial management, coding and a variety of other support services designed to help rural providers navigate the changing health care system. The North Carolina AHEC Practice Support Program (PSP) has provided support to 1,100 primary care practices in North Carolina. Its focus is on helping primary care practices to improve quality and transform to PCMHs. The North Carolina AHEC PSP also houses the North Carolina Health Information Technology Regional Extension Center (HITREC), which aids practices in selecting and implementing electronic health records and attaining meaningful use certification.²⁴

Conclusions

Increasing medical school enrollments in NC is unlikely to address the state's future health care needs because most medical students do not choose to practice in the geographies and specialties facing the most critical workforce shortages. Instead, policy interventions need to focus on increasing support for residency training and better targeting the existing state funds invested in residencies. Different policy interventions are needed at different points along physician's career pathway to influence specialty choice and practice location. These include:

Medical School

- recruit medical students with rural backgrounds who wish to return to their hometowns to practice
- support medical students with an interest in practicing in underserved communities and shortage specialties via programs such as UNC's Kenan Primary Care Medical Scholars Program²⁵

Post Graduate Training

- encourage NC medical school graduates to complete a NC medical residency to boost in-state retention
- fund residencies in rural communities and community health center sites
- increase the accountability and transparency of public funds spent on residency education so funds are targeted to needed geographies and specialties

Transition to First Practice Location

- increase loan repayment opportunities for physicians who wish to practice in underserved areas

Support Ongoing Practice

- support physicians in underserved areas by providing access to practice support services.



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