

We're Not Keeping Up With the Joneses: North Carolina Has Fewer Dentists per Capita Than Neighboring (and Most Other) States

Erin Fraher, Victoria McGee, Jacqueline Hom, Jessica Lyons, Katie Gaul

This commentary provides a data-driven analysis that shows that North Carolina faces a geographically maldistributed dentist workforce that is inadequate in supply. Not only has North Carolina consistently lagged behind other states in dentists per capita for over 10 years, but projections of future workforce supply do not show improvement.

In the face of rapid population growth, an aging population, and expansions in insurance coverage, there are many questions as to whether or not North Carolina will have enough doctors and nurses to meet the increased demand for health care services. Much less frequently asked is the question of whether or not the state will have enough dentists.

Many factors influence oral health including insurance coverage, access to fluoridated water, nutrition, genetics, personal oral hygiene, and tobacco use; but access to dental providers, especially dentists, is a critical element that contributes to the population's oral health [1]. This commentary provides a data-driven analysis of the supply, distribution, and practice patterns of dentists in the state. It shows that one of the most persistent and pressing health workforce issues facing North Carolina is that dentist supply is both inadequate and geographically maldistributed. (Unless otherwise noted, the data in this commentary are from the North Carolina Health Professions Data System and are derived from licensure data from the North Carolina State Board of Dental Examiners.)

Supply

In 2010, there were 4,178 dentists in active practice in North Carolina, or 4.4 dentists per 10,000 population. North Carolina has consistently ranked 47th out of the 50 states in dentists per capita for over 10 years [2] (Table 1). The state has not only consistently lagged behind the US average of 6.0 dentists per 10,000 population, but has also had fewer dentists per capita than neighboring states of Georgia, South Carolina, Tennessee, and Virginia (4.5-5.9).

In recent years, North Carolina has become a net importer of dentists. More of the state's newly licensed dentists have trained in or moved from other states. An impor-

tant factor contributing to this trend is that a decreasing number of North Carolina educated dentists are staying in state after graduation. Although there has been some volatility in retention rates between individual years, retention of University of North Carolina-Chapel Hill (UNC-Chapel Hill) graduates declined approximately 20 percentage points between 2003 and 2009. This decline is likely due to the increasing number of UNC-Chapel Hill graduates pursuing residency training in other states and remaining out of state after completing their residency. Unlike the practice of medicine, dentistry does not require residency training, but it is increasingly popular among dental school graduates who wish to gain additional training or specialized skills. An exit survey of the UNC-Chapel Hill class of 2007 found that 42% of all graduates planned to explore advanced dental education after graduation (A. Wilder, personal communication). Given that UNC-Chapel Hill graduates account for more than half of the dental workforce in North Carolina, if the number of graduates pursuing dental residencies continues to increase, it will become increasingly important to create more residency opportunities in North Carolina or create incentive programs to bring dentists back to the state after completing residency training. Although retention of North Carolina-trained dentists has been on the decline, a 63% retention rate is relatively high compared to physicians. On average between the 4 medical schools in the state, North Carolina retains about 40% of its medical school graduates; among public schools, the retention rate is 53% at East Carolina University (ECU) and 45% at UNC-Chapel Hill[3].

Of the 234 new dentists who joined the North Carolina workforce between 2009 and 2010, 19% were new graduates from UNC-Chapel Hill, 16% were new graduates from an educational program in another state, 42% previously held a North Carolina license and were not practicing in the state in 2009, and the remaining 23% were licensed by cre-

Electronically published May 17, 2012.

Address correspondence to Dr. Erin Fraher, Cecil G. Sheps Center for Health Services Research, UNC-Chapel Hill, 725 Martin Luther King Jr. Blvd, CB #7590, Chapel Hill, NC 27599 (erin_fraher@unc.edu).

N C Med J. 2012;73(2):111-114. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73206

TABLE 1.
Active Dentists per 10,000 Civilian Population

State	1996		2000		2003		2007	
	Rank	Ratio	Rank	Ratio	Rank	Ratio	Rank	Ratio
United States		6.1		6.1		6.0		6.0
Top ranked states								
Massachusetts	4	8.1	2	8.1	2	8.2	1	8.2
Hawaii	1	8.9	1	8.2	1	8.2	2	8.1
New Jersey	5	8.1	4	7.9	3	7.9	3	8.1
New York	2	8.2	3	8.0	4	7.9	4	7.9
North Carolina's neighboring states								
Virginia	22	5.8	21	5.7	21	5.7	19	5.9
Tennessee	28	5.3	28	5.3	29	5.2	37	5.0
South Carolina	45	4.5	43	4.5	42	4.6	44	4.6
Georgia	42	4.7	44	4.4	46	4.4	46	4.5
Bottom ranked states								
North Carolina	47	4.4	47	4.2	47	4.4	47	4.5
Alabama	46	4.4	46	4.3	45	4.4	48	4.4
Arkansas	48	4.1	48	4.0	48	4.1	49	4.1
Mississippi	49	4.0	49	3.9	50	4.0	50	4.1

dential. Licensure by credential began in 2003 and allows dentists who have held a license and practiced in another state for at least 5 years to obtain a North Carolina license without retaking an exam.

Distribution

The maldistribution of the state's dental workforce has been a persistent problem and it is not improving. Figure 1 shows the ratio of dentists per population in metropolitan and nonmetropolitan counties from 1979-2010. The per capita supply of dentists in metropolitan areas has grown slowly over time, but supply in nonmetropolitan areas has held nearly constant. The result has been a slowly widening gap in supply between metropolitan and nonmetropolitan counties since 1993.

Figure 2 shows the change in the ratio of dentists per 10,000 population by county between 2005 and 2010—a measure of whether the supply of dentists in a county has kept pace with population growth. More than half (51) of North Carolina counties experienced a decline in the ratio of dentists per 10,000 population during the 5-year period. Of these 51 counties, 10 showed an increase in the number of dentists, but that increase did not keep pace with population growth. Thirteen counties had no change in the number of dentists, but experienced a population increase. Twenty-eight counties lost dentists. Tyrrell and Camden Counties have not had an active dentist since data collection began in 1979, Hyde County has had no dentists since 1989, and Gates County lost its only dentist in 2005.¹ Figure 2 also

shows that there are multiple contiguous counties in the state in which dental supply has declined in recent years. If access to dentists is not currently a problem in these areas, it may become a problem in the near future.

To address the state's limited dentist supply and persistent maldistribution, the North Carolina General Assembly appropriated funds for the new School of Dental Medicine at ECU, which opened in 2011. ECU's dental school is the result of UNC General Administration system-level and multi-stakeholder planning to improve North Carolina's supply of dentists, particularly in rural areas of the state. ECU's plan to provide care and educate students in community-based settings around the state may also play an important role in improving distribution in rural counties.

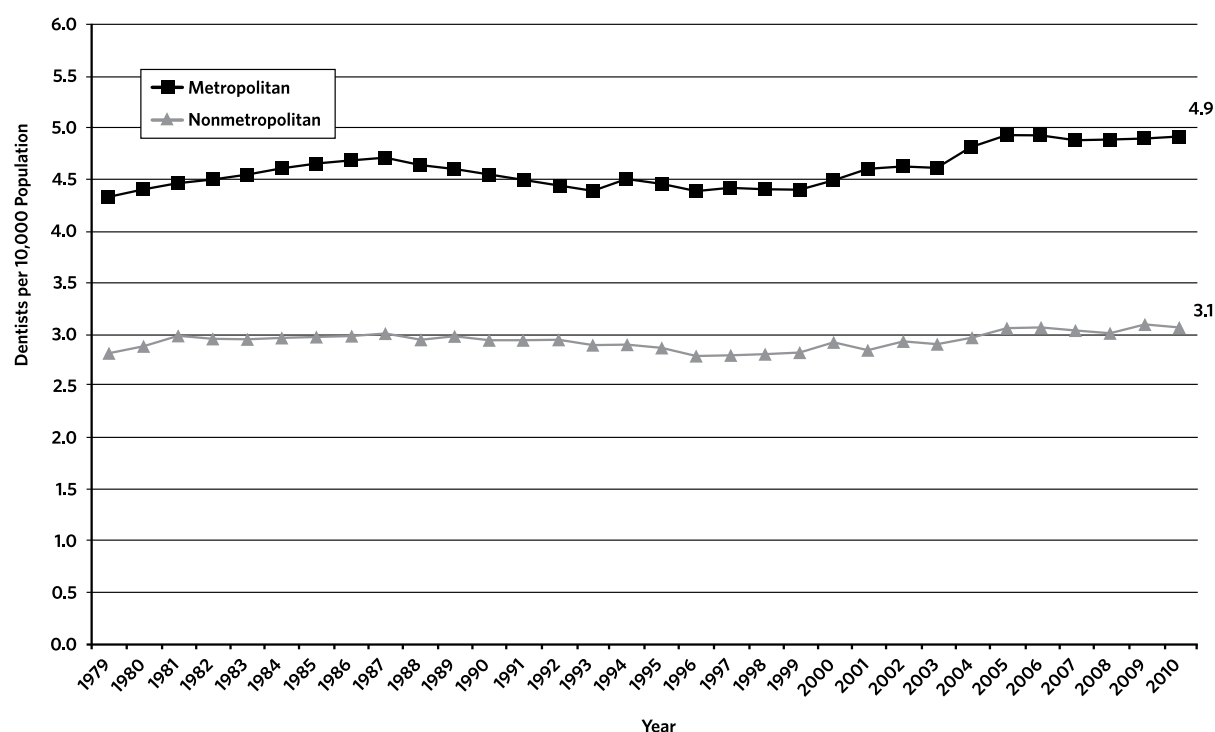
Demographic and Practice Characteristics of North Carolina's Dentists

The average age of North Carolina dentists is 48. One in five (21%) dentists is 60 years of age or older. In 6 counties in North Carolina, the average age of dentists is 60 years or older; 5 of these 6 counties are in the eastern part of the state. This region is at risk of losing even more dentists if providers are unable to find a replacement willing to move to their county and buy their practice or start a new practice before they retire.

Compared to 2007 and 2008, fewer dentists left the workforce in 2010. This is likely due to more dentists postponing retirement due to the recession. If more dentists are, in fact, delaying retirement due to the recession, existing

¹Preliminary 2011 data and local correspondence indicate that there is now a dentist actively practicing in Gates County. The analyses described in this paper are based on licensure data effective through October 2010.

FIGURE 1.
Dentists per 10,000 Population by Metropolitan and Nonmetropolitan Counties, North Carolina, 1979-2010



Sources. North Carolina Health Professions Data System, 1979-2010. North Carolina Office of State Planning. Figures include all licensed, active, in-state dentists. 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.

supply and distribution issues will be exacerbated when the economy recovers and these dentists exit the workforce.

About 1 in 4 (24%) North Carolina dentists were female in 2010. The percentage of female dentists in the workforce has increased by 8 percentage points in the last 10 years. While much ado has been made about the adverse effects that feminization of the workforce will have on hours worked, female dentists reported working nearly the same average number of hours as men in 2010: 35 and 36 hours per week, respectively. Since the average age of female dentists (41 years old) is approximately 10 years younger than their male counterparts (51 years old), the influx of female dentists has helped, and will continue to help, to offset losses due to retirement. Compared to male dentists, female dentists are more likely to practice in metropolitan counties (85% versus 78%, respectively). Therefore, the increasing proportion of female dentists may exacerbate the existing geographic maldistribution of the workforce.

Diversity among dentists in North Carolina has improved, but has not yet achieved parity with the demographic make-up of the state. In 2010, approximately 16% of North Carolina's dentists were nonwhite, compared to 35% of the state's population. The number of nonwhite dentists has increased slowly over the last 20 years but the representation of nonwhite dentists relative to North Carolina's population differs greatly between different racial/ethnic

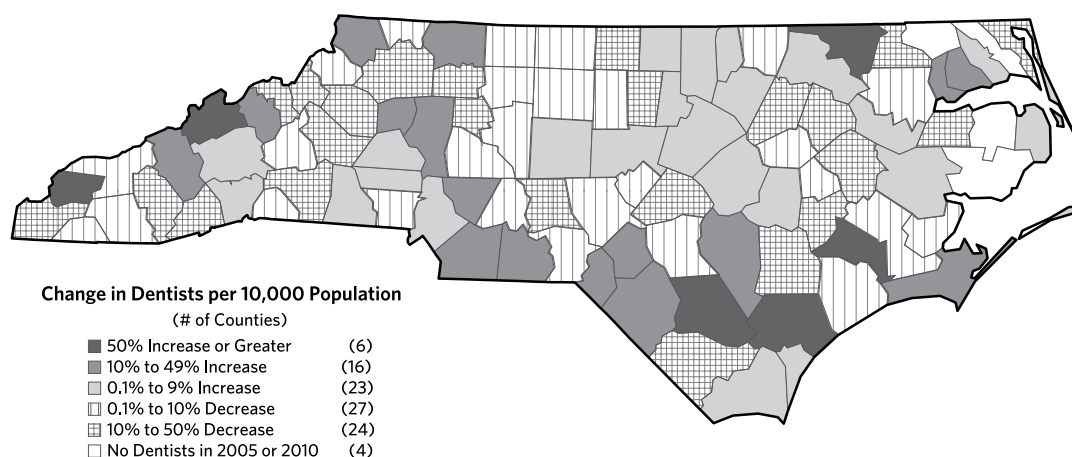
subgroups. For example, the percentage of dentists who are Asian/Pacific Islander has increased at a faster pace than North Carolina's population of Asian/Pacific Islanders, and the percentage of Hispanic dentists has increased at a much slower rate than the number of Hispanics in North Carolina.

In 2010, approximately 4 out of every 5 (79%) dentists practiced general dentistry. The most common dental specialties were orthodontics (250 dentists, 6% of workforce), pediatric dentistry (152, 4%) and oral surgery (156, 4%). Between 2000 and 2010, the state added 39 public health dentists, an increase of 144%, making it the fastest growing dental specialty. The next fastest growing specialty was pediatric dentistry, with an increase of 103% or 77 dentists. The increase in the number of pediatric dentists is partly attributable to implementation of recommendations made by the North Carolina Institute of Medicine Dental Task Force to increase the number of pediatric dentistry residents offered by the UNC-Chapel Hill School of Dentistry [4, 5]. It should be noted that these gains in pediatric and public health dentists have been mostly limited to metropolitan areas.

Looking Forward: Dentist Workforce Projections

The future dentist supply in North Carolina was estimated with a projection model that uses licensure data on past flows of dentists into and out of practice by age

FIGURE 2.
Change in Dentists per 10,000 Population, North Carolina, 2005-2010



Note. Data include all active, in-state dentists. Source: North Carolina Health Professions Data System, with data derived from the North Carolina State Board of Dental Examiners, 2005 and 2010. Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina-Chapel Hill.

cohort to forecast future supply. The projections estimate that the ratio of dentists per 10,000 population will drop from 4.4 per 10,000 population in 2010 to 4.1 in 2020. The forecast accounts for the additional graduates from ECU's dental school, without which the projected ratio of dentists per 10,000 population would be 3.9. It does not, however, include the increased enrollment at UNC-Chapel Hill since that expansion has been delayed. The most significant contributors to the projected decrease in dentist supply are the decreasing retention of UNC-Chapel Hill dental graduates, the increasing number of dentists retiring, and the fast-paced growth of North Carolina's population.

Conclusion

In 2009, North Carolinians made 69,000 trips to emergency rooms for dental care [6]. Dental conditions were the 10th most common reason for emergency room visits in the state [6]. These data reflect a very costly symptom of North Carolina's limited dentist workforce. Improving the supply of North Carolina dentists will not only lower health care costs, but also improve health outcomes of citizens who currently cannot reach a dentist. North Carolina can do better than 47th out of 50 states and it must to meet the needs of its citizens. NCMJ

Erin Fraher, PhD, MPP director, North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina-Chapel Hill, and assistant professor, Departments of Surgery and Family Medicine, University of North Carolina -Chapel Hill School of Medicine, Chapel Hill, North Carolina.

Victoria McGee, MA data coordinator, North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina-Chapel Hill, Chapel Hill, North Carolina.

Jacqueline Hom, DMD resident, pediatric dentistry, School of Dentistry and PhD candidate, Department of Health Policy and Management, Gillings School of Global Public Health, University of North Carolina-Chapel Hill, Chapel Hill, North Carolina.

Jessica Lyons, MS research associate, Lineberger Comprehensive Cancer Center, University of North Carolina-Chapel Hill, Chapel Hill, North Carolina.

Katie Gaul, MA research associate, North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina-Chapel Hill, Chapel Hill, North Carolina.

Acknowledgments

We are grateful to Caroleen Quach, graduate research assistant at the Sheps Center.

Funding to support this work was provided by the North Carolina AHEC Program, and by the Health Resources and Services Administration (HRSA) through a state health workforce planning grant.

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. Institute of Medicine and National Research Council. 2011 Improving Access to Oral Health Care for Vulnerable and Underserved Populations. Washington, DC: The National Academies Press; 2011.
2. Centers for Disease Control and Prevention. Health, United States, 2010. Washington, DC: US Department of Health and Human Services; 2010. <http://www.cdc.gov/nchs/data/abus/abus10.pdf>. Accessed March 28, 2012.
3. University of North Carolina Board of Governors. Monitoring the Progress of North Carolina Graduates Entering Primary Care Careers. University of North Carolina Web site. <https://www.northcarolina.edu/bog/doc.php?code=bog&id=27913>. Published October 2011. Accessed March 15, 2012.
4. North Carolina Institute of Medicine. North Carolina Institute of Medicine Task Force on Dental Care Access: Report to the North Carolina General Assembly and to the Secretary of the North Carolina Department of Health and Human Services. Durham, NC: North Carolina Institute of Medicine; 1999. <http://www.nciom.org/publications/?dentalaccess>. Accessed March 28, 2012.
5. North Carolina Institute of Medicine. 2005 North Carolina Oral Health Summit: Access to Dental Care. Summit Proceedings and Action Plan. Durham, NC: North Carolina Institute of Medicine; 2005. <http://www.nciom.org/wp-content/uploads/NCIOM/projects/dental/2005dentalupdate.pdf>. Accessed on February 15, 2012.
6. The Pew Center on the States. A Costly Dental Destination: Hospital Care Means States Pay Dearly. Washington, DC: Pew Center on the States; 2012. <http://www.pewcenteronthestates.org/uploadedFiles/A%20Costly%20Dental%20Destination.pdf>. Accessed March 15, 2012.