

APPENDIX Q

April 5, 2010

TO: Members, Board of Governors
FROM: Alan Mabe
SUBJECT: Report on Pharmacy

We now have the Report on Pharmacy with recommendations from General Administration, the Report from the Team of Visiting Pharmacy Deans, and a data report from the Sheps Center that updates the report they did for General Administration in 2002-03, in that order.

The recommendations to the Educational Planning Committee are on page 7 of the General Administration report.

We have posted this material and the proposals provided by the two campuses on the BOG Web site for meeting materials.

University of North Carolina
General Administration Report on Pharmacy

Introduction

North Carolina has traditionally had one public pharmacy school at the University of North Carolina at Chapel Hill and now has two private pharmacy schools, the older program at Campbell University and a more recent program at Wingate University. The most recent review of pharmacy by the General Administration of the University of North Carolina occurred in 2002-03 and several options were considered, a stand-alone program at East Carolina University, a stand along program at Elizabeth City State University and a satellite program at Elizabeth City State University delivered by UNC Chapel Hill. The result of that review (assisted by an outside team of pharmacy deans) was the Board's endorsement of a UNC Chapel Hill satellite pharmacy program in conjunction with ECSU in Elizabeth City. Chapel Hill and Elizabeth City State University collaborated to establish a satellite program in Elizabeth City and in May 2009 it produced its first graduating class of ten.

The occasion for this review are proposals from UNC-CH and UNCG regarding pharmacy. UNC-CH proposes to establish a second satellite pharmacy program in Asheville where it would expand the number of pharmacists being produced by up to 40. UNCG proposes to start up a new stand-alone pharmacy school in Greensboro with a production target of up to 90 pharmacists per year.

Proposals

UNC Chapel Hill would leverage its investment in successfully establishing a satellite in collaboration with Elizabeth City State University in Elizabeth City which serves the Northeast to collaborate with Mission Hospital, Mountain AHEC, UNC Asheville and other partners including the city and county as well as local business interests to place a satellite pharmacy program in Asheville that would graduate up to 40 pharmacists per year. UNC-CH sees this expansion as a way to serve broad state and regional needs through a central campus and two satellites that would address distributional issues in the eastern and western parts of the state.

UNC Greensboro seeks to develop a new school of pharmacy in Greensboro that would produce up to 90 pharmacy graduates per year. The proposal is to develop graduate/research opportunities in coordination with the development of a PharmD program. UNCG has identified local and regional partners, including Moses Cone Hospital, NCA&T, Guilford Tech Community College, Wake Forest Baptist Medical Center, other regional medical centers, as well as several local foundations and business interests. UNCG sees this proposal as a way to contribute to the pharmacy workforce in North Carolina and stimulate economic development in the area.

Addressing cost is somewhat preliminary but from the proposals the following can be said at this point. UNC-CH would require approximately \$3.5 million to start up, but after the fourth year of the program it is not clear how much recurring state funding would be needed. Because Mission Hospital plans to help share the cost of the clinical faculty and residents in the hospital, tuition is expected to largely cover the recurring cost. The program would either rent space or receive the use of space as part of the overall plan with its partners so it would not need a new building. Buncombe County has pledged \$600,000 dollars to the project primarily to renovate space for the programs use in the Zeis Center on the UNCA campus. The Area Chamber has pledged to work with public and private funding sources to raise \$2.5 million.

UNCG would need approximately \$10 million to initiate the program but after the program is fully ramped up the campus projects it would then need approximately \$1.6 million on a recurring basis. It would need a building for the pharmacy program and the estimated range is from \$50 million to \$75 million. Local Greensboro foundations have pledged land valued at between \$1 million and \$2 million, as well as creative short-term financing.

These are early estimates and would need to be refined and pressure tested.

Visiting Team

As is typical for proposals for first professional degree proposals, General Administration decided to invite a team of pharmacy deans to provide advice regarding the two proposals it was considering. A list of pharmacy deans was assembled for review by both campuses. The list was reduced to six people based on recommendations from the campuses and both campuses signed off on the final list from which the three-person team was chosen.

Dr. Jordan Cohen has served as dean of two pharmacy programs, most recently at the University of Iowa. Currently he is serving as Interim Vice President for Research and Economic Development. He agreed to chair the committee and be responsible for providing the team's report. Dr. Natalie Eddington is dean of pharmacy at the University of Maryland, and Dr. Marilyn Speedie is dean of pharmacy at the University of Minnesota. We were indeed fortunate to secure such an accomplished and knowledgeable team for this review.

The team arrived on the evening of March 3rd, visited the UNC Chapel Hill campus on the morning of March 4, and flew to Asheville for a working lunch and afternoon meetings at Mission Hospital. The team had a late afternoon tour on the UNC Asheville campus to review potential space that could be repurposed for pharmacy.

On March 5th the team arrived on the UNC Greensboro campus at eight in the morning for a packed schedule there and left in the early afternoon for a final exit meeting in Chapel Hill in the afternoon.

The team was provided copies of the two proposals, a preliminary data report from the Sheps Center, and some supplemental material from each campus.

Update of the 2002-03 Data Report on Pharmacy

The Sheps Center, which tracks a wide range of data indicators in the health professions, provided an update to the report on pharmacy they provide in 2002-03. The currently updated version of the report can be found in Appendix 2.

Among the findings are the following:

North Carolina has 9.3 pharmacists per 10,000 population while the nation has 8 pharmacists per 10,000 population

North Carolina has 10.1 pharmacists per 10,000 population in metropolitan counties and 7.5 pharmacists per 10,000 population in non-metropolitan counties.

Nationally there has been a sizable increase in the number of pharmacy schools. Prior to 2000 there were 82 pharmacy schools in the US. Between 2000 and 2005 14 new pharmacy schools were opened. Between 2006 and 2009, 20 new pharmacy schools have open in the US, and 5 more are projected to open in 2010 or later. That represents a 41% increase in existing pharmacy programs since 2000 and a 48% increase in those that are open or will open in the near term. In addition there has been expansion at some existing pharmacy schools. While this has added a large number of pharmacy graduates to the supply, some of these schools have not reached the point of having a graduating class, so the supply will continue to grow.

The pharmacy profession in North Carolina is composed disproportionately of female practitioners. The average age of all practitioners is 43 while the average age of females is 39. The report says regarding North Carolina, "The age-gender pyramids in Figure 10 show a growing cohort of young pharmacist between 2003-2008, the majority of whom are female. This widening base suggests a good future supply of pharmacists in the state." This is in contrast to many professions that face retirement and ageing out issues.

The data report includes the Aggregate Demand Index (AGI) which has an index for the US of 3.66 and for NC an index of 3.86. According to this source, an index between 3 and 4 would indicate that "demand is in balance with supply." More recent trend data is also informative since it indicates the trends in the state and nationally are both in the direction of demand being less than the supply. (Figure 18, Sheps Center Report)

Visit by the Team of Pharmacy Deans

The team spent time during the visits interacting with the groups each campus assembled. In each case, there were faculty and administrators from the campuses, and a wide variety of representatives from the community and region, including other campuses or institutions, medical facilities, foundations, business and industry, as well as local elected official.

Report by the Visiting Team

The Visiting team provided a report on their visit and made a number of assessments of the proposals and reflected on the state of pharmacy. Their report reflects on the strengths and weakness or challenges of each proposal after which they provide a summary of their findings and a set of recommendations. Appendix 1

The following general observations and recommendations are taken directly from the report:

“GENERAL OBSERVATIONS

The University of North Carolina is faced with some unique challenges and opportunities with these two proposals, both focused on pharmacy education expansion. Clearly, since the previous SHEP study was completed in 2002-03, the workforce landscape has changed for pharmacists and the future is far from clear. A number of key factors create this uncertainty; including (1) the effect that numerous new schools of pharmacy across the country and the southeast region will have on current employment opportunities; (2) the continued expansion on the numbers and role of pharmacy support personnel; (3) the increasing reliance on automation and robotics as a way to handle prescription volume and reduce personnel costs; and perhaps most importantly, (4) the uncertainty of the health care reimbursement system with regard to creating a revenue stream to compensate pharmacists for patient care services, which is the primary focus of our current Pharm.D programs. While there will always be “shortages” of health care workers in selected geographical and economically disadvantaged areas, most would argue that today the supply and demand nationally are in balance, if not already overcorrected as a result of the rapid expansion in the number of new pharmacy schools and increased class sizes in many established programs. Looking into the future the visiting team agrees that future pharmacists must provide value added in patient care in all practice settings, and that others not necessarily receiving the PharmD degree will increasingly provide the dispensing needs for pharmaceuticals. Given the aging of the US population it is also clear that our educational programs must prepare pharmacists to work effectively with others in the health care team and manage drug therapy in very complex patients, which will require excellence in faculty and experiential training capacity. Any expansion today, particularly in the Public University Sector, needs to be done carefully, to not only avoid creating a surplus of graduates who may be unemployable or underemployed, but also to allow universities to optimize their investments for the benefit of the institution and the state. The School of Pharmacy at UNC-CH has an exceptional faculty and is a nationally recognized leader in forward looking clinical education and, with the Elizabeth City satellite, has clearly demonstrated the ability to maintain quality and increase diversity through sophisticated, interactive distance learning. This not only serves the people of North Carolina well, but reduces the need for major long term capital and operational investment, which may prove to be unnecessary as the future of health care plays out. Building on this great strength seems particularly prudent in this era of severe fiscal constraints.

Equally important to a top tier research University is the ability to continue to enhance research, be a partner in economic development and address important problems facing the state and nation. The existing research programs at UNC-CH are among the nation’s elite in the areas of Health Policy and Outcomes research, clinical pharmaceutical sciences and drug development, and they are well integrated into other strong programs on the campus including the molecular medicine/genomics, public health and the CTSA. The school has also developed very strong linkages with pharmaceutical industry partners in the Triangle area and beyond. In this vein the visiting team identified a unique opportunity in research and economic development related to the UNCG strengths in Medicinal Biochemistry, and nanotechnology and could envision synergy by meaningful collaborative research and graduate programs between UNC-CH, UNCG and NCA&T as well as additional interaction and expansion of activity with the Pharmaceutical, Medical, Biotechnology industry clusters that exist in the Triad region as well as in RTP. Given the proximity of these two thriving areas this could position the

University to create a dominant region in this important industry sector that has great potential to benefit the Universities and the State.

“RECOMMENDATIONS

1. Recommend moving forward with establishing a UNC Asheville satellite program given the long history of their successful partnership and forward looking pharmacy education and service models.* The proposed plan is not only financially responsible but provides the opportunity to increase the pharmacist supply in an underserved area with the same level of quality associated with the existing UNC program in CH and Elizabeth City. The team is concerned about the viability of creating a basic science faculty cohort comparable to the standards for tenure track faculty at UNC-CH and recommends that the University consider only placing full time clinical and practice based faculty initially, and then subsequently examining the feasibility of adding faculty with possible research focus and ties to UNC Asheville programs in translational sciences, health care delivery and outcomes research. Possible links to the UNC Asheville Health and Wellness Program and the Bent Institute also provide very exciting collaborative research linkages as well. One approach would be to examine the feasibility of establishing a 2 + 2 satellite program, where students would matriculate on the UNC-CH campus their first two years and then finish their program in Asheville. To take full advantage of all this site has to offer these additional students should be selected based on their commitment to returning to Western North Carolina to complete their program and practice pharmacy.
2. Consider adding on-site faculty as preceptors and mentors and expanding the student cohort at the Elizabeth City Program to enhance the statewide pharmacy education commitment to diversity and respond to the potential supply needs of pharmacists for the Northeastern region.
3. Explore joint pharmaceutical sciences graduate/research programs between UNCG, NCA&T and UNC-CH that indentify and build unique strengths for UNCG, e.g. biotechnology, nanotechnology, linkage with genomics, clinical research, translational research. Explore the concept of an institute for Drug Discovery/Development with a physical presence on both UNC-CH and UNCG campuses, with linkage to the Kannapolis Campus and increased ties to relevant industry partners in both RTP and the Triad region. Such a program would continue to enhance collaboration across the state and leverage assets such as currently being accomplished through the the North Carolina Chemical Biology Center, a NIH funded collaboration between faculty in the UNC-CH School of Pharmacy and North Carolina Central University’s Biomanufacturing Research Institute and Technology Enterprise in Durham focused on cancer drug discovery.
4. Capitalize on the expressed interest from Medical and Hospital Administrators at Wake Forest and Moses Cone Hospitals to increase pharmacy and inter-professional education collaboration with UNC pharmacy. Explore the opportunities’ to add jointly appointed clinical faculty to both locations for purposes of expanding quality educational sites but also enhancing health care delivery through team development.

5. Reevaluate the pharmacist workforce in the Central region in two years and, if a compelling case can be made for an additional pharmacy program in Greensboro, consider creating a full four year pharmacy program as a joint venture between UNCG and UNC-CH so that the program would utilize UNC-CH's curriculum and distance delivery methodology to create an efficient, effective, high quality program.

*** The visiting team was advised as we were finalizing this report of the recently announced commitment by Wingate University to establish a program in Asheville/Hendersonville which will impact this consideration. It is unlikely that both an expanded UNC-CH program and a Wingate program are needed and would have sufficient clinical sites for training. We believe the UNC-CH expansion would better serve the needs of the citizens of the region for a high quality, lower cost, accessible pharmacy program based on the highly regarded pharmacy practice and education model at UNC-CH. This decision may be impacted as well by the status of Wingate's discussions regarding affiliation agreements with hospitals, health systems and other practice sites in the Asheville area. The team was impressed with the Asheville Health Care and business community's commitment to UNC-CH clinical education and practice development model. "**

Recommendations by General Administration

Based on the report by the Visiting Team of Pharmacy deans, UNC GA recommends that UNC Chapel Hill be authorized to start up a satellite pharmacy program enrolling up to 40 students per class in Asheville with the following conditions:

1. Funding from the Buncombe County Commission: \$600,000
2. Fund raising pledge by Asheville Area Chamber of Commerce: \$2.5 million
3. Mission Hospital provides 1 to 1 support on average for Clinical Faculty and Residents embedded at Mission Hospital
4. Tuition covers everything else
5. Develop research plan with UNCG and NCA&T in drug discovery and development
6. Look at the need in the Greensboro area in two years and if need is indicated explore a joint venture with UNC Chapel Hill.

This envisions starting up the satellite pharmacy program in Asheville without additional state funding.

In addition UNC Chapel Hill should explore, in collaboration with this initiative, a plan for expansion at the satellite program with Elizabeth City State University.

Appendix

Appendix 1: Report by Visiting Team

Appendix 2: Data Report from the Sheps Center

[Posted]

Appendix 3: UNC Chapel Hill Proposal

Appendix 4: UNC Greensboro Proposal

APPENDIX 1

**EXTERNAL REVIEW TEAM REPORT TO UNC SYSTEM OFFICE REGARDING PROPOSED
EXPANSION OF PHARMACY EDUCATION AND RESEARCH PROGRAMS**

March 4-5, 2010

INTRODUCTION

A three person visiting team comprised of Chair, Jordan Cohen, Ph.D., Interim Vice President for Research, University of Iowa, Marilyn Speedie, Ph.D., Dean, University of Minnesota, College of Pharmacy and Natalie Eddington, Ph.D., Dean, University of Maryland, School of Pharmacy conducted a two day on-site review related to proposals for pharmacy education programs at UNC Asheville and at UNC Greensboro. In preparation for this visit the team reviewed a comprehensive pharmacy workforce study from the SHEP Center at UNC, and detailed proposals for; (1) a satellite expansion program from UNC Chapel Hill to create a second synchronous/asynchronous teaching site for up to 40 students per class in Asheville in conjunction with UNC Asheville, Mission Hospital and the Mountain Area Health Education Center and; (2) from UNC Greensboro to establish a free standing, research intensive School of Pharmacy enrolling up to 90 Pharm.D. students per class in Greensboro.

CHARGE

The Visiting Team was invited to the state to review the two proposals. UNC General Administration sought advice from the Visiting Team regarding the need for, expected quality, and the cost of the proposals as well as advice on the national and state situation regarding the relation of the production of Pharmacy graduates to the need for additional pharmacy graduates and the implications of this both in the near and long term for the two proposals. The review should provide a report providing advice to UNC General Administration as to whether they should pursue one of the programs, both programs, or features from the two programs with the assessment taking into account the state's needs for pharmacy graduates in both the near and long term, cost and potential economic impact.

SITE VISIT SCHEDULE

The Visiting Team met with Dr. Alan Mabe, Senior Vice President for Academic Affairs, who hosted and staffed this process prior to initial meetings with UNC-CH Chancellor, Holden Thorp, Executive Vice Chancellor, Bruce Carney and Dean Robert Blouin, as well as key faculty and staff at UNC-CH to gain an understanding of the facilities and technology related to their current satellite campus in Elizabeth City and their plans for Asheville. The Team then visited Asheville and met with Asheville area community leaders and representatives from Mission Hospital, Chancellor Anne Ponder and others from UNC Asheville and toured facilities at UNC Asheville. On Day 2 the Team visited UNC Greensboro and met with Chancellor Linda Brady, Vice Chancellor David Perrin and Randall Kaplan, BOT Chair, followed by a series of meetings with UNC-G faculty, Triad area community and business leaders. The Site Visit concluded with an exit meeting with Dr. Mabe in UNC Central Administration offices in Chapel Hill.

In this report we will address each program separately in terms of strengths and weaknesses related to the charge we were given and conclude by offering general observations and specific recommendations for UNC President Erskine Bowles to consider.

University of North Carolina Chapel Hill Proposed Satellite Pharmacy Program in Asheville

Pharmacy Workforce Needs: Regional and Statewide

Strengths

- The expansion to Asheville supports the pharmacy manpower needs in Western NC where there are reportedly 8.9-9.0 pharmacists/10,000 citizens in the region, which is lower than other parts of the state.
- If the planned Asheville expansion is coupled with an increase in students and resident faculty at Elizabeth City, the result would be increased support of pharmacy manpower needs in rural NC, and an increase in the long-term stability and utility of the satellite model.

Weaknesses

- Because the new pharmacy programs in Eastern Tennessee (including Johnson City) have not yet graduated a class, the potential impact of the graduates of these programs on the pharmacy workforce in western North Carolina is unknown at this time.
- The Asheville satellite would not appear to have the potential to increase diversity among North Carolina graduates to the same extent as UNC Greensboro would, although a concomitant expansion of the number of students in Elizabeth City would be a positive factor in Eastern North Carolina.
- The Asheville expansion may distract UNC-CH from increasing student and faculty numbers in Elizabeth City, where they are greatly needed.
- Of note is the very recent announcement by Wingate University to expand its pharmacy program in Asheville/Hendersonville in Western North Carolina. The press release reported that Wingate will recruit 13 full time faculty and staff and enroll 18 students per class in a new Asheville Program with affiliations in community pharmacies, long term care facilities and Park Ridge Hospital in Fletcher and the VA Medical Center in Asheville. The potential impact of the Wingate expansion cannot be fully determined at this time. However there will be an increase in the competition for clinical sites in Asheville community hospital sites needed to meet the experiential requirements of both the proposed UNC-CH/UNC Asheville and Wingate expansions. Furthermore, the Wingate expansion may impact the workforce needs of the region if they attract students from the region who will remain after graduation.

Quality/Role of the Program

Strengths

- UNC-CH is a top 5 nationally ranked school of pharmacy, and is a leader in the renaissance of pharmacy education and would bring this excellence to the program expansion in Asheville.

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- UNC-CH has a long-standing successful partnership with Mission Health System that fosters excellence in the delivery of pharmaceutical care and outstanding experiential sites for Pharm.D. students
- The Asheville site is nationally renowned for its role in innovations in pharmacy practice and continues to serve as a national model for delivering pharmaceutical care and demonstrating improved quality of care and reduced overall costs. Expanding this model by virtue of this satellite program would provide unique opportunity to continue to develop models for health care reform.
- Expansion of pharmacy training through this well developed, validated synchronous/asynchronous model allows for rapid start up of the new program and further assures quality consistent with current student outcomes being achieved at UNC-CH. This model for expansion also provides flexibility with regard to the uncertainty of predicting future pharmacy workforce needs, which may become clear over time as health care delivery and reimbursement models evolve. Should the future pharmacy workforce projections, as many predict, evolve to a need for fewer Pharm.D. graduates and an increased demand for training of more highly skilled technicians or a different level of dispensing practitioners, the distance sites could be downsized as needed and faculty/staff relocated to the UNC-CH program or programs within the UNC system that may emerge at that time.

Weaknesses

- The UNC Asheville partnership will be challenging due to the liberal arts culture and mission, the lack of experience with professional programs, and the limited experience the campus has in recruiting and supporting professional education and research oriented faculty. The UNC-CH promotion and tenure model is based significantly on research quality and productivity. This will be particularly challenging to the faculty in the pharmaceutical sciences, but could be more workable for clinical faculty (both tenure and non-tenure track) and faculty in social science and policy disciplines.
- Wingate University has expressed a strong interest in adding a pharmacy school campus in Asheville and could potentially provide graduates in the future at a much lower cost to the state and university. Questions clearly arise though with regard to the impact of private school tuition on regional applicants and with regard to expanding the Wingate program given the longstanding successful linkages between UNC-CH, the Mountain AHEC, Mission Hospital and the excellent work accomplished with the entire community in the nationally regarded "Asheville Project".

Costs

Strengths

- The existing IT infrastructure and technical support at UNC-CH provides a unique opportunity for extension of this model at relatively low cost. Buncombe County has committed \$600K and the Asheville Chamber of Commerce has committed to working with other regional partners to raise \$2.5M to support major portions of the start-up and renovation costs.

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- Pro forma indicate that ultimately the operating costs can be covered by tuition thereby creating an additional high quality site serving rural needs in a fiscally responsible manner.

Weaknesses

- Depending on how many on site faculty are planned, there will be significant start-up costs in hiring faculty and staff and bridging to a full four years of tuition-paying students. The renovation of the Zeis building or acquisition of additional space for offices, student areas, and appropriate laboratory and other non-laboratory research spaces could greatly exceed initial estimates due to the physical science, classical laboratory construction model.
- If UNC adopts the model in which Asheville is added and Elizabeth City expands, there will be additional costs for faculty, operations and possibly facilities expansion as well.

Infrastructure/ Building/Preceptors

Strengths

- The UNC-CH proposal calls for 25 additional faculty (2/3 clinical faculty), and 40 students per year plus 6 residents.
- Practice based faculty will be embedded in the Mission Health System and other hospitals.
- UNC-CH currently has a cohort of established faculty/preceptors providing 55 high quality 4-week practice experiences at Mission Health System and various other practice sites in the Asheville area. The additional 16 or so clinical faculty should provide the capacity required to develop/implement new sites/or expansion of sites to meet the needs of the 40 additional students per class.
- The state's commitment to a new facility (currently under construction) to enhance the pharmacy program in Elizabeth City will be of great benefit should the Asheville expansion be coupled with an expansion of both student and faculty numbers in Elizabeth City as recommended later in this report.

Weaknesses

- As mentioned above the Zeiss building as it now stands to support classical laboratory instruction and research will have to be reconfigured to create requisite classroom and student space, practice laboratories, distance education/video conferencing and expanded office space that will be required in the professional program.
- If a robust pharmaceutical science research program were developed as proposed, the current research infrastructure (buildings, labs) for the 1/3 science faculty is inadequate for the anticipated level of faculty scientists (i.e., those who would be qualified for tenure-track at UNC-CH) and would require renovation and upgrading.

Meeting the Research Mission

Strengths

- Long-standing track record in research excellence at UNC-CH.
- Bent Creek/natural products research has potential in identifying new compounds and expanding drug discovery research across the system. Additional potential federal and industry research funding and the development of intellectual property would also add value.
- Potential unique research linkages could be envisioned in translational research and policy research related to health care delivery

Weaknesses

- A major weakness of the UNC-CH UNC Asheville proposal is the challenge to develop necessary research synergies and the intellectual infrastructure needed to deliver the research program envisioned.
- Other potential research partnerships/collaborations with UNC Asheville faculty are under defined or undefined; as few as 1-2 pharmacy faculty would be involved in natural products research, although collaboration could also engage Chapel Hill based faculty.
- Would be challenging for the UNC Asheville science faculty to have the similar research outcomes as their counterparts at UNC-CH. This may lead to inequities and promotion and tenure issues.

Economic Impact

Strength

- Although the proposal did not detail the economic impact on the region, continued expansion and refinement of the nationally recognized Asheville Project, which demonstrated significant improvements in health outcomes and lower overall health care costs, could continue to inform the health care delivery model and have a positive impact across the state and nation.

Underserved Representation (citizens, regions, students)

Strength

- The expansion will serve the rural western (Asheville) and eastern (Elizabeth City) part of the state, but would increase ethnic and racial diversity only if Elizabeth City enrollment and support is expanded.

Proposed New Research Oriented School of Pharmacy at UNC Greensboro

Pharmacy Manpower Needs: Regional and Statewide

Strength

- The UNC Greensboro program will create increased numbers of clinically trained pharmacists to fill stated needs of Moses Cone, Wake Forest and others for clinical specialists; however no comprehensive data was provided to support shortages in community practice that cannot be met by current supply of in state graduates or through importation from other schools.

Weaknesses

- Although pharmacist workforce data may be outdated, the AHEC data for the central region report a range of 9.4-12.5 pharmacists/10,000 compared to a ratio of 8.9-9.0 pharmacists/10,000 in the western AHEC regions of the state.
- The team noted the absence of any discussions or reference to linkages or interaction with independent or chain community pharmacies in the written materials or during the site visit and feels that a comprehensive pharmacy program must address patient oriented pharmacy practice in all practice settings.
- A new school of pharmacy at UNC-G (Guilford County) does not adequately address regional needs, particularly in light of pharmacist supply and state budget exigencies. It would place a relatively “large school” within a 60 mile radius of UNC-CH.
- While the team sees synergy in research and potential for expansion of strong clinical pharmacy at Moses Cone and Wake Forest, the proposed UNC-G model does not allow the UNC system to leverage the incredible strengths in Pharmacy existing at UNC-CH, nor optimize their new investments in these very tight budget times for the benefit of the entire state.
- Elon, a closely located private university could potentially develop a pharmacy program without significant new state expenditure for facilities and recurring operating funds. However, private schools generally have significantly higher tuition, do not provide the same opportunities for increasing racial diversity, and generally have very limited research opportunities.

Quality/Role of the Program

Strength

- UNC Greensboro has the potential to support a strong research-based pharmacy program. They understand tenurable, externally supported research and would create a stronger program than most private schools of pharmacy. The clinical training sites at Wake-Forest and Moses Cone are superb and the fact that the chief medical officers at both places are committed to inter-professional education of physicians and pharmacists would add significant strength to the educational opportunities and the care model.

Weaknesses

- As with all new schools of pharmacy (or expansion); it will be extremely challenging to recruit a strong faculty without recruitment from their sister institute (UNC-CH). In addition, there will be a need to establish a number of new community and inpatient experiential education/training

sites and recruit high quality preceptors in the central region, which may also impact UNC-CH established preceptor sites.

- There was no discussion or emphasis on establishing community preceptor sites within the Triad region. There was no representation of independent or chain community pharmacy partners at the meetings.

Costs

Strengths

- The UNC-G proposal includes a letter of commitment from the Weaver Foundation stating that this group would donate the land as an off campus site for the new school of pharmacy (\$1-2M) Community representatives professed a strong commitment to assisting in fund raising and developing creative financing to get the project started.
- Guilford Technical College indicated strong interest in linking with a new pharmacy program and perhaps co locating in a new facility.

Weaknesses

- A building is proposed to house the new school of pharmacy at an estimated cost of \$50-70M Since UNC is reportedly unable to acquire significant bonding authority in the foreseeable future, the business model to fund this new facility needs much better definition. The commitment of the business community and the foundations is impressive but specific plans are needed.
- The proposal estimates approximately \$12M in faculty, staff and operating costs over a 5-6 year period.
- The costs of starting a new school (building, faculty, staff, preceptors, etc.) during this economic climate may not be prudent in a system that currently has an outstanding program in close proximity.
- Major hospitals in the region that now support clinical education for UNC-CH would consider reducing clerkship availability for UNC-CH and Campbell students, which could negatively impact UNC-CH's ability to educate students in the region and result in no net increase in trainees in the Triad region. (This would also be true if Elon University started a school of pharmacy.)

Infrastructure/Building/Preceptors

Strengths

- The UNC-G proposal presents a number of Health System partners (Moses Cone Health and Wake Forest) to support the new school in terms of preceptor sites and/or residency experiences. (Some of the sites are presently UNC-CH sites, so overall capacity will become an issue.)

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- Administrative and medical leaders at the Wake Forrest School of Medicine and hospital were extremely enthusiastic about partnering with the new school to support inter-professional education and other relevant synergies.
- Both programs expressed willingness to examine co-funded positions for on-site faculty.

Weaknesses

- The ability to recruit up to 39 new faculty of the quality needed to insure a strong program is problematic in this era of rapidly expanding pharmacy schools and the graying of the senior faculty across the country.
- Significant time will be needed to develop and sell a strong plan to finance the construction/purchase of the building.

Meeting the Research Mission

Strengths

- Strong research programs exist among various schools (Chemistry/Biochem Program; Center for Biotechnology and Genomics/Health Research) and programs at UNC-G, e.g. the Medicinal Biochemistry program has attracted 18 graduate students in two years and several faculty have a strong track record of NIH support with the potential for more.
- As a part of the campus strategic plan, UNC-G is committed to growing its research infrastructure and external funding and UNC-G administrators and faculty clearly value a strong research culture consistent with criteria established at UNC-CH.

Weaknesses

- Although the goals in research are well articulated in the UNC Greensboro Strategic Plan existing critical mass and record of strong extramural research funding is lacking in pharmaceutical science disciplines beyond Medicinal Chemistry. A strong case could be made for an integrated research/graduate program in selected disciplines with UNC-CH which would cost far less and be much more competitive for attracting future faculty, strong graduate students, extramural funding leading to the generation of new commercializable technologies.

Economic Impact

Strengths

- The proposal states that the economic impact would be derived from a school of pharmacy in Greensboro initially due to the construction, and subsequently as a result of a functioning school with faculty, staff and students contributing to the economy in the region.
- Representatives of Economic Development and business community envision synergy with existing industry strengths and make a strong case that the school will become a magnet for attracting new companies in selected industry clusters to the Triad region.

Underserved Representation (citizens, regions, students)**Strength**

- There is a strong commitment, particularly linked to the vision and mission of UNC-AT to identify, mentor and help direct underrepresented minority students into the program, with slots reserved for sister feeder schools with higher numbers of under-represented minorities

Weakness

- A major weakness is that the school will be producing more pharmacists in an area that has one of the highest number per population of pharmacists. The proposal does not address underserved areas nor did the meetings articulate a vision consistent with expanding the number of pharmacists in either western or north eastern areas.

GENERAL OBSERVATIONS

The University of North Carolina is faced with some unique challenges and opportunities with these two proposals, both focused on pharmacy education expansion. Clearly, since the previous SHEP study was completed in 2002-03, the workforce landscape has changed for pharmacists and the future is far from clear. A number of key factors create this uncertainty; including (1) the effect that numerous new schools of pharmacy across the country and the southeast region will have on current employment opportunities; (2) the continued expansion on the numbers and role of pharmacy support personnel; (3) the increasing reliance on automation and robotics as a way to handle prescription volume and reduce personnel costs; and perhaps most importantly, (4) the uncertainty of the health care reimbursement system with regard to creating a revenue stream to compensate pharmacists for patient care services, which is the primary focus of our current Pharm.D programs. While there will always be “shortages” of health care workers in selected geographical and economically disadvantaged areas, most would argue that today the supply and demand nationally are in balance, if not already overcorrected as a result of the rapid expansion in the number of new pharmacy schools and increased class sizes in many established programs. Looking into the future the visiting team agrees that future pharmacists must provide value added in patient care in all practice settings, and that others not necessarily receiving the Pharm.D. degree will increasingly provide the dispensing needs for pharmaceuticals. Given the aging of the US population it is also clear that our educational programs must prepare pharmacists to work effectively with others in the health care team and manage drug therapy in very complex patients, which will require excellence in faculty and experiential training capacity. Any expansion today, particularly in the Public University Sector, needs to be done carefully, to not only avoid creating a surplus of graduates who may be unemployable or underemployed, but also to allow universities to optimize their investments for the benefit of the institution and the state. The School of Pharmacy at UNC-CH has an exceptional faculty and is a nationally recognized leader in forward looking clinical education and, with the Elizabeth City satellite, has clearly demonstrated the ability to maintain quality and increase diversity through sophisticated, interactive distance learning. This not only serves the people of North Carolina well, but reduces the need for major long term capital and operational investment, which may prove to be unnecessary as the future of health care plays out. Building on this great strength seems particularly prudent in this era of severe fiscal constraints.

Equally important to a top tier research University is the ability to continue to enhance research, be a partner in economic development and address important problems facing the state and nation. The existing research programs at UNC-CH are among the nation’s elite in the areas of Health Policy and

Outcomes research, clinical pharmaceutical sciences and drug development, and they are well integrated into other strong programs on the campus including the molecular medicine/genomics, public health and the CTSA. The school has also developed very strong linkages with pharmaceutical industry partners in the Triangle area and beyond. In this vein the visiting team identified a unique opportunity in research and economic development related to the UNC-G strengths in Medicinal Biochemistry, and nanotechnology and could envision synergy by meaningful collaborative research and graduate programs between UNC-CH, UNC-G and UNC-AT as well as additional interaction and expansion of activity with the Pharmaceutical, Medical, Biotechnology industry clusters that exist in the Triad region as well as in RTP. Given the proximity of these two thriving areas this could position the University to create a dominant region in this important industry sector that has great potential to benefit the Universities and the State.

RECOMMENDATIONS

1. Recommend moving forward with establishing a UNC Asheville satellite program given the long history of their successful partnership and forward looking pharmacy education and service models.* The proposed plan is not only financially responsible but provides the opportunity to increase the pharmacist supply in an underserved area with the same level of quality associated with the existing UNC program in CH and Elizabeth City. The team is concerned about the viability of creating a basic science faculty cohort comparable to the standards for tenure track faculty at UNC-CH and recommends that the University consider only placing full time clinical and practice based faculty initially, and then subsequently examining the feasibility of adding faculty with possible research focus and ties to UNC Asheville programs in translational sciences, health care delivery and outcomes research. Possible links to the UNC Asheville Health and Wellness Program and the Bent Institute also provide very exciting collaborative research linkages as well. One approach would be to examine the feasibility of establishing a 2 + 2 satellite program, where students would matriculate on the UNC-CH campus their first two years and then finish their program in Asheville. To take full advantage of all this site has to offer these additional students should be selected based on their commitment to returning to Western North Carolina to complete their program and practice pharmacy.
2. Consider adding on-site faculty as preceptors and mentors and expanding the student cohort at the Elizabeth City Program to enhance the statewide pharmacy education commitment to diversity and respond to the potential supply needs of pharmacists for the Northeastern region.
3. Explore joint pharmaceutical sciences graduate/research programs between UNC-G, UNC-AT and UNC-CH that identify and build unique strengths for UNC-G, e.g. biotechnology, nanotechnology, linkage with genomics, clinical research, translational research. Explore the concept of an institute for Drug Discovery/Development with a physical presence on both UNC-CH and UNC-G campuses, with linkage to the Kanapolis Campus and increased ties to relevant industry partners in both RTP and the Triad region. Such a program would continue to enhance collaboration across the state and leverage assets such as currently being accomplished through the the North Carolina Chemical Biology Center, a NIH funded collaboration between faculty in the UNC-CH School of Pharmacy and North Carolina Central University's Biomanufacturing Research Institute and Technology Enterprise in Durham focused on cancer drug discovery.

4. Capitalize on the expressed interest from Medical and Hospital Administrators at Wake Forest and Moses Cone Hospitals to increase pharmacy and inter-professional education collaboration with UNC pharmacy. Explore the opportunities' to add jointly appointed clinical faculty to both locations for purposes of expanding quality educational sites but also enhancing health care delivery through team development.
5. Reevaluate the pharmacist workforce in the Central region in two years and, if a compelling case can be made for an additional pharmacy program in Greensboro, consider creating a full four year pharmacy program as a joint venture between UNC-G and UNC-CH so that the program would utilize UNC-CH's curriculum and distance delivery methodology to create an efficient, effective, high quality program.

*** The visiting team was advised as we were finalizing this report of the recently announced commitment by Wingate University to establish a program in Asheville/Hendersonville which will impact this consideration. It is unlikely that both an expanded UNC-CH program and a Wingate program are needed and would have sufficient clinical sites for training. We believe the UNC-CH expansion would better serve the needs of the citizens of the region for a high quality, lower cost, accessible pharmacy program based on the highly regarded pharmacy practice and education model at UNC-CH. This decision may be impacted as well by the status of Wingate's discussions regarding affiliation agreements with hospitals, health systems and other practice sites in the Asheville area. The team was impressed with the Asheville Health Care and business community's commitment to UNC-CH clinical education and practice development model.**

March 30, 2010

APPENDIX 2

Trends in the Supply of Pharmacists in North Carolina

March 2010

Quick Facts, 2008

Number of Pharmacists in NC:

8,578

Pharmacists per 10,000 Population

North Carolina: 9.3

United States: 8.0

Average age of NC Pharmacists:

43 years, total

48 years, male

39 years, female

Average hours worked per week:

37 hours, total

39 hours, male

36 hours, female

From 2003-2008, relative to population:

69 counties gained pharmacists

29 counties lost pharmacists

2 counties had no pharmacists either year

North Carolina Health Professions Data System

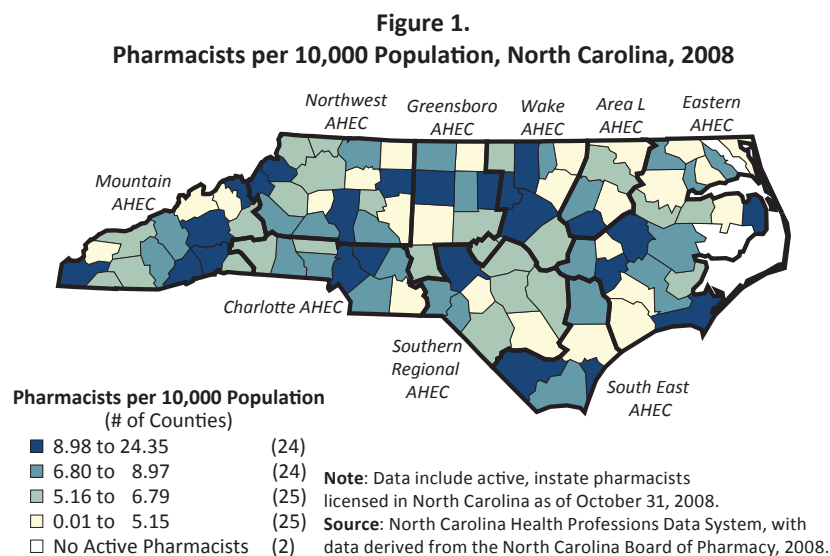
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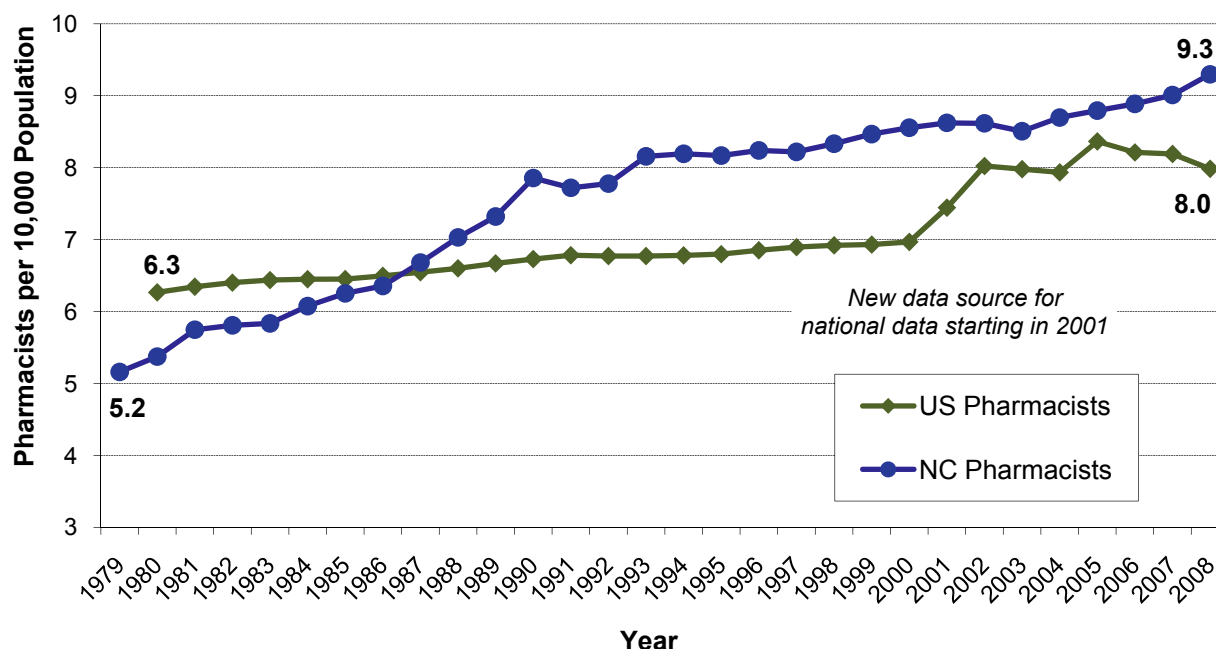
Workforce Supply

There were 8,578 pharmacists in active practice in North Carolina as of October 2008, or 9.3 per 10,000 residents. The ratio of pharmacists to population is a good indicator for comparisons with national and other state rates, and to track trends over time. The distribution of pharmacists varies across counties; Durham had the highest number of pharmacists relative to population (24.3) and two counties, Hyde and Camden, did not have an active pharmacist (Figure 1).



Comparisons to national benchmarks provide another metric by which to measure North Carolina's supply. Due to differences in national and state data sources and methodologies, specific comparisons between United States (US) and North Carolina practitioner-to-population ratios for any year should be interpreted with caution. Since 1987, North Carolina's supply of pharmacists relative to population has exceeded the national ratio, and in the last four years the state's supply has grown against population while the ratio has fallen for the nation (Figure 2).

**Figure 2. Pharmacists per 10,000 Population
US and NC, 1979-2008**



Sources: North Carolina Health Professions Data System, 1979 to 2008; HRSA, Bureau of Health Professions; US Census Bureau; North Carolina Office of State Planning. Figures include all licensed, active, instate pharmacists. Population data are smoothed figures based on 1980, 1990 and 2000 Censuses.

Each year, the North Carolina Health Professions Data System (HPDS) receives a file from the North Carolina Board of Pharmacy containing information on pharmacists licensed to practice in the state in that year. Comparison of these files from year-to-year is useful because it reveals, on an annual basis, the flow of pharmacists into and out of active practice. **Figure 3** shows that there is a dynamic gain and loss every year, where approximately 16% of the workforce either enters or exits active practice. Of the pharmacists added to the workforce in 2008, 554 were newly licensed in North Carolina, and 316 were previously licensed and moved from inactive to active practice or out-of-state to in-state status. The net gain from 2007-2008 was significantly higher than the previous two years.

Figure 3. Components of Change

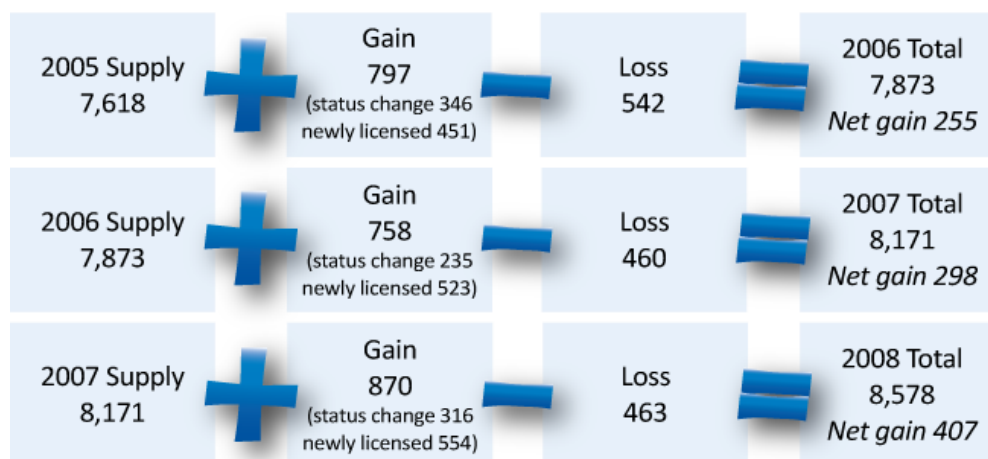
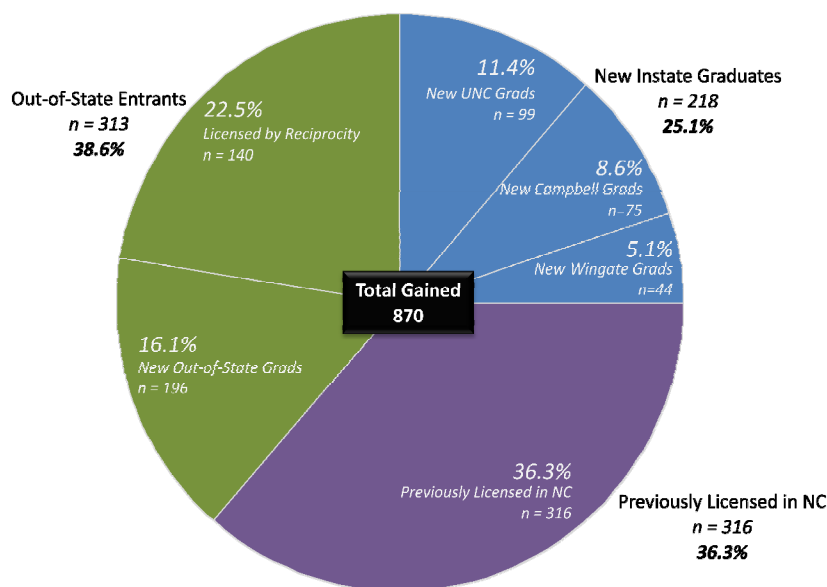


Figure 4 shows additional detail about the pharmacists gained in 2008. Of the 870 new pharmacists in North Carolina, 25.1% were new graduates of North Carolina schools of pharmacy, 36.1% came from out-of-state, including new graduates and pharmacists licensed by reciprocity, and 36.3% previously held a license in North Carolina and were not practicing in the state in 2007. North Carolina imported nearly as many new graduates from other states as we produced, and more than one in three pharmacists gained was from out-of-state.

Figure 4. Gain in Pharmacists, 2008



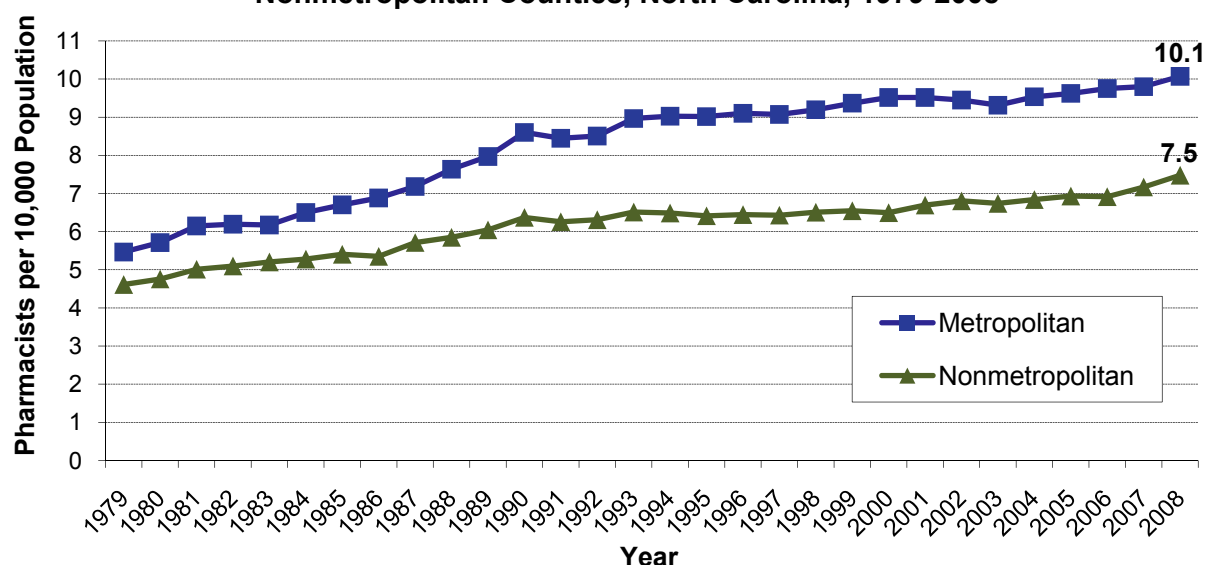
Distribution

Although North Carolina's supply of pharmacists relative to population exceeds the national average, there are differences in the way the workforce is distributed among counties. **Figure 5** depicts the ratio of pharmacists per population in metropolitan and nonmetropolitan counties in North Carolina, and shows a recent uptick in supply in nonmetropolitan counties. In 2008, there were 10.1 pharmacists per 10,000 people in metropolitan counties, while non-metropolitan counties had 7.5. This gap has remained fairly consistent since 1979.

Figure 6 paints a slightly different picture, showing pharmacists per 10,000 population by persistent Health Professional Shortage Area (PHPSA) designation¹ (see Appendix A for map). There is no shortage designation specifically for pharmacists, so primary care HPSAs are used here as a proxy. The data in Figure 6 indicate that, although overall supply has increased, the supply in whole county PHPSAs has not generally improved, while supply in part-county HPSAs and counties not designated as HPSAs has grown.

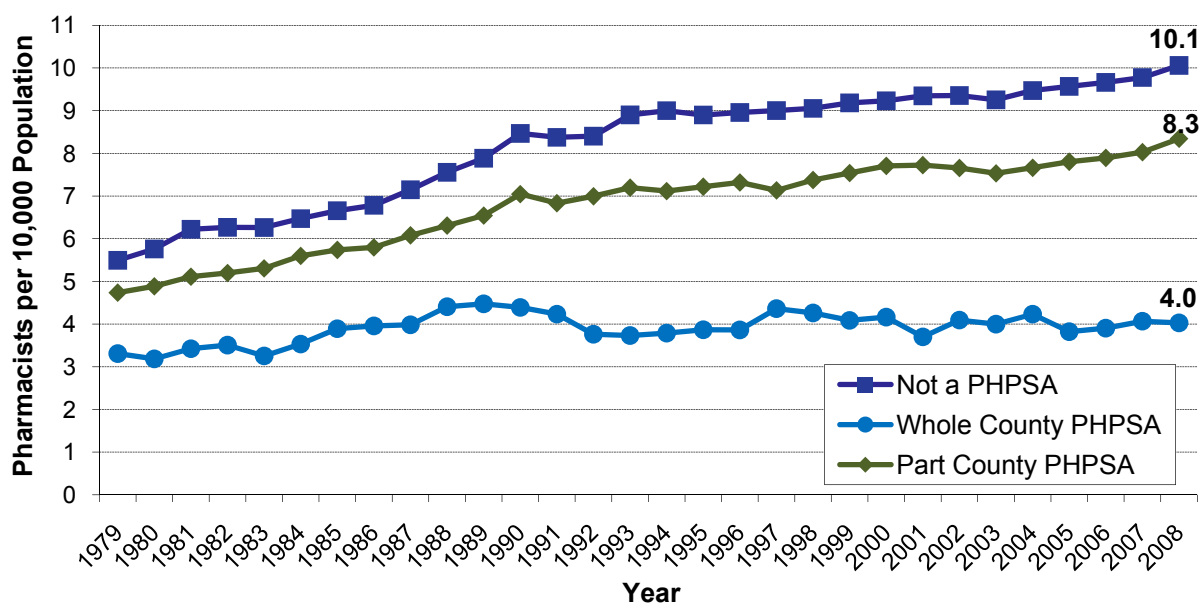
¹ HPSAs are federally designated by the Health Resources and Services Administration (HRSA); designation is generally given to areas with an inadequate number of primary care health professionals or whose population has unusually high needs for primary medical services or face increased barriers to accessing primary care services. Persistent HPSAs are defined by the Sheps Center as counties defined as HPSAs by HRSA from 1999-2005, or in 6 of the last 7 releases of HPSA definitions.

Figure 5. Pharmacists per 10,000 Population by Metropolitan and Nonmetropolitan Counties, North Carolina, 1979-2008



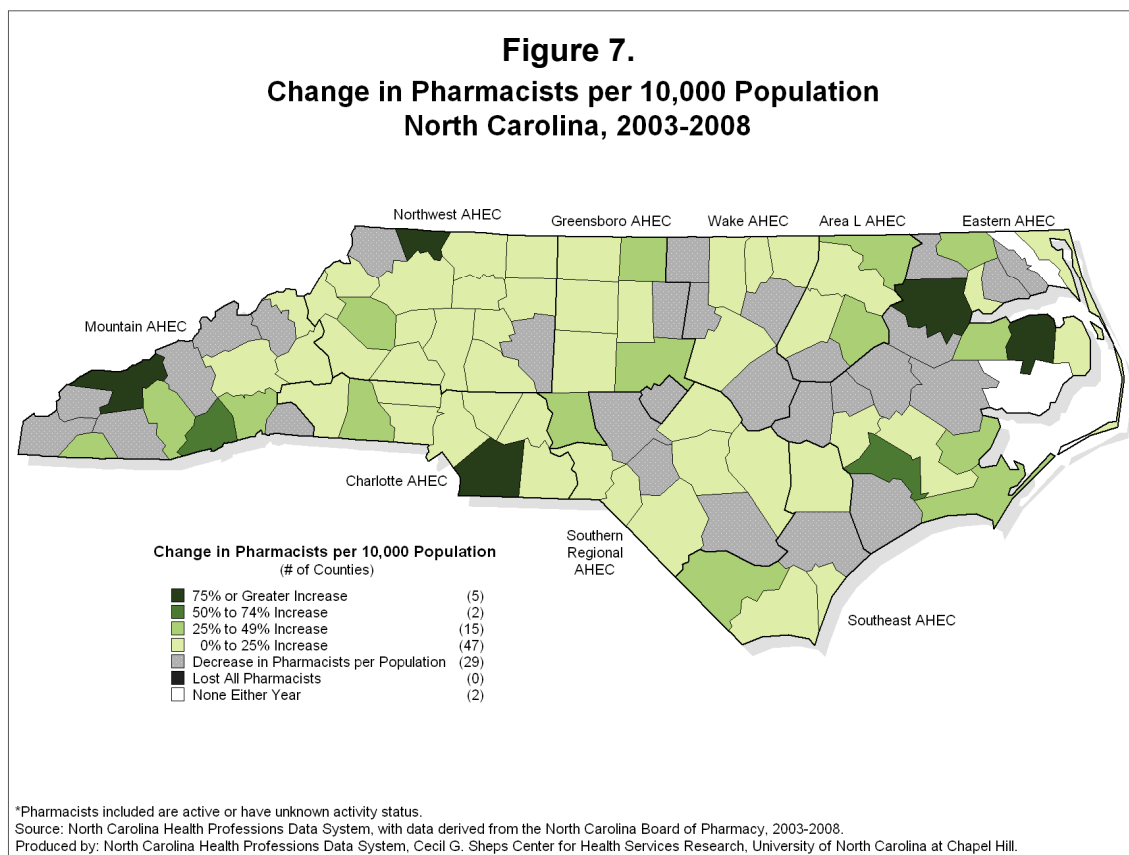
Sources: North Carolina Health Professions Data System, 1979 to 2008; North Carolina Office of State Planning. Figures include all licensed, active, in-state pharmacists. North Carolina population data are smoothed figures based on 1980, 1990 and 2000 Censuses. Source for Metropolitan-Nonmetropolitan definition: Office of Management and Budget, 2006.

Figure 6. Pharmacists per 10,000 Population by Persistent Health Professional Shortage Area (PHPSA) Status North Carolina, 1979 to 2008



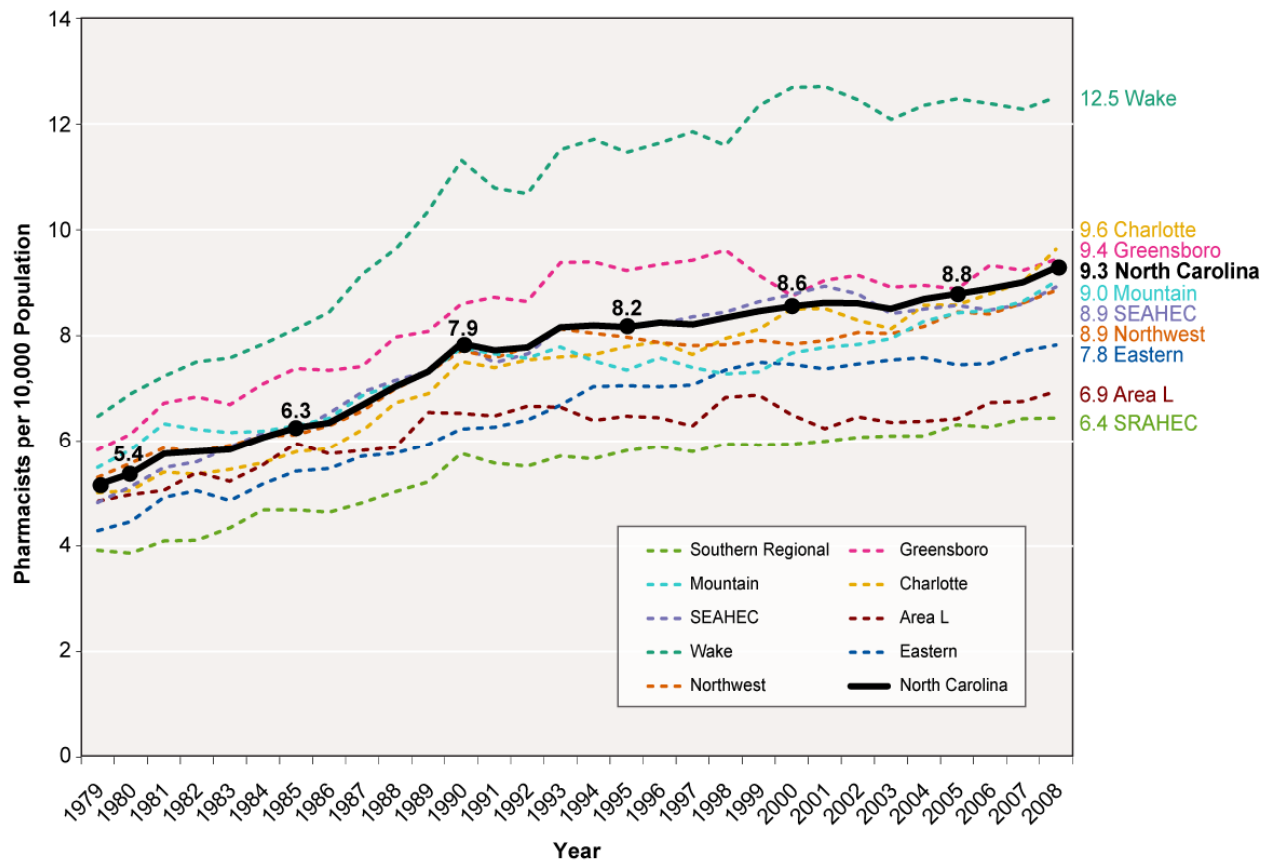
Sources: North Carolina Health Professions Data System, 1979 to 2008; North Carolina Office of State Planning. Figures include all licensed, active, in-state pharmacists. North Carolina population data are smoothed figures based on 1980, 1990 and 2000 Censuses. Source for Health Professional Shortage Areas: Area Resource File, HRSA, Department of Health and Human Services, 2006. Persistent HPSAs are those designated as HPSAs by HRSA from 1999 through 2005, or in 6 of the last 7 releases of HPSA definitions.

Illustrating whether or not the supply of pharmacists in individual counties is keeping pace with population, **Figure 7** shows the change in supply of pharmacists per 10,000 population between 1998 and 2008. Supply grew more rapidly than population in 68 counties. Of the counties that saw a decrease in the ratio of pharmacists per population, sixteen gained pharmacists and five had no change in the number of pharmacists, but growth in population outpaced the gain in pharmacists. One county, Hyde, lost both of its pharmacists in 2001.



In addition to metropolitan and PHPSA designations, it is useful to examine regional variation. There are nine Area Health Education Centers (AHEC) regions in North Carolina, as shown by bold outlines in Figures 1 and 7. The data in **Figure 8** show pronounced disparities in the supply of pharmacists per population by AHEC region from 1979-2008. Wake AHEC, in which Raleigh is located, had 12.5 pharmacists per 10,000 population in 2008, and is consistently much higher than other regions and the state average. Area L, Southern Regional, and Eastern AHECs have the fewest pharmacists per 10,000 population. Charlotte AHEC saw a spike in their ratio from 2007 to 2008, due in part to the 2007 graduation of Wingate's first class of pharmacy students.

Figure 8.
Pharmacists per 10,000 Population by AHEC Region
North Carolina, 1979-2008

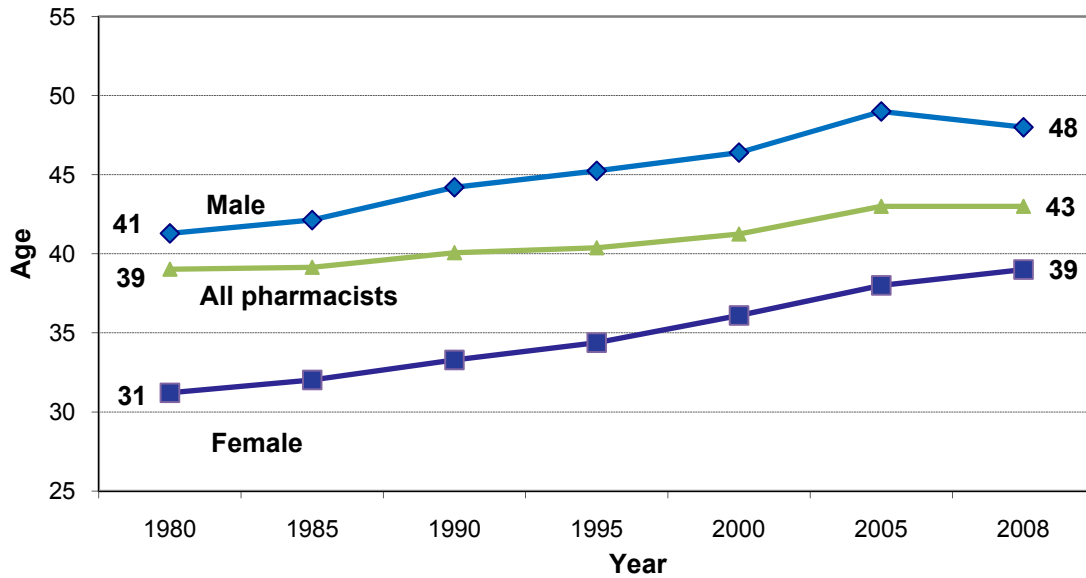


Note: Data include active, in-state pharmacists licensed in North Carolina as of October 31 of the respective year. In 1998, Rutherford county was reassigned from Charlotte AHEC to Mountain AHEC.
Sources: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with data derived from the North Carolina Board of Pharmacy; North Carolina State Data Center.

Workforce Demographic Characteristics

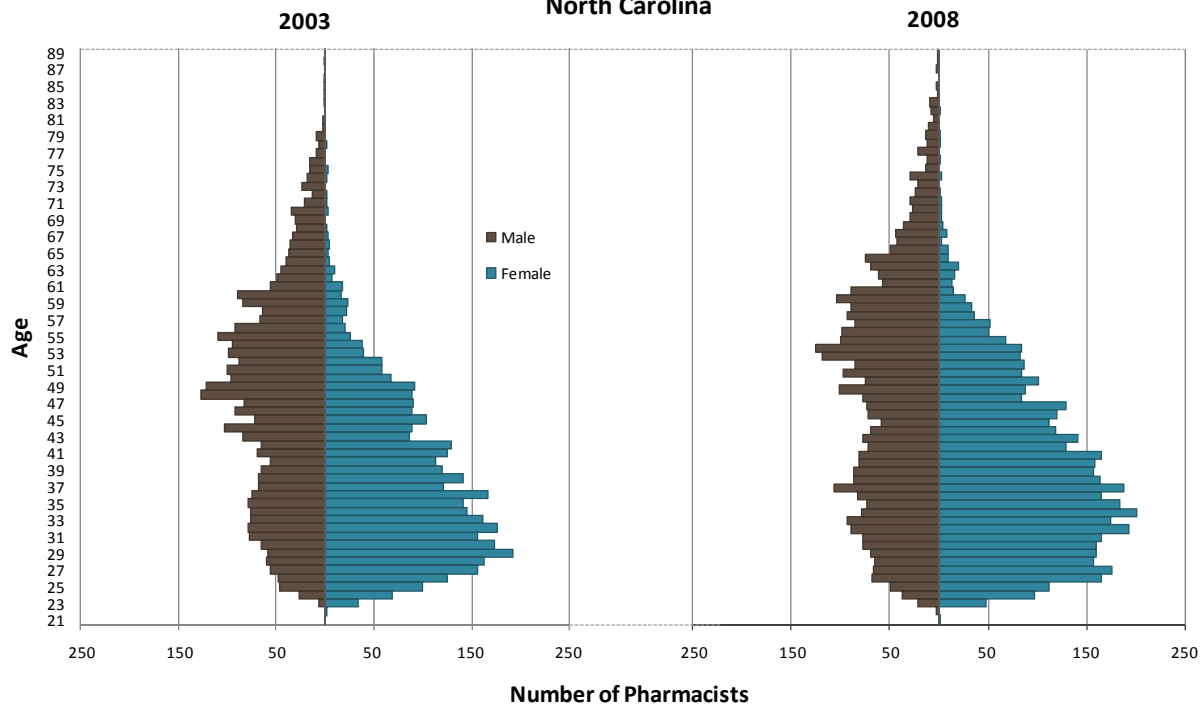
The average age of pharmacists in North Carolina has grown from 39 years in 1980 to 43 years in 2008 (**Figure 9**). The female workforce, younger than male pharmacists by an average of nine years, continues to age steadily. The average age of men has decreased slightly in the most recent data. The overall increase in the average age of the workforce might partially be attributed to the move to the PharmD, and the longer training period associated with this degree.

Figure 9. Average Age of Active Licensed Pharmacists in North Carolina by Sex, 1980-2008



The age-gender pyramids in **Figure 10** show a growing cohort of young pharmacists between 2003-2008, the majority of which are female. This widening base suggests a good future supply of pharmacists in the state.

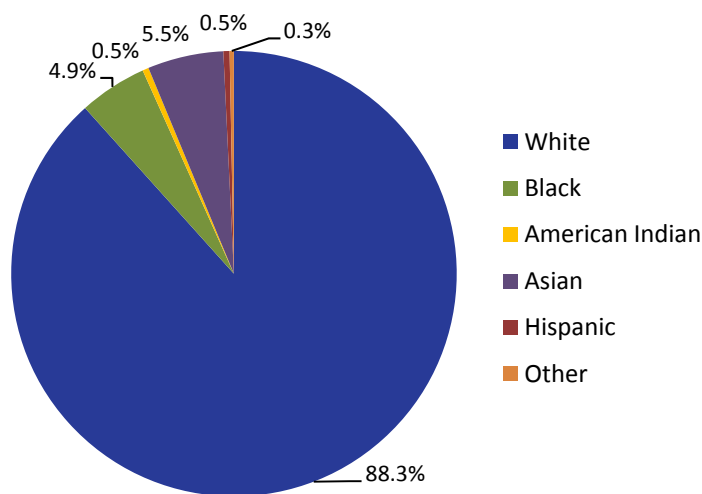
Figure 10. Age-Gender Pyramids, Pharmacists North Carolina



Note: Data include active, instate pharmacists licensed in North Carolina as of October 31 of the respective year. There were 5 pharmacists missing age information in 2008.
Source: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy.

Figure 11 shows that the North Carolina pharmacist workforce is predominately white (88.3%). Currently, only about 12% of North Carolina pharmacists are nonwhite, compared to 26% of North Carolina's total population. Although the makeup of the North Carolina pharmacist workforce does not match the racial and ethnic makeup of the general population, pharmacist diversity in North Carolina has shown improvement, with the proportion of nonwhite pharmacists growing from 3% of the workforce in 1980, to 6% in 2000, and 12% in 2008.

Figure 11. Racial Composition of Active Pharmacists, North Carolina, 2008



Workforce Practice Characteristics

In 2008, the majority of North Carolina pharmacists worked for a chain pharmacy, (37.7%), hospital (24.1%) or independent pharmacy (16.1%) (**Figure 12**). While retail chains have grown rapidly over the last few decades, the distribution of pharmacists by employment setting has remained relatively unchanged. From 1998 to 2008, there was a slight decrease (-0.7%) in the percentage of pharmacists working in retail pharmacies and a 2% increase in the number of pharmacists employed by hospitals. The number of pharmacists working for independent pharmacies has remained relatively consistent since 2000.

Figure 12. Employment Setting, 2008

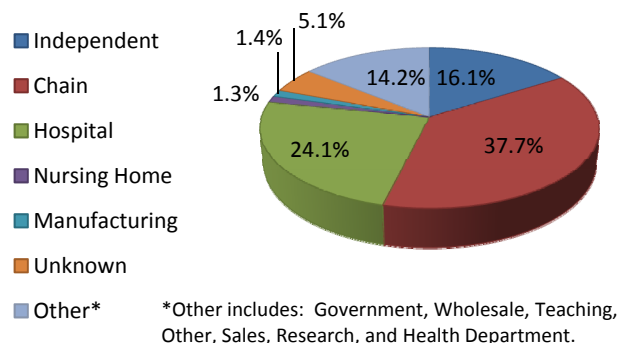
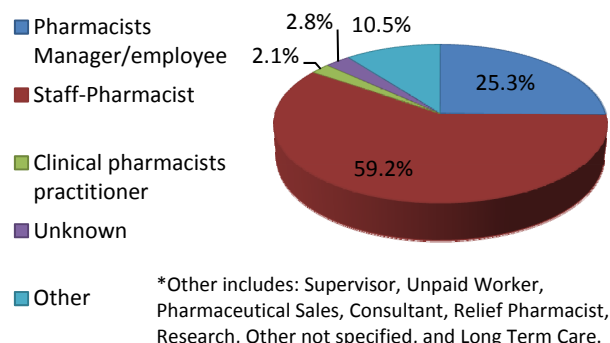
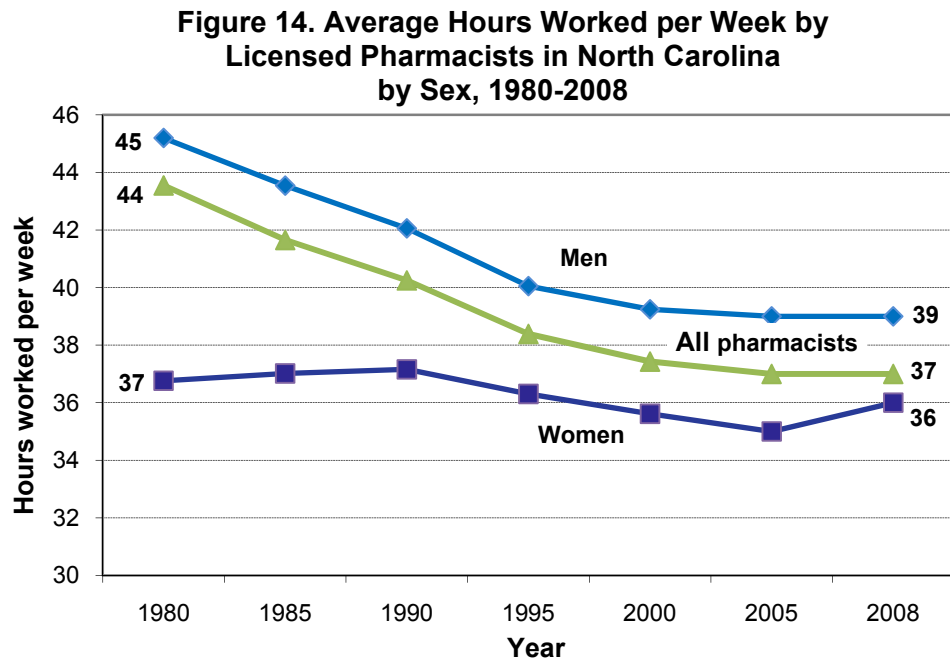


Figure 13 describes the form of employment, or type of position, that NC pharmacists hold. An overwhelming majority (59.2%) of the pharmacists in North Carolina report that they are staff pharmacists.

Figure 13. Form of Employment, 2008



North Carolina pharmacists worked an average of 37 hours in 2008. Since 1980, men have worked more hours on average than women, but this number has decreased from 45 hours per week in 1980 to 39 hours per week in 2008 (Figure 14). Women worked an average of 37 hours in 1980 and 36 hours in 2008, working slightly longer hours from 2005 to 2008.



Note: Hours were not available for 263 women and 181 men.
Source: North Carolina Health Professions Data System with data derived from the NC Board of Pharmacy, 2010.

Training Characteristics

The majority of pharmacists (58.3%) practicing in North Carolina in 2008 graduated from a North Carolina school of pharmacy (Table 1). The data also reveal South Carolina, Pennsylvania, New York and other countries as top contributors to the North Carolina pharmacist workforce. Neighboring Georgia, as well as Florida, also ranked in the top ten school states, and Tennessee was lower on the list, contributing just 0.7% of all active pharmacists in North Carolina.

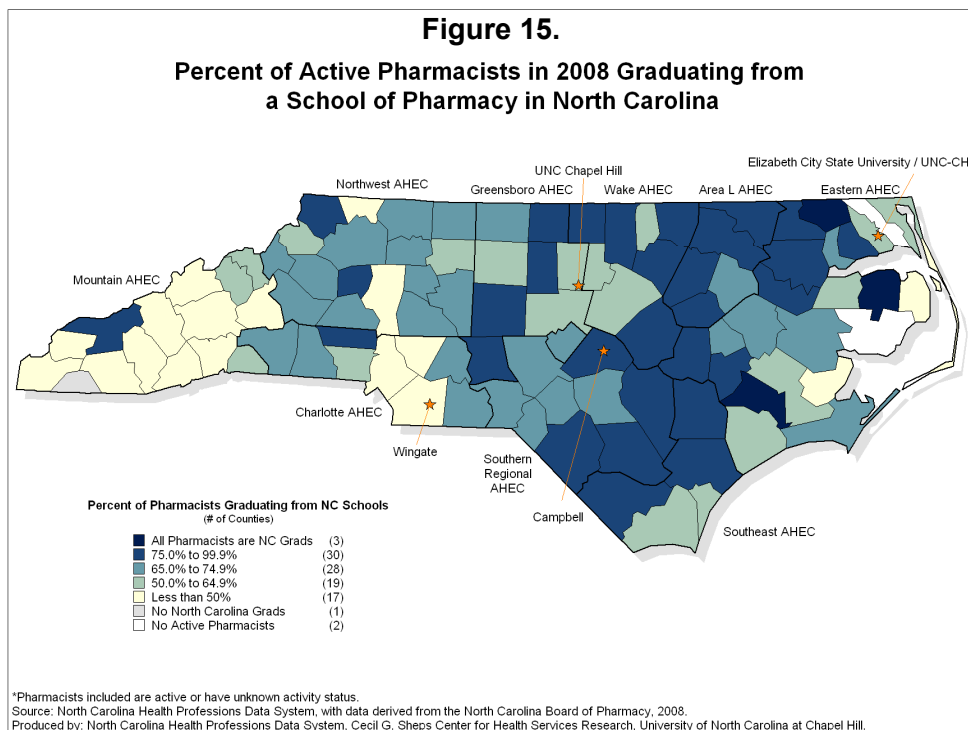
The distribution of North Carolina graduates as a percentage of the county-level workforce is shown in Figure 15. Less than 50% of the workforce in a large cluster of counties in the western part of the state graduated from a North Carolina program; in these counties, North Carolina graduates still accounted for the majority of pharmacists, but Georgia, South Carolina and Florida were also key contributors. Clay County, which didn't have any pharmacists trained in NC and is shaded gray in the map, had one pharmacist from Florida, five from Georgia, and one from Massachusetts. Figure 16 shows the data in a slightly different light, showing the proportion of pharmacists in each county that graduated from UNC, Campbell, Wingate, and outside of North Carolina.

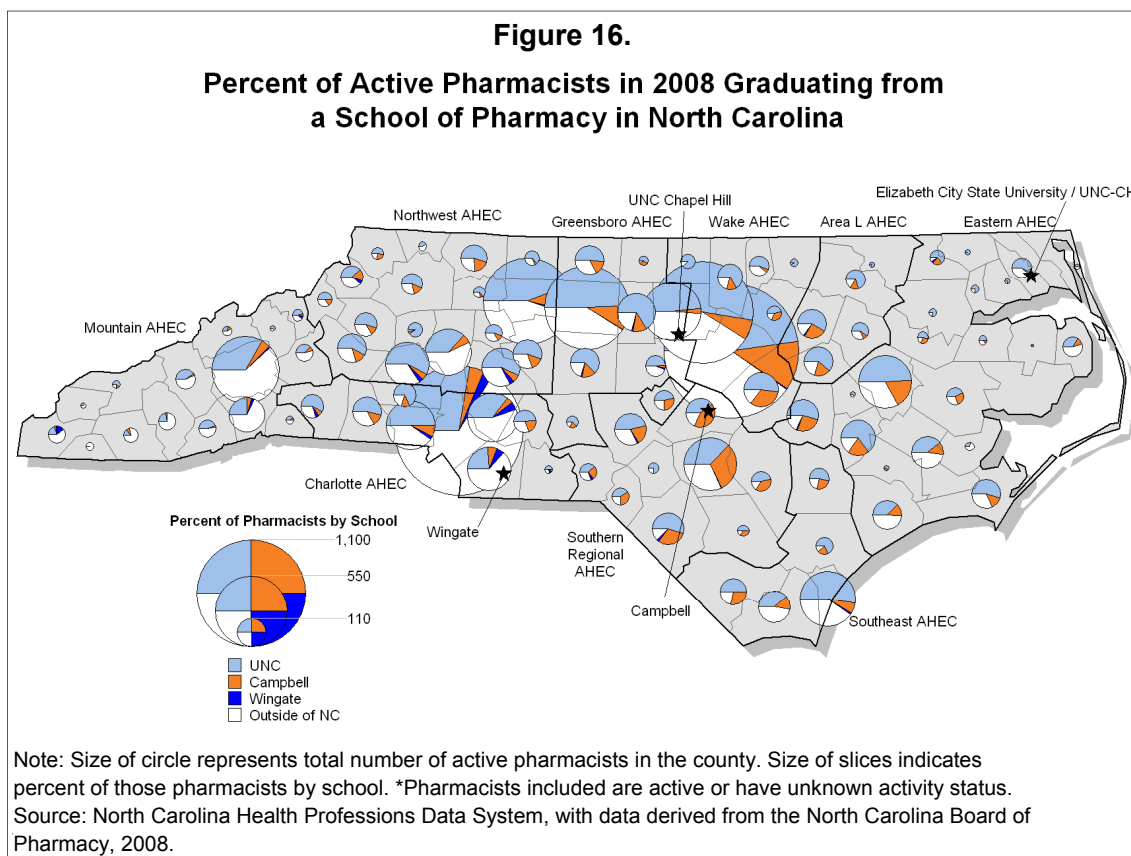
Of the new pharmacists practicing in North Carolina, new NC graduates (21.1%) were more likely to practice in nonmetropolitan counties than new graduates from other states (13.3%) or those licensed by reciprocity (15.0%). Pharmacists who were previously licensed in North Carolina (26.3%) were the most likely to practice in nonmetropolitan counties. There was not a significant difference in the likelihood of practicing in whole or part county HPSAs.

Table 1. Training Location of North Carolina Pharmacists Active in 2008

	School State	Number (Rank)	Percent of All Pharmacists	Percent of Pharmacists Trained Outside of NC
	North Carolina	5003 (1)	58.3%	--
	UNC Chapel Hill	3,967	46.3%	
	Campbell	948	11.1%	
	Wingate	88	1.0%	
Adjacent	South Carolina	443 (2)	5.2%	12.4%
	Georgia	256 (6)	3.0%	7.2%
	Virginia	190 (8)	2.2%	5.3%
	Tennessee	56 (16)	0.7%	1.6%
Region	Florida	158 (9)	1.8%	4.4%
	West Virginia	111 (11)	1.3%	3.1%
	Alabama	108 (12)	1.3%	3.0%
Other Top Contributors	Louisiana	69 (15)	0.8%	1.9%
	Pennsylvania	359 (3)	4.2%	10.0%
	New York	315 (4)	3.7%	8.8%
	International	264 (5)	3.1%	7.4%
	Ohio	220 (7)	2.6%	6.2%
	Massachusetts	129 (10)	1.5%	3.6%
	Michigan	95 (13)	1.1%	2.7%
	Indiana	93 (14)	1.1%	2.6%

Source: North Carolina Health Professions Data System with data derived from the North Carolina Board of Pharmacy. Data include active, instate pharmacists licensed in North Carolina as of October 31, 2008.





North Carolina Programs

North Carolina has three schools of pharmacy, including UNC-Chapel Hill (founded 1887), Campbell (established 1986), and Wingate (established 2002). UNC-Chapel Hill and Elizabeth City State University (ECSU) have a PharmD partnership that launched in the fall of 2005, and enrolls 10-15 students per year. Students spend the first three years at ECSU before enrolling in clinical practice experiences. They graduate with a doctor of pharmacy from UNC-Chapel Hill, with an acknowledgment of the partnership with ECSU.²

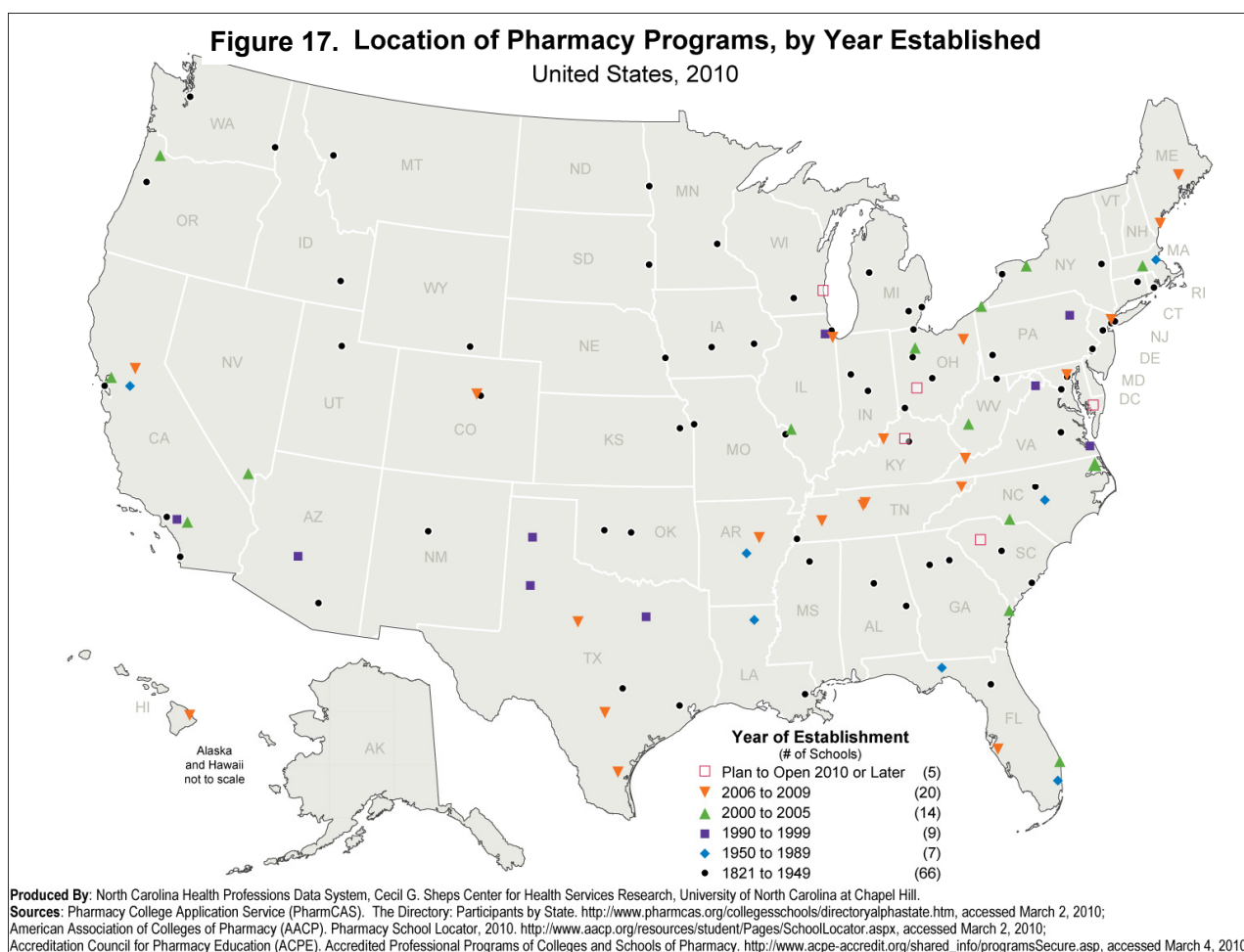
In 2009, UNC received 772 applications for 153 slots, Wingate received 1,132 applications for 76 slots, and Campbell received 1,744 applications for 108 slots. The number of applications for UNC and Wingate has fluctuated from year to year, and no steady increase or decrease is discernable. For Campbell, however, the number of applications doubled between 2003 and 2004, increased steadily through 2008, and declined by 17% in 2009. On average, UNC admits approximately 19% of applicants, and Campbell and Wingate, with greater numbers of applicants and fewer available seats, admit approximately 7.1% and 6.4% respectively.³

² <http://pharmacy.unc.edu/programs/the-pharmd/ecsu-partnership>

³ Data obtained through personal communication with representatives from UNC-Chapel Hill, Campbell, and Wingate.

Expansion of Pharmacy Education Programs

Several new US schools of pharmacy have recently opened or expanded, including some in North Carolina, and more are being developed. In 1986, the establishment of Campbell University School of Pharmacy marked the first new US school of pharmacy to open in 35 years.⁴ Wingate School of Pharmacy opened in 2002, graduated their first class in 2007, is increasing their class size to 90 upon completion of a new facility in 2011, and plans to expand to the Asheville/Hendersonville area in 2011, enrolling an additional 72 students.^{5,6} With the development of the UNC-ECSU PharmD Partnership in 2005, UNC saw an increase in the number of admissions. Four new schools are in development or have recently opened in Tennessee, Virginia opened one in 2008, and Presbyterian College in South Carolina is slated to open its doors in Fall 2010 (Figure 17).



⁴ <http://www.campbellpharmacy.net/academics/graduate/mspas/index.html>, accessed 2/25/10.

⁵ Data obtained through personal communication with representatives from Wingate (2/16/10).

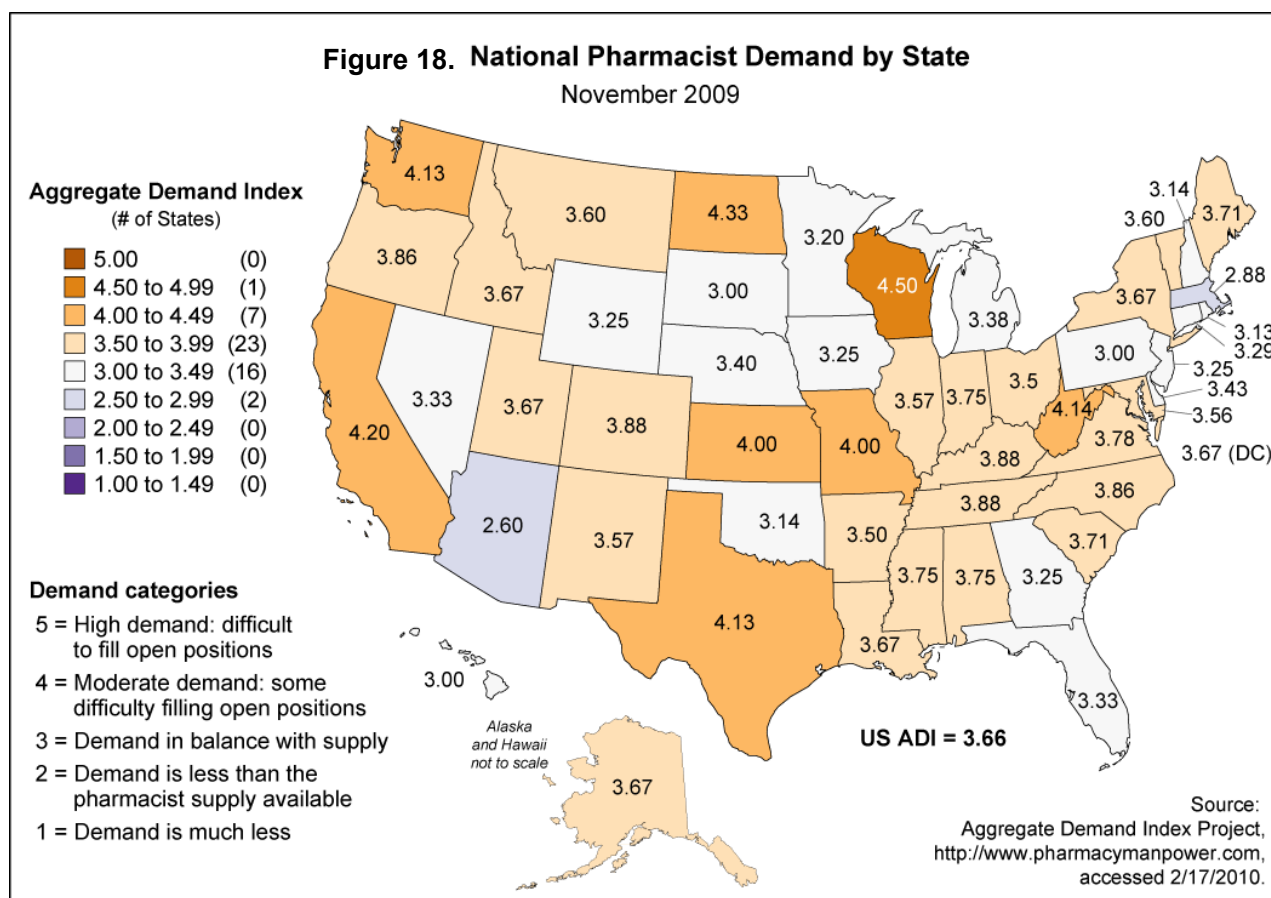
⁶ Wingate News. "Pharmacy program to expand to Western N.C." March 24, 2010. http://www.wingate.edu/calendar/news_details.asp?ID=5079, accessed 3/25/10.

Demand-Side Factors

Much is revealed about the supply of pharmacists from the licensure data, for instance, where they work, where they trained, how old they are, how many hours they work per week. What the licensure data don't reveal are demand-side indicators.

Aggregate Demand Index

At the national level, the Aggregate Demand Index (ADI) is a rough indicator of pharmacist demand. The ADI is based on monthly surveys from those involved in hiring pharmacists and seeks to gauge pharmacist supply at the national, regional and state levels. A continuous scale characterizes the level of need. In November 2009, the mean ADI for the US was 3.66, and was 3.86 for North Carolina; values between 3.0 and 3.9 indicate that demand is in balance with supply (**Figure 18**). From March 2009 to January 2010, the ADI for North Carolina went from 4.43 to 3.56. From January 2009 to January 2010, the ADI for the US went from 3.79 to 3.44.⁷



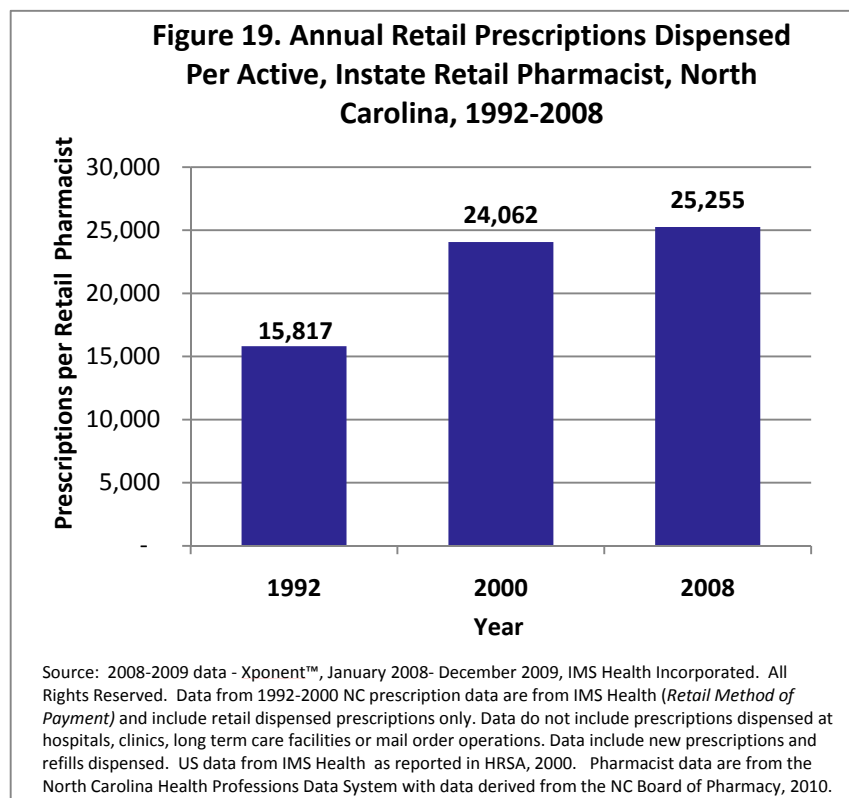
⁷ For more information on the Aggregate Demand Index and the Pharmacy Manpower Project, see <http://www.pharmacymanpower.com/>; visitors are cautioned that the data and information available through the website are for informational purposes only. Data cited in the text were obtained from the website's homepage and archived state-level maps; January data accessed 3/30/10, older data accessed 2/17/10.

Retail Prescriptions Dispensed

As the population grows and ages, demand for prescription medications generally increases. Data obtained from IMS Health⁸ allow for the calculation of the average number of retail prescriptions per person annually, and in conjunction with North Carolina licensure data, the average number of retail prescriptions filled per retail pharmacist.

The rate of growth for retail prescriptions filled relative to population has slowed. Between 1992 and 2000 there was a 76% increase in the number of prescriptions dispensed in retail settings in North Carolina (52.1 million to 91.8 million prescriptions),⁹ but between 2000 and 2008 there was only a 27% increase in prescriptions dispensed (91.8 million to 116.7 million prescriptions). Comparable data available for the US show a 44% growth in the number of retail prescriptions dispensed between 1992-1999, and 22% growth from 1999-2008.¹⁰

In 1992, retail pharmacists, on average, dispensed 15,817 prescriptions in a year, and in 2000, 24,062 prescriptions were dispensed,⁹ increasing by 52%. In 2008, this figure rose to 25,255, an increase of only 5% since 2000^{8,10}



(Figure 19). Perhaps a more tangible measure of pharmacist workload is the number of prescriptions filled per hour. Assuming that pharmacists, on average, work about 2,000 hours annually, North Carolina pharmacists filled about 12.0 prescriptions per hour in 2000 (or 144 per 12-hour day),⁹ and in 2008, they filled 13.0 prescriptions per hour (152 per 12-hour day)¹¹. However, the workload for retail pharmacists is not evenly distributed among the state, ranging from 1.3 prescriptions per hour (Gates county) to 39.8 prescriptions per hour (Orange county).

⁸ Prescription data for 2008 include total dispensed prescriptions from retail channels (chain, mass merchandiser, food store, independent pharmacies); Xponent™, January 2008-December 2008, IMS Health Incorporated. All Rights Reserved. See Data and Methodology section for additional information.

⁹ Fraher EP, Smith LM, Dyson S, Ricketts TC. August 2002. "Figure 17. Annual Retail Prescriptions Dispensed Per Retail Pharmacist, US and NC, 1991-2000" (pg. 35). In *The Pharmacist Workforce in North Carolina*. Cecil G. Sheps Center for Health Services Research.

¹⁰ US data were not available for the year 2000; instead, data for 1999 are used.

¹¹ Average hours worked per year is based on a 40 hour work week for 50 weeks per year, as used in Fraher EP, Smith LM, Dyson S, Ricketts TC. August 2002. *The Pharmacist Workforce in North Carolina*. Cecil G. Sheps Center for Health Services Research. See Data and Methodology section for additional information.

The map in **Figure 20** shows the average number of retail prescriptions filled per retail pharmacist per hour by North Carolina county in 2008. Due to small cell sizes and to protect confidentiality, data for Camden, Currituck, Hyde, and Yancey counties were omitted from the map.

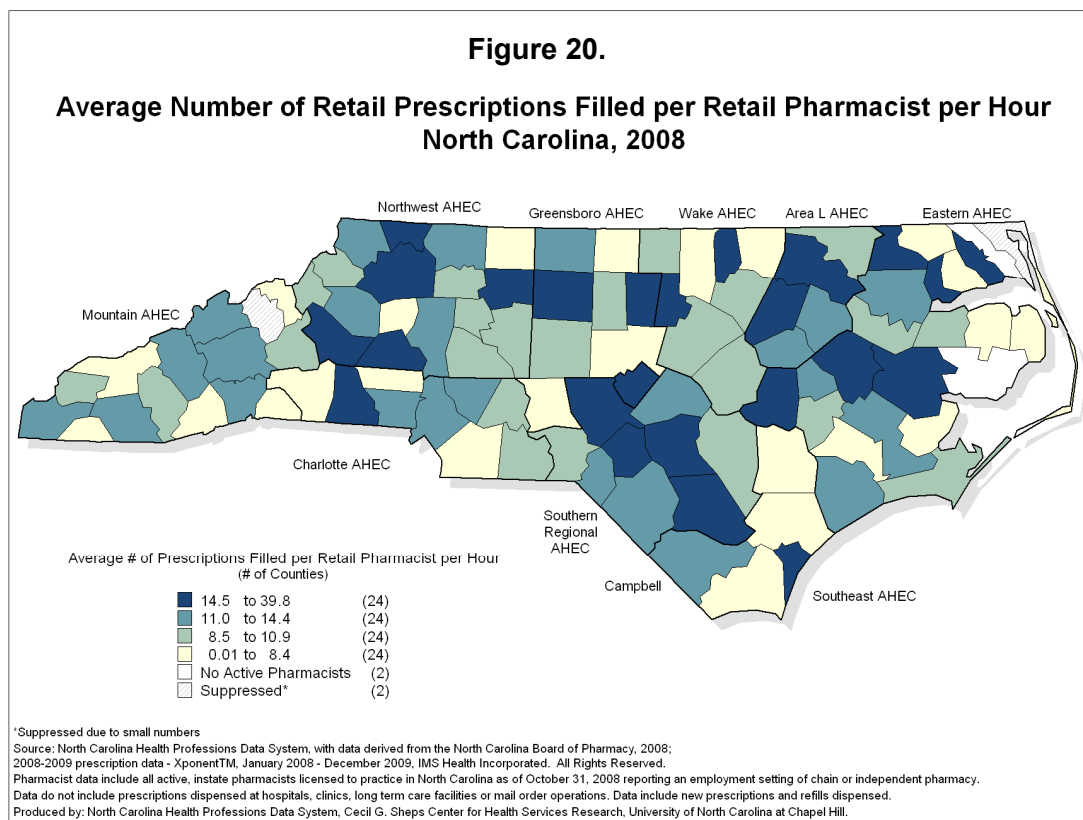


Table 2 describes the regional variation in average prescriptions filled per retail pharmacist per hour. On average in 2008, retail pharmacists in Mountain AHEC filled 11.3 prescriptions per hour, while retail pharmacists in Greensboro AHEC were filling 15.5 prescriptions per hour.

Table 2. Retail Pharmacists and Average Hourly Workload by AHEC Region, 2008

AHEC Region	Total Population	Number of Retail Pharmacists	Average Prescriptions Filled per Retail Pharmacist per Hour
Area L	301,094	136	14.4
Charlotte	1,701,378	945	11.6
Eastern	956,466	444	14.1
Greensboro	1,088,392	519	15.5
Mountain	714,325	406	11.3
Northwest	1,524,295	761	14.1
South East	455,190	267	12.4
Southern Regional	868,197	316	14.9
Wake	1,560,428	818	11.7
North Carolina	9,227,016	4,621	13.2

Source: Prescription data include total dispensed prescriptions from retail channels (chain, mass merchandiser, food store, independent pharmacies); Xponent™, January 2008- December 2008, IMS Health Incorporated. All Rights Reserved. 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, instate pharmacists licensed in North Carolina as of October 31, 2008, using average hours per week as reported by pharmacists at time of license renewal.

Hospital Workforce Surveys

Each year, the North Carolina Hospital Association (NCHA) surveys their member hospitals to collect data on the North Carolina hospital workforce. The following data were gathered from published reports and unpublished, preliminary data for 2009.¹²

Pharmacists and pharmacy technicians make up approximately 2% of all hospital workers in the state. Vacancy rates for hospital pharmacists hover near or above the vacancy rate for all hospital professions. Two factors that point to difficulties in hiring hospital workers are average days to fill vacant positions and cost to recruit for a position. On average, it takes over three months to recruit a pharmacist to a vacant hospital position, and from 2004-2008, pharmacists took the longest to recruit. Pharmacists are also one of the professions with the highest recruitment costs in North Carolina hospitals, where an average of \$11,325 was spent to recruit a pharmacist in 2004; that figure fluctuates from year to year, but rose to approximately \$18,000 in 2008, \$14,000 in 2009. In rural counties, it is more expensive and takes longer to recruit a pharmacist than in urban counties. In 2008 it cost \$1,000 more to recruit a pharmacist to hospitals in rural counties, and it took 63 days longer to fill a rural position.

¹² Fraher EP, McKethan A, Broome SJ, Haygood MK, Heilig KE. North Carolina Hospital Workforce Trends Analysis, 2004-2006. North Carolina Hospital Association. July 2008; Broome SJ. 2008 NCHA Workforce Report. North Carolina Hospital Association. April 2009; Preliminary 2009 hospital workforce data provided by Dr. Sarah Broome, Director of Economic Research, North Carolina Hospital Association, Cary, NC. Data based on the annual NCHA workforce survey for 2009. The survey had a response rate of 76%. Missing responses imputed based on total licensed beds.

Data and Methodology

Data on North Carolina pharmacists were analyzed by 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 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: 2010 (129th Edition)*, U.S. Census Bureau, Washington, DC, 2009; <http://www.census.gov/statab/www/>. 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 or 2000), 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.

A list of the location and year of establishment of US pharmacy programs (shown in Figure 18) was generated from the Pharmacy College Application Service (PharmCAS), the American Association of Colleges of Pharmacy (AACP), and the Accreditation Council for Pharmacy Education (ACPE). Additional information was verified at individual college of pharmacy websites. This list may not include all satellite locations.

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 2008 update. Nonmetropolitan counties include micropolitan and counties outside of CBSAs.

Persistent Health Professional Shortage Areas (PHPSAs) are derived from the Area Resource File, Health Resources and Services Administration (HRSA), U.S. Department of Health and Human Services. Persistent HPSAs are those designated as HPSAs by HRSA from 1999 through 2005, or in 6 of the last 7 releases of HPSA definitions. Current HPSA designations can be found at <http://bhpr.hrsa.gov/shortage/>.

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 2008-December 2009, 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 March 4, 2010, 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 2008-December 2008 and January 2009-December 2009 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 the text on page 14 showing the annual number of retail prescriptions filled per retail pharmacist per hour were calculated using retail pharmacist counts and an assumption that, on average, pharmacists work 2,000 hours per year (40 hours per week for 50 weeks). This was done in order to allow for direct comparison between current and previously published state-level data in Fraher, et. al's 2002 report on the pharmacy workforce. However, data in Figure 20 and Table 2 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). 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.

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Appendix A

