




Pharmacists in North Carolina: Steady Numbers, Changing Roles



Julie C. Spero, MSPH
Christopher Del Grosso, BS
Erin P. Fraher, PhD, MPP



February 2014

This work was supported by the
University of North Carolina General Administration



UNC

THE CECIL G. SHEPS CENTER
FOR HEALTH SERVICES RESEARCH

Corresponding author:

Julie C. Spero, MSPH | juliespero@unc.edu | 919.966.9985

Program on Health Workforce Research and Policy

Cecil G. Sheps Center for Health Services Research, The University of North Carolina at Chapel Hill.
725 MLK Jr. Blvd, CB# 7590 | Chapel Hill, NC 27599-7590 | <http://www.healthworkforce.unc.edu> | 919.966.7112

Suggested citation:

Spero JC, Del Grosso C, Fraher EP. Pharmacists in North Carolina: Steady Numbers, Changing Roles. Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, The University of North Carolina at Chapel Hill. February 2014.

Acknowledgments:

This work was supported by the University of North Carolina General Administration.

The authors wish to thank a group of pharmacy advisors for their generous contribution of expertise, data, editorial comments and other input that greatly contributed to this work: Tom Bacon, Renee Batts, Jay Campbell, Sandra Covington, Skip Cummings, Jacquelyn Curtis, Fred Eckel, Anthony Emekalam, Mark Gregory, Sterling Koonce, Michael Manolakis, Angela Mitchell, Mark Moore, Joe Moose, Shay Phillips, Douglas Scheckelhoff, Jon Schommer, Mollie Scott, Betsy Sleath, Richard Stanford, and Troy Trygstad. The authors also wish to thank Katherine Knapp, Professor and Dean of the College of Pharmacy at Touro University (California) for permission to use the Aggregate Demand Index graphic shown in Figure 13. Additionally, the authors thank Sarah Broome and Marjah Haygood at the North Carolina Hospital Association for sharing annual 2012 hospital workforce data to inform the demand-side of this report. Finally, the authors thank Katie Gaul, Research Associate, Sheps Center, UNC, for her assistance in designing the graphics and layout of this report, and Lisa Beavers, Information and Communications Specialist, Sheps Center, UNC, for the photographs of the advisory meeting.

Pharmacists in North Carolina: Steady Numbers, Changing Roles

Executive Summary

This study of the pharmacy workforce in NC was conducted by the Program on Health Workforce Research and Policy at the Cecil G. Sheps Center (Sheps Center) in response to a request by the University of North Carolina General Administration.

Key Findings:

NC Has a Strong Supply of Pharmacists

- NC's supply of pharmacists relative to population exceeds the national average (10.1 vs. 9.1 pharmacists per 10,000 population).
- Between 2008 and 2012, the growth in pharmacists outpaced population growth in most counties in the state (n=69 of 100 counties).
- Young pharmacists are increasingly entering the workforce and a relatively low percentage of pharmacists are nearing retirement age, suggesting that NC will have a stable future supply of pharmacists.

The Pharmacist Workforce is Mostly Female and Mostly White

- The pharmacist workforce is 60% female.
- Although significant progress has been made in increasing the diversity of the pharmacy workforce in the last decade, African-American/Black, Hispanic, and American Indian/Alaskan Native pharmacists are still underrepresented in the workforce.

A Majority of the NC Pharmacist Workforce Was Trained in NC

- In 2012, 57% of pharmacists practicing in NC graduated from a NC school of pharmacy, as did 69% of pharmacists practicing in non-metropolitan counties.
- Between 2008 and 2012, NC retained 60% of PharmD graduates from the three in-state Pharmacy Schools: UNC, Campbell, and Wingate.
- High Point University is developing a school of pharmacy scheduled to open in 2016.
- NC continues to attract pharmacists into the workforce from outside the state.

The Demand for Pharmacists Has Declined Over the Past Decade

- NC's supply of pharmacists is in balance with demand, reflecting national and regional trends.
- Between 2008 and 2012, growth in retail pharmacists outpaced that of retail prescriptions dispensed, and average annual retail prescriptions dispensed per pharmacist declined below levels seen in 2000.
- Hospital pharmacist recruitment time has decreased from 90 days in 2008 to 72 days in 2012.
- New graduates from PharmD programs have reported difficulty in securing full time employment and residency positions. Signing bonuses, common in the past, have disappeared.

New Models of Healthcare Delivery May Expand Roles for Pharmacists and Pharmacy Technicians

- New models of healthcare delivery may integrate pharmacists into healthcare teams as direct patient care providers. A pilot project in Asheville is one example of an innovative use of pharmacists as part of primary care teams.
- NC regulations allow Clinical Pharmacist Practitioners (CPPs) to provide broader direct care services, but few pharmacists have sought this credential due to the lack of reimbursement mechanisms for expanded practice.
- If pharmacists assume additional tasks related to direct patient care, there may be a corresponding opportunity to expand the role of pharmacy technicians.
- Pharmacy technician career pathways are currently limited by a lack of standardized training. If requirements are standardized, the NC Community College System is well-positioned to provide pharmacy technician education.

Conclusions

North Carolina has a strong supply of pharmacists to meet the demand for pharmaceutical services in the state. A relatively low percentage of pharmacists are near retirement age, the pipeline for new pharmacists is strong, and competition for jobs is high. New and emerging roles for pharmacists and pharmacy technicians in North Carolina may emerge in the future in response to new models of healthcare delivery.

Data and Methods

Data used in the study are from the North Carolina Health Professions Data System (derived from NC Board of Pharmacy licensure data), as well as data from IMS Health Inc., The Pharmacy Manpower Project Inc., the North Carolina Hospital Association, the North Carolina Community College System, and the three Doctor of Pharmacy (PharmD) granting educational institutions in the state. Data were reviewed by an advisory group of pharmacy leadership experts from across the state.

Pharmacists in North Carolina: Steady Numbers, Changing Roles

Introduction

In late summer 2013, the University of North Carolina Office of General Administration asked the Program on Health Workforce Research and Policy (PHWRP) at the Cecil G. Sheps Center for Health Services Research (Sheps Center) to update a 2010 study examining trends in the NC pharmacy workforce.ⁱ

This report summarizes the findings from that study which aimed to:

- 1) Assess the supply of pharmacists in the state and the demand for pharmacist services;
- 2) Describe the changing demographics and work patterns of the pharmacist workforce;
- 3) Identify where new pharmacists are trained; and
- 4) Describe new models of healthcare delivery and potential expanded roles for both pharmacists and pharmacy technicians.

Methods

Data Analysis

Data related to pharmacist supply and demand, demographics, work trends, and location of education were primarily derived from the North Carolina Health Professions Data System (HPDS). The NC HPDS obtains annual licensure data from the North Carolina Board of Pharmacy that contains information on all pharmacists licensed to practice in the state as of October 31st of the year. The Sheps Center also obtained data from external sources including IMS Health Inc., The Pharmacy Manpower Project Inc., the North Carolina Hospital Association, the North

Carolina Community College System, and the three PharmD-granting educational institutions in the state.

Pharmacy Leadership Advisory Group

As part of this study, the Sheps Center convened an advisory group of pharmacy leaders from across the state (see [Appendix](#)). The goal was to create a group with a diversity of perspectives, including educators, hospitals, retail settings, and other pharmacy workforce employers. We also sought a diverse representation by geographic location in NC, race/ethnicity, and gender.

The advisory group served as a resource to contextualize and interpret clinical, education, and policy trends affecting the pharmacy workforce. Advisory group members were contacted as needed for data or other information. On December 5th, 2013, PHWRP staff convened a half-day meeting of the pharmacy study advisory group at the UNC Eshelman School of Pharmacy. Advisory group members reviewed pharmacy workforce study findings and participated in a facilitated discussion about new roles for pharmacists and pharmacy technicians under new models of healthcare delivery.

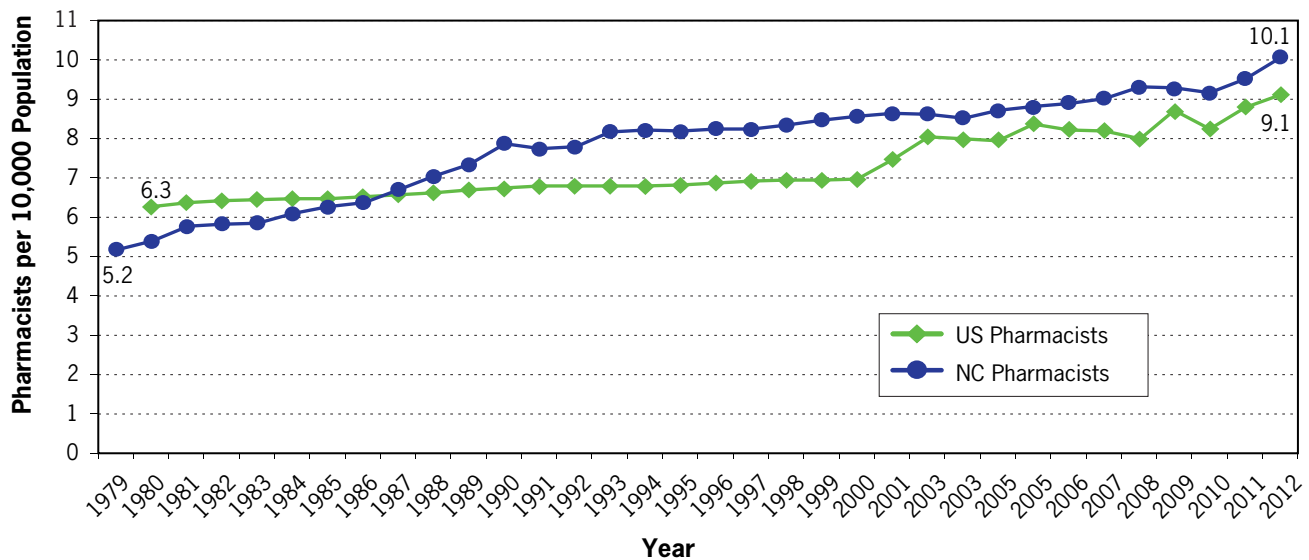
Workforce Supply and Distribution

Comparing State and National Pharmacist Supply

In 2012, there were 9,822 licensed pharmacists in active practice in North Carolina. North Carolina's pharmacist workforce has grown rapidly, increasing by 42% since 2000. Given the rapid population growth underway in the state, the ratio of pharmacists to population provides a better indicator of supply than the total number. Since the mid-1980s, NC has consistently outpaced

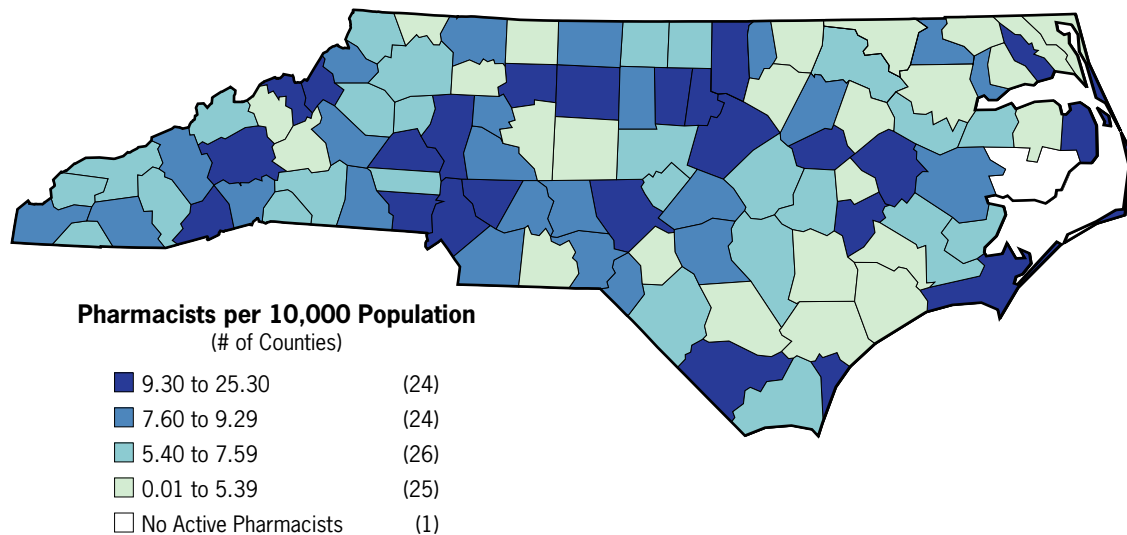
i. "Trends in the Supply of Pharmacists in North Carolina," available at: http://www.shepscenter.unc.edu/hp/publications/NCpharmacists_march2010.pdf.

Figure 1. Pharmacists per 10,000 Population, US and NC, 1979-2012



Sources: North Carolina Health Professions Data System, 1979 to 2012; HRSA, Bureau of Health Professions; Statistical Abstract of the United States; US Census Bureau; North Carolina Office of State Planning. Figures include all licensed, active, instate pharmacists.

Figure 2. Pharmacists per 10,000 Population by County, North Carolina, 2012



Note: Data include active, instate pharmacists licensed in North Carolina as of October 31, 2012.

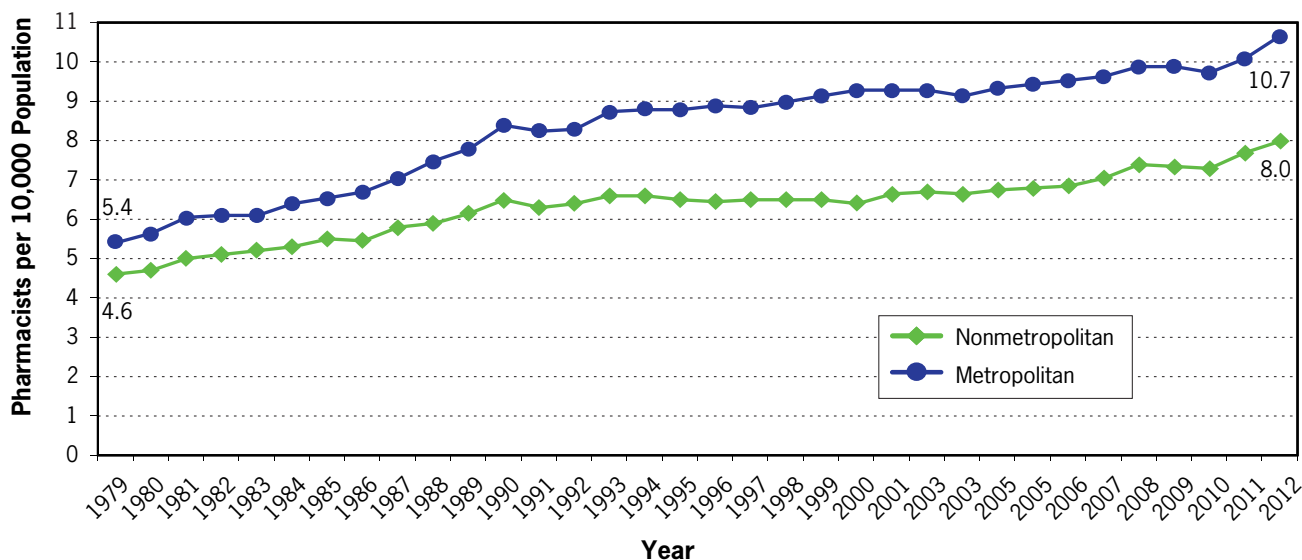
Source: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2012.

the national ratio of pharmacists-to-population (Figure 1). In 2012, the ratio of pharmacists to NC residents was 10.1 per 10,000 population, while the

national average was 9.1.ⁱⁱ Since 2010, NC has seen an increase in the pharmacist-to-population ratio, mirroring the national trend. This recent uptick

ⁱⁱ Because these ratios are derived from different state and national data sources, comparisons should be made with caution.

Figure 3. Pharmacists per 10,000 Population by Metropolitan and Nonmetropolitan Counties, North Carolina, 1979-2012



Sources: North Carolina Health Professions Data System, 1979 to 2012; North Carolina Office of State Budget Management; NC Office of State Planning; US Office of Management and Budget; US Census Bureau. Figures include all licensed, active, instate pharmacists.

in supply likely reflects an expansion of training capacity in new and existing educational programs.

Distribution of Pharmacists within North Carolina

Figure 2 shows that the ratio of pharmacists-to-population varies by county. One quarter of NC counties have a pharmacist-to-population ratio that is higher than the national average, while 23 counties have fewer than five pharmacists per 10,000 population. Many of the counties with the lowest pharmacist-to-population ratios are clustered in the eastern part of the state. Durham County has the highest ratio, at 25.3 pharmacists per 10,000 population. Hyde County has not had a full-time pharmacist since 2002.ⁱⁱⁱ

Figure 3 shows the gap between pharmacists practicing in metropolitan versus non-metropolitan counties, as defined by the US Census Bureau and

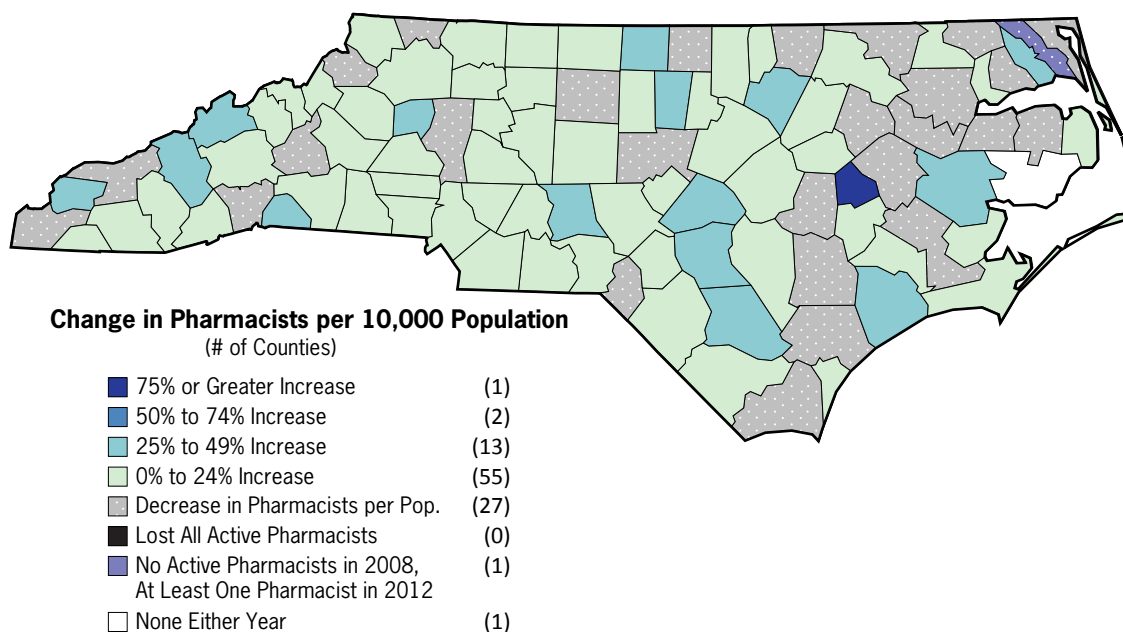
the Office of Management and Budget. This gap widened in the early 1990s but has remained fairly constant since that point in time. Compared to other types of health professionals such as physicians, pharmacists are fairly evenly distributed between metropolitan and non-metropolitan counties in NC. There are nearly three more pharmacists per 10,000 population in metropolitan counties than in non-metropolitan counties. By comparison, there are approximately six more physicians per 10,000 population in metropolitan counties than in non-metropolitan counties, (with ratios of 15.1 and 9.3 respectively, data not shown). The relatively even distribution of pharmacists is likely a result of the distribution of pharmacies throughout the state.^{iv}

To determine whether growth in the pharmacist workforce was keeping pace with population growth, we compared the change in the pharmacist-to-10,000 population ratio by county between 2008 and 2012 (**Figure 4**). In the

ⁱⁱⁱ Two pharmacy locations in Hyde county have limited service permits: Ocracoke Health Center and the Hyde County Health Department. Both locations are covered by part-time pharmacists. Board of Pharmacy data does not show pharmacists by FTE hours by location. (Personal communication, Debbie Stump, NC Board of Pharmacy, 16 January 2014; Personal communication, Kristi Williams, Hyde County Health Department, 16 January 2014; Personal communication, Ocracoke Health Center, 16 January 2014).

^{iv} As of January 2014, Camden County is the only county without a pharmacy permit on record with the NC Board of Pharmacy (personal communication, Debbie Stump, 15 January 2014). Two pharmacists who did not provide business county address information but did provide a home address in Camden County were assigned to this county.

Figure 4. Change in Pharmacists per 10,000 Population by County, North Carolina, 2008 to 2012



Note: Data include active, in-state pharmacists licensed in North Carolina as of October 31 of the respective year.

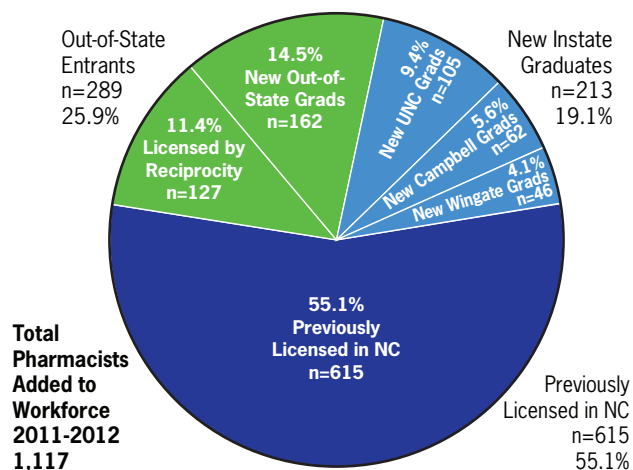
Source: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2008-2012

majority of counties in the state (n=69), the growth in pharmacists outpaced population growth over the five year time period. Three counties saw a negligible change in the ratio of pharmacists to population, and 27 counties experienced a decrease in the pharmacist-to-population ratio. Of those 27 counties, 14 lost at least one pharmacist over the five year period, whereas in the remaining 13 counties, population growth outpaced growth of the pharmacist workforce. Three other rural counties in the state, Graham, Greene, and Madison, saw greater than a 50% increase in the pharmacist to population ratio during the five year period. In Greene County, the population grew roughly 1% during the five year period but the number of pharmacists grew 166%, from three in 2008 to eight in 2012.

Newly Licensed Pharmacists

New pharmacists enter the state's workforce each year. In 2012, roughly 11% (n=1,117) of the pharmacist workforce in NC was comprised of

Figure 5. Newly Licensed and Re-Licensed Pharmacists, North Carolina, 2011-2012



***Note:** Data include active, in-state pharmacists licensed in North Carolina as of October 31, 2012 who were not actively practicing in North Carolina as of October 31, 2011. Previously licensed pharmacists are those who were licensed in NC in an earlier year but were either inactive or active out-of-state in the previous year. Individuals who become licensed by reciprocity are those pharmacists who have been actively practicing in other states. **Source:** North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2011-2012.

pharmacists who either had been previously licensed in NC but were not actively practicing in the state the prior year (n=615), or who became licensed for the first time in the state (n=502) (**Figure 5**).

Of the pharmacists who were newly licensed or re-entered the workforce in 2012, roughly a third (33.6%, n=375) were new graduates of PharmD programs, and more than half of those new graduates (56.8%, n=213) attended school in NC: 28.0% (n=105) graduated from the University of North Carolina Eshelman School of Pharmacy, 16.5% (n=62) from the Campbell University College of Pharmacy & Health Sciences, and 12.2% (n=46) from Wingate University School of Pharmacy. Fewer than half (43.2%, n=162) graduated from pharmacy schools outside of NC. The remaining 11.4% (n=127) of the newly licensed pharmacists were licensed by reciprocity, meaning that the pharmacist had completed equivalent licensure requirements in another state and completed the process to obtain NC licensure.

Demographics

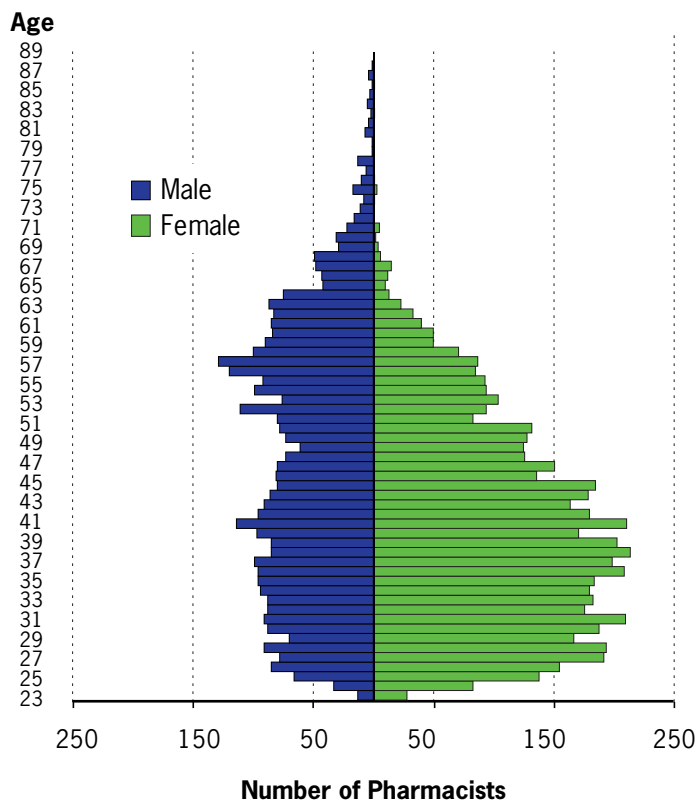
Age of the Pharmacist Workforce

A relatively small proportion of North Carolina pharmacists are nearing retirement age (**Figure 6**). In 2012, more than half of pharmacists in NC (54.4%, n=5343) were between the ages of 30 and 49, while just 5.3% (n=525) were 65 years of age or older. These data imply that North Carolina will continue to have a stable supply of pharmacists in the future.

Over the past three decades, NC's pharmacist workforce has shifted from being mostly male to mostly female. In 1980, 21.7% of pharmacists were female (n=688 of 3,160), while in 2012, that proportion grew to 58.8% (n=5,775 of 9,822) (**Figure 6**).

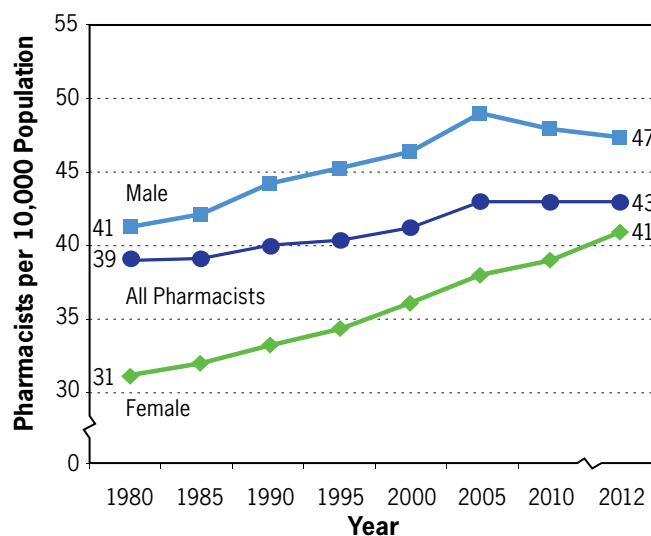
Figure 7 demonstrates that the average age of the pharmacist workforce has increased over the past 40 years, from 39 in 1980 to 43 in 2012. The female

Figure 6. Pharmacists by Age and Sex, North Carolina, 2012



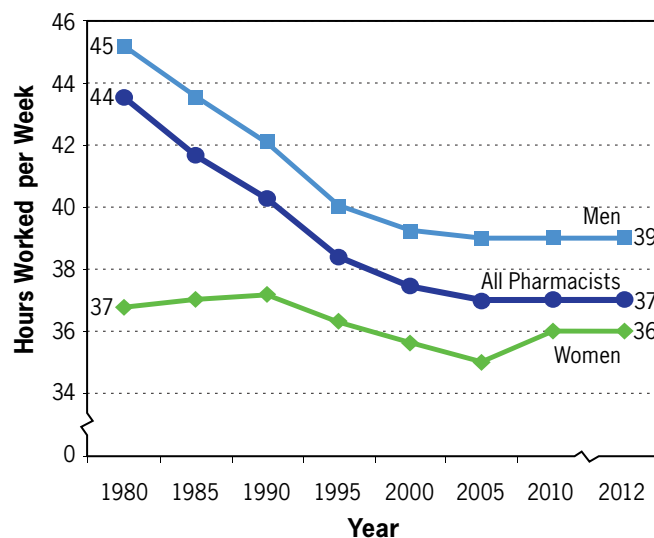
Note: Data include all active, in-state pharmacists licensed in North Carolina as of October 31, 2012. There were 7 pharmacists missing age information. **Source:** North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2012.

Figure 7. Average of Active Licensed Pharmacists by Sex, North Carolina, 1980 to 2012



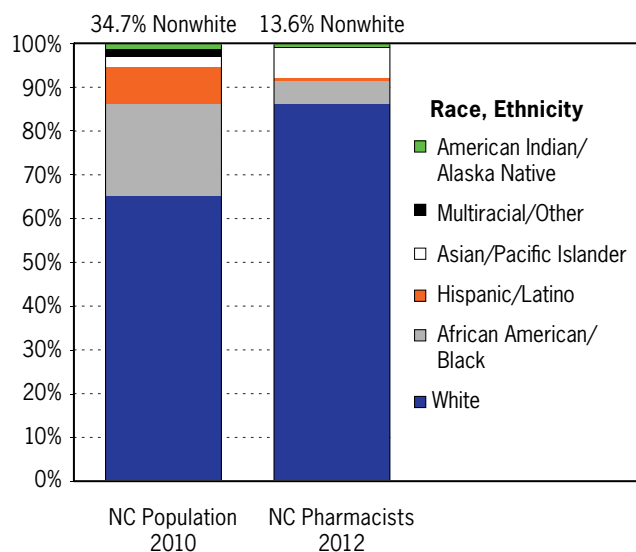
Note: Data include all active, in-state pharmacists licensed in North Carolina as of October 31 of the respective year. Age data missing for 1 observation in 1980, 3 in 1985, 13 in 1990, 2 in 1995, 8 in 2010, and 7 in 2012. Sex data missing for 29 observations in 1980, and 18 in 1990. **Source:** North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy, 2012.

Figure 8. Pharmacists' Average Hours Worked per Week by Sex, North Carolina, 1980 to 2012



Note: Data include all active, in-state pharmacists licensed in North Carolina as of October 31 of the respective year. Age data missing for 1 observation in 1980, 3 in 1985, 13 in 1990, 2 in 1995, 8 in 2010, and 7 in 2012. Sex data missing for 29 observations in 1980, and 18 in 1990. Hours data missing for 189 men and 150 women in 1980, 151 men and 98 women in 1985, 206 men and 158 women in 1990, 105 men and 125 women in 1995, 64 men and 77 women in 2000, 62 men and 101 women in 2005, 145 men and 188 women in 2010, and 140 men and 264 women in 2012. **Source:** North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy, 2012.

Figure 9. Diversity of North Carolina Pharmacists, 2012, vs. North Carolina Population, 2010



Note: NC pharmacist data include active, in-state pharmacists licensed in NC as of October 31, 2012. Race data were missing for 4 observations. **Source:** North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2012. State population diversity data derived from U.S. Census Bureau; 2010 Census Summary File 1, Race and Hispanic or Latino Origin; generated by Julie Spero; using American FactFinder; <http://factfinder2.census.gov>; (6 Jan. 2014).

pharmacist workforce in 1980 was 10 years younger on average than the male pharmacist workforce but this gap decreased to a six year age difference in 2012. While the average age of the female pharmacists has increased since 1980, the average age of male pharmacists began to decline slightly in the latter 2000s.

Pharmacist Work Hours

Over time, average pharmacist work hours per week have declined from 44 hours per week in 1980 to 37 hours per week in 2012 (**Figure 8**). Prior research has demonstrated that, similar to other professions, female pharmacists tend to work fewer hours on average than male pharmacists^{1,2} and the NC pharmacist data reflect this trend. However, the gap between male and female pharmacist work hours has dropped to 3 hours per week in 2012, and the narrowing of this gap has been driven by male pharmacists reducing their average work hours. Between 1980 and 2012, male pharmacists decreased their work hours by 6 hours per week (from 45 to 39 hours), while female pharmacists decreased their average work hours by just one hour per week (from 37 to 36 hours). Prior research using data on NC physicians demonstrated that

Table 1. Pharmacist Workforce Race and Ethnicity, North Carolina, 2000 and 2012

| Race/Ethnicity | 2000 | | 2012 | |
|--------------------------|--------------|-------|---------------|-------|
| | (n) | (%) | (n) | (%) |
| White | 6,477 | 93.6% | 8,491 | 86.5% |
| African American/Black | 225 | 3.3% | 521 | 5.3% |
| Am. Indian/Alaska Native | 25 | 0.4% | 50 | 0.5% |
| Asian | 178 | 2.6% | 671 | 6.8% |
| Hispanic | 9 | 0.1% | 47 | 0.5% |
| Other | 3 | 0.04% | 38 | 0.4% |
| Total Pharmacists | 6,917 | | 9,818* | |

*Four observations in the 2012 file did not have race information. **Source:** North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy. Data include active, in-state pharmacists licensed in North Carolina as of October 31, 2000 and 2012.

male physicians in younger generational cohorts (Generation X) tend to work fewer hours than do male physicians from older cohorts (WWII and Baby Boomers).³ A similar generational effect may be underway in the pharmacist workforce.

Diversity of the Pharmacist Workforce

The racial and ethnic diversity of the pharmacist workforce does not match that of the state's population (**Figure 9**). The U.S. Census Bureau estimates indicate that 65.3% of the NC population self-identified as white and non-Hispanic but HPDS data indicate that 86.5% of NC pharmacists self-identified as white.^v Between 2000 and 2012, the non-white pharmacist workforce grew from 6.4% to 13.5% (**Table 1**). Relative to other health professions in the state, pharmacists have diversified more rapidly.⁴ However, this diversification has been driven by the growth in Asian pharmacists. Over 21% of NC's population self-identified as Black/African-American, compared to just 5% (n=521) of the pharmacist workforce. Hispanics are also underrepresented in this workforce, representing

8.4% of the state's population but just 0.5% (n=47) of pharmacists. American-Indian/Alaska Natives comprise 1.1% of the state's population, and 0.5% (n=50) of the pharmacist workforce. A prior analysis of 2009 HPDS data showed that pharmacists are less diverse than dentists, registered nurses, respiratory therapists, primary care physicians, and licensed practical nurses.⁵

Workforce Practice Characteristics

Employment Setting

In 2012, slightly more than half (53.1%, n=3,815) of pharmacists reported that they worked in a retail pharmacy setting, either operated by a chain (37.5%, n=2,712) or independently (15.7%, n=1,537) (**Table 2**). Slightly more than a quarter of pharmacists reported being employed in a hospital setting (26.7%, n=2,622). The distribution of pharmacists by employment setting has not changed dramatically since 2000. The proportion

Table 2. Number, Percent, and Average Weekly Hours Worked for Pharmacists by Employment Setting, North Carolina, 2000 and 2012

| Employment Setting | 2000 | | | 2012 | | |
|--------------------|-----------|---------|-----------------------------|-----------|---------|-----------------------------|
| | Frequency | Percent | Average Weekly Hours Worked | Frequency | Percent | Average Weekly Hours Worked |
| Chain | 2,712 | 39.2% | 38.1 | 3,678 | 37.5% | 37.7 |
| Hospital | 1,486 | 21.5% | 37.5 | 2,622 | 26.7% | 37.9 |
| Independent | 1,104 | 16% | 38.6 | 1,537 | 15.7% | 36.6 |
| Nursing Home | 154 | 2.2% | 36.4 | 113 | 1.2% | 37.0 |
| Manufacturing | 109 | 1.6% | 42.6 | 88 | 0.9% | 42.4 |
| Other | 1,070 | 15.5% | 37.3 | 1,450 | 14.8% | 36.8 |
| Unknown | 282 | 4.1% | 18.1 | 334 | 3.4% | 21.8 |
| Total Pharmacists | 6,917 | | | 9,822 | | |

Note: 141 pharmacists did not report average weekly hours worked in 2000. 202 pharmacists did not report average weekly hours worked in 2012. Other includes other, wholesale, pharmaceutical sales, research, health department, government, and teaching.

Source: North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy. Data include active, in-state pharmacists licensed in North Carolina as of October 31, 2000 and 2012.

^v In the NC Board of Pharmacy Licensure Forms, "Hispanic" is included as a category in the question about pharmacist race. Race and Hispanic origin are separate questions in U.S. Census forms.

of the workforce employed in a hospital setting increased slightly during this 12 year period, from 21.5% (n=1,486) in 2000 to 26.7% in 2012. The proportion of the workforce employed in chain pharmacies decreased slightly, from 39.2% (n=2,712) in 2000 to 37.5% in 2012, which is surprising given the proliferation of chain pharmacies during this period. The proportion employed in independent pharmacies has remained relatively constant. In 2012, NC pharmacists reported working an average of 37.4 hours per week (n=9,148, S.D. = 8.7). Average weekly work hours by employment setting did not vary substantially between 2000 and 2012, aside from a small drop of 2 hours for pharmacists employed in independent pharmacies.

While licensure data indicate that there have not been large changes in practice settings reported by licensed pharmacists between 2000 and 2012, our pharmacy leadership expert advisory group noted that this finding may be due to the level of granularity of the licensure board data. The group noted that “hospital setting” is a broad category encompassing both hospital and ambulatory care. Members also noted that some pharmacists practicing in ambulatory care settings are employed by university education systems. The sense of the group was that the pharmacist workforce in community health centers and large group practices had grown. Another advisory group member noted that younger pharmacists tend to practice in multiple settings, yet the data only capture one setting. An analysis of hours worked in each practice setting would provide more nuanced information but licensure forms do not allow pharmacists to report hours for multiple practice settings.

Pharmacist Employment and the Clinical Pharmacist Practitioner Role

When asked about type of job, or form of employment, the majority of pharmacists in 2012 reported working as staff pharmacists (60.1%, n=5,900). Just 1.3% (n=130) reported working as

Clinical Pharmacist Practitioners (CPPs). State legislation that went into effect in 2000 allows CPPs who receive approval from both the NC Board of Pharmacy and the NC Medical Board to provide medication therapy management services under the direction of a licensed physician. This expanded scope of services enables CPPs to order, change, or substitute therapies and order tests.⁶ The number of CPPs in the state has dropped since 2008, when 2.1% (n=181) of the pharmacist workforce worked as a CPP. As discussed later in this document, CPPs are well-positioned to take on new roles under new models of healthcare delivery. However, reimbursement mechanisms for enhanced CPP services have been lacking, and as a result fewer pharmacists have sought this credential than was initially anticipated.

Education

Training Location of NC Pharmacists

At present, North Carolina has three universities that grant the PharmD degree. More than half of pharmacists actively practicing in NC in 2012 were educated in-state (56.9%, n=5,587). Of this group, 74.3% (n=4,149) graduated from the University of North Carolina Eshelman School of Pharmacy (UNC), 21.9% (n=1,225) graduated from Campbell University College of Pharmacy & Health Sciences, and 3.8% (n=211) graduated from Wingate University School of Pharmacy.

The University of North Carolina Eshelman School of Pharmacy (UNC) is the oldest school of pharmacy in the state, with campuses in Chapel Hill and as of 2011, in Asheville. The UNC Eshelman School of Pharmacy also has a partnership program with Elizabeth City State University (ECSU) that dates from 2005. The Chapel Hill campus admits roughly 140 students in its entering classes. The Asheville campus has admitted between 17 and 23 students annually since the program began, and plans to admit up to 32 in coming years.⁷ The ECSU satellite

campus program has admitted 10-15 applicants annually since it was established, but did not admit any new students in the entering class of 2013-2014. Campbell University College of Pharmacy & Health Sciences (Campbell) was established in 1986 and enrolls roughly 108 students annually. Wingate University School of Pharmacy (Wingate) was established in 2003. Beginning with the entering class of 2011, Wingate increased its class size from 79 students to 108. High Point University is also developing a school of pharmacy and expects to admit the first class of 65 students in August 2016, graduating the first class in May 2020 (personal communication, Ronald Ragan, High Point University School of Pharmacy, 3 February 2014).

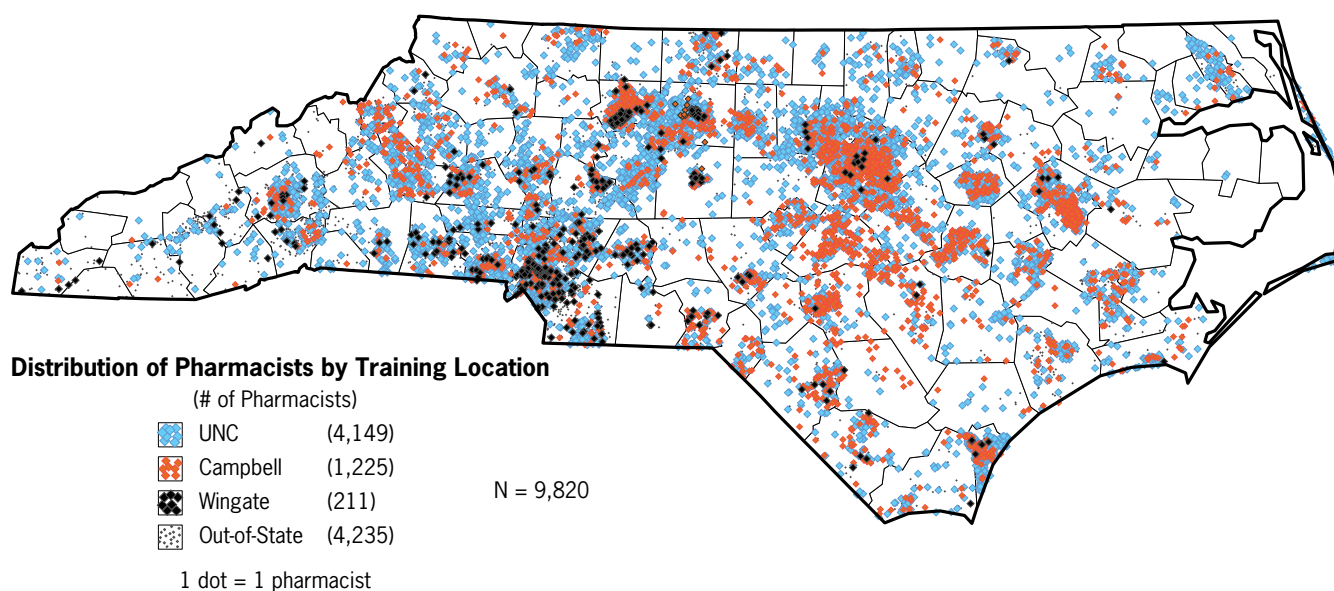
The expansion of PharmD program enrollment and the development of new pharmacy schools in NC reflect broader trends seen across the US. National data from the American Association of Colleges of Pharmacy show that the annual number of PharmD graduates has nearly doubled since 2000, growing from 7,260 PharmD graduates in 2000 to 12,719 Pharm D graduates in 2012.⁸ In 2000, there

were 78 accredited pharmacy schools in the US.⁹ As of January 2014, the Accreditation Council for Pharmacy Education reported that 129 pharmacy schools in the US have received accreditation status, meaning that 51 new pharmacy schools were developed in a little more than a decade.¹⁰

Figure 10 shows the distribution of North Carolina-trained pharmacists throughout the state by the school from which they graduated. UNC graduates are well dispersed across the state, with expected concentrations along the I-40 and I-85 urban crescent. Campbell graduates are concentrated in Wake, Johnson, Harnett, and neighboring counties. Wingate graduates are most concentrated in Charlotte and the surrounding counties. The majority of the pharmacists practicing in rural areas completed pharmacy training in-state. Of the 1,745 pharmacists practicing in non-metropolitan areas of the state in 2012, 68.4% (n=1,194) graduated from a NC pharmacy school.

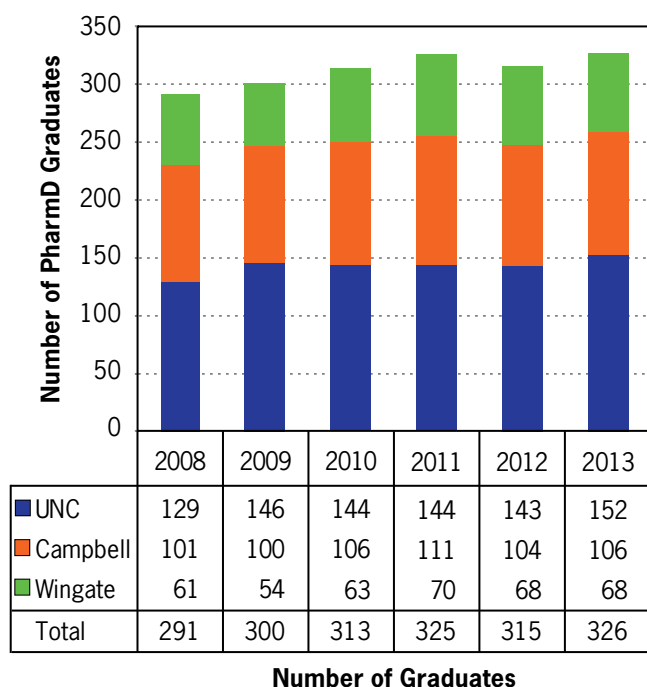
Since 2008, the total number of graduates from NC pharmacy schools has grown slightly, with the distribution of graduates among the three schools

Figure 10. Distribution of Pharmacists Trained In-State, North Carolina, 2012



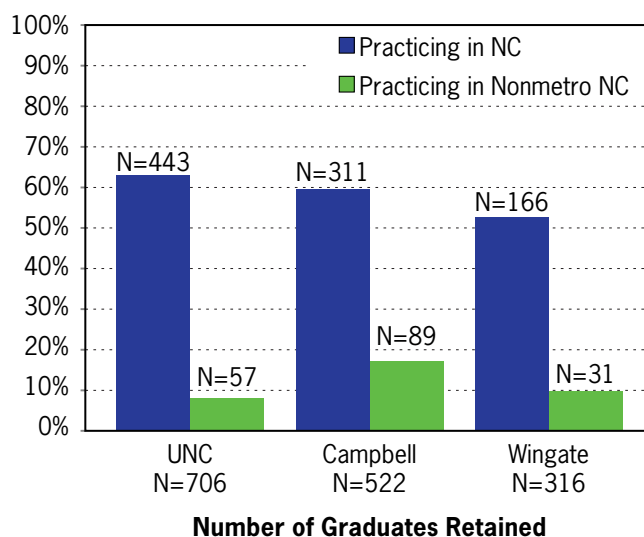
Note: NC pharmacist data include active, in-state pharmacists licensed in NC as of October 31, 2012. Dots are scattered randomly within the business ZIP code.
Source: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2012.

Figure 11. Total PharmD Graduates from Pharmacy Schools in North Carolina, Classes of 2008 to 2013



Source: Personal communication, Michael Manolakis, Wingate University School of Pharmacy, 10 October, 2013; Personal communication, Wendy Cox, UNC Eshelman School of Pharmacy, 25 October, 2013; Personal communication, Mark Moore, Campbell University College of Pharmacy & Health Sciences, 14 November, 2013.

Figure 12. In-State Retention of PharmD Graduates, Classes of 2008-2012, North Carolina, 2012



Source: Personal communication, Michael Manolakis, Wingate University School of Pharmacy, 10 October, 2013; Personal communication, Wendy Cox, UNC Eshelman School of Pharmacy, 25 October, 2013; Personal communication, Mark Moore, Campbell University College of Pharmacy & Health Sciences, 14 November, 2013. North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy. **Note:** Data include active, in-state pharmacists licensed in North Carolina as of October 31, 2012 who graduated from an in-state pharmacy school between 2008-2012.

remaining constant (**Figure 11**). Between 2008 and 2012, 59.7% (n=922) of the graduates from NC's pharmacy schools have remained in state to practice.

Between 2008 and 2012, UNC retained the highest percentage of graduates in state at 62.7% (n=445 of 706), closely followed by Campbell at 59.6% (n=311 of 522), and Wingate at 52.5% (n=166 of 316) (**Figure 12**). During the same period, 17% (n=89) of Campbell's graduates entered practice in a non-metropolitan area of NC, as did 9.8% (n=31) of Wingate graduates, and 8.1% (n=57) of UNC graduates.

During the pharmacy leadership expert group meeting, representatives from all three pharmacy schools in NC noted that their institutions had been actively recruiting underrepresented minority students. However, despite these efforts, these minority students have not been retained in the state. An analysis of pharmacists who graduated from an in-state PharmD program between 2008 and 2012 showed that the race/ethnicity profile of the most recent graduates licensed to practice in NC closely resembles that of the state's pharmacy workforce as a whole, with African American/Black, Hispanic, and American Indian/Alaskan Native pharmacists underrepresented compared to the population (**Table 3**).

Pharmacists Trained Outside of NC

In 2012, 42.2% (n=4,144) of pharmacists in NC reported a location of training outside the state (**Table 4**). South Carolina (4.7%, n=459), Pennsylvania (4.5%, n=440), and New York (3.6%, n=356) are top contributors to the state's pharmacist workforce. Internationally trained pharmacists comprise 3.6% (n=351) of the state's pharmacist workforce.

Table 3. Race/Ethnicity of North Carolina Pharmacists Who Graduated From a North Carolina School of Pharmacy, 2008 to 2012

| Race/Ethnicity | UNC | | Campbell | | Wingate | | Total | |
|-------------------|-----|-------|----------|-------|---------|-------|-------|-------|
| | # | % | # | % | # | % | # | % |
| White | 366 | 82.6% | 275 | 88.4% | 150 | 90.4% | 791 | 86.0% |
| Black | 23 | 5.2% | 12 | 3.9% | 9 | 5.4% | 44 | 4.8% |
| American Indian | 1 | 0.2% | 5 | 1.6% | 0 | 0.0% | 6 | 0.7% |
| Asian | 49 | 11.1% | 16 | 5.1% | 4 | 2.4% | 69 | 7.5% |
| Hispanic | 2 | 0.5% | 1 | 0.3% | 2 | 1.2% | 5 | 0.5% |
| Other | 2 | 0.5% | 2 | 0.6% | 1 | 0.6% | 5 | 0.5% |
| Total Pharmacists | 443 | | 311 | | 166 | | 920 | |

Source: North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy. Data include active, in-state pharmacists licensed in North Carolina as of October 31, 2012. Percentages may not add to 100% due to rounding.

Demand for Pharmacists in North Carolina

While licensure and education data provide information about the supply side of the pharmacy workforce, they tell nothing about the demand for pharmacist services. To estimate the demand for pharmacists in North Carolina, we examined data from the Pharmacy Manpower Project, Inc. and IMS Health, Inc.

Aggregate Demand Index

The Pharmacy Manpower Project tracks data on the supply and demand of pharmacists over time and across the country (**Figure 13**). North Carolina has followed both national and regional trends regarding the demand for pharmacists. In the mid-2000s, NC had a high demand for pharmacists. In recent years, demand has declined. North Carolina, with an index of 3 in 2012, appears to be in balance in terms of the demand and supply of pharmacists.

Retail Pharmacist Demand

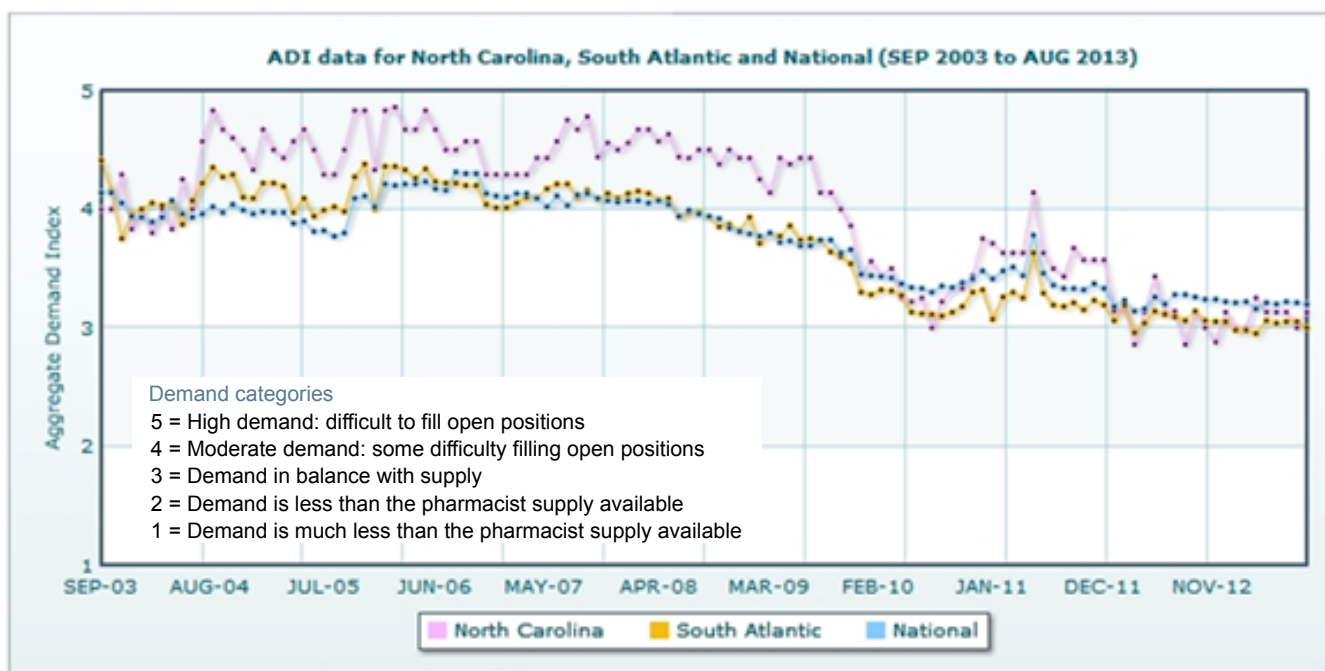
Data from IMS Health, Inc demonstrate that between 2008 and 2012, the number of retail prescriptions dispensed in NC increased by

Table 4. Training Location of North Carolina Pharmacists in Active Practice in 2012

| | School State | Number (Rank) | % of All Pharmacists |
|------------------------|-----------------------|-----------------|----------------------|
| | North Carolina | 5587 (1) | 56.9% |
| | UNC CH | 4,149 | 42.2% |
| | Campbell | 1,225 | 12.5% |
| | Wingate | 211 | 2.1% |
| Adjacent | South Carolina | 459 (2) | 4.7% |
| | Georgia | 285 (6) | 2.9% |
| | Virginia | 239 (8) | 2.4% |
| | Tennessee | 63 (16) | 0.6% |
| Region | Florida | 183 (9) | 1.9% |
| | West Virginia | 122 (11) | 1.2% |
| | Alabama | 116 (13) | 1.2% |
| Other Top Contributors | Pennsylvania | 440 (3) | 4.5% |
| | New York | 356 (4) | 3.6% |
| | International | 351 (5) | 3.6% |
| | Ohio | 268 (7) | 2.7% |
| | Massachusetts | 135 (10) | 1.4% |
| | Indiana | 117 (12) | 1.2% |
| | Michigan | 106 (14) | 1.1% |
| | Indiana | 93 (14) | 1.1% |

Source: North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy. Data include active, in-state pharmacists licensed in North Carolina as of October 31, 2012. Ninety-one pharmacists did not list state of training. Two pharmacists listed NC as state of training but did not indicate school of training.

Figure 13. Aggregate Demand Index Data for Pharmacists in North Carolina, the South Atlantic Region, and the United States, September 2003 to August 2013



Note: Used with permission as per personal communication, Katherine Knapp, Pharmacy Manpower Project, 2 December 2013.

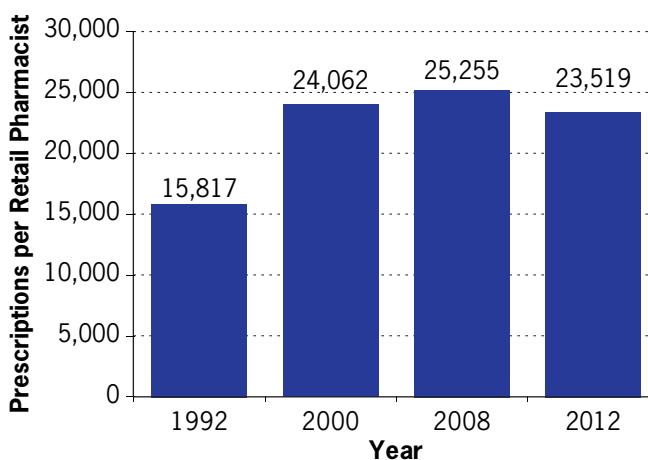
Source: Aggregate Demand Index Supported by the Pharmacy Manpower Project, Inc. Accessed 14 November 2013 at <http://www.pharmacymanpower.com/trends.jsp>

Table 5. Percent Growth in Retail Pharmacists and Retail Prescriptions Dispensed, North Carolina, 2008-2012

| | 2008 | 2012 | Percent Growth 2008-2012 |
|-------------------------------------|------------|-------------|--------------------------|
| Active, in-state retail pharmacists | 4,621 | 5,215 | 12.9% |
| Retail prescriptions dispensed | 11,702,666 | 122,655,024 | 5.1% |

Source: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2012; 2012 prescription data - Xponent™, January 2012-December 2012, IMS Health Incorporated. All Rights Reserved. Pharmacist data include active, in-state pharmacists licensed in North Carolina as of October 31, 2012 reporting an employment setting of chain or independent pharmacy. Data do not include prescriptions dispensed at hospitals, clinics, long-term care facilities or mail order operations. Data include new prescriptions and refills dispensed. 1992-2008 prescription data: March 2010. "Figure 19. Annual Retail Prescriptions Dispensed per Active, In-state Retail Pharmacist in North Carolina, 1992 to 2008" (pg 13). In Trends in the Supply of Pharmacists in North Carolina. Cecil G. Sheps Center for Health Services Research.

Figure 14. Annual Retail Prescriptions Dispensed per Active, Instate Retail Pharmacist North Carolina, 1992 to 2012



Source: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2012; 2012 prescription data - Xponent™, January 2012-December 2012, IMS Health Incorporated. All Rights Reserved. Pharmacist data include active, in-state pharmacists licensed in North Carolina as of October 31, 2012 reporting an employment setting of chain or independent pharmacy. Data do not include prescriptions dispensed at hospitals, clinics, long-term care facilities or mail order operations. Data include new prescriptions and refills dispensed. 1992-2008 prescription data: March 2010. "Figure 19. Annual Retail Prescriptions Dispensed per Active, In-state Retail Pharmacist in North Carolina, 1992 to 2008" (pg 13). In Trends in the Supply of Pharmacists in North Carolina. Cecil G. Sheps Center for Health Services Research.

5.1% (**Table 5**). During the same period, the state saw almost a 13% growth in the number of retail pharmacists working in chain and independent pharmacies. With the growth in retail pharmacists over the past five years far outpacing the growth in retail prescriptions dispensed, the number of annual retail prescriptions dispensed per retail pharmacist dropped slightly during this period (**Figure 14**). This measure of demand indicates that NC is well-supplied in terms of retail pharmacists.

Table 6 shows the average hourly workload by AHEC Region, based on the average number of prescriptions filled. Greensboro AHEC has the highest number of average prescriptions filled per retail pharmacist per hour, at 14.7, while neighboring Wake AHEC has the lowest, at 10.8.

Compared to data from a similar analysis in 2008, the average prescriptions filled per retail pharmacist per hour dropped in 7 AHEC regions, remained

the same in Charlotte, and grew very slightly from 14.1 to 14.3 in Northwest AHEC. Statewide, the average prescriptions filled per retail pharmacist per hour dropped from 13.2 to 12.6 prescriptions. One important limitation of this analysis is that we do not have data on hours worked by retail pharmacists for multiple locations. Therefore, retail pharmacists that work in multiple counties, which may cross AHEC regions, are only included in the county of their primary business address.

Hospital Pharmacist Demand

To estimate the demand for hospital pharmacists in 2012, we obtained data from the North Carolina Hospital Association, which conducts an annual hospital workforce survey.^{vi}

On average, hospitals reported that it took 72 days to fill a permanent, full-time pharmacist position in 2012. This recruitment time is a decrease from

Table 6. Retail Pharmacists and Average Hourly Workload by AHEC Region, 2012

| AHEC Region | Total Population | Number of Retail Pharmacists | Average Prescriptions Filled per Retail Pharmacist per Hour |
|-----------------------|------------------|------------------------------|---|
| Area L | 309,165 | 148 | 13.3 |
| Charlotte | 1,827,256 | 1,060 | 11.6 |
| Eastern* | 1,076,388 | 508 | 13.7* |
| Greensboro | 1,147,212 | 558 | 14.7 |
| Mountain | 748,374 | 452 | 11.1 |
| Northwest | 1,566,740 | 834 | 14.3 |
| SouthEast | 494,872 | 299 | 11.8 |
| Southern Regional | 909,169 | 391 | 13.7 |
| Wake | 1,686,053 | 965 | 10.8 |
| North Carolina | 9,765,229 | 5215 | 12.6 |

Source: Prescription data include total dispensed prescriptions from retail channels (chain, mass merchandiser, food store, independent pharmacies); Xponent™, January 2012 - December 2012, IMS Health Incorporated. All Rights Reserved. Data for 17 counties were suppressed by IMS Health due to small numbers. In these cases, the average number of retail prescriptions dispensed in suppressed counties was used to estimate workload by AHEC region. See Data and Methodology section for additional information. Pharmacist data from the North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy; data include active, in-state pharmacists licensed in North Carolina as of October 31, 2012, using average hours per week as reported by pharmacists at time of license renewal. ***Note:** These data should be interpreted with caution as retail prescription data were suppressed by IMS Health for 48% (11 of 23) of the counties in the Eastern AHEC region. The average number of retail prescriptions dispensed in suppressed counties was used for those 11 counties to estimate retail pharmacist workload in the Eastern AHEC region.

vi Personal communication with Sarah Broome, North Carolina Hospital Association 23 October 2013. Data are based on the annual NCHA workforce survey for 2012. The survey had a response rate of 81%. Missing responses were imputed based on total licensed beds.

90 days reported in 2008.¹¹ It took 65 days longer to recruit a pharmacist in a non-metropolitan area compared to a metropolitan area in 2008, but by 2012 it only took 2 weeks longer to fill a position in a non-metropolitan area compared to a metropolitan area (80 days vs. 65 days, respectively).

Pharmacists and New Models of Care

Nationwide, spurred along by the Patient Protection and Affordable Care Act (ACA), the US health system has undergone rapid change. New models of healthcare delivery, including accountable care organizations and patient centered medical homes, emphasize primary and preventive care and aim to decrease costs, increase quality, and improve patient experiences. These new models seek to integrate and coordinate healthcare services across the patient's journey through the system, with increased use of technology to facilitate communication among healthcare providers. From a financial perspective, the system is progressively shifting from fee-for-service based payments to bundled and capitated payments. Many healthcare services are being moved from the expensive inpatient setting to ambulatory settings. These changes in care delivery are generating new roles for health professionals including pharmacists and pharmacy technicians.

Pharmacists are rarely perceived as direct care providers¹² as much of their work is “invisible to the public.”¹³ Historically, the primary role of the pharmacist, particularly in community settings, has been that of medication dispensing.¹²⁻¹⁴ Scope of practice regulations limit the ability of pharmacists to serve as direct care providers in most states.^{12,15} North Carolina, along with New Mexico and Montana, is an exception to this rule, due to the regulatory mechanism that allows pharmacists to provide direct patient care as a Clinical Pharmacist Practitioner (CPP).^{6,16,17}

Pharmacists' expertise in medication management has been described in the academic literature as “underutilized.”¹⁸ This expertise includes the coordination of medication therapies across prescribers, the ability to determine drug efficacy, safety, and cost-effectiveness, and the ability to develop medication management plans. The significant factor contributing to this “underutilization,” is that the current payment model for pharmacists emphasizes dispensing fees. Few mechanisms enable pharmacists to reimburse for “cognitive services” like medication therapy management with patients.^{12,14,15,19}

As the health system evolves, the workforce is expected to incorporate more team-based models of health care delivery.²⁰ The ACA created the Center for Medicare and Medicaid Innovation (CMMI), which supports models of care that focus on the use of medication therapy management to improve patient care and reduce costs, as well as demonstration projects that place pharmacists on physician-led primary care teams.²¹ In these new models, pharmacists in primary care practices are authorized to conduct patient assessments, review medication therapies, develop and document treatment plans, and discuss and follow up with patients. While the ACA provided opportunities for pharmacists to take on a greater role in direct patient care services, larger scale payment reforms will be required to broadly expand these models.

Several new models incorporating a greater role for pharmacists in the health care team have been described in the literature. One collaborative model “embeds” pharmacists on transition of care teams in ACOs and PCMHs.¹² This model incorporates a “warm hand-off” as the patient moves from a visit with his/her primary care provider to a consultation with a pharmacist as part of (or at the conclusion of) the visit. Pharmacist services are coordinated with those provided by other professionals on the care

team.²² Another model expands pharmacist services in retail clinics. Data indicate that services provided in retail settings are similar in cost and quality to those provided in physician offices and urgent care centers.²³ The current model of retail clinics focuses on patients seeking care from nurse practitioners for acute health concerns. However, some have posited that community pharmacists are well-positioned to serve in a routine medication therapy management role for patients with chronic diseases.¹³

December 2013 Sheps Pharmacy Study Advisory Group Discussion

On 5 December, 2013, the Sheps Center convened a group of pharmacy workforce experts to review the preliminary analyses and brainstorm on changes in pharmacist and pharmacy technician roles that may be forthcoming as a result of new models of healthcare, the implementation of health reform, and other changes affecting the state. The following section summarizes the advisory group meeting discussion.

NC's Pharmacist Workforce Diversifying Slowly

Advisory Group members recognized the lack of diversity in the pharmacist workforce is problematic, particularly, as one member noted, the “Grand Canyon” between the percentage of the Hispanic/Latino population in the state (8%) and that of the pharmacist workforce (0.5%, n=47). The pharmacist workforce has increased rapidly over the past decade and has become more diverse, but most of the racial/ ethnic diversification has been the result of a gain in Asian pharmacists rather than of underrepresented minorities (URMs). Representatives from all three of NC's schools of pharmacy

noted that their institutions were aware of these challenges and have proactively sought to diversify their student population. The representative from Campbell University remarked that Campbell has a 3 year average of 20% URMs in its student body. Following the advisory group meeting, Sheps Center staff analyzed race/ethnicity data on the 2008-2012 cohort of graduates from NC pharmacy schools who were retained in the NC workforce in 2012 (n=920). The data show that just 6.5% (n=60) of this group belonged to an underrepresented minority group (**Table 3**). These data indicate that despite efforts of the pharmacy schools to recruit and train URM students, URM graduates of NC pharmacy schools are not being retained at a level to significantly increase their numbers in the overall pharmacist workforce in the state.

School of pharmacy representatives also commented that while in recent years, URM representation in the student bodies of all three schools was strong, they had noticed a decrease in both the number of qualified URM applicants and in qualified applicants overall. The UNC Pharmacy program at Elizabeth City State University (ECSU) was developed in part to provide pharmacy training in a more racially diverse part of the state, with the goal of attracting



URM pharmacy students. However, the ECSU program has had difficulties attracting students who meet enrollment criteria. Advisory group members noted that strong URM students with an interest in healthcare are heavily recruited by other health science programs and often choose to pursue careers in medicine or dentistry rather than pharmacy.

New PharmD Graduates Face Strong Competition for NC Jobs and Residencies

Representatives from pharmacy schools remarked that in recent years, new graduates have reported difficulty finding jobs. Signing bonuses, common in the past, have disappeared. A representative from Wingate University School of Pharmacy reported that new graduates who desire to work in Charlotte were taking entry level pharmacist positions with chain pharmacies without being assigned a specific store. These circumstances stand in contrast to graduates from four years ago who started with the chain in an assigned store.



Advisory group members noted that job postings in the retail sector have decreased dramatically. A representative from Kerr Drug noted that there are zero opportunities open in their retail settings, and when a new location is opened, only a few positions are posted at one time. The advisory group agreed that overall, there seem to be few job vacancies for pharmacists in North Carolina.

The representative from UNC Eshelman School of Pharmacy – Asheville campus noted that post-graduate residency positions for new graduates are highly competitive and many graduates seeking residencies in North Carolina are unable to obtain one. Many out-of-state pharmacists are also interested in completing a residency program in NC, as NC has a reputation for being a good place to train and to practice pharmacy.

A representative from GSK remarked that in industry, the base for hiring is a PharmD degree but preferred applicants have completed advanced training and have a strong understanding of pharmaceutical research and development (R&D). Advanced training may include post-graduate research fellowships. One prominent example is a program at Rutgers University that trains PharmD graduates who wish to pursue industry careers. Dual degree programs are also becoming more popular in pharmacy education with an aim to better prepare graduates for the pharmaceutical industry, government and regulatory agencies and academia. Campbell offers several dual degree programs (PharmD/MBA, PharmD/MS Public Health, PharmD/MS Clinical Research, PharmD/MS Pharmaceutical Sciences) and UNC is developing a master's degree program in collaboration with GSK that is aimed at training PharmD graduates for industry R&D positions in addition to its PharmD/MBA and PharmD/MPH programs. At present, many industry pharmacists in R&D and sales have master's degrees and/or PhDs. With the move to the six-year PharmD degree as the minimum standard for pharmacist training, few pharmacists

are willing to complete an additional five to seven years of training to earn a PhD, preferring a master's program with a shorter time commitment. The GSK representative noted that licensure is not a requirement to work in an industry setting, although many of GSK's pharmacists are licensed in NC or another state. The representative from the Board of Pharmacy noted that, in recent years, the Board has seen cases of PhD-level industry pharmacists seeking to reactivate their NC licenses so they are able to practice in NC again, presumably as a result of downsizing in the industry setting.

Advisory group members remarked that many pharmacists are attracted to the profession by the high salaries. However, the historically high compensation levels have led to saturation in the marketplace, even in rural areas that have difficulty recruiting health professionals. As a representative of ECSU noted, saturation in the marketplace does not imply that all NC residents have access to or are receiving adequate pharmaceutical care. Rather, as an independent pharmacist noted, "pharmacists are looking for jobs that don't exist." The group agreed that when looking toward the future, pharmacist compensation is likely to deflate unless the role of the pharmacist on the healthcare team expands with a corresponding way to reimburse for these expanded services.

Advisory group feedback aligned with Sheps Center findings indicating that the demand for pharmacists in North Carolina is in balance with the supply. Pharmacists are evenly distributed by age group, indicating that a shortage of pharmacists in the future due to retirement is unlikely. North Carolina has a steady stream of new graduates from the three in-state pharmacy schools, with High Point University poised to add to this pipeline in the near future. The number of reciprocity applications has continued to increase each year, providing another stream of pharmacists who join the workforce from out-of-state.

Expanding Roles of Pharmacists Under New Models of Healthcare Delivery

Advisory group members expressed some frustration that pharmacists have not been able to practice to the full scope of their training, particularly providing direct patient care. Group members noted that many members of the profession would like to see the role of the pharmacist move beyond dispensing, with more responsibility for patient outcomes as a direct patient care provider. The discussion about new roles for pharmacists was framed around education, regulatory, and payment mechanisms that would be needed to advance pharmacist practice. Group members concurred that the main limiting factor to enhancing pharmacist roles on the healthcare team was the current payment model.

The new roles envisioned for pharmacists included greater responsibility for managing patient outcomes, particularly for patients with chronic conditions on multiple medications. One pharmacist from an independent pharmacy expressed frustration with the current healthcare delivery system, noting that pharmacists may see the patient more often than other health professionals, but are not integrated into the healthcare team and therefore do not have full access to necessary patient information including labs and test results. Without this information, the pharmacist repeatedly provides a generic message about how to manage a given health condition and the pharmacy visit becomes a lost opportunity for proactive healthcare intervention. The advisory group recognized that increased pharmacist services are not of the same value for all patients. One pharmacist gave an example of the need to tailor extended pharmacist services for different types of patients. He explained that a 25-year-old woman who came into the pharmacy once per month to fill a prescription for birth control pills would not have much value added with more extensive pharmacist consultation, while a 47-year-old patient with

chronic conditions taking multiple medications would be more likely to benefit from pharmacist intervention. The group felt that extending pharmacist services will be most efficient and cost effective if targeted to specific patient populations.

The representative from UNC Eshelman School of Pharmacy – Asheville campus shared a success story of expanded pharmacist service use in western NC, an initiative led by Mountain Area Health Education Center (MAHEC). MAHEC began embedding clinical pharmacist practitioners with responsibilities for patient pharmacotherapy in family practice clinics in 2001. The program started with one pharmacist and grew to five, with plans to add two more positions. Pharmacists are responsible for (and can bill for) employee wellness visits, Medicare wellness visits, transitional care, and anticoagulation visits and others. Pharmacists do not have dispensing responsibilities, instead working with patients and providers directly for medication optimization. Scalability is a focus of the program, with particular emphasis on replicating this model in non-academic, rural communities. Expansion of this model has been delayed by time required to hire a Clinical Pharmacist Practitioner, as so few in the pharmacist workforce have this credential.

A representative from Roanoke Chowan Community Health Center (CHC) described the center's model of incorporating pharmacist services for complete healthcare under one roof, a service which will open in February 2014. Patients at the CHC have difficulty coming to appointments, so the CHC's goal is to provide all needed services, including pharmacy, at one time. The CHC pharmacist will have access to electronic health records to check labs and ensure the appropriateness of the medication therapy, as well as time to consult with patients about their medication and adherence. Because many CHC patients are unable to pay for healthcare services, the CHC is motivated to deliver care in the most efficient way and will structure payment systems

to promote quality of care. While this flexibility may not exist in other healthcare settings, CHCs can be used as laboratories to test the outcomes of different mixes of healthcare professionals on patient outcomes, including pharmacists.

The group felt that the current education received by PharmD graduates was sufficient to support an expanded role for pharmacists as direct care providers. Advisory group members felt that most pharmacists were not practicing to the full extent of their PharmD training. As one pharmacist from an independent pharmacy noted, "we are underperforming as a profession. We can easily step it up a notch without a lot of extra training." Group members from UNC Eshelman School of Pharmacy noted that pharmacist training has not emphasized assessment and measurement of enhanced pharmacy services on patient outcomes through data analysis. UNC Eshelman School of Pharmacy is working to build these skills into the curriculum.

From a regulatory perspective, further legislation in NC would not be needed to support enhanced pharmacist care. A regulatory pathway for the type of consultation and cognitive services envisioned in enhanced pharmacist practice, including the administration and quasi-independence to prescribe, exists with the Clinical Pharmacist Practitioner (CPP) credential. However, few pharmacists in the state's workforce have pursued this credential and are able to practice with the expanded professional authority.

The group concurred that the largest barrier preventing pharmacists from taking on an expanded role in direct patient care is not education or regulation, but the current payment model. Pharmacies earn money by charging a fee for each prescription dispensed. This payment model emphasizes efficiency and high volumes in medication dispensing. As one member explained, the emphasis has been "fast, cheap, and accurate" dispensing. Few mechanisms exist to



pay pharmacists for patient consultation and other cognitive services. Under the existing system, particularly in community pharmacies, adding consultative services disrupts workflow and may represent a financial loss. The MAHEC model uses several different codes to bill for pharmacist services, but reimbursement remains a concern. The group felt there is a need for pharmacists to be recognized as providers so that they can be routinely reimbursed for clinical services in new models of care such as Patient Centered Medical Homes (PCMHs) and Accountable Care Organizations (ACOs). One member noted that the profession has been reluctant to let go of the dispensing-based reimbursement model due to a lack of understanding about how reimbursement under different payment models, such as capitated payments, would take place. Another member noted that for pharmacists to be paid differently, a business case will need to be made to payers, particularly private insurance companies.

Pharmacy Technician Trends in North Carolina

Pharmacy technicians work under the supervision of pharmacists to prepare and distribute prescription medications. Pharmacy technicians must register with the NC Board of Pharmacy, but because these health professionals are not licensed by the Board, the Sheps Center does not maintain data on pharmacy technician supply. In 2012, NC

BOP data show that 15,052 pharmacy technicians were registered with an NC business address.²⁴

Pharmacy Technician Education

There is no standard educational pathway for pharmacy technicians, who may be trained either on-site at their place of work or at a community college. North Carolina Community College System (NCCCS) offers a standardized pharmacy technology curriculum providing training in the preparation of prescription medications, inventory management, and data collection.²⁵ Sixteen community colleges in the state deliver pharmacy technician training programs, including certificate programs at two community colleges, diploma programs at 12 community colleges, and associate's degree programs at ten community colleges. Since 2009, 249 students have completed the associate's degree, 555 students have completed the diploma program, and 30 students have completed the certification program (personal communication, Renee Batts, 20 Dec 2013). Forty-six of NC's community colleges offer a pharmacy technician continuing education training, enrolling a total of 8,940 students since 2009.

Pharmacy Technician Demand

In contrast to pharmacists, pharmacy technician recruitment requires more time in densely populated areas than it does in less urban areas. North Carolina Hospital Association data show that in 2012, pharmacy technician recruitment required less time in non-metropolitan areas (41 days) compared to metropolitan areas (47 days).^{vii}

New Roles for Pharmacy Technicians Under New Models of Healthcare Delivery

National data show that over half of a pharmacist's day is spent on tasks related to medication dispensing.²⁶ If pharmacists assume additional

vii Personal communication with Sarah Broome, North Carolina Hospital Association 23 October 2013. Data are based on the annual NCHA workforce survey for 2012. The survey had a response rate of 81%. Missing responses were imputed based on total licensed beds.

tasks with expanded roles in direct patient care, there are corresponding opportunities for pharmacy technicians to take on increased dispensing responsibilities to reduce pharmacist workloads. Some services at Mission Hospital in Asheville are provided by pharmacy technicians in order to enhance the level of care provided by the pharmacists. Other models include expanding the technician role to include non-judgmental distributive tasks, or using pharmacy technicians to handle medical assisting-type functions for patients on multiple routine medications.

Members of the advisory group noted that the debate around expanding the role of pharmacy technicians has been contentious. The pharmacy technician workforce has expanded rapidly, but there is no career ladder for pharmacy technicians, largely due to the lack of standard educational requirements and testing. Members noted that despite data and evidence regarding the safety of pharmacy technician services,^{15,27} the pharmacist profession has not been comfortable with the idea of pharmacy technicians taking on an expanded role in dispensing. Two reasons were cited for this discomfort: the sense that pharmacists would lose their professional identity if not solely responsible for dispensing, and concerns about reimbursement. One group member noted that pharmacy technicians are most interested in pursuing additional training if it will lead to increased responsibility and higher salaries. As long as “on-the-job” training for pharmacy technicians is available and no incentives are provided to complete additional training, the pharmacy technician career pathway remains limited. However, should requirements for pharmacy technician education become standardized, NC is well-positioned to provide pharmacy technician education to these professionals via the North Carolina Community College System.

Conclusions

Mirroring national trends, North Carolina has a strong supply of pharmacists to meet the demand for pharmaceutical services in the state. A relatively low percentage of pharmacists are near retirement age, the pipeline for new pharmacists is strong, and competition for jobs is high. The pharmacy workforce is rapidly feminizing, and although progress has been made in the last decade to improve racial and ethnic diversity, the pharmacy workforce remains largely white. New and emerging roles for pharmacists and pharmacy technicians in North Carolina may be developed in the future in response to new models of healthcare delivery. ☒

Notes on Data and Methodology

Data on North Carolina pharmacists were accessed from the North Carolina Health Professions Data System using licensure data from the North Carolina Board of Pharmacy. These data represent all pharmacists actively practicing in the state of North Carolina and are based on yearly snapshots effective October 31 of each year. All data are self-reported by the pharmacist at time of initial application for licensure and subsequent renewals. When analyzing the dynamics in pharmacist supply between years, newly licensed pharmacists are those who are new to file with a license date in the current or previous year. Status change pharmacists are those who were licensed in NC in an earlier year but were either inactive or active out of state in the previous year. Pharmacists can be licensed by exam or by reciprocity. Pharmacists who become licensed by reciprocity are those individuals who have been actively practicing in other states.

National pharmacist data were accessed from the Statistical Abstract of the United States, 2013: ProQuest LLC. ProQuest Statistical Abstract of the United States, 2013. (1st ed.) Bethesda, MD, 2012. Earlier editions are available at http://www.census.gov/compendia/statab/past_years.html.

North Carolina population data were retrieved from the Office of State Planning and U.S. population data were accessed from the U.S. Census Bureau. Population data are dependent on the year and are corrected census counts (April 1, 1970, 1980, 1990, 2000, or 2010), or the estimates or projections from the data source (April 1, 2000, 2010; July 1, other years). All years subsequent are projected. A projection differs from an estimate in that it relies on certain assumptions about long-term trends in data, which are not yet available, while an estimate is always based on data from predictor variables, which are available for the estimate year.

Metropolitan and Nonmetropolitan status definitions were derived from the Office of Management and Budget's Core Based Statistical Areas, and are current as of the November 2013 update, except for North Carolina Hospital Association data, which use the 2011 definition. Nonmetropolitan counties include micropolitan counties and counties outside of CBSAs.

The statements, findings, conclusions, views, and opinions contained and expressed in this report are based in part on data obtained under license from the following IMS Health Incorporated information service: Xponent™, January 2012-December 2012, IMS Health Incorporated. All Rights Reserved. Such statements, findings, conclusions, views, and opinions are not necessarily those of IMS Health Incorporated or any of its affiliated or subsidiary entities. IMS Health data were extracted November 1, 2013, and include total dispensed prescriptions, new dispensed prescriptions and refill dispensed prescriptions through retail settings (chain, mass merchandiser, food stores and independent pharmacies) from January 2012-December 2012 for the United States, North Carolina, and North Carolina counties.

Average annual retail prescriptions were calculated using North Carolina population data retrieved from the Office of State Planning and U.S.

population data accessed from the U.S. Census Bureau in combination with the total number of retail dispensed prescriptions data provided by IMS Health. Average annual retail prescriptions per retail pharmacist were calculated using the total number of retail dispensed prescriptions and licensure data from the North Carolina Pharmacy Board; only pharmacists who identified a specialty in a retail setting (chain or independent pharmacy) were included. Data in Figure 14 and Table 7 use pharmacists' average hours per week as reported to the North Carolina Board of Pharmacy at time of their annual license renewal; this method takes into account pharmacists working fewer than 40 hours per week and gives a more accurate estimate of workload at smaller units of geography (county and region). Data for 17 counties were suppressed by IMS Health due to small numbers. In these cases, the average number of retail prescriptions dispensed in suppressed counties was used to estimate workload by AHEC region. These data were then used in conjunction with the IMS Health Incorporated data to determine the average number of retail prescriptions filled per retail pharmacist per hour.

References

- 1) Polgreen LA, Mott DA, Doucette WR. An examination of pharmacists' labor supply and wages. *Research in Social & Administrative Pharmacy* RSAP. Dec 2011;7(4):406-414.
- 2) Carvajal MJ, Armayor GM, Deziel L. The gender earnings gap among pharmacists. *Research in Social & Administrative Pharmacy* : RSAP. Jul-Aug 2012;8(4):285-297.
- 3) Fraher E. Slacker Gen Xers or Workaholic Boomers?: An Analysis of Age, Gender, Cohort and Period Effects on Hours Worked in Patient Care. International Medical Workforce Conference; September 2008; Edinburgh, Scotland. http://rcpsc.medical.org/publicpolicy/imwc/Fraher_IMWC_Career_Structure_071808.pdf. Accessed 17 January 2014.
- 4) Fraher E, McGee V. The Status of Health Professions Diversity in North Carolina. North Carolina Health Professions Diversity Conference; 29 August 2012; Greensboro, North Carolina. http://www.shepscenter.unc.edu/hp/presentations/Diversity_29Aug2012.pdf. Accessed 6 January 2014.
- 5) McGee V, Fraher E. The state of racial/ethnic diversity in North Carolina's health workforce. *North Carolina Medical Journal*. Sep-Oct 2012;73(5):337-345.
- 6) An Act Authorizing the North Carolina Medical Board and the Board of Pharmacy to Adopt Rules to Approve Clinical Pharmacist Practitioners to Practice Drug Therapy Management Pursuant to a Drug Therapy Management Agreement. General Assembly of North Carolina Session Law 1999-290; 1999. <http://www.ncleg.net/EnactedLegislation/SessionLaws/PDF/1999-2000/SL1999-290.pdf>. Accessed 3 February 2014.

- 7) Personal communication with Mollie Scott, Regional Associate Dean, Asheville Satellite Campus, UNC Eshelman School of Pharmacy, 25 February 2014.
- 8) Taylor DA, Taylor J. American Association of Colleges of Pharmacy Profile of Pharmacy Students 2011-2012. Alexandria, Virginia. April 2013. http://www.aacp.org/resources/research/institutionalresearch/Documents/Fall12_Degrees%20Conferred.pdf. Accessed 16 December 2013.
- 9) Walton SM, Mott DA, Knapp KK, Fisher G. Association between increased number of US pharmacy graduates and pharmacist counts by state from 2000-2009. *American Journal of Pharmaceutical Education*. May 10 2011;75(4):76.
- 10) Accreditation Council for Pharmacy Education: Frequently Asked Questions. <https://www.acpe-accredit.org/students/faqs.asp#5>. Accessed 16 December 2013.
- 11) Trends in the Supply of Pharmacists in North Carolina. North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research. Chapel Hill, North Carolina. March 2010; http://www.shepscenter.unc.edu/hp/publications/NCpharmacists_march2010.pdf. Accessed 3 September 2013.
- 12) Smith M, Bates DW, Bodenheimer TS. Pharmacists belong in accountable care organizations and integrated care teams. *Health Affairs*. Nov 2013;32(11):1963-1970.
- 13) Smith MA. Pharmacists and the primary care workforce. *Annals of pharmacotherapy*. Nov 2012;46(11):1568-1571.
- 14) Brown D. The paradox of pharmacy: A profession's house divided. *Journal of the American Pharmacists Association*. Nov 1 2012:e139-e143.
- 15) Maine LL, Knapp KK, Scheckelhoff DJ. Pharmacists and technicians can enhance patient care even more once national policies, practices, and priorities are aligned. *Health Affairs*. Nov 2013;32(11):1956-1962.
- 16) Murawski M, Villa KR, Dole EJ, et al. Advanced-practice pharmacists: practice characteristics and reimbursement of pharmacists certified for collaborative clinical practice in New Mexico and North Carolina. *American Journal of Health-System Pharmacy*. Dec 15 2011;68(24):2341-2350.
- 17) Abramowitz PW, Shane R, Daigle LA, Noonan KA, Letendre DE. Pharmacist interdependent prescribing: a new model for optimizing patient outcomes. *American Journal of Health-System Pharmacy*. Nov 15 2012;69(22):1976-1981.
- 18) Smith M, Bates DW, Bodenheimer T, Cleary PD. Why pharmacists belong in the medical home. *Health Affairs*. May 2010;29(5):906-913.
- 19) Scott MA, Hitch WJ, Wilson CG, Lugo AM. Billing for pharmacists' cognitive services in physicians' offices: multiple methods of reimbursement. *Journal of the American Pharmacists Association*. Mar-Apr 2012;52(2):175-180.
- 20) Ricketts TC, Fraher EP. Reconfiguring health workforce policy so that education, training, and actual delivery of care are closely connected. *Health Affairs*. Nov 2013;32(11):1874-1880.
- 21) Matzke GR, Ross LA. Health-care reform 2010: how will it impact you and your practice? *Annals of Pharmacotherapy*. Sep 2010;44(9):1485-1491.
- 22) Matzke GR. Health care reform 2011: opportunities for pharmacists. *Annals of Pharmacotherapy*. Apr 2012;46(4):S27-32.
- 23) Mehrotra A, Liu H, Adams JL, et al. Comparing costs and quality of care at retail clinics with that of other medical settings for 3 common illnesses. *Annals of Internal Medicine*. Sep 1 2009;151(5):321-328.
- 24) North Carolina Board of Pharmacy Census of Registrants, Fiscal Year 2012. 2012; <http://www.ncbop.org/PDF/2012Statistics.pdf>. Accessed 16 January 2014.
- 25) North Carolina Community College System Curriculum Standard: Pharmacy Technology. http://www.nccommunitycolleges.edu/programs/docs/Curric_Standards/45/A45580_Pharmacy_Tech_FA08v3.pdf. Accessed 27 January 2014.
- 26) Doucette WR, Gaither CA, Kreling DH, Mott DA, Schommer JC. Final Report of the 2009 National Pharmacist Workforce Survey. Midwest Pharmacy Workforce Research Consortium, Alexandria, Virginia. March 2010. <http://www.aacp.org/resources/research/pharmacymanpower/Documents/2009%20National%20Pharmacist%20Workforce%20Survey%20-%20FINAL%20REPORT.pdf>. Accessed 19 December 2013.
- 27) Adams AJ, Martin SJ, Stolpe SF. "Tech-check-tech": a review of the evidence on its safety and benefits. *American Journal of Health-System Pharmacy*. Oct 1 2011;68(19):1824-1833.

Appendix: Pharmacy Leadership Expert Advisory Group, 2013

Tom Bacon (Facilitator)

Senior Research Fellow
Cecil G. Sheps Center for Health Services Research,
Former Director, North Carolina
Area Health Education Centers (AHEC) Program

Renee Batts

Education Consultant
Health Sciences Academic Programs
North Carolina Community College System

Jay Campbell

Executive Director
North Carolina Board of Pharmacy

Sandra Covington

Program Director
Durham Technical Community College

Doyle Cummings

Berbecker Distinguished Professor of Rural Medicine,
Professor of Family Medicine and Public Health
East Carolina University, Brody School of Medicine

Jacquelyn Curtis

Pharmacy Technician Supervisor
Duke Regional Hospital

Fred Eckel

Adjunct Professor
Division of Practice Advancement & Clinical Education
UNC Eshelman School of Pharmacy

Anthony Emekalam

Assistant Professor of Clinical Pharmacy
Director, ECSU Health Resource Center
Department of Pharmacy and Health Professions
Elizabeth City State University

Mark Gregory

Senior Vice President Store Operations
Kerr Drug

Sterling Koonce

Chief Executive Officer
Koonce Drug Company, Inc.

Michael Manolakis

Assistant Dean of Student Development
Associate Professor
Wingate University School of Pharmacy

Angela Mitchell

Pharmacy Director
Roanoke Chowan Community Health Center

W. Mark Moore

Associate Dean for Student Affairs & Admissions
College of Pharmacy & Health Sciences
Campbell University

Joe Moose

Owner and Pharmacist Manager
Moose Pharmacy

Shay Phillips

Assistant Professor
Ambulatory Clinical Pharmacist Specialist
Carolinas Healthcare System

Douglas Scheckelhoff

Vice President, Professional Development
American Society of Health-System Pharmacists®

Jon Schommer

Professor and Associate Department Head
Pharmaceutical Care & Health Systems
University of Minnesota College of Pharmacy

Mollie Scott

Regional Associate Dean
Asheville Satellite Campus
UNC Eshelman School of Pharmacy

Betsy Sleath

George H. Cocolas Distinguished Professor and Chair
Division of Pharmaceutical Outcomes and Policy
UNC Eshelman School of Pharmacy

Richard Stanford

Director, US Health Outcomes
GlaxoSmithKline

Troy Trygstad

Vice President, Pharmacy Programs
Community Care of North Carolina



UNC

THE CECIL G. SHEPS CENTER
FOR HEALTH SERVICES RESEARCH