Outcomes of NC Medical School Graduates: How Many Stay in Practice in NC, in Primary Care, and in High Need Areas?

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EXECUTIVE SUMMARY

In 1993, the General Assembly mandated an annual report on the number of medical school graduates going into primary care. Since 1994, the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill ("Sheps Center") and the NC Area Health Education Centers program (AHEC) have collaborated to produce this report which tracks the number of students practicing primary care in rural North Carolina from all NC medical schools five years after graduation. As a result of the legislative mandate, NC is a national model for tracking medical student outcomes. While not required by the original legislation, the Sheps Center and NC AHEC have enhanced the annual report to reflect the state's workforce needs and high-urgency workforce issues. As in prior years, this report tracks NC medical school graduate outcomes for physicians who practice in NC and in rural NC counties. This report also includes an analysis of the number of medical school graduates that practice in NC safety net settings[1] that deliver care to uninsured, Medicaid, and other vulnerable populations and a description of each medical school's efforts to increase the number of graduates practicing primary care in rural North Carolina.

Historically, this report has examined NC medical school graduates at five years following graduation per the legislative mandate. However, this period is not ideal given the time required to complete residency (3-6 years). At five-years post-graduation from medical school, physicians in psychiatry, obstetrics & gynecology (ob/gyn), surgery, and medicine/pediatrics are just completing residency, or may be in fellowship/specialty training, and may not have settled in a permanent practice location. Thus, although not required by the legislature, this report also includes ten-year outcomes for the 2013 cohort.

Analyses of the five-year outcomes of NC class of 2018 graduates and ten-year outcomes of NC class of 2013 graduates show:

- Of the 597 NC medical school graduates from the class of 2018, 84 (14%) were in practice or training in primary care in NC in 2023, and 14 (2.3%) are in primary care in a rural NC county.
- As in prior years, ECU retained the largest proportion of graduates in practice or training in NC after five years (52%), followed by UNC (40%), Campbell (28%), Duke (25%) and Wake Forest (23%).
- For the class of 2018, nearly a quarter of ECU graduates (ECU: 23%, n=16) were practicing in primary care in-state five years after graduating. From the same cohort, 31 UNC graduates (18%) and 26 Campbell graduates (17%) were practicing primary care in-state. These three medical schools supply the state with the largest number of primary care physicians in absolute terms.
- Fourteen graduates from the class of 2018 were in practice in safety net settings in NC in 2023, a large increase from the class of 2017, when only four graduates were in safety net settings.
- Five graduates from the class of 2013 were in practice in safety net settings in 2023, including four UNC graduates and one ECU graduate.
- Of the 445 NC medical school graduates from the class of 2013, 45 (10%) were practicing primary care in NC in 2023, 10 years post-graduation; 6 graduates (1.3%) were in rural primary care in NC.

[1] NC DHHS Office of Rural Health. Safety Net Sites website. Accessed February 20, 2023. https://www.ncdhhs.gov/divisions/office-rural-health/safety-net-resources/safety-net-sites

- Five 2013 graduates were in practice in general surgery in NC ten years after graduating with one in a rural county. Nine graduates from the same year were practicing psychiatry in NC ten years later with none practicing primarily in a rural county.

BACKGROUND

In 1993, the North Carolina General Assembly expressed interest in expanding the pool of generalist physicians for the state. In N.C.S.L.1993-321, the General Assembly required each of the state's four medical schools to develop a plan to expand the percent of medical school graduates choosing residency positions in primary care. Primary care was defined as family practice, general internal medicine, general pediatric medicine, internal medicine-pediatrics, and obstetrics-gynecology. It set the goal for the East Carolina University (ECU) and UNC Schools of Medicine at 60% of graduates entering primary care. For the Wake Forest University and Duke University Schools of Medicine, it set the goal at 50%. Campbell University School of Osteopathic Medicine graduated its first class in 2017 and was therefore not included in these goals.

Since 1994, the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill ("Sheps Center") and the NC Area Health Education Centers program (AHEC) have collaborated to produce this report tracks the workforce outcomes for NC medical schools. As a result of the legislative mandate, NC is a national model for tracking medical student outcomes. Data from this report were featured in the New England Journal of Medicine as an example of how to track workforce outcomes in John Iglehart's 2018 article on "The challenging quest to improve rural health care."[2]

While not required by the original legislation, the Sheps Center and NC AHEC have enhanced the annual report to reflect the state's workforce needs and including other high-urgency workforce settings. As in prior years, this report tracks NC medical school graduate outcomes for physicians who practice in NC and in rural NC counties. This report also includes an analysis of the number of medical school graduates that practice in NC safety net settings[3] that deliver care to uninsured, Medicaid, and other vulnerable populations.

Historically, this report has examined NC medical school graduates at five years following graduation per the legislative mandate. However, this period is not ideal given the time required to complete residency (3-6 years). At five-years post-graduation from medical school, physicians in psychiatry, obstetrics & gynecology (ob/gyn), surgery, and medicine/pediatrics are just completing residency, or may be in fellowship/specialty training, and may not have settled in a permanent practice location. This is typically the case for general surgeons, whose training period is five years, and for ob/gyns, psychiatrists and medicine/pediatrics residents who often do a fellowship after a four-year residency. Ten years following graduation from medical school is a more reasonable timeframe to track outcomes, as it allows for fellowship training following residency. Thus, although not required by the legislature, this report also includes ten-year outcomes for the 2013 cohort.

Since reporting on medical student outcomes began in 1994, Campbell University became the fifth medical school in North Carolina and is included in this report. The health care system has also undergone dramatic change in in the last thirty years and the data in this report remain as critical as ever to help inform the state's efforts to address chronic shortfalls of primary care physicians, especially in rural areas. The composition of the primary care workforce itself has also changed. For example, an

[2] Iglehart J. The challenging quest to improve rural health care. NEJM, 2018. 378(5):473-479. https://www.nejm.org/doi/full/10.1056/NEJMhpr1707176

[3] NC DHHS Office of Rural Health. Safety Net Sites website. Accessed February 20, 2023. https://www.ncdhhs.gov/divisions/office-rural-health/safety-net-resources/safety-net-sites

increasing proportion of general internal medicine physicians are subspecializing; recent national analyses found the percentage of graduating IM residents planning a career in general internal medicine has declined by half in the last decade.[4] Concurrently, the growth of hospitalists and the declining number of internal medicine physicians trained, and practicing, in community-based settings has reduced the number of primary care physicians choosing community-based primary care medicine.

DATA SOURCES AND METHODS

Data Sources

Data included in this report come from several sources:

- The North Carolina Medical Board's annual licensure files (NCMB), maintained by the NC Health Professions Data System
- Data from the alumni and student affairs offices at the Campbell University School of Osteopathic Medicine, the Duke University School of Medicine, the Brody School of Medicine at East Carolina University, the University of North Carolina at Chapel Hill School of Medicine, and the Wake Forest University School of Medicine
- The Federal Office of Management and Budget for population and core based statistical area data, which are used to determine which counties in NC are classified as metropolitan (urban) or non-metropolitan (rural). For this report, we used the July 2023 file in which 55 counties in North Carolina are rural (non-metropolitan).
- The NC Department of Health and Human Services (DHHS) list of safety net sites, updated in September 2022.
- The 2021 vintage of the Area Deprivation Index (ADI) produced by the University of Wisconsin Center for Health Disparities Research. We used the version of the index which is calculated relative only to areas within the state, not the entire nation. This is a change from previous years, in which we used the national index.

Campbell University School of Osteopathic Medicine (Campbell) is not mandated to provide data for this report, as the school did not exist when the 1993 legislation was passed. However, Campbell has provided initial match data for the last several years and now has its second five-year cohort reported in this report.

As in prior years, this report does not emphasize initial residency match data, as many physicians change residency specialties, subsequently subspecialize or change geographic location over the course of their GME training. Outcomes are better measured after graduation from residency.

Methods

As in last year's report, we used the NCMB's licensure data as the primary data source. This differs from older reports which used GMETrack data from the Association of American Medical Colleges (AAMC) as the source list for graduates within a cohort. This change was spurred by the AAMC inability to provide data on Campbell graduates under the current data use agreement. The NCMB's licensure data has long

[4] Paralkar N, LaVine N, Ryan S, Conigliaro R, Ehrlich J, Khan A, Block L. Career Plans of Internal Medicine Residents From 2019 to 2021. JAMA Intern Med. 2023 Oct 1;183(10):1166-1167. doi: 10.1001/jamainternmed.2023.2873. Erratum in: JAMA Intern Med. 2024 Mar 1;184(3):336

been used to determine primary practice location and area of practice, so we decided to use the medical school and graduation year fields in the licensure data as well.

For last year's report, we validated this method. First, we matched data from GMETrack to the NCMB annual licensure file on variables like name, date of birth, and birth city to confirm and check the NCMB data. In only two instances across both cohorts, did the GMETrack data contain graduates who were not in the NCMB data for the cohort. Further analyses clarified that these individuals were present in the licensure file but had entered an incorrect graduate year. Conversely, several graduates in each cohort were found in the NCMB data who did not initially match to graduates in the GMETrack data, usually because of combinations of data entry errors (e.g., transposed birth dates) and name changes. These data validation analyses suggest that the change in methodology should not affect the outcomes reported.

This report also uses the reports received directly from each medical school for the number of graduates in each cohort, i.e., the denominator for the retention calculations, and the outcomes of last year's resident match process. Generally, a handful of individuals each year will not transition to training or practice after graduation. These people are excluded from the number of graduates.

Primary care residency specialties are defined by legislation passed by the NC General Assembly in 1993 (Senate Bill 27/ House Bill 729) and include family medicine, general internal medicine, general pediatric medicine, internal medicine-pediatrics, and obstetrics and gynecology. Despite the fact that internal medicine-pediatrics is not reported as an area of practice by the NCMB, physicians trained in internal medicine-pediatrics typically report either pediatrics or general internal medicine as an area of practice and are therefore still captured as primary care physicians in the report.

"Primary Care" is defined for both initial specialty of residency training (identified using match data provided by each medical school) and for current practice or training area (identified using NCMB data for physicians in NC). As discussed above, many graduates who initially match to internal medicine and are counted as primary care for their initial match to residency training will go onto train and practice in subspecialties outside of primary care five years after graduation. Also, we do not differentiate between internal medicine and medicine-preliminary. For both reasons, the data on the number of medical students matching to primary care for their initial residency choice significantly overstates the number of physicians who will end up practicing in primary care.

Psychiatry includes physicians who report practicing in the following specialties: Psychiatry, Child and Adolescent Psychiatry, Psychoanalysis, Forensic Psychiatry, Psychosomatic Medicine, Psychiatry/Geriatric, Family Medicine-Psychiatry, Internal Medicine-Psychiatry, and Pediatrics-Psychiatry.

For safety net provider information, we geocoded both the North Carolina Department of Health and Human Services safety net site list and the practice addresses in the NCMB file for each cohort. We then intersected the geocoded datasets to find potential matches between providers and sites. Potential matches were manually checked for accuracy with many false positives being discarded. Safety net providers are defined as health care facilities that provide a significant level of health care and other health-related services to uninsured, Medicaid, and other vulnerable populations. These include rural health clinics, rural health centers, federally qualified health centers, free and charitable clinics, small rural hospitals, health departments, and critical access hospitals. We also used the geocoded locations to place each physician in a block group and a county, allowing us to assign each an area deprivation

index and non-metropolitan (rural) status. In this report, we use the US Census Bureau and Office of Management and Budget's July 2023 "Core Based Statistical Area" (CBSA) definitions to identify rural counties. In this analysis, nonmetropolitan counties include micropolitan and counties outside of CBSAs.

FINDINGS

Class of 2018 Outcomes: *Retention in Primary Care*

Figure 1 shows the number of 2018 North Carolina medical graduates in primary care.

Figure 1: Retention of 2018 NC Medical Graduates in NC Rural Primary Care Five Years After Graduating

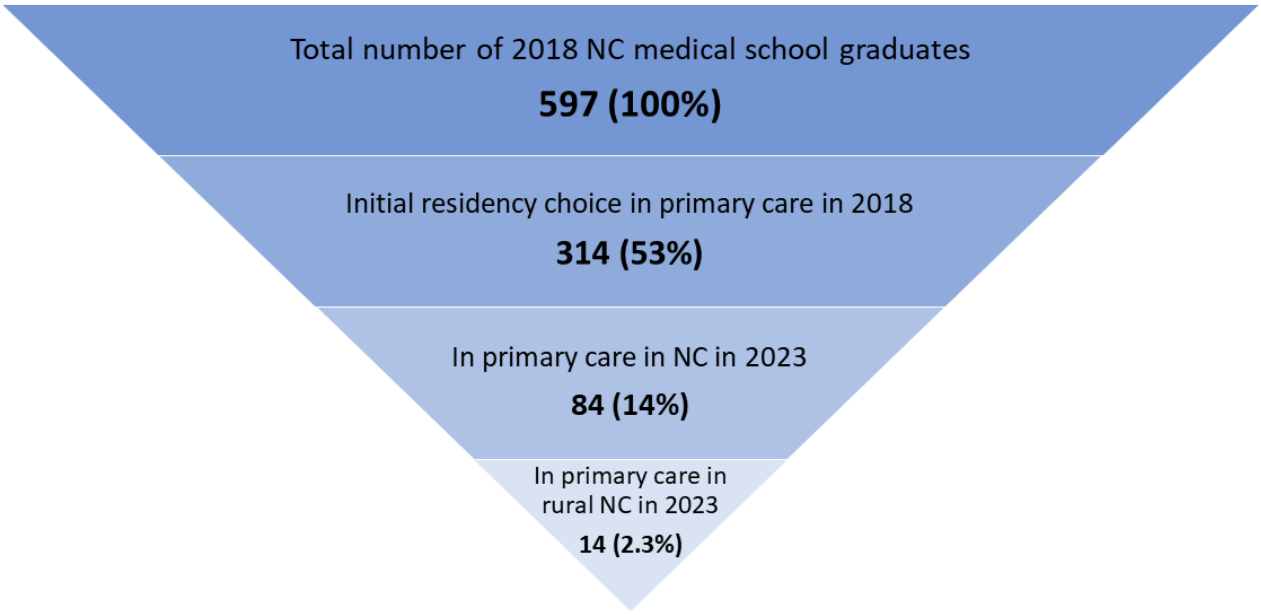


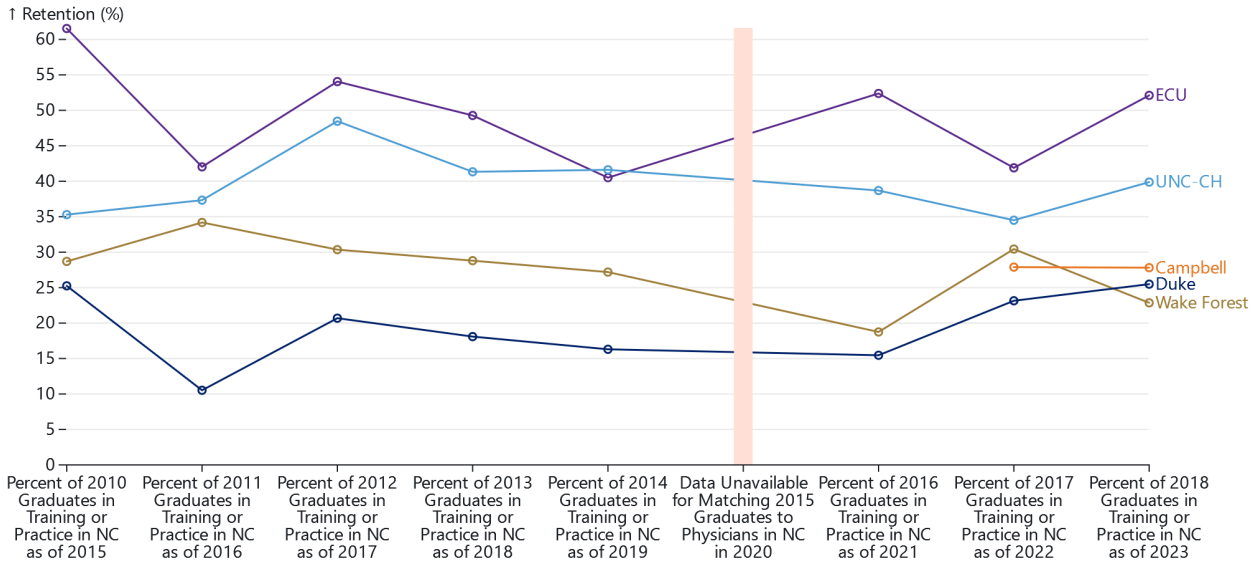
Figure 1: Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: North Carolina Health Professions Data System with data derived from the NC Medical Board and the respective medical schools, 2023. Rural source: US Census Bureau and Office of Management and Budget, July 2023. "Core Based Statistical Area" (CBSA) is the OMB's collective term for Metropolitan and Micropolitan Statistical areas. Here, nonmetropolitan counties include micropolitan and counties outside of CBSAs.

Out of the 615 medical school graduates in 2018, 84 (14%) were in training or practice in primary care in NC in 2023 (**Figure 1**). For purposes of comparison, between 12% and 17% of the most recent graduating cohorts (the classes of 2010-2017), were in training or practice in primary care in NC five years after graduating. Over 2% (n=14) of the 2018 cohort was in primary care in a rural NC county. Typically, between 1% and 3% of NC medical school graduates tend to practice in primary care in rural NC five years after graduating.

Retention of Graduates in North Carolina and in Rural Counties

A greater percentage of graduates from the state's public medical schools are retained in NC five years after graduating, compared to the state's private medical schools (**Figure 2**). For the class of 2018, over half of ECU graduates (52%) and 40% of UNC graduates were practicing in state in 2023.

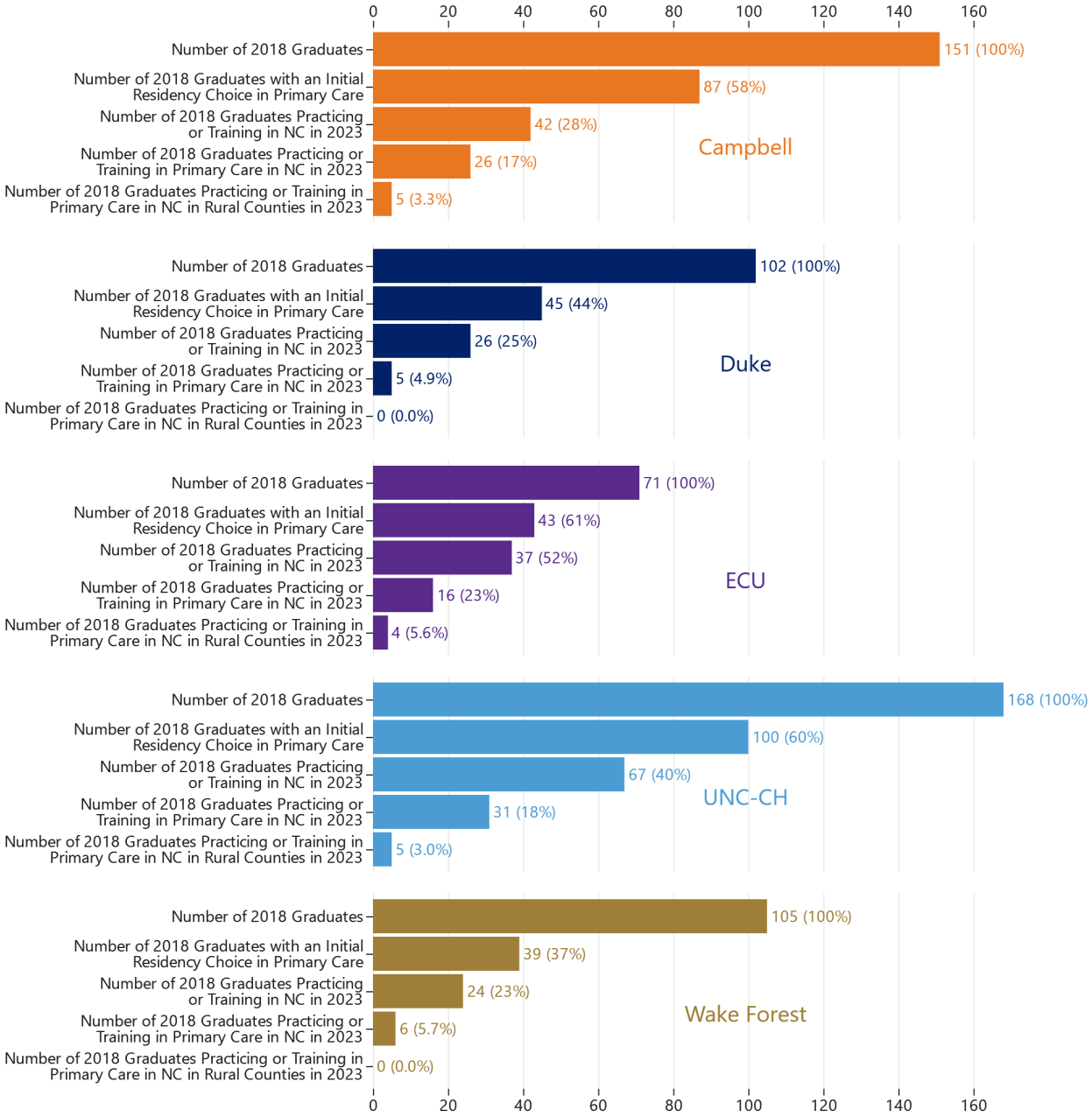
Figure 2: Percent of NC Medical School Graduates in Training or Practice in North Carolina Five Years After Graduating



Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: North Carolina Health Professions Data System with data derived from the NC Medical Board and the respective medical schools.

Figure 3 shows the primary care practice or training outcomes for each school's 2018 graduates. Each individual figure is a version of **Figure 1** for each school's graduates. Very few graduates from any school are practicing primary care in a rural area. However, ECU retained 23% (n=16) of its 2018 graduating class in North Carolina practicing or training in primary care. While UNC and Campbell had lower retention than ECU (18% and 17%, respectively), that pool of retained graduates represented 57 physicians practicing primary care in NC.

Figure 3: Workforce Outcomes Five Years after Graduation, 2018 Medical School Graduates by School



Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: North Carolina Health Professions Data System with data derived from the NC Medical Board and the respective medical schools, 2023. Rural source: US Census Bureau and Office of Management and Budget, July 2023. "Core Based Statistical Area" (CBSA) is the OMB's collective term for Metropolitan and Micropolitan Statistical areas. Here, nonmetropolitan counties include micropolitan and counties outside of CBSAs.

Practice in Safety Net Settings and Most Economically Distressed Neighborhoods

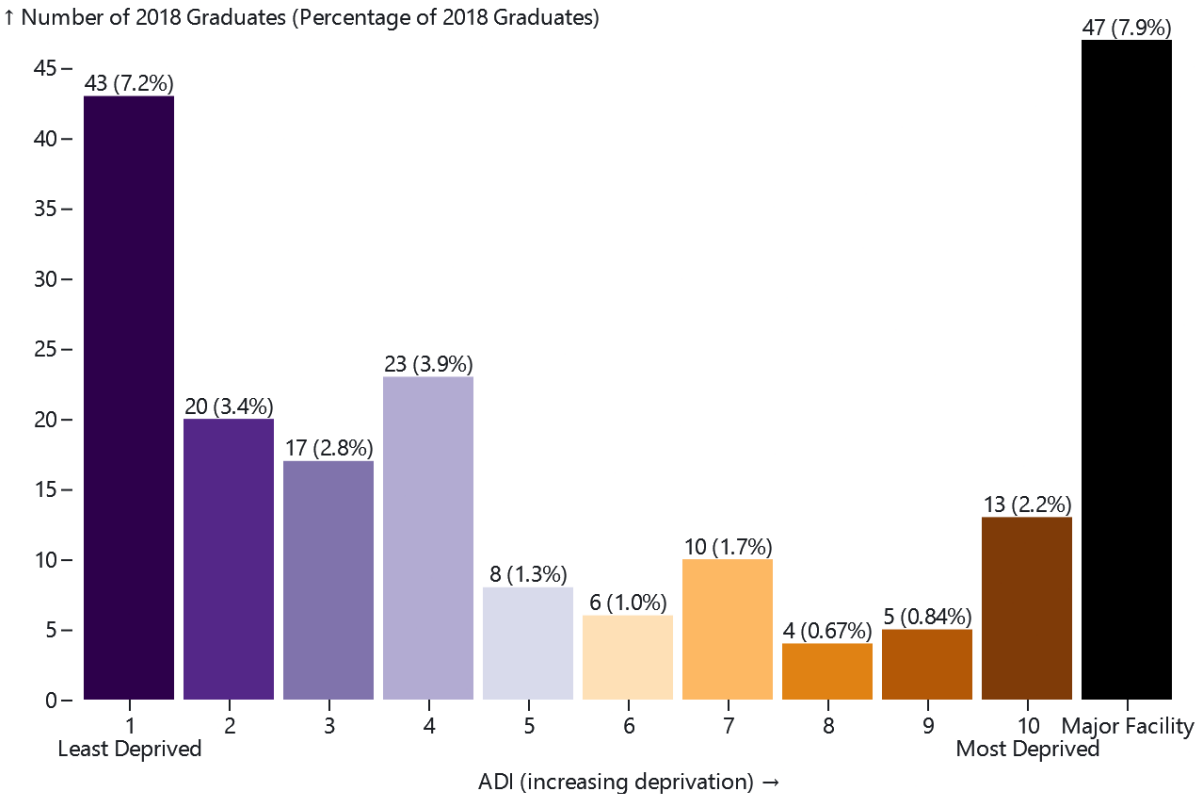
Safety net providers are defined as health care facilities that provide a significant amount of health care and other health-related services to uninsured, Medicaid, and other vulnerable populations. Fourteen graduates from the class of 2018 were in practice in safety net settings in NC in 2023, including six UNC graduates and five Campbell graduates.

Figure 4 compares the Area Deprivation Index (ADI) of the neighborhoods where physicians who were retained in North Carolina five years after graduation report their primary practice location. The ADI is based on factors related to income, education, employment, and housing quality in a census block group, which is the geographic equivalent of a neighborhood. Low scores indicate low levels of economic distress, and high scores indicate high levels of economic distress. Three percent (18/597) of the class of 2018 worked in a practice location in the top quintile (ADI 9 and 10) of economically distressed neighborhoods five years after graduation.

ADI scores are not assigned for census block groups dominated by large facilities, such as hospitals. ADI scores were not available for almost a quarter (24%, n=47/196) of the graduating class of 2018 who were still in North Carolina because their primary practice location was a large facility, most likely a hospital, which makes sense as many of these physicians are likely still in training.

Figures 4, 5, and 6 include only individuals who were active and licensed in North Carolina in 2023, as this report relies on the NCMB data for practice outcomes. The 401 (67%) graduates who were practicing or training in another state, or who were not active in 2023 are omitted. However, the values are calculated as a percentage of the total graduating class of 597.

Figure 4: Neighborhood Disadvantage Status in 2023 of Physicians Retained in North Carolina Who Graduated from a NC Medical School in 2018

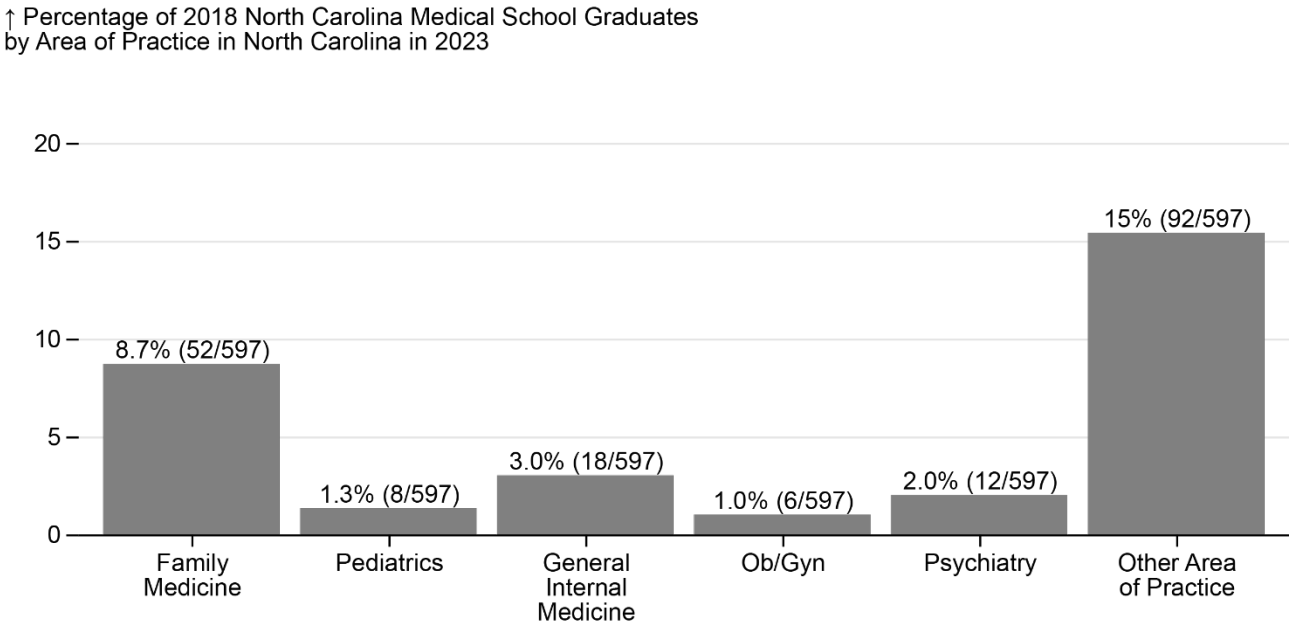


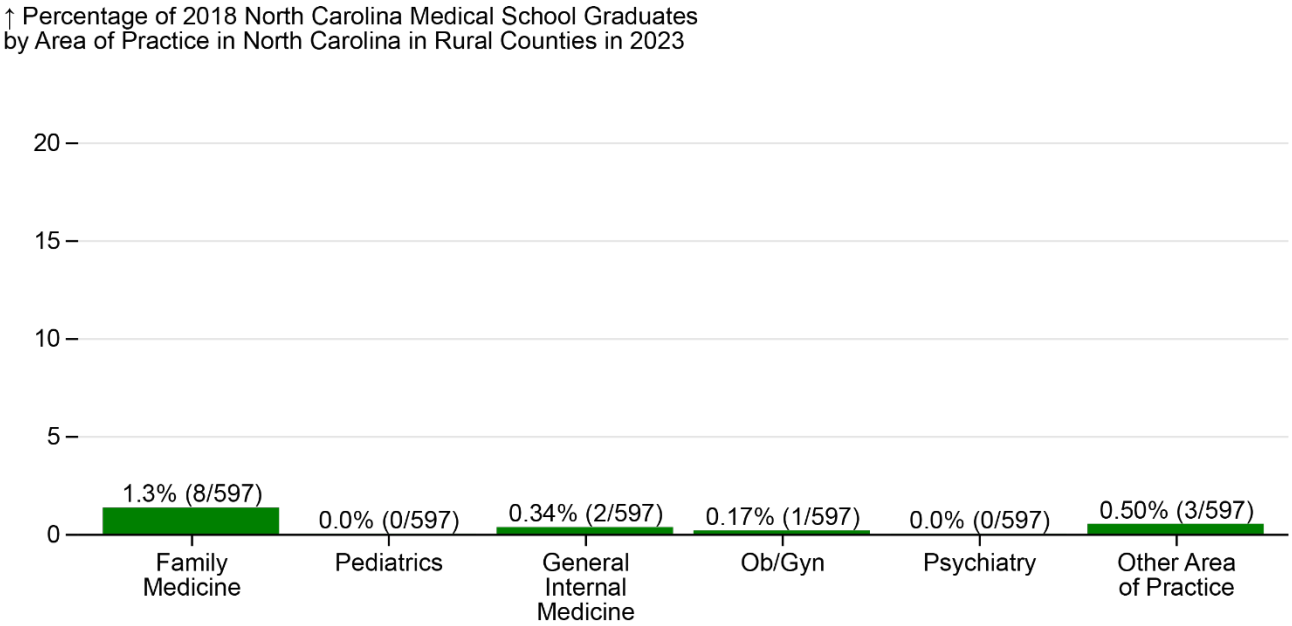
Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: North Carolina Health Professions Data System with data derived from the NC Medical Board and the respective medical schools, 2023. ADI Score obtained from the University of Wisconsin School of Medicine Public Health. 2021 Area Deprivation Index v4.0.1 Downloaded from https://www.neighborhoodatlas.medicine.wisc.edu/ October 5, 2023.

Retention in Primary Care and Psychiatry Areas of Practice

Figure 5 displays the outcomes for 2018 graduates by area of practice. Physicians report a primary area of practice to the NCMB each year of licensure. A physician's primary area of practice can differ from their training specialty.

Figure 5: Percentage of 2018 Medical School Graduates Practicing or Training in Primary Care in North Carolina by Area of Practice in 2023, North Carolina Overall and Rural

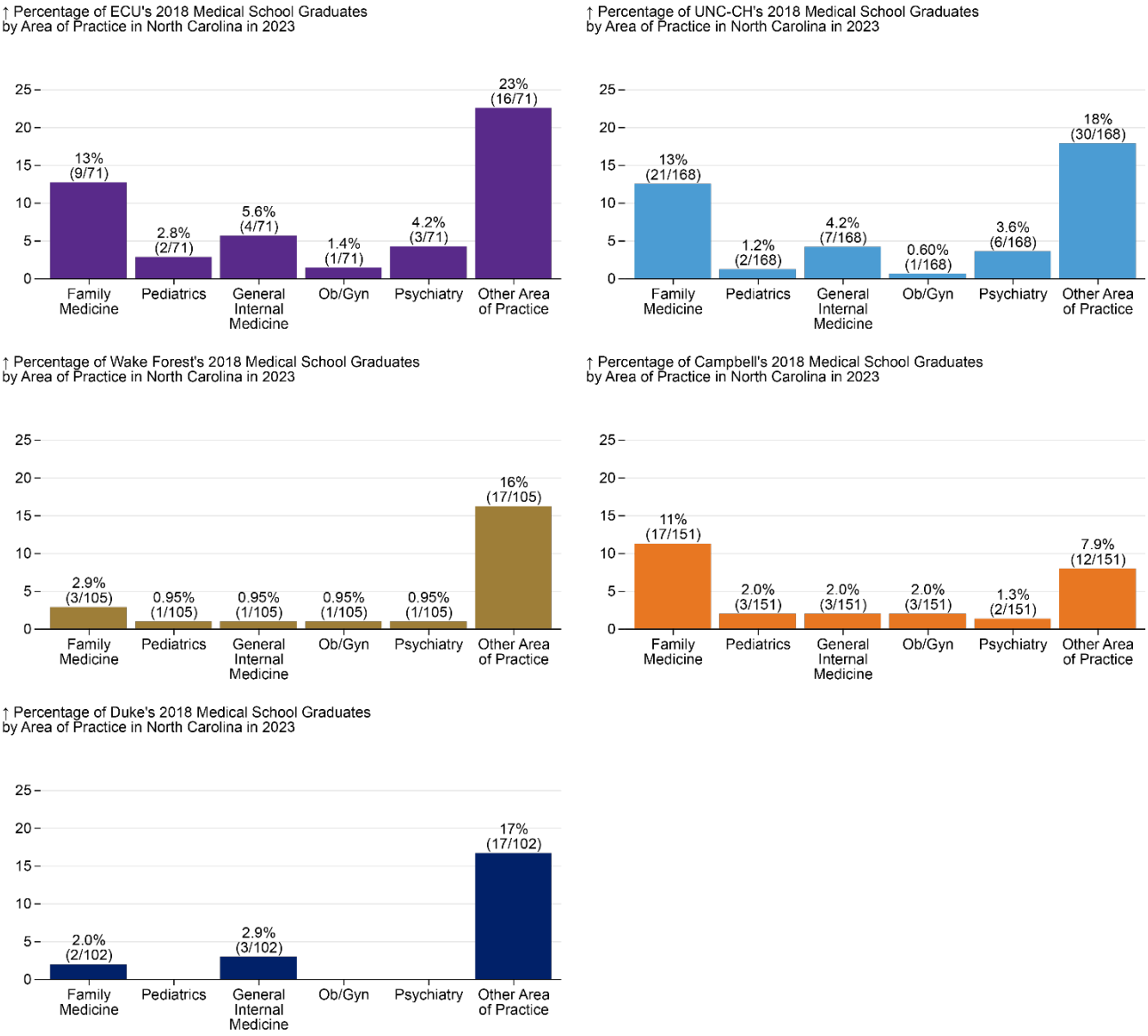




Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: North Carolina Health Professions Data System with data derived from the NC Medical Board and the respective medical schools, 2023. Rural source: US Census Bureau and Office of Management and Budget, July 2023. "Core Based Statistical Area" (CBSA) is the OMB's collective term for Metropolitan and Micropolitan Statistical areas. Here, nonmetropolitan counties include micropolitan and counties outside of CBSAs.

Figure 6 shows the same set of practice outcomes but for each school individually.

Figure 6: Percentage of 2018 Medical School Graduates Practicing or Training in Primary Care in North Carolina by Medical School and Area of Practice in 2023.



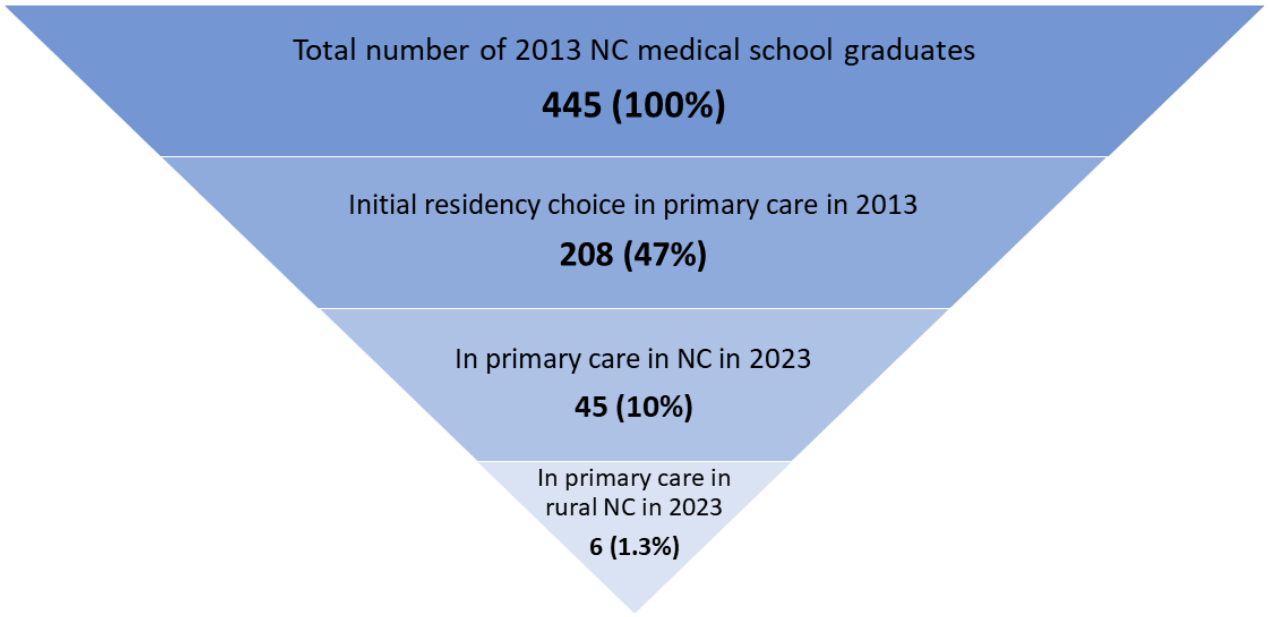
Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: North Carolina Health Professions Data System with data derived the NC Medical Board and the respective medical schools, 2023.

Class of 2013 Outcomes

We also tracked 2013 graduates of NC medical schools to determine where graduates were ten years following graduation from medical school. As noted previously, ten years post-graduation from medical school allows time for physicians to complete residency and fellowship training and settle into practice.

Figure 7 illustrates the aggregate outcome of North Carolina's medical school graduates ten years after graduation in 2013.

Figure 7: Retention of 2013 NC Medical Graduates in NC Rural Primary Care Ten Years After Graduating

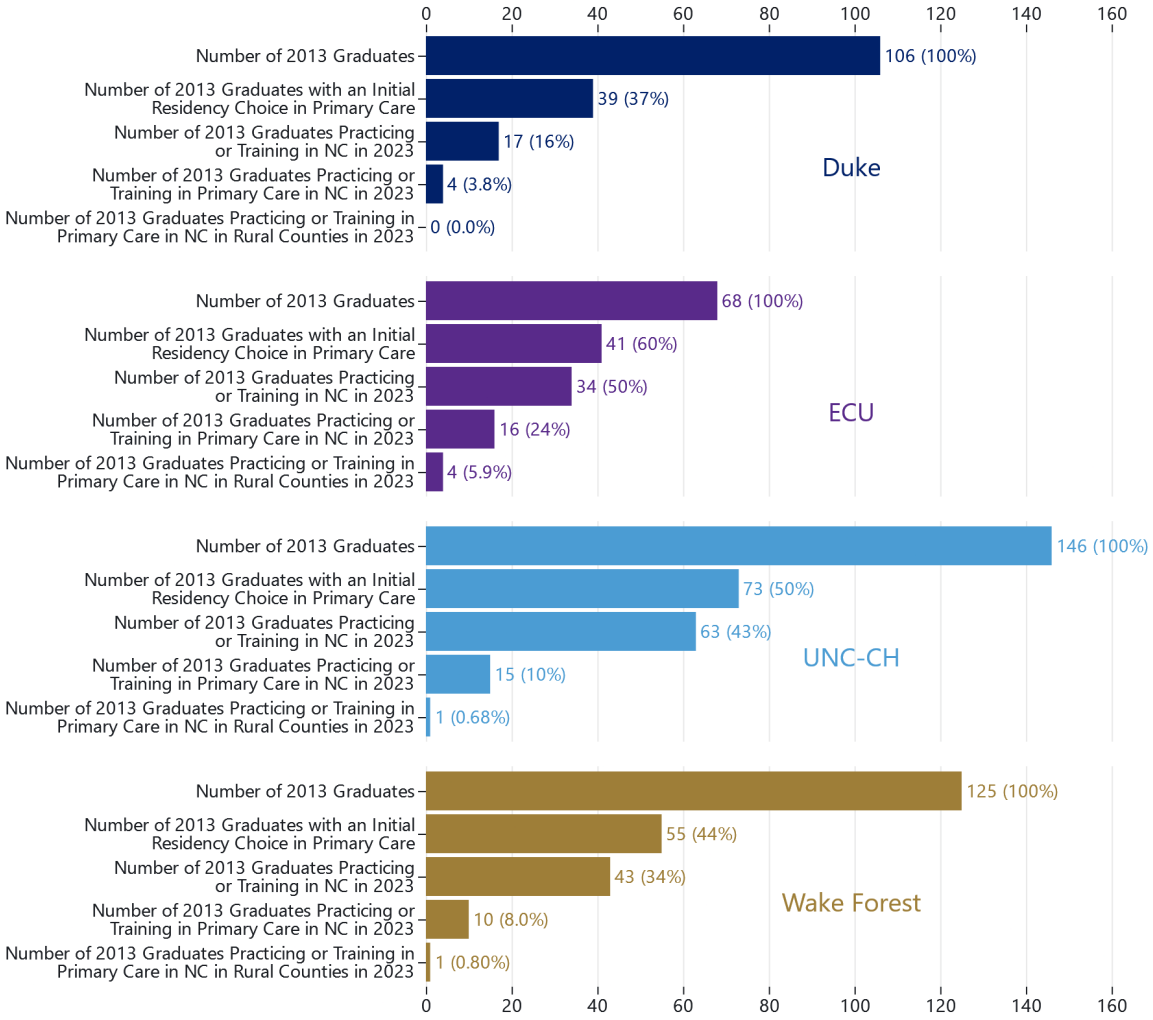


Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: North Carolina Health Professions Data System with data derived from the NC Medical Board and the respective medical schools, 2023. Rural source: US Census Bureau and Office of Management and Budget, July 2023. "Core Based Statistical Area" (CBSA) is the OMB's collective term for Metropolitan and Micropolitan Statistical areas. Here, nonmetropolitan counties include micropolitan and counties outside of CBSAs.

Retention of Graduates in North Carolina and in Rural Counties

The retention of primary care providers for each school's 2013 graduates is illustrated in **Figure 8.**

Figure 8: Workforce Outcomes Ten Years after Graduation, 2013 Medical School Graduates by School



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Practice in Safety Net Settings and Most Economically Distressed Neighborhoods

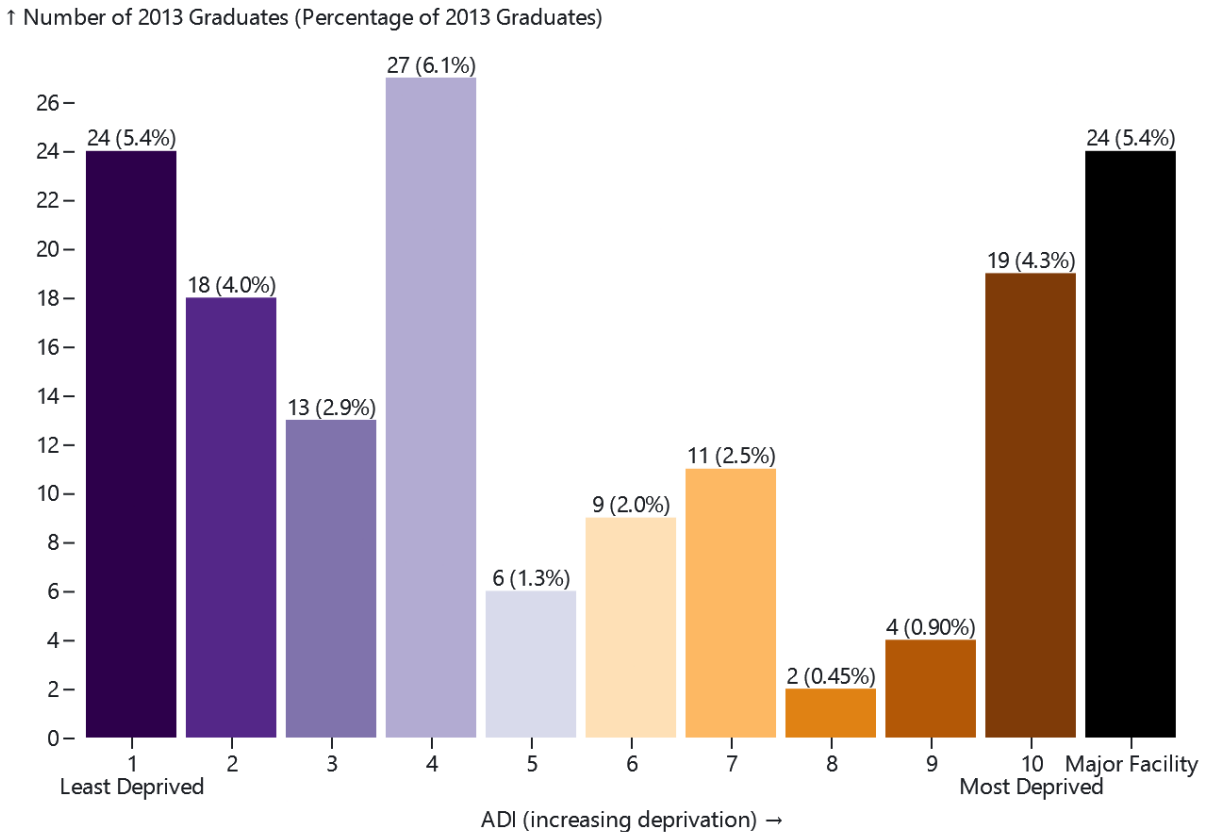
Five graduates from the class of 2013 were in practice in safety net settings in 2023, including four UNC graduates and one ECU graduate.

Figure 9 compares the Area Deprivation Index (ADI) of the neighborhoods in North Carolina where physicians from the class of 2013 report their primary practice location in 2023. Over five percent

(n=23/445) of the class of 2013 worked in a practice location in the top quintile of economically distressed neighborhoods ten years after graduation. As with the 2018 cohort, note the large proportion of graduates for whom an ADI score is not available because their practice location is a major facility. Of course, depending on the location and type of facility, many of these graduates will also be serving many economically distressed patients.

Figures 9, 10, and 11 include only individuals who were active and licensed in North Carolina in 2023, as this report relies on the NCMB data for practice outcomes. The 288 (65%) graduates who were practicing or training in another state, or who were not active in 2023 are omitted. The values are calculated as a percentage of the total graduating class of 445.

Figure 9: Neighborhood Disadvantage Status in 2023 of Physicians Retained in North Carolina Who Graduated from a NC Medical School in 2013



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Retention in Primary Care, General Surgery, and Psychiatry Areas of Practice

Figure 10 shows outcomes for 2013 graduates who are in North Carolina and have a primary care area of practice, or who are practicing psychiatry or general surgery. The outcomes for general surgery are reported here for the 2013 cohort, but not for the 2018 cohort, because general surgery residencies typically last five years, and many general surgeons complete a sub-specialty fellowship afterwards. For this reason, reporting on general surgery practice outcomes at five-years post-graduation may be misleading.

Figure 10: Percentage of 2013 Medical School Graduates Practicing or Training in Primary Care in North Carolina by Area of Practice in 2023, North Carolina Overall and Rural

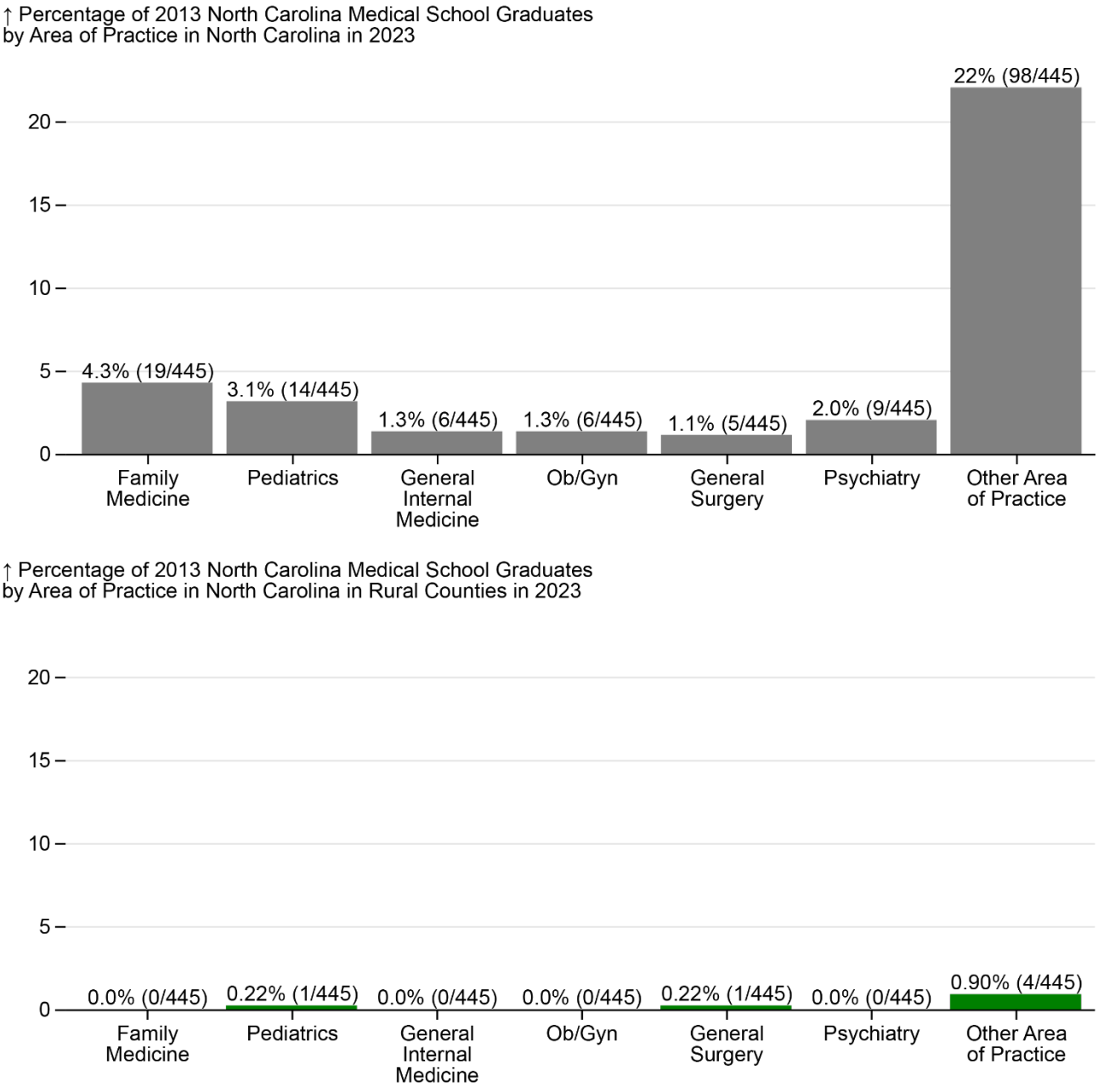

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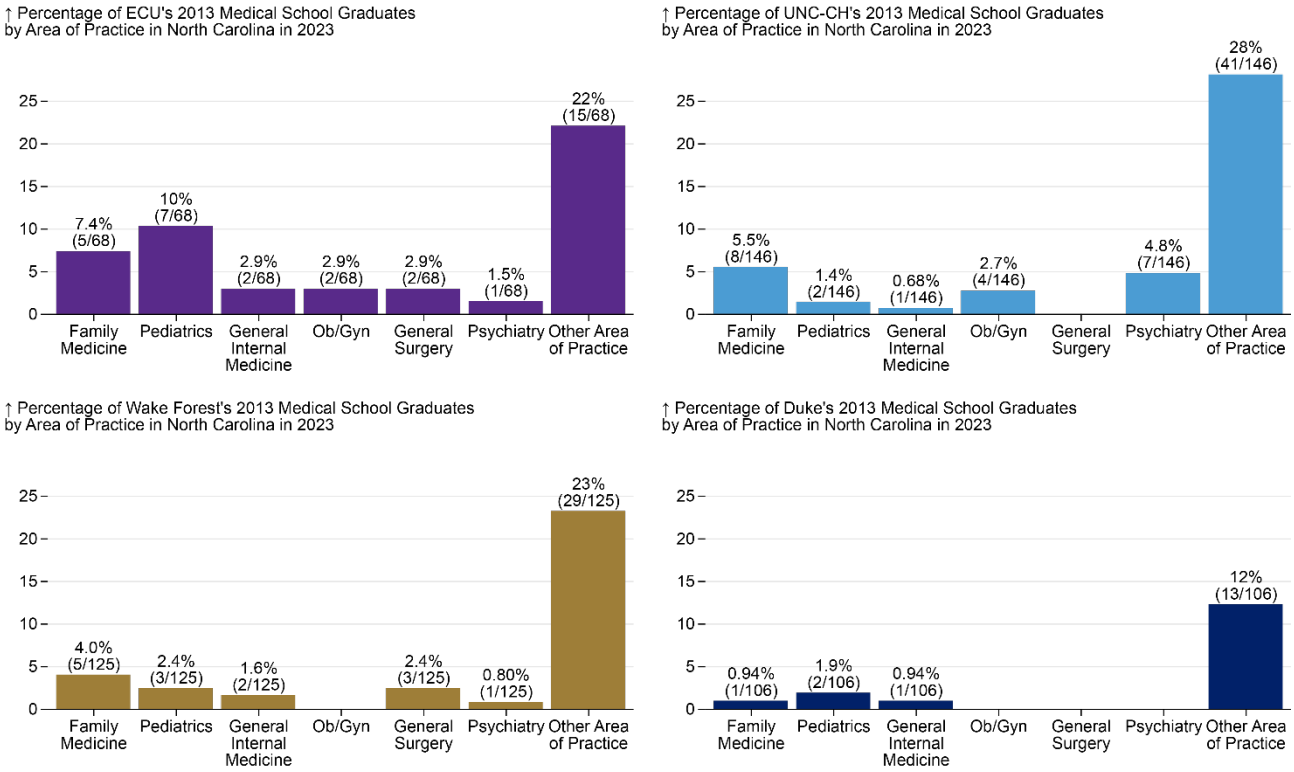
Figure 11 shows the same set of area of practice outcomes but for each school individually.

Figure 11: Percentage of 2013 Medical School Graduates Practicing or Training in Primary Care in North Carolina by Medical School and Area of Practice in 2023.



Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: North Carolina Health Professions Data System with data derived from the NC Medical Board and the respective medical schools, 2023.

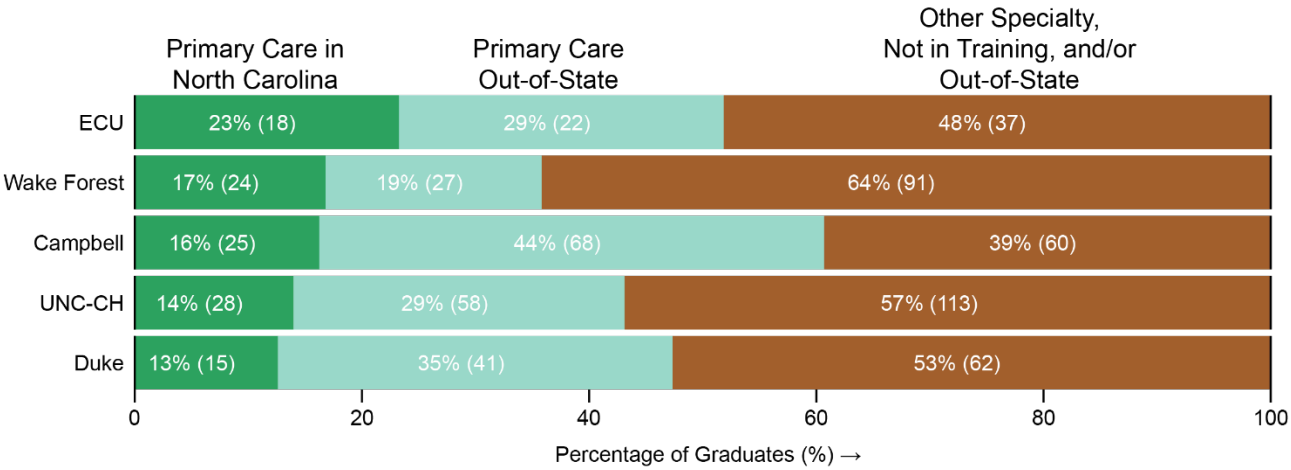
General surgery includes physicians report practicing in the following specialties: General Surgery, Abdominal Surgery, Colon & Rectal Surgery, Critical Care Surgery, Head and Neck Surgery, Oncology Surgery, Pediatric Surgery, Transplant Surgery, Trauma Surgery, or Vascular Surgery.

Initial Match Data: 2023 Graduating Cohort

As mentioned earlier, this report does not emphasize initial match data from the NC medical schools. Residents sometimes switch specialties or residency programs throughout the course of their training, and many subspecialize. Matches to "primary care" specialties (Family Medicine, Internal Medicine, Pediatrics, Internal Medicine-Pediatrics, and Obstetrics & Gynecology) are inflated compared to the number of graduates eventually expected to practice in those fields. We also track two other needed specialties in NC: psychiatry and general surgery. Prior trends indicate that many NC graduates, including most of those who match to Internal Medicine and General Surgery, will go on to complete fellowship training and eventually practice in a sub-specialty field. Family Medicine is an exception to this trend.

Figure 12 shows the proportion of each school's 2023 graduates who had an initial match to a primary care residency in North Carolina or in another state. ECU matched the greatest proportion to primary care residencies in North Carolina (23%, n = 18). However, Campbell matched the greatest proportion to primary care overall (in-state and out-of-state) with 93 (61%).

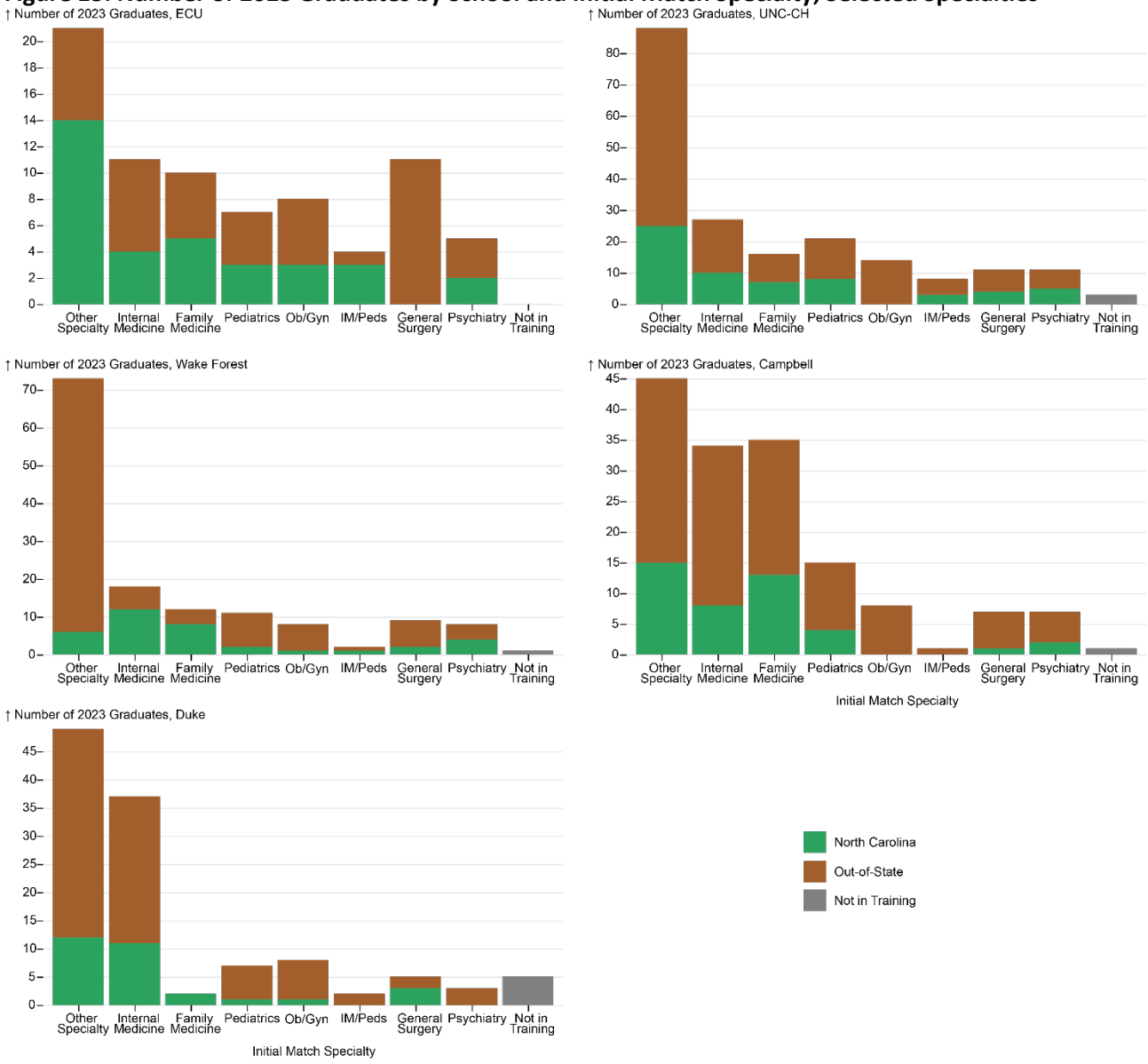
Figure 12: Initial Matches of 2023 Graduates for Primary Care by School



Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: the respective medical schools, 2023.

Figure 13 displays the number of 2023 graduates who matched to primary care specialties, general surgery, or psychiatry. (Note that the axes are scaled to each school's number of graduates.)

Figure 13: Number of 2023 Graduates by School and Initial Match Specialty, Selected Specialties



Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Source: the respective medical schools, 2023.

DISCUSSION

Research demonstrates that exposure to rural communities and primary care practice increases the likelihood that a medical student will pursue a career in rural primary care. Primary care physicians who train in rural communities are more likely to end up in practice in rural areas.[5] In response, North Carolina's medical schools have developed the programs described in Exhibit A to encourage their

[5] Patterson DG, Shipman SA, Pollack SW, et al. Growing a rural family physician workforce: The contributions of rural background and rural place of residency training. Health Serv Res. 2024; 59(1):e14168. doi:10.1111/1475-6773.14168

students to select a career in rural primary care. It is important to recognize, however, that medical school is one of many steps along the pathway to a career in a needed specialty or geography.

A key driver of retention of primary care physicians in North Carolina is the availability of community-based primary care residencies in the state. Medical students must go through at least three years of training before being able to practice independently, and many physicians practice close to their residencies for the remainder of their careers.[6][7][8] AHEC primary care residencies have a solid track record of keeping physicians in the state. Data from the American Medical Association physician master file demonstrate that 53% of active physicians who completed an NC AHEC residency between 1997-2017 remained in practice in NC, compared to 41% who completed a non-AHEC residency.[9]

This report tracks outcomes from NC medical schools but does not track outcomes of NC residency programs. While some NC medical school graduates also complete an NC residency, many residents in NC residency programs completed medical school outside of North Carolina. Although there is no legislative mandate to track NC residency program outcomes, the Sheps Center, in collaboration with AHEC, will begin to track and report these outcomes in addition to medical school outcomes in next year's report.

Exhibit B describes work underway to develop a pilot Pathway to Rural Primary Care program for North Carolina. It begins by recruiting students from rural communities and establishing linkage programs for those students to attend medical school. In medical school, those students would participate in a specialized rural curriculum and have focused community-based experiences in select rural teaching practices. Upon graduation, they would be directed toward primary care residencies in North Carolina and upon completion of their residencies they would be supported as they transitioned to practice.

Medical students have multiple career options and will respond to financial, personal and other opportunities. Primary care, especially rural primary care, is not as financially rewarding as other potential career choices. Programs like scholarships to reduce or eliminate student debt are an important tool to encourage students to select a career in primary care in rural North Carolina. There are other public policy approaches, including increasing reimbursement rates and other payment forms to value primary care, that would also be helpful.

[6] Dorner FH, Burr RM, Tucker SL. The geographic relationships between physicians' residency sites and the locations of their first practices. Acad Med. 1991;66(9):540–4

[7] Seifer SD, Vranizan K, Grumbach K. Graduate medical education and physician practice location. JAMA. 1995;274(9):685–91.

[8] Fagan EB, et. al. Family medicine graduate proximity to their site of training: policy options for improving the distribution of primary care access. Fam Med. 2015;47(2):124-30.

[9] Spero J. Compared to Non-AHEC Residents, a Higher Percentage of NC AHEC Residents are Practicing in NC. Sheps Health Workforce NC Blog, 18 March 2019. Accessed 10/8/19 at: https://nchealthworkforce.unc.edu/ahec_resident_outcomes_2017/

Appendix A

Self-reported responses to requests for information about what each North Carolina medical school is doing to try to increase the number of students who will practice primary care in rural North Carolina.

Campbell University School of Osteopathic Medicine

The mission of the Campbell University School of Osteopathic Medicine (CUSOM) is to educate and prepare community–based osteopathic physicians in a Christian environment to care for the rural and underserved populations in North Carolina, the Southeastern United States, and the nation. The focus on community-based care is significant as it recognizes the unique health care needs of rural and underserved populations. The preparation to enter those environments is unique and has been a core focus for our school. The Christian environment that we foster has played a significant role in shaping the values and beliefs of our graduates and shaping the way they approach their work as physicians. By instilling a strong sense of compassion, empathy, and ethical principles in its graduates, CUSOM is helping to ensure that they are well-prepared to provide high-quality, patient-centered care that is consistent with institutional values.

Campbell University School of Medicine opened its doors to its inaugural class of 162 students in 2013. Campbell University also became the first College of Osteopathic Medicine to serve as an ACGME sponsoring institution for Graduate Medical Education. As a sponsoring institution, Campbell University has provided support and resources to its affiliated residency programs ensuring that they meet the standards and requirements set forth by the ACGME. 15 osteopathic programs successfully transitioned to ACGME accreditation under Campbell University's Sponsoring Institution. Campbell University now serves as the Sponsor for 25 ACGME accredited programs with 1 additional pending application in partnership with 6 hospitals and systems. We serve as an educational affiliate partner for 1 additional hospital system in NC.

Medical Student Impacts

The graduating class of 2017 (our inaugural class) would have completed 3 year residencies in 2020, 4 year residencies in 2021, and 5 year residency programs in 2022.

The graduating class of 2018 would have completed 3 year residencies in 2021, 4 year residencies in 2022, and 5 year residency programs in 2023.

Neither class is, likely, fully represented in the data collected by AAMC or UNC Sheps Center for Health Services Research until the 2023 and 2024 information is released.

Of the data that we have on the first two classes and partial for 2019 and 2020, 349 of our graduates are currently in practice with 97 of those graduates (28%) located in the state of North Carolina. 72 are still in fellowship and 156 are still in a primary training program. The first two classes show 47% of our graduates being in the fields of Family Medicine or Internal Medicine and an additional 22% being in NC specific areas of need defined as General Surgery, Obstetrics, Psychiatry, and Pediatrics.

Overall, these trends suggest that CUSOM is making a positive contribution to the development of the physician workforce in North Carolina and that its graduates are well-prepared to enter the workforce and provide high-quality care to patients. It's great to see that a significant number of the CUSOM graduates from the classes of 2017 and 2018 have entered practice or fellowship programs, with a substantial number remaining in North Carolina. The strong commitment to primary care fields and specific areas of need is critical to positively impacting our state's ability to provide comprehensive, patient-centered care.

Graduate Medical Education Impacts

Campbell University had a goal of having a net neutral impact on the number of graduate medical education positions by creating enough positions that we would not graduate more medical students than the graduate medical education positions we created. To date, Campbell University has started 25 residency and fellowship programs in North and South Carolina with 1 pending applications. Those programs contain 439 GME positions with 161 of those being PGY-1 positions. We have residency programs in Family Medicine (x5), Internal Medicine (x3), Emergency Medicine (x2), General Surgery, Psychiatry, OBGYN, Dermatology, and Transitional Year (x5). We have fellowship programs in Sports Medicine (x2), Child and Adolescent Psychiatry, Cardiology, Pulmonary Disease, and Moh's Micrographic Surgery.

Our first resident started in 2014. Since that time, Campbell University Graduate Medical Education programs have placed 87 providers into active clinical practice with 32 of those remaining in North Carolina (38%) and 19/32 (59%) being in the fields of Family Medicine or Internal Medicine. Primary care is a critical component of health care, as it provides the foundation for patient care and helps to manage the overall health and well-being of individuals and populations. A solid primary care workforce is essential to ensuring that patients have access to comprehensive, high-quality care and that health care systems can effectively address the health needs of their communities.

Summary

Campbell University Graduates are now currently active in 44 of North Carolina's 100 counties. The full impact of Campbell University graduates to the physician workforce is still emerging. 2020 saw the inaugural class graduate from 3-year primary care programs. 2022 saw the first graduates in Surgery and Psychiatry from Campbell University GME programs. Combining the efforts of our medical school and our graduate medical education programs, Campbell University has placed 184 new providers in 44 North Carolina counties as of April 2024.

Duke University School of Medicine

Duke provides medical student clinical rotations. The goals of this program are for students to learn clinical skills in the context of a local community and to appreciate the effects of culture and context on health and health behaviors. Duke students may rotate through clinics in Person and Durham County health departments evaluating and following patients in these rural communities.

Duke also offers the Primary Care Leadership Track (PCLT), the goal of which is to create change agents for the system through primary care and leaders in the health care profession. The 4-year program offers leadership training, a longitudinal-integrated 2nd year clerkship, which includes following

pregnant mothers and delivering their babies, time for service with a community agency, and 3rd year research in community-engaged population health.
PCLT graduates have chosen primary care residencies: family medicine (outpatient adults, children, and prenatal care), general internal medicine (adults only), primary care pediatrics (children only), pediatrics/psychiatry, medicine/psychiatry, family medicine/psychiatry and Obstetrics/gynecology.

ECU Brody School of Medicine

Brody School of Medicine (BSOM) stands apart with its three-part mission to increase the supply of primary care physicians serving the state, improve the health and well-being of the region, and train physicians who will meet the state's health care needs. This distinctive mission makes BSOM a top choice for those intending to practice primary care specialties in our state.

The success of our students is a testament to the quality of education at BSOM. The Class of 2023, for instance, achieved a 100% match rate, with 43% of our students having been matched to programs in North Carolina and 60% secured positions in primary care specialties within our state. Nationally, BSOM ranks above the 90th percentile in the percentage of graduates practicing in primary care and in-state. These achievements are why we are proud to be ranked #14 among the top 20 medical schools for best medical schools for primary care and #10 in the percentage of graduates practicing in Health Professional Shortage Areas (HPSAs).

In addition to curricular and learning measures focusing on primary care and early immersion in patient care experiences, non-curricular events have been created for students to interact with primary care practitioners. An example is the Career Tasters Series, in which students can connect with practitioners, alumni, and/or faculty to learn about the various medical specialties, specifically those in primary care. These events are held in person with virtual options and combine the efforts of various school offices. Students are encouraged to apply for scholarships and financial aid resources like the Primary Care Medicine and Psychiatry Forgivable Education Loan Program. Additionally, our medical students actively participate in various interest groups with faculty sponsorship in each of the primary care specialties.

With a robust medical education curriculum, BSOM exposes students to diverse aspects of population care and health systems science. It prepares them with the knowledge, skills, and attitudes to provide reliable evidence-based care and utilize quality measures to improve care systems. As a result, over 80% of our graduating students met or exceeded residency program directors' expectations during their first year in areas like identifying system failures, patient safety concerns, and interprofessional skills. Relevantly, 93% of our graduating students have the skills to address social determinants that differentially influence the health status of their patients.

At BSOM, we believe in providing our students with unique opportunities beyond the classroom. We partner with rural Eastern North Carolina practice environments, offering students ample learning and clinical experiences within the region and with primary care practitioners. This exposure equips them to serve these communities better and enhances their desire to practice in rural settings. By graduation, 87% of our students participate in electives and activities with a free clinic for the underserved population in our region, like the Pitt County Care Clinic. Our national rankings reflect these efforts, with

BSOM ranking at the 92nd percentile for graduates practicing in rural areas and at the 91st percentile for the percentage of graduates practicing in underserved areas.

University of North Carolina at Chapel Hill School of Medicine

Our mission is to **improve the health and wellbeing of North Carolinians** and others whom we serve through excellence in patient care, education, and research. We have several programs to support those interested in primary care, and we have also developed innovative programs to try to enhance the number of providers serving rural areas. We have highlighted our primary care and rural programs below.

Kenan Rural Primary Care Scholars Program – With support of the Sarah Graham Kenan Endowment and the William R. Kenan, Jr. Charitable Trust, the Kenan Primary Care Scholars Program offers medical students rural experiences in central, eastern, and western North Carolina. These longitudinal exposures during medical school prepare students for careers in rural primary care while also providing financial support and enrichment experiences to sustain their commitment to rural primary care in NC.

This program started in 2013 and expanded in 2017 from one cohort to three cohorts. Here are the results of this program thus far:

- Through 2023, there have been 57 graduates of which 49 (85%) matched into primary care residencies including combined medicine-pediatrics programs.
- Among the 49, 31 (63%) matched in NC residency programs.
- Of the 22 who have completed primary care residencies, 13 (59%) are practicing in NC; 3 additional scholars were in rural NC for two years prior to moving out of state for family reasons.
- Seven of the 13 are in rural counties in NC and one is in Chapel Hill but serves patients via telehealth psychiatry in Rockingham County.
- All three residents completing 2024 signed in rural NC.

FIRST (Fully Integrated Readiness for Service Training) Program – The FIRST Program is a three-year accelerated program with a mission to increase the number of students seeking rural and underserved primary care residency placements and careers in NC. It consists of three parts: 1) An enhanced 3-year medical school curriculum, 2) A directed pathway into an affiliated residency program, and 3) Three years of service in a rural or underserved area of NC with ongoing support in practice. Students are recruited to the FIRST Program during their first year of medical school. The FIRST Program promotes close faculty mentorship and familiarity with healthcare systems, including early and longitudinal integration into clinical care, and fosters a close cohort of fellow students. Currently, FIRST has affiliated programs in six specialties: 1) Family Medicine, 2) General Surgery, 3) Internal Medicine, 4) Medicine-Pediatrics, 5) Pediatrics, and 6) Psychiatry with ties to residency programs through partnerships with Mountain Area Health Education Center (MAHEC), Southeastern Area Health Education Center (SEAHEC), Greensboro, WakeMed in Raleigh, and Novant Hospital in Charlotte.

This program started in 2016 with 3 matriculants in the field of Family Medicine and expanded in 2019 via an American Medical Association (AMA) Reimaging Residency Grant. Here are the results of this program thus far:

- Through 2023, we have 9 classes of FIRST students. There have been 50 students accepted into the FIRST Program. Of these 50, 9 students decelerated out of the FIRST program, with a total of 41 FIRST program participants.
- Currently, the first three classes (5 total students) have graduated residency and are in practice. 100% of the graduates are practicing Family Medicine in medically underserved communities in North Carolina (e.g. Siler City, Clyde, Wilmington, and Pittsboro).
- Classes 4 through 6 are currently in residency (13 students), all in the state of NC.
- Of our 41 FIRST participants, we have 3 students committed to Internal Medicine, 1 student committed to Medicine-Pediatrics, 6 students committed to Pediatrics, 5 students committed to psychiatry, 1 student committed to Surgery, and 25 students committed to Family Medicine.

NC Rural Promise Scholarship - The NC Promise Scholarship is a scholarship program which allows students additional "on-ramps" for pursuit of rural primary care, which started in 2016. The program began as a one-time scholarship for students in their 3rd and 4th years who had a commitment to rural primary care in North Carolina. During the academic year 2023-2024, the program expanded to support students who make a commitment following their 1st year of medical school. Students are supported with rural placements for rotations, connections to rural educational opportunities through the Office of Rural Initiatives (ORI), and support for practice placement after residency through the Office of Rural Health and others. Promise Scholars plan to enter the fields of family medicine, pediatrics, internal medicine, OB/Gyn, psychiatry, or general surgery and commit to serving in one of North Carolina's rural counties. The scholarship funding was allocated by the North Carolina General Assembly in recognition of the mission of the School of Medicine and the potential impact graduates can make caring for the people of the state. Scholarship support is paid toward debt reduction before graduation. Upon the completion of residency training, the honorees have made a commitment to serve in one of the state's rural counties that is underserved. To date, 89 Promise Scholarships have been awarded. Students who are part of the Kenan Rural Primary Care Scholars Program and FIRST program are eligible to apply, further supporting loan reduction prior to graduation for a commitment to service in North Carolina.

49 Promise Scholars have completed primary care residencies with 4 additional alumni completing in 2024. 1 alumnus is completing a fellowship. 2 scholars changed career paths out of primary care. 35 of the 49 are in practice in North Carolina or will be practicing in fall 2024. 24 of the 35 are in rural counties of NC, and 2 additional alumni practiced for 2 years in rural NC but had to leave the state for family reasons.

Important Pathway Programs before medical school – UNC SOM has a wide array of other programs that seek to connect high school and college students to rural primary care programs and interests. Examples include the *Rural Medicine Summer Academy* that offers rising high school seniors a week-long immersive experience on UNC's SOM campus; the *Rural Medicine Pathway Program*, a partnership with the Carolina Covenant Scholars Program provides mentorship, guidance, and community engagement experiences to students from rural areas of North Carolina and helps prepare students to apply to UNC SOM.

One of our newest pathway programs, *SERVE (Southeastern Rural Vocational Experiences),* started its work in the southeast part of the state in November 2022 through funding provided by Novant Health, UNC Health, and UNC School of Medicine; *SERVE's* outreach efforts are focused on reaching rural students in middle school, high school, and college in Bladen, Brunswick, Columbus, Pender, and New Hanover Counties, and it introduces students to healthcare workforce shortages in their counties, as well

as across North Carolina. *SERVE* also showcases various health professions careers and the many paths that students can take to get into those careers. Moreover*, SERVE* has several additional pathway programs that have been created under its parent umbrella, including exploration events hosted in the above-listed communities like the *On-Call Speaker Series*, which connects providers who graduated from high schools in southeastern communities back to those schools to share their journeys with local students. *SERVE* also houses *Health Career Exploration Events* hosted with Cape Fear Community College in an effort to show students how they can start their healthcare journeys while in high school. The UNC SOM Office of Rural Initiatives (ORI) has hosted over 120 students with *Heal Day with the Heels*, which brings high school and college students to UNC's campus for a day of learning about the path to medical school and primary care through simulations, panels, and interaction with medical students. The *SERVE* program can positively impact the North Carolina health professions workforce shortages by providing students early exposures to these careers and alerting them about the opportunities that lie in returning to their rural communities or other similar communities in North Carolina to practice. In its first year, *SERVE* reached 1100 students and in the first quarter of 2024, 757 students have already been touched by the program.

The **SEEDS Scholarship Program** enters its second year, offering support specifically to students from five counties in Southeastern NC, and those who plan to pursue needed specialties in the region. Scholars in the inaugural cohort of 11 students were from the MD, PT, and undergraduate programs, focusing primarily on radiologic sciences and chemistry. The current second cohort of 19 students consists of 11 renewals plus 8 students from the nursing, dentistry, PA, pharmacy, and MD programs. In partnership with the UNC SOM Office of Scholastic Excellence and Equity (OSEE) and AHEC partners, ORI also provides outreach and program support to high schools, community college, and undergraduate institutions across the state and works with collaboratives such as Rockingham Primary Care Initiative on community-based programs to develop the healthcare workforce for North Carolina. Most recently, ORI is partnering with Chatham County Community college on a week-long immersive camp for high school students from Chatham County sponsored by the PAHEC Camp Med Experience.

Wake Forest University School of Medicine

Family Medicine Interest Group: The mission of the Wake Forest School of Medicine Family Medicine Interest Group is to encourage interest in the specialty of Family Medicine; furthering the ideal of longitudinal, patient-centered care. Inspired by the AAFP Family Physicians' Creed and the Mission Statements of the AAFP and NCAFP, we strive to holistically improve the health of our community while exemplifying professionalism and creativity. Our overarching goal is to support and recruit interest by capturing students in training to become exceptional, humanistic physicians. Exposing students to Family Medicine as a career path early at interest fairs and via lunch talks supports this goal. Having upper-level students (formally and informally) mentor new students continues this pipeline through the residency match process. Further, our events consider health care policy and affordability, striving to advance high quality clinical evidence and advocate for health equity. By hosting events and combining efforts with other student groups, we hope that topics (e.g. LGBTQ health) that do not receive extensive attention elsewhere in the curriculum are illuminated. While we hope that our efforts lead to more students entering the primary care Family Medicine workforce, those who choose other specialties will also benefit from our diverse programming. 100 students signed up on Canvas; casting workshop with 20 students; NCAFP Family Medicine Day with around 18 students; created a strong executive

leadership group with eight positions including Class representation, president, vice president, treasurer, event coordinators, volunteer coordinator, and AAFP liaison.

Share the Health Fair: According to the 2022 Forsyth County SCOTCH Report, the top five leading causes of death for the county are cancer, heart diseases, chronic lower respiratory disease, cerebrovascular disease, and diabetes. Share the Health Fair exists to help meet these health discrepancies by minimizing barriers to care, improving social determinants of health, increasing awareness of preventative measures to avoid common chronic diseases, connecting fair participants to options for year-round health care, and empowering fair participants with the tools necessary to take their health into their own hands. Since is inception in 2000, the mission of the Share the Health Fair has been to provide basic medical screenings and information on health care and healthy living for all members of the Winston-Salem community, especially those who may not otherwise have adequate access to these services. It is an entirely student-organized effort, providing a unique opportunity for Wake Forest University School of Medicine (WFUSM) students to learn about community health and promote wellbeing within the community that has welcomed us as we pursue medical education. Since restarting the fair after the pandemic, STHF has expanded to host over three hundred attendees per year and has added several integral and highly requested screenings, including dental and vision screenings, mammography, and pap smears. The fair in 2023 was staffed by over two hundred volunteers, including 162 students from WFUSOM, 13 students from WSSU PT, 26 NW AHEC Scholars, 15 physician volunteers, and other DHP and outreach program volunteers.

DEAC Clinic: DEAC provides an opportunity for to deliver high quality patient care adapted to our unique student-run clinical model. Students and attending physicians love our new clinical space with areas for exam rooms, lab space, triage, front desk, and teaching from our wonderful physician volunteers. Our new clinic also allows us to deliver new initiatives like providing hot meals in partnership with Campus Kitchen. As our clinic grows, we look forward to further developing the wonderful roles that DEAC plays in our community over the many years in this new space.

DEAC implemented our Food Insecurity pilot program in partnership with Campus Kitchen last year. Campus Kitchen is an organization at Wake Forest University that aims to reduce food waste by distributing excess produce to the community. As part of our partnership, Campus Kitchen prepares fresh, nutritious meals with the surplus they acquire for distribution at the DEAC clinic. All patients being seen at the clinic are offered a meal to take home with them at the end of their visit. We have received positive feedback and gratitude from patients who otherwise would not have had time to cook dinner that night.

Clinic Information

1. In this most recent quarter, there were 52 total visits to the DEAC Clinic. (0 telehealth, 52 In-person). Of those visits, 5 were for patients new to DEAC and 47 were for patients returning to DEAC.
2. Show rate: 80% of patients showed up for scheduled appointments between Oct - Dec 2023.
3. During Oct - Dec 2023, 21 patient encounters required use of a translator during the visit.
4. Number of student volunteers Jan - Dec 2023: 258 Students volunteered 475 times

5. Number of preceptor volunteers Jan - Dec 2023: 11 preceptors volunteered 126 times

Schweitzer Fellowship: The Vision Clinic, which is a student-run clinic run in partnership with City with Dwellings, primarily serves those experiencing homelessness in Winston Salem. It is currently funded via the Schweitzer Fellowship for the 2023-2024 academic year. To date, there have been 3 clinics, and a total of 12 patients. During each clinic, we provide routine eye exams, order, and administer appropriate eyewear, and ensure follow up for patients, if needed.

The new Schweitzer Fellowship project for 2024-2025 is called SEE: Screening Eyes and Education, and our purpose is to hold eye health screening events at Downtown Health Plaza (DHP) on a quarterly to a monthly basis where the underinsured and uninsured population around Winston-Salem (WS) can come and receive free services. On top of the screening services, we will be offering eye health education and nutrition counseling to help them mitigate the risk factors for developing eye disease.

Clerkships: As part of the Wake Ready Curriculum, students complete a variety of community rotations/experiences between our two campuses (Winston-Salem and Charlotte) during the clerkship, with the opportunity to participate in electives in the post-clerkship curriculum. During the clerkship curriculum, all students complete an Ambulatory Internal Medicine (IM) clerkship and Family Medicine clerkship. Students also complete ambulatory components during their Pediatrics, Psychiatry, and Obstetrics/Gynecology clerkships. A description of the dedicated community/ambulatory clerkships of Ambulatory IM and Family Medicine are included below.

Clerkship: Ambulatory Internal Medicine

Duration: 2 weeks

Description of Clerkship: The core clerkship in Ambulatory Internal Medicine focuses on the basic competencies of ambulatory internal medicine. Students spend time in various ambulatory settings which include continuity care clinics, complex care teams, and urgent care clinics. Students are expected to participate in the care of patients presenting to these clinics, including but not limited to conditions such as COPD, Diabetes, Hyperlipidemia, Hypertension, Obesity, Tobacco Use, Depression, and Joint Pain. Also, as part of the clerkship, students complete a Population Health QI activity in which students address patient's health maintenance by addressing vaccine gaps in patients they are participating in their care.

Participants in clerkship: All third year medical students on the Winston-Salem and a longitudinal clerkship on our Charlotte campus (approx. 145 total)

Outcomes: Participation in care of patients with the above listed diagnoses/conditions and completion of the Population Health project.

Clerkship: Family Medicine

Description of Clerkship: The core clerkship in Family Medicine is a 4 week clerkship on the Winston-Salem campus and Charlotte campus during the 2023-2024 academic year. The clerkship consists of students participating in patient care at the outpatient family medicine clinics in both Winston-Salem and Charlotte. Students are expected to participate in the care of patients presenting with back/neck pain, dysuria, headache, joint pain, rashes, asthma/COPD, depression, diabetes mellitus, hyperlipidemia, hypertension, obesity, respiratory illness, tobacco use, adult and pediatric maintenance health exams, and counseling on smoking cessation.

Participants in clerkship: All third year medical students on the Winston-Salem and Charlotte campuses (approx. 145 total)

Outcome: Participation in care of patients with above noted presentations, along with final exam in course (NBME exam).

Also during the clerkship phase of the curriculum, students also complete the Health Equity thread/curriculum. The curriculum encompasses a series of activities that focuses on health equity and the social determinants of health, such as housing, transportation, access to care, maternal-fetal health disparities as examples. When possible, the experiences are partnered with a community organization in Winston-Salem and Charlotte that are working to address these disparities.

Health Equity

Goals of Program:

1. Understand the scope of health disparities in the United States.
2. Identify ways to contribute to the reduction of health disparities as a practicing clinician.
3. Demonstrate the knowledge and skills needed to improve the health of underserved populations.
4. Explore activities with community partners that will foster an interest in careers working with underserved populations.

Number of participants: All third year medical students at both campuses (approx.. 145 students)

Outcomes: Completion of multiple exercises during curriculum addressing health equity and the social determinants of health.

Appendix B

A Roadmap for a Statewide (and Nationwide) Approach to Training Primary Care Physicians Who Will Practice in Rural North Carolina

An AHEC Proposal to develop a Collaboration between NC Medical Schools

Objectives:

1. Improve the supply and distribution of physicians in needed specialties in rural communities and other communities with less access to resources to create a healthy North Carolina.
2. Facilitate a path into medicine for students from rural and other underserved communities who might otherwise not have been able to envision themselves as future physicians.
3. Develop and extend learning opportunities across the state of North Carolina through community-based learning and relationships.

Summary:

Medical students will choose their specialty based on financial, personal, and professional goals. A medical student is more likely to choose to practice rural primary care if they are from a rural community, are trained in a rural community and are supported in practice once they locate in a rural community. A multi-pronged approach is needed to address this set of complex and important decision points. The different components of the approach are described in more detail below.

AHEC has been convening educational leaders of the two state medical schools to focus on 1) how to recruit more students who are likely to pursue careers in needed specialties, 2) how to train students in high quality rural primary care while in medical school and 3) how to create and support high functioning rural practices in which to teach students. The other components – residencies and post-training support in addition to scholarships, loan forgiveness and increased reimbursements - are also critically important and need to be addressed in a different manner. We are working together to develop a pilot Pathway to Primary Care that, once developed, could be extended to any interested North Carolina medical school.

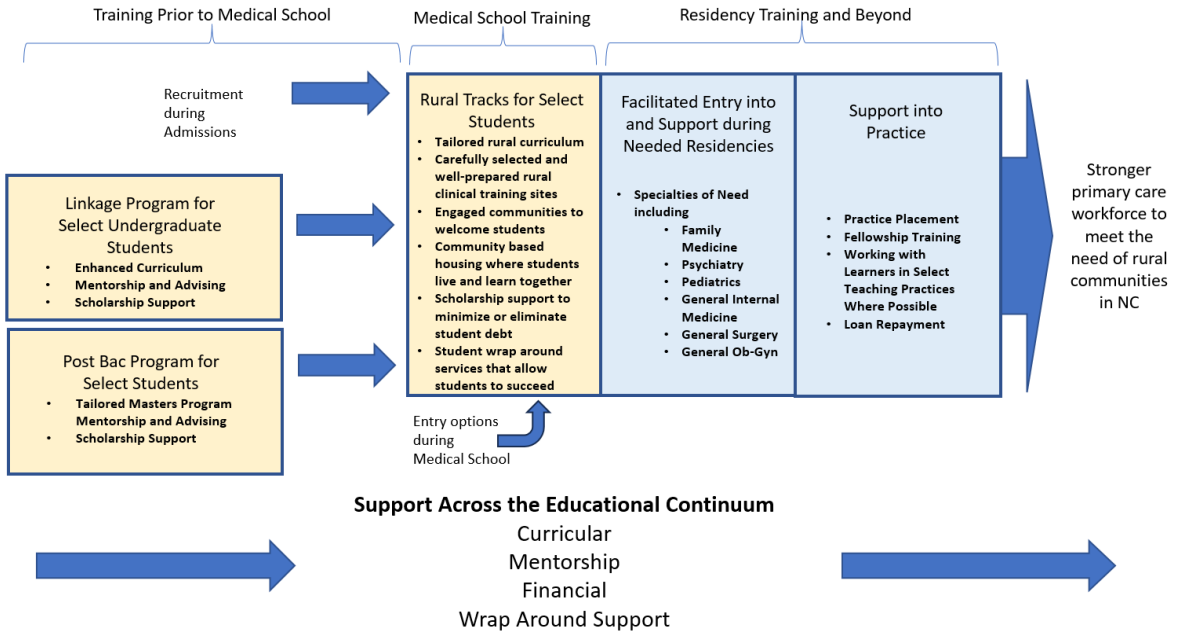
Critically Important Areas of Focus to Achieve Objectives:

To reach these objectives, the program will:

1) Recruit students into medical school who are more likely to pursue careers in needed specialties in rural and other underserved communities **(Linkage Programs into Medical School)**
2) Train these students in high quality primary care while in medical school **(Rural Tracks with Focused Curriculum)**
3) Creation and Support of high functioning primary care practices able to effectively teach **(Select Teaching Practices)**
4) Help students match into appropriate residencies and support them during residency training **(Facilitated Primary Care Residency Training)**
5) Provide further support and training after residency to optimize their successful entry into practice in rural and other underserved areas **(Fellowship Training Programs)**

6) Provide financial support during training to allow learners to focus on their training and not be burdened by debt load that dissuade them from pursuing careers in primary care with a goal of entering practice without debt **(Scholarships and Loan Forgiveness Programs)**
7) Continue to work at a national and state level to increase financial investments in primary care to allow for long term sustainability of primary care practices **(Increase Primary Care Reimbursement)**

Rural Primary Care Pathway



Area of Focus #1: Linkage Programs from Undergraduate Training Programs and Post Baccalaureate Masters Program

The Linkage Program for undergraduate students will recruit students from rural communities with strong intentions to practice primary care in rural and other underserved communities in North Carolina at the end of their first year of undergraduate school and notify them of acceptance into program prior to their second year of undergraduate school. The students who successfully complete the program will have strong recommendations (linkages) to be admitted to participating NC medical schools. Key components of the program include 1) mentorship and 2) curriculum focusing on professional formation, clinical skills, and foundational sciences.

Universities in the UNC System will be selected based on their interest in participating and their ability to recruit students who will likely pursue careers in rural and other underserved areas.

For students with a baccalaureate degree who need additional preparation to enter medical school, a Master of Clinical Science will be created specifically tailored for students committed to entering

primary care careers in rural North Carolina. Again, students who successfully complete the program will have strong recommendations (linkages) to be admitted to participating NC medical schools.

The educational collaborative convened by AHEC will further refine these programs.

Program participants who matriculate into medical school are guaranteed a place in the Rural Track described below and will learn in high performing Select Teaching Practices in rural communities.

Area of Focus #2: Focused Curriculum with Community Health Service Track:

This track would expand the total number of students engaged in rotations and experiences across rural and less resourced communities. It will also build a cohort of students who can support and grow with each other both in school and when practicing and will, hopefully, encourage more students to select rural primary care. In addition, having a specific and named rural track for students committed to rural practice will provide students additional leverage for residency placement through an LCME accredited track. Medical Schools participating in the collaboration will either have such a track already in existence or will develop such a track. Schools may choose to name their track differently. The components below are draft components of what such a track would include. **The educational collaborative convened by AHEC will further refine this area of focus.**

Participating medical schools will work together to offer students an augmented rural and underserved curriculum. This will allow team formation among students who have shared commitment to education and engagement in rural and underserved communities across the state.

The track focuses on training medical students to become physicians who will serve rural and other underserved communities and will better prepare medical students and serve as a recruitment incentive for students considering careers in primary care.

Sample Program Components:

1) Mentorship – Entering into Community Health Track, every student will be assigned a rural health preceptor. They will help students develop a statewide network of support that will provide important academic, professional, and social development.
2) Curricular Enhancements – Students in the track will complete all core requirements of the respective medical school curricula, but in addition will learn skills essential to being a rural physician in NC such as enhanced procedural skills including advanced point of care ultrasound skills.
3) Training in rural hospitals for a portion of required and elective inpatient experiences.
4) Training in Select Teaching Practices for the majority of outpatient clinical experiences – Select Teaching Practices are essential to the success of this program and are currently underdeveloped at most medical schools. For this reason, Creation and Support of Select Teaching Practices is discussed as a separate area of focus.

Area of Focus #3: Creation and Support of Select Teaching Practices

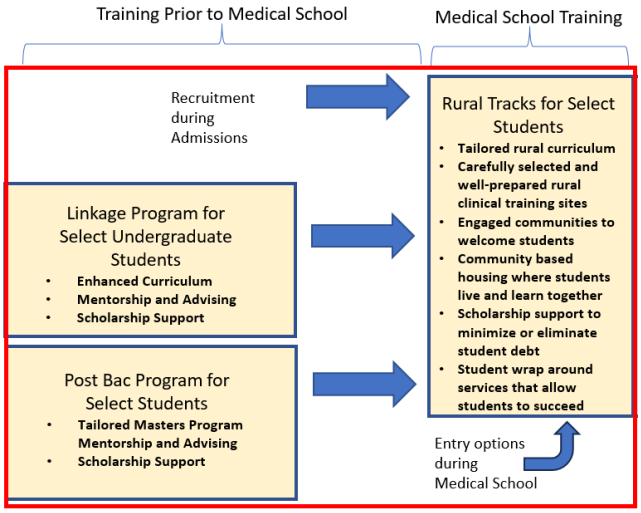
Students will learn clinical medicine in teaching practices that are chosen based on the location of the practice in a rural or otherwise underserved setting, the quality of care delivered in the practice, and the high commitment to education. These practices will receive additional support and training to allow them to effectively train Track students.

The creation of high functioning primary care practices in which to teach learners (Select Teaching Practices) deserves further discussion. Developing these Select Teaching Practices is fundamental to ensuring a well-prepared primary care workforce for our future as these practices will provide learners with the skills and role modeling needed to succeed in primary care. Five such hubs are being developed by AHEC currently with funding from the NC Legislature. **The educational collaborative convened by AHEC will further refine this area of focus.**

Sample Components that make Select Teaching Practices different from currently existing community preceptors:

1) Engaged Practices that provide high quality care. Select Teaching Practices will be high functioning primary care offices that provide a broad range of services to patients and have an enthusiasm for passing on their knowledge to the next generation of physicians. Select Teaching Practices will teach regularly so they can hone teaching skills and so that students integrate effectively into practice and directly contribute to the care of patients. Teachers in Select Teaching Practices will participate in occasional events to help improve their teaching skills and help us improve the curriculum. Select Teaching Practices will be important members of the teaching team will have an important voice in how students are trained.
2) Select Teaching Practices will be reimbursed at rates that allow them to teach effectively and remain financially viable. High performing practices face multiple pressures and increased reimbursement will allow them to compensate physicians and other staff to effectively teach students.
3) Select Teaching Practices will teach learners from multiple health disciplines to allow for high quality interprofessional education that is needed to prepare an effective health workforce of the future.
4) Students learning in these sites will be closely incorporated into the rural communities in which the Select Teaching Practices are located. Housing will be located in the communities to foster community integration and collaborative learning. Such immersive experiences are known to increase commitment to pursue careers in rural primary care.
5) Student assigned to Select Teaching Practices intend to pursue careers in primary care. These students will be carefully selected for their interest in primary care and will receive focused training in high quality primary care. Select Teaching Practices are thus able to teach a highly motivated group of students that share the practices enthusiasm for rural primary care.
6) Students assigned to Select Teaching Practices make useful contributions to care. The same group of students are assigned to Select Teaching Practices over time so that they get to know the practice. This allows students to contribute to patient care in meaningful ways. The students are able to assist in value-based care, patient education, documentation, and other tasks.

Summary Diagram of Focus Areas 1 -3 described above:



Additional Areas of Focus that are important but are not currently part of this collaborative:

Additional Area of Focus: Facilitated Primary Care Residency Training

Participating residencies will ensure that Track students continue to receive mentorship and support during residency.

The goal of this longitudinal approach is to train students in needed specialties to work in rural and underserved communities. Formal training often ends with residency. A minority of medical students from NC medical schools will practice primary care or psychiatry, and far fewer still will practice in rural and underserved areas.

Graduate Medical Education (GME) in NC has grown from 4 communities 50 years ago to 26 communities now. Most GME outside of academic health centers is in primary care psychiatry. Training residents in the communities in rural and urban communities where people live and work is a proven strategy to increasing provider supply and improving access to care. Additional community-based residencies to align with this Pathway would be needed.

Students from the track will be encouraged to schedule guest rotations with aligned community-based residency programs. These students will be encouraged to consider these programs as ideal opportunities to train in the types of communities they want to live and work and develop professional connections to those communities.

Additional Area of Focus: Fellowship Training Programs

Upon completion of residency, the program would support entry into practice with additional fellowship training. Fellowship training will provide enhanced clinical and business skills to succeed in rural practice. The fellowship will also provide teaching skills to grow the next generation of elite teaching practices.

MAHEC and UNC Office of Rural Initiatives have developed a rural fellowship program. Recently trained providers with employment in a rural community can have a portion of their professional time covered by the fellowship (10-20%) to allow the physician time to develop specific skills for rural practice as well as networking and rural leadership development. This fellowship has demonstrated early success and efforts will be made to expand it statewide. AHEC Practice Support may also be able to provide targeted support to practices that employ recent graduates. Ideally, these graduates would also practice in a Select Teaching Practice.

Additional Area of Focus: Financial Support and Reduction of Loan Burden

Loan burden on students graduating from medical school has increased dramatically over the past decade. The current average debt of graduating medical students nationally is now about $200,000. With continued wide disparities in salaries between specialties, large debt burden can influence student choice of specialties.

Even for students trained in needed specialties, large health systems in wealthier communities often provide larger recruiting incentives and salaries, making it more difficult to recruit physicians into rural and underserved areas.

Programs to minimize financial pressures during training and reducing eventual total debt burden are an important part of ensuring an appropriate physician workforce in rural and other underserved communities. The goal of this program is to have participants enter practice with zero debt. Ideally, this program would align with the scholarship and loan repayment programs recently enacted by the General Assembly.

Additional Area of Focus: Increase Primary Care Reimbursement

Work at a national and statewide level to implement the recommendations of the National Academies of Science Engineering and Medicine to pay for primary care teams to care for people not doctors to deliver services. The report recommends that:

- Payers should evaluate and disseminate payment models based on the ability of those models to promote the delivery of high-quality primary care, not on achieving short-term cost savings.
- Payers using a fee-for-service (FFS) model should shift primary care payment toward hybrid (part FFS, part capitated) models, and make them the default over time.
- The Centers for Medicare & Medicaid Services (CMS) should increase the overall portion of spending going to primary care.
- States should implement primary care payment reform by facilitating multi-payer collaboration and by increasing the overall portion of health care spending in their state going to primary care. Implementing high-quality primary care begins by committing to pay primary care more and differently because of its capacity to improve population health and health equity for all of society, not because it generates short term returns on investment for payers. High-quality

primary care is a common good promoted by responsible public policy and supported by private-sector action.

Reducing student debt and increasing reimbursement are essential components as students weigh their personal and professional goals when choosing a medical specialty.

Selected References:

Implementing High Quality Primary Care: Rebuilding the Foundation of Health Care. The National Academies of Science, Engineering and Medicine 2021. https://www.nationalacademies.org/our-work/implementing-high-quality-primary-care

Multiple Models exist on which this proposal is built. Links to some of these programs are provided below:

Alabama College of Community Health Sciences: https://cchs.ua.edu/rural-programs/rmsp/#:~:text=The%20Rural%20Medical%20Scholars%20Program,where%20they%20are%20most%20needed
Michigan State: https://msururalhealth.chm.msu.edu/programs/rural-physician-program.html
U of Minnesota https://med.umn.edu/md-students/individualized-pathways/rural-physician-associate-program-rpap
NE Ohio Medical School: https://www.neomed.edu/medicine/admissions/paths/early-assurance/
Eight Year Continuum. Brown Rhode Island. https://plme.med.brown.edu/
JAMP with support from Texas Legislature: https://www.uta.edu/academics/schools-colleges/science/degree-programs/health-professions/special-programs-volunteering-research-opportunities/jamp
WWAMI; Recruit students from rural communities and enroll them in Rural Track (TRUST). https://www.uwmedicine.org/school-of-medicine/md-program/wwami