

AGENDA ITEM

C-3. AHEC Annual Report on Primary Care Physicians..... Warren Newton

Situation: Presentation of the annual report on Monitoring the Progress of North Carolina Medical School Graduates Entering Primary Care Careers in North Carolina.

Background: This report responds to the mandate of the 1993 and 1995 sessions of the General Assembly to expand the pool of generalist physicians for the state. In Senate Bill 27, as amended by House Bill 729, the General Assembly required that each of the state's four schools of medicine develop a plan with the goal for an expanded percentage of medical school graduates choosing residency positions in primary care.

Assessment: This report provides information from the Wake Forest University School of Medicine, the Brody School of Medicine at East Carolina University, Duke University School of Medicine, and the University of North Carolina at Chapel Hill School of Medicine. At the request of these four schools, the AHEC Program has assumed responsibility for developing and managing a common database to track medical students; this is done in association with the SHEPS Center for Health Services Research at UNC-CH.

Action: This item requires a vote for adoption by the Committee, with full Board vote through the consent agenda.

Medical Students Entering Primary Care: A Changing Environment

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North Carolina Board of Governors in response to General Statute 143-613 as
amended by Chapter 507 of the 1995 Session Laws (House Bill 230) of the
North Carolina General Assembly

Medical Students Entering Primary Care: A Changing Environment

EXECUTIVE SUMMARY

In 1993, the General Assembly mandated an annual report on the progress of medical school graduates going into primary care. North Carolina AHEC, working with the Sheps Center, produces this report using state licensure data bases as well as national data bases. Over the past six years, the data have demonstrated relative stability in the percent of graduates from NC schools of medicine who are in practice or training in primary care five years following graduation, with the overall percentage hovering between 29% and 34%. Compared to the 2009 cohort, the data showed a slight increase (5%) in state medical school graduates going into primary care: of 420 graduates of the state medical schools matriculating in 2010, 34% were in practice or training in primary care specialties five years after graduation (up from 29% for 2009 graduates). Of the 2010 cohort, only 67 or 16% were practicing in North Carolina and 11 (or 3%) were practicing in one of the 54 rural counties in the state.¹

While the slight increase is encouraging, these data do not represent a dramatic departure from prior trends. The 2008 cohort and the 2010 cohort were similar in their primary care practice patterns, with 16% (69 of 419) of the 2008 NC medical school graduates practicing in primary care in NC five years post-graduation, and 3% (14 graduates) practicing in rural counties. This report also documents initial data about the differences across specialties in converting initial interest in a primary care specialty into primary care practice and practice in North Carolina, with students going into family medicine more likely to go into practice and into rural areas than internist, with those choosing pediatrics falling in between. The changing health marketplace, the beginning of state commitments to expand graduate medical education in needed specialties and areas and increasing attention to the overall primary care pipeline in four of the states five medical school may have stopped the decline of interest in practice in primary care in North Carolina.

Recognizing the need for increased primary care and other needed specialties for the rural and underserved areas of the state, the North Carolina Department of Health and Human Services has recommended selective GME expansion to focus on primary care in rural areas, and the state's proposed Medicaid reform has as a key component the development of a more robust primary care workforce.

¹ "Rural" is based on 2015 Core-Based Statistical Area (CBSA) definitions, and includes counties that are "micropolitan" and "outside of CBSAs." Using this definition, NC has 54 rural counties.

Introduction

This report presents trends of entry into primary care in North Carolina by graduates of the four schools of medicine in the state. In 1993, the North Carolina General Assembly expressed its interest in expanding the pool of generalist physicians for the state. In Senate Bill 27, as amended by House Bill 729, the General Assembly required that each of the state's four schools of medicine develop a plan with the goal for an expanded percentage 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 %.

The Data

This report provides information from the Wake Forest University School of Medicine, the Brody School of Medicine at East Carolina University, Duke University School of Medicine and the University of North Carolina at Chapel Hill School of Medicine. Each of the four schools of medicine has committed to developing a common database to track medical students. At the request of the four schools, the AHEC Program has assumed responsibility for developing and managing the common database in association with the Sheps Center for Health Services Research at UNC-CH. The development of a common database to track medical students has required a complex process of merging two national data sets, a state data set, and files in alumni and student affairs offices of the four medical schools. The national data sets include the graduate medical education tracking file of the Association of American Medical Colleges and the physician master file maintained by the American Medical Association. The state data set used is the North Carolina Medical Board's file for physicians licensed in North Carolina. The format for the information on medical students is consistent with and comparable to the baseline information provided in the May 1994 report "Expanding the Pool of Generalist Physicians for North Carolina."

While the original mandate of this report was specific to the four NC medical schools, new programs will also be monitored. Our intent is to include Campbell University School of Osteopathic Medicine as its graduates enter residencies in 2017 and into practice in 2020. Given that residency placement is a major driver of practice placement, and that AHEC residencies preferentially keep graduates in state, we will also begin to track placement in residencies in North Carolina as a

key outcome of North Carolina medical schools. Finally, AHEC and its partner hospitals have committed to reviewing the outcomes of residency programs across the state in order to guide the placement of residency stipends.

While we have historically examined NC medical school graduates at five years following graduation per legislative requirements, many physicians are just completing residency or fellowship/specialty training at this point in their career trajectory and may not have settled in a permanent practice location. This is the case for general surgeons, whose training period is 5 years, and for obstetricians/gynecologists and psychiatrists who often do a fellowship after a four year residency. We are exploring the optimal time intervals for future analyses.

Another issue over the past decade has been the dramatic increase of physicians choosing full time hospitalist practice, which decreases the proportion of primary care physicians in primary care Internal Medicine and, increasingly, other specialties. Hospitalists are included in primary care counts in the findings presented in this report because we do not have a way to systematically identify them in the dataset; it is likely this is a significant issue for internal medicine.

Retention of Graduates in Primary Care: Class of 2010

The most valuable measure of the choice of primary care careers is retention of graduates in clinical primary care after residency. Table 1 shows the graduates and the percentage that remained in primary care five years (in 2015) after graduation.

Out of the 420 medical school graduates in 2010, 415 are still in training or practice as of 2015. From this number, 142 (or 34 %) remained in one of the five primary care specialties (per the 1993 legislation mandating this analysis, these specialties include family medicine, general internal medicine, general pediatrics, obstetrics & gynecology, and internal medicine-pediatrics).

Figure 1 shows the trend in the percentage of physicians who graduated from NC medical schools practicing in primary care five years after graduation from 1990 - 2010. This graph shows that graduates from each school tend to fall into a relatively stable range of percentages, with ECU tending to have the highest percentage of graduates practicing in primary care five years after graduation, followed by UNC, Wake Forest, and then Duke. Compared to the 2009 cohort, all 4 medical schools showed an increase in 2010 graduates practicing in primary care five years after graduation: ECU at 55% (up from 43%), UNC at 38% (up from 32%), WFU at 30% (up from 26%) and Duke at 21% (up from 18%).

Retention of Graduates in North Carolina

Table 2 describes medical school graduates remaining in North Carolina. The number of 2010 graduates remaining in NC five years later is 146 or 35 % (compared to 131 or 31% of 2009 graduates). The number of graduates in primary care training or practice in NC increased as well from 59 (or 14 %) of 2009 graduates to 67 (16 %) of 2010 graduates. ECU's Brody School of Medicine graduates continue to show the highest rate of retention in North Carolina at 62 %, and in primary care in the state (42 %).

NC Medical Students – Retention in Rural Areas

Table 3 shows the retention of 2010 graduates in rural counties, primary care, and in/out of NC as of 2015. Out of 67 graduates practicing in primary care in NC in 2015, only 11 (3 %) of these were in rural counties, (an increase from 5 graduates or 1 % in the 2009 cohort). NC has 54 rural (or non-metropolitan) counties based on the 2015 Office of Management and Budget Core Based Statistical Area definition.

Differences in Retention by Practice Specialty

Prior analyses have consolidated data by practice specialty into an overall analysis of primary care and rural rates of retention between primary care specialties. This report begins documentation of outcomes by initial specialty choice in Table 4. For the 2010 cohort, 66% (n=27) of physicians who initially matched to family medicine (n=41) remained in clinical family medicine in NC five years post-graduation, with 15% (n=6) practicing in rural NC. Comparatively, 5 year retention of general internal medicine physicians was lowest of all five primary care specialties, with just 9% (n=9) of 2010 NC med school grads who initially matched to general IM (n=96) remaining in generalist practice in NC, and 0% retained in rural counties. It is important to understand that initial internal medicine match numbers are imprecise, both inflated since they include physicians who do a preliminary year before moving on to a different residency specialty and deflated because they include a sizable percentage of hospitalists. Some graduates who completed an internal medicine residency and later specialized remained in NC but are not included in this count.

Different schools also had different retention rates by specialty. For the 2010 cohort, graduate retention in family medicine in NC at 5 years after graduation was driven by ECU graduates. All of the ECU graduates who initially matched to family medicine (100%, 14 of 14) were in practice or training in NC 10 years after

graduation, and 29% (4 of 14) practiced in rural counties. Retention in general pediatrics in NC 5 years after graduation was driven by UNC graduates in the 2010 cohort. Sixty-nine percent (11 out of 16) of the UNC graduates who initially matched to pediatrics were retained in NC after 5 years, 13% (2 of 16) in rural counties.

Community Psychiatry, General Surgery and General Obstetrics and Gynecology remain critical to the workforce necessary for rural and underserved communities and for Medicaid. Our data are limited by the use of a five year time frame which does not adequately address individuals with fellowship training, but only 2% and 1% of North Carolina medical students are in training or practice in North Carolina in general surgery and psychiatry, respectively. These are likely an over estimate of actual numbers. We plan to determine the optimal time course next year.

Discussion

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 3 years of training before being able to practice on their own, and the large majority practice for the rest of their life close to their residencies.²³⁴ AHEC primary care residencies have a better track record of keeping physicians in the state. Data from the American Medical Association physician master file demonstrate that 50% of active physicians who completed an NC AHEC residency remained in practice in NC, compared to 38% who completed a non-AHEC residency.⁵ AHEC residencies, however, have grown only minimally over the last decade, and the large majority of new residency positions have been devoted to subspecialty physicians in large hospitals. In recent years, federal and philanthropic support has focused on building primary care capacity, with support for new residencies or expansions of residencies in community health center settings (Hendersonville, Greensboro, Prospect Hill and New Hanover) and the legislature has supported new residencies at MAHEC and Cape Fear. The

² 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

³ Seifer SD, Vranizan K, Grumbach K. Graduate medical education and physician practice location. *JAMA.* 1995;274(9):685–91.

⁴ 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.

⁵ Fraher EP, Spero JC. The State of the Physician Workforce in North Carolina: Overall Physician Supply Will Likely Be Sufficient but Is Maldistributed by Specialty and Geography. Program on Health Workforce Research and Policy, The Cecil G. Sheps Center for Health Services Research, The University of North Carolina at Chapel Hill. August 2015. Accessed 10/15/2015 at <http://www.shepscenter.unc.edu/wp-content/uploads/2015/08/MedicalEducationBrief-ShepsCenter-August20151.pdf>

Department of Health and Human Services has develop a plan for a substantial expansion of rural residencies in needed specialties and included an emphasis on creating the workforce for Medicaid in the 1115 Medicaid reform waiver.

There is a national trend away from primary care that is also influencing the medical students in North Carolina. Despite the ACA and its support of primary care, the proportion of graduating US medical school students has been essentially stable in recent years. Factors which deter choices of primary care careers include the high levels of debt being incurred by many students, particularly in private schools; lower salary levels associated with primary care careers; lifestyle choices being made by the current generation of medical students, and, increasingly, students' concerns about the support for primary care in North Carolina.

Physicians are increasingly gravitating to specialties that are more lucrative and also allow them to control their hours and have less call on nights and weekends.

An additional trend that further exacerbates the loss of primary care physicians is the declining percentages of internists and pediatricians remaining in primary care careers. Ten years ago over 50 % of residents choosing internal medicine and pediatrics practiced as generalists. Today many fewer play these roles. This trend further depletes the pool of generalists physicians needed to serve North Carolina's growing population; this is particularly acute for adults.

Several contextual issues in North Carolina are important to underscore. First, there has been rapid consolidation of hospitals and health care systems over the last several years; this has exacerbated the mal-distribution of primary care providers over the last decade. Most health care systems have not developed a robust workforce strategy for primary care and population health needs. Second, in terms of the pipeline of primary care providers, the Campbell School of Medicine and many new NP/DNP and PA programs have opened over the last decade. Many of these graduates are potentially available for primary care; we urge systematic tracking of these new providers. Third, the shortage of community preceptor sites for health care clinicians has become acute across North Carolina over the last years; these community sites play a key role in attracting medical students and other professionals into primary care. Finally, there has been significant uncertainty about the future of primary care in the care of Medicaid patients.

Medicaid reform and submitted 1115 waiver underscore the foundational role of primary care.

Conclusions

These data suggest stabilization of primary care practice and rural settings at a level that is lower than the 50% targets set by the NC legislature. There are 14 counties in the state⁶ where the entire county is identified as persistent primary care health professional shortage areas, meaning they have met Federal criteria as a health professional shortage area in at least 6 of the last 7 designation periods.

Furthermore, there are additional counties that meet these criteria but do not apply for the designation. Getting more primary care generalists for high need communities will require new strategies to care for these populations.

North Carolina's rural areas continue to have a higher supply of physicians than comparable rural areas elsewhere in the country, because of the work of the medical and other health science schools, the North Carolina AHEC Program, the State Office of Rural Health, and related programs. Given the burgeoning need for primary care and population health, however, there will be need for both increased supply and especially better distribution of primary care physicians to meet the goal of improving the health of North Carolinians.

⁶ Beaufort, Clay, Currituck, Dare, Gates, Graham, Hoke, Hyde, Montgomery, Northampton, Robeson, Stokes, Tyrrell, Washington.

Table 1: North Carolina Medical Students - Retention in Primary Care Five Years After Graduation (2010 Graduates)

School Primary Care* Residency Specialty	Number of 2010 Graduates in Training or Practice as of 2015	Number of 2010 Graduates in Training or Practice with an Initial Residency Choice of Primary Care*	Percent of 2010 Graduates in Training or Practice with an Initial Residency Choice of Primary Care*	Number of 2010 Graduates in Training or Practice in Primary Care** as of 2015	Percent of 2010 Graduates in Training or Practice in Primary Care** as of 2015
Duke	99	47	47%	21	21%
Family Medicine		2	2%	2	2%
Internal Medicine		34	34%	10	10%
Pediatrics		6	6%	4	4%
IM/ Peds		2	2%	2	2%
OBGYN		3	3%	3	3%
ECU	65	42	65%	36	55%
Family Medicine		14	22%	16	25%
Internal Medicine		12	18%	6	9%
Pediatrics		9	14%	7	11%
IM/ Peds		2	3%	2	3%
OBGYN		5	8%	5	8%
UNC-CH	136	78	57%	51	38%
Family Medicine		14	10%	14	10%
Internal Medicine		23	17%	6	4%
Pediatrics		25	18%	16	12%
IM/ Peds		3	2%	3	2%
OBGYN		13	10%	12	9%
Wake Forest	115	62	54%	34	30%
Family Medicine		11	10%	11	10%
Internal Medicine		27	23%	6	5%
Pediatrics		16	14%	10	9%
IM/ Peds		2	2%	1	1%
OBGYN		6	5%	6	5%
Total	415	229	55%	142	34%
Family Medicine		41	10%	43	10%
Internal Medicine		96	23%	28	7%
Pediatrics		56	13%	37	9%
IM/ Peds		9	2%	8	2%
OBGYN		27	7%	26	6%

Note: Two ECU grads initially matched to general surgery but were practicing in family medicine in 2015.

*2010 Primary Care Residency Specialty includes Family Medicine, General Pediatric Medicine, General Internal Medicine, Internal Medicine/Pediatrics, and Obstetrics/Gynecology. Source: Association of American Medical Colleges (AAMC). Internal medicine in this case also includes "medicine - preliminary," which likely overestimates the initial primary care figures.

** As of 2014, primary care definitions are based on NC Medical Board licensure data (for NC physicians) and AAMC data (for non-NC physicians) and include Family Medicine (Family Medicine, Family Medicine-Adolescent Medicine, Family Medicine-Geriatric, Family Medicine-Sports Medicine, General Practice; Internal Medicine (Internal Medicine, Internal Medicine-Geriatric, Infectious Disease, Nephrology, Rheumatology); Pediatrics (Pediatrics, Pediatrics-Adolescent, Pediatric Infectious Disease, Pediatrics Nephrology, Pediatric Rheumatology, Pediatric-Sports Medicine); Internal Medicine-Pediatrics (Internal Medicine-Pediatrics, Internal Medicine-Adolescent Medicine); OBGYN (Obstetrics & Gynecology, Obstetrics, Gynecology, Maternal-Fetal Medicine).

Sources: Association of American Medical Colleges and NC Medical Board

Compiled by: NC AHEC Program and Cecil G. Sheps Center for Health Services Research

Figure 1: Percentage of North Carolina Medical Graduates (Classes 1990-2010) Practicing in Primary Care Five Years After Graduation

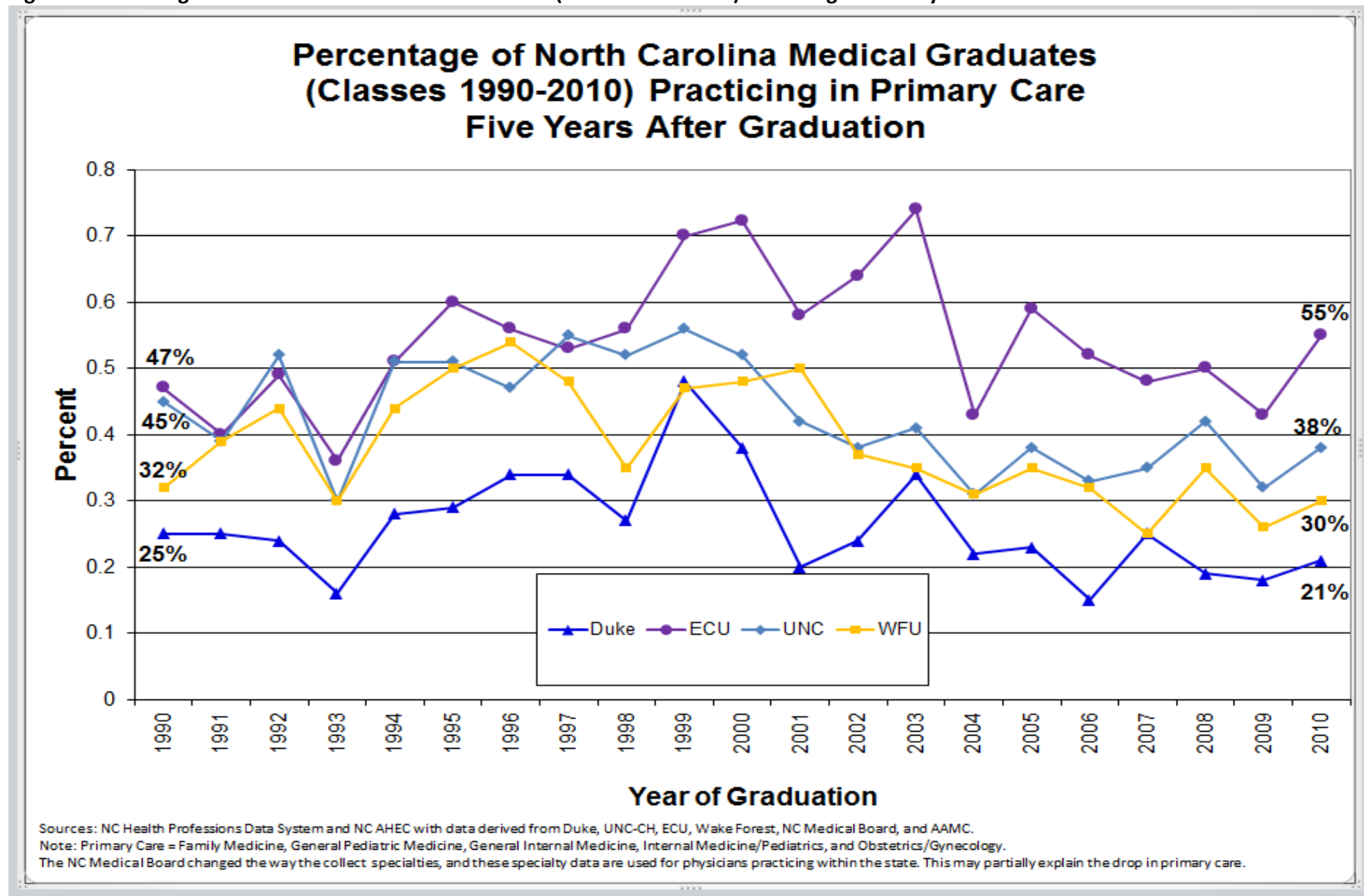


Table 2: North Carolina Medical Students-Primary Care Retention in NC (2010 Graduates)

School <i>Primary Care*</i> <i>Residency</i> <i>Specialty</i>	Number of 2010 Graduates in Training or Practice as of 2015	Number of 2010 Graduates in Training or Practice in North Carolina as of 2015	Percent of 2010 Graduates in Training or Practice in North Carolina as of 2015	Number of 2010 Graduates in Training or Practice in Primary Care** in North Carolina as of 2015	Percent of 2010 Graduates in Training or Practice in Primary Care** in North Carolina as of 2015	Number of 2010 Graduates in Training or Practice in Primary Care** in Rural*** Counties in North Carolina as of 2015	Percent of 2010 Graduates in Training or Practice in Primary Care** in Rural*** Counties North Carolina as of 2015
Duke	99	25	25%	2	2%	0	0%
<i>Family Medicine</i>				0	0%	0	0%
<i>Internal Medicine</i>				1	1%	0	0%
<i>Pediatrics</i>				0	0%	0	0%
<i>IM/ Peds</i>				0	0%	0	0%
<i>OBGYN</i>				1	1%	0	0%
ECU	65	40	62%	27	42%	6	9%
<i>Family Medicine</i>				14	22%	4	6%
<i>Internal Medicine</i>				5	8%	0	0%
<i>Pediatrics</i>				5	8%	1	2%
<i>IM/ Peds</i>				1	2%	0	0%
<i>OBGYN</i>				2	3%	1	2%
UNC-CH	136	48	35%	22	16%	4	3%
<i>Family Medicine</i>				6	4%	1	1%
<i>Internal Medicine</i>				1	1%	0	0%
<i>Pediatrics</i>				11	8%	2	1%
<i>IM/ Peds</i>				2	1%	0	0%
<i>OBGYN</i>				2	1%	1	1%
Wake Forest	115	33	29%	16	14%	1	1%
<i>Family Medicine</i>				7	6%	1	1%
<i>Internal Medicine</i>				2	2%	0	0%
<i>Pediatrics</i>				4	3%	0	0%
<i>IM/ Peds</i>				0	0%	0	0%
<i>OBGYN</i>				3	3%	0	0%
Total	415	146	35%	67	16%	11	3%
<i>Family Medicine</i>				27	7%	6	1%
<i>Internal Medicine</i>				9	2%	0	0%
<i>Pediatrics</i>				20	5%	3	1%
<i>IM/ Peds</i>				3	1%	0	0%
<i>OBGYN</i>				8	2%	2	0.5%

*2010 Primary Care Residency Specialty includes Family Medicine, General Pediatric Medicine, General Internal Medicine, Internal Medicine/Pediatrics, and Obstetrics/Gynecology. Source: Association of American Medical Colleges (AAMC). Internal medicine in this case also includes "medicine - preliminary," which likely overestimates the initial primary care figures.

**As of 2014, primary care definitions are based on NC Medical Board licensure data (for NC physicians) and AAMC data (for non-NC physicians) and include Family Medicine (Family Medicine, Family Medicine-Adolescent Medicine, Family Medicine-Geriatric, Family Medicine-Sports Medicine, General Practice; Internal Medicine (Internal Medicine, Internal Medicine-Geriatric, Infectious Disease, Nephrology, Rheumatology); Pediatrics (Pediatrics, Pediatrics-Adolescent, Pediatric Infectious Disease, Pediatrics Nephrology, Pediatric Rheumatology, Pediatric-Sports Medicine); Internal Medicine-Pediatrics (Internal Medicine-Pediatrics, Internal Medicine-Adolescent Medicine); OBGYN (Obstetrics & Gynecology, Obstetrics, Gynecology, Maternal-Fetal Medicine).

***"Rural" is based on 2015 Core-Based Statistical Area (CBSA) definitions, and includes counties that are "micropolitan" and "outside of CBSAs." Using this definition, NC has 54 rural counties.

Sources: Association of American Medical Colleges and NC Medical Board

Compiled by: NC AHEC Program and Cecil G. Sheps Center for Health Services Research

Table 3: North Carolina Medical Students-Retention in Rural Practice (2010 Graduates)

School <i>Primary Care* Residency Specialty</i>	Number of 2010 Graduates in Training or Practice as of 2015	Number of 2010 Graduates in Training or Practice in North Carolina as of 2015	Percent of 2010 Graduates in Training or Practice in North Carolina as of 2015	Number of 2010 Graduates in Training or Practice in Rural*** Counties as of 2015	Percent of 2010 Graduates in Training or Practice in Rural*** Counties as of 2015	Number of 2010 Graduates in Training or Practice in Rural*** Counties in North Carolina as of 2015	Percent of 2010 Graduates in Training or Practice in Rural*** Counties in North Carolina as of 2015	Number of 2010 Graduates in Training or Practice in Primary Care** in Rural*** Counties in North Carolina as of 2015	Percent of 2010 Graduates in Training or Practice in Primary Care** in Rural*** Counties North Carolina as of 2015
Duke	99	25	25%	1	1%	0	0%	0	0%
Family Medicine								0	0%
Internal Medicine								0	0%
Pediatrics								0	0%
IM/ Peds								0	0%
OBGYN								0	0%
ECU	65	40	62%	7	11%	6	9%	6	9%
Family Medicine								4	6%
Internal Medicine								0	0%
Pediatrics								1	2%
IM/ Peds								0	0%
OBGYN								1	2%
UNC-CH	136	48	35%	10	7%	6	4%	4	3%
Family Medicine								1	1%
Internal Medicine								0	0%
Pediatrics								2	1%
IM/ Peds								0	0%
OBGYN								1	1%
Wake Forest	115	33	29%	5	4%	2	2%	1	1%
Family Medicine								1	1%
Internal Medicine								0	0%
Pediatrics								0	0%
IM/ Peds								0	0%
OBGYN								0	0%
Total	415	146	35%	23	6%	14	3%	11	3%
Family Medicine								6	1%
Internal Medicine								0	0%
Pediatrics								3	1%
IM/ Peds								0	0%
OBGYN								2	0.5%

*2010 Primary Care Residency Specialty includes Family Medicine, General Pediatric Medicine, General Internal Medicine, Internal Medicine/Pediatrics, and Obstetrics/Gynecology. Source: Association of American Medical Colleges (AAMC). Internal medicine in this case also includes "medicine - preliminary," which likely overestimates the initial primary care figures.

** As of 2014, primary care definitions are based on NC Medical Board licensure data (for NC physicians) and AAMC data (for non-NC physicians) and include Family Medicine (Family Medicine, Family Medicine-Adolescent Medicine, Family Medicine-Geriatric, Family Medicine-Sports Medicine, General Practice; Internal Medicine (Internal Medicine, Internal Medicine-Geriatric, Infectious Disease, Nephrology, Rheumatology); Pediatrics (Pediatrics, Pediatrics-Adolescent, Pediatric Infectious Disease, Pediatrics Nephrology, Pediatric Rheumatology, Pediatric-Sports Medicine); Internal Medicine-Pediatrics (Internal Medicine- Pediatrics, Internal Medicine-Adolescent Medicine); OBGYN (Obstetrics & Gynecology, Obstetrics, Gynecology, Maternal-Fetal Medicine).

***"Rural" is based on 2015 Core-Based Statistical Area (CBSA) definitions, and includes counties that are "micropolitan" and "outside of CBSAs." Using this definition, NC has 54 rural counties.

Sources: Association of American Medical Colleges and NC Medical Board

Compiled by: NC AHEC Program and Cecil G. Sheps Center for Health Services Research

Table 4: North Carolina Medical Students - Retention by Specialty in NC (2010 Graduates)

	Physician Specialty				
	Family Medicine	Internal Medicine	Pediatrics	IM/ Peds	OBGYN
Number of 2010 Graduates in Training or Practice in 2015 that Initially Matched to Specialty*	41	96	56	9	27
Number (<i>Percent</i>) of 2010 Graduates in Training or Practice as Generalist** in Specialty as of 2015	43 (105%)	28 (29%)	37 (66%)	8 (89%)	26 (96%)
Number (<i>Percent</i>) of 2010 Graduates in Training or Practice as Generalist** in Specialty in North Carolina as of 2015	27 (66%)	9 (9%)	20 (36%)	3 (33%)	8 (30%)
Number (<i>Percent</i>) of 2010 Graduates in Training or Practice As Generalist** in Specialty in Rural*** Counties in North Carolina as of 2015	6 (15%)	0 (0%)	3 (5%)	0 (0%)	2 (7%)

Notes: Two physicians at ECU that initially matched to general surgery were in practice in family medicine in 2015.

*2010 Data Source: Association of American Medical Colleges (AAMC). Internal medicine in this case also includes "medicine - preliminary," which likely overestimates the initial match to Internal Medicine.

**Physicians who branch from primary care specialties into subspecialty fields are not included in these counts, even if they remain in practice in NC. Practice specialty definitions are based on NC Medical Board licensure data (for NC physicians) and AAMC data (for non-NC physicians) and include Family Medicine (Family Medicine, Family Medicine-Adolescent Medicine, Family Medicine-Geriatric, Family Medicine-Sports Medicine, General Practice; Internal Medicine (Internal Medicine, Internal Medicine-Geriatric, Infectious Disease, Nephrology, Rheumatology); Pediatrics (Pediatrics, Pediatrics-Adolescent, Pediatric Infectious Disease, Pediatrics Nephrology, Pediatric Rheumatology, Pediatric-Sports Medicine); Internal Medicine-Pediatrics (Internal Medicine-Pediatrics, Internal Medicine-Adolescent Medicine); OBGYN (Obstetrics & Gynecology, Obstetrics, Gynecology, Maternal-Fetal Medicine).

***"Rural" is based on 2015 Core-Based Statistical Area (CBSA) definitions, and includes counties that are "micropolitan" and "outside of CBSAs." Using this definition, NC has 54 rural counties.

Sources: 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, North Carolina Medical Board

Compiled by: NC AHEC Program and Cecil G. Sheps Center for Health Services Research

Notes

Limitations: The information used in this analysis to determine a medical graduate's initial specialty choice for residency and to determine retention in primary care comes from different sources. When calculating retention in primary care five years after graduation, data from the AAMC are used to determine initial choice of residency. AAMC does not differentiate between internal medicine and medicine-preliminary, so the data may appear to be inflated for initial residency choice of primary care. Two data sources are used to determine current practice or training area. For physicians practicing in North Carolina, NC Medical Board (NCMB) data are used to determine the physician's current self-reported primary area of practice. For physicians practicing outside of North Carolina, AAMC data are used to determine current practice or training area. AAMC data are based on the AMA Physician Masterfile.

Beginning with the class of 2006 all MDs graduating in a year, regardless of month, is counted with that year's graduates.

Primary Care Tables: Primary care coding was revised in 2014 to reflect more accurate aggregation of AMA minor codes to AMA major codes. 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. Specialties included under the definitions of current practice specialties for primary care, psychiatry, and general surgery were revised in 2014 and reviewed by practicing clinicians for accuracy.

"Primary Care" is defined for both initial specialty of residency training (identified using AAMC data and denoted by the use of one asterisk) and for current practice or training area (identified using either NCMB data for physicians in NC and AAMC data for physicians practicing out of state and denoted by the use of two asterisks). More specialties are included under the definition of "primary care" for current practice or training area than for specialty of residency training because physicians may specialize within their primary care area of practice following training. For example, a physician who entered residency training in "pediatrics," and following completion of training reported a current practice area of "adolescent medicine" would be counted as a primary care physician.

General Surgery Tables: For tables calculating retention in general surgery five years after graduation, it is important to note that surgical residencies are currently a minimum of five years, and students who select an initial specialty of general surgery often transition to more specialize surgical training.

State-Supported Students at Duke and Wake Forest Medical Schools: Prior analysis tracked outcomes just for the subgroup of students that received the state IMEO funds (roughly 35% of the Wake Forest Students and 20% of the Duke students). Students were identified using data from NCSEAA. The IMEO grant program was repealed in 2009 legislation (see Senate Bill 202) and tracking for those students is no longer a component of this analysis.

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