The Dental Workforce in North Carolina: Trends, Challenges and Opportunities

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Overview of Presentation: The View from 30,000 Feet

- Access to oral health care is multifaceted, more complex than “counting noses”
- But basic data on workforce supply, distribution, demographic and practice characteristics can provide powerful evidence to inform policy
- Projections of future supply allow us to simulate effect of policy, workforce changes and new models of care
- State budget constraints create need to show “bang for buck” for public investments in education
- Rapid pace of health system change provides policy window to improve flexibility in how/where workforce deployed
NC has high per capita rate and most rapid increase in ED visits for dental disorders

Emergency Department Visits for ICD-9-CM All-Listed Diagnosis Code 525.9, Dental Disorder Not Otherwise Specified, per 10,000 Population, US and Select States, 2006-2010

Source: State statistics from HCUP State Inpatient Databases and State Emergency Department Databases, Agency for Healthcare Research and Quality (AHRQ).*Weighted national estimates from HCUP Nationwide Emergency Department Sample (NEDS), Agency for Healthcare Research and Quality (AHRQ), based on data collected by individual States and provided to AHRQ by the States.
North Carolina versus the United States:
Supply and Distribution
NC has consistently lagged behind US in dentists per capita

*NDA number of total dentists in the U.S. in 2008 is 181,774, an increase of 73 from 2007. This increase is not consistent with that of previous years. Taking prior increases into account would result in an estimate of 182,028 dentists in the U.S. in 2008 and 185,202 in 2009. Total number of U.S. dentists in 2010 imputed using projected number of 2010 active dentists in the American Dental Association Dental Workforce Model: 2006-2030.


*Note: US population data for 2001-2002 are slightly different than previous years and may partially account for the slight drop in dentists per 10,000 population at the national level.
And has lagged behind most states as well...

### Active Dentists per 10,000 Civilian Population

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rank</td>
<td>Ratio</td>
<td>Rank</td>
<td>Ratio</td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Massachusetts</td>
<td>4</td>
<td>8.1</td>
<td>2</td>
<td>8.1</td>
</tr>
<tr>
<td>Hawaii</td>
<td>1</td>
<td>8.9</td>
<td>1</td>
<td>8.2</td>
</tr>
<tr>
<td>New Jersey</td>
<td>5</td>
<td>8.1</td>
<td>4</td>
<td>7.9</td>
</tr>
<tr>
<td>New York</td>
<td>2</td>
<td>8.2</td>
<td>3</td>
<td>8.0</td>
</tr>
<tr>
<td>North Carolina</td>
<td>47</td>
<td>4.4</td>
<td>47</td>
<td>4.2</td>
</tr>
<tr>
<td>Alabama</td>
<td>46</td>
<td>4.4</td>
<td>46</td>
<td>4.3</td>
</tr>
<tr>
<td>Arkansas</td>
<td>48</td>
<td>4.1</td>
<td>48</td>
<td>4.0</td>
</tr>
<tr>
<td>Mississippi</td>
<td>49</td>
<td>4.0</td>
<td>49</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Over half of NC’s counties saw a loss or no change in ratio of dentists per capita

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

Note: Data include all active, in-state dentists. "Core Based Statistical Area" (CBSA) is the OMB’s collective term for Metropolitan and Micropolitan statistical areas. OMB has not defined an affirmative title for areas outside CBSAs.
Source: NC HPDS, with data derived from the NC State Board of Dental Examiners, 2005 & 2010; US Census Bureau and Office of Management and Budget, December 2009.
Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
Per capita supply of dentists in nonmetropolitan counties is stagnant...

Dentists per 10,000 Population by Metropolitan and Nonmetropolitan Counties, North Carolina, 1979 to 2010

Sources: North Carolina Health Professions Data System, with data derived from the NC State Board of Dental Examiners, 1979 to 2010; North Carolina Office of State Planning; Office of Management and Budget, 2006. Figures include all licensed, active, in-state dentists. North Carolina population data are smoothed figures based on 1980, 1990 and 2000 Censuses.
... And the gap between NC’s most underserved and not underserved counties has been slowly widening.
NC has more dental hygienists per capita than the US average.

Sources: North Carolina Health Professions Data System, with data derived from the NC State Board of Dental Examiners 1979 to 2010; HRSA, Bureau of Health Professions; US Bureau of the Census; North Carolina Office of State Planning. Figures include all licensed active dental hygienists. North Carolina population data are smoothed figures based on 1980, 1990 and 2000 Censuses.
Dental hygienists slightly more likely than dentists to practice in nonmetropolitan counties

**NC Dentists vs. Dental Hygienists**
in Metropolitan and Nonmetropolitan Counties, 2010

<table>
<thead>
<tr>
<th></th>
<th>Nonmetro</th>
<th>Metro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental hygienists</td>
<td>25.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Dentists</td>
<td>20.8%</td>
<td>79.2%</td>
</tr>
</tbody>
</table>

Unlike dentists, hygienists experienced some growth in supply in NC’s most underserved counties.

Dental Hygienists per 10,000 Population by Persistent Health Professional Shortage Area (PHPSA) Status
North Carolina, 1979 to 2010

Sources: North Carolina Health Professions Data System, with data derived from the NC State Board of Dental Examiners, 1979 to 2010; North Carolina Office of State Planning. 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. Figures include all licensed active in-state dental hygienists. Population data are smoothed figures based on 1980, 1990 and 2000 Censuses.
Demographic and Practice Characteristics
Trends look smooth but there is a ~10% churn in workforce every year

### NC Dentist Supply: 2006-2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Supply</th>
<th>New Actives</th>
<th>Left File</th>
<th>Total</th>
<th>Net Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>3,921</td>
<td>256</td>
<td>190</td>
<td>3,987</td>
<td>66</td>
</tr>
<tr>
<td>2008</td>
<td>3,987</td>
<td>225</td>
<td>119</td>
<td>4,093</td>
<td>106</td>
</tr>
<tr>
<td>2009</td>
<td>4,093</td>
<td>234</td>
<td>149</td>
<td>4,178</td>
<td>85</td>
</tr>
<tr>
<td>2010</td>
<td>4,178</td>
<td>273</td>
<td>210</td>
<td>4,205</td>
<td>63</td>
</tr>
</tbody>
</table>


Counts include active, instate dentists. Note: Newly licensed dentists are those who are new to file with a license date in the current or previous year. New active dentists are those who were licensed in NC in an earlier year but were either inactive or active out of state in the previous year.
Fewer dentists left workforce during recession but older dentists now retiring in greater numbers


Counts include active, instate dentists. Note: Newly licensed dentists are those who are new to file with a license date in the current or previous year. New active dentists are those who were licensed in NC in an earlier year but were either inactive or active out of state in the previous year.
North Carolina’s dental workforce is graying

4 counties in NC have dentists whose average age is 60 years or older

Note: Three dentists were missing age. Sources: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2009. Figures include active, instate dentists licensed in North Carolina as of October 31, 2009.
Rural, contiguous counties with older dentists are a concern.

Average Age of Active Dentists
North Carolina, 2011

Average Age of Dentists

- 55 and Older (17)
- 50 to 55 (34)
- 45 to 50 (41)
- Younger than 45 (5)
- No Active Dentists (3)
- Nonmetropolitan County (60)

Average age of all dentists in North Carolina = 47.8

Note: Data include all active, in-state dentists licensed in North Carolina as of October 31, 2011. Age data were missing for 8 dentists. Core Based Statistical Areas are current as of the December 2009 update. Nonmetropolitan counties include micropolitan and counties outside of CBSAs. Source: NC HPDS, with data derived from the NC State Board of Dental Examiners, 2011; US Census Bureau and Office of Management and Budget, December 2009. Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
Now let’s focus on the new entrants to the dental workforce

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Counts include active, instate dentists. Note: Newly licensed dentists are those who are new to file with a license date in the current or previous year. New active dentists are those who were licensed in NC in an earlier year but were either inactive or active out of state in the previous year.
Where do our new dentists come from?

Gain in NC Dentists, 2010

- Newly licensed from credential: 16%
- Previously licensed in NC: 42%
- New UNC grads: 18%
- New out-of-state grads: 24%
- Previously licensed out of state grads: 19%
- Previously licensed UNC graduates: 23%

n=234

Sources: North Carolina Health Professions Data System, with data derived from the North Carolina State Board of Dental Examiners, 2010.
More than half of NC’s overall dentist workforce graduated from UNC

Percent of Active Dentists who Graduated from UNC-Chapel Hill Dental School
North Carolina, 2011

Percent Graduating from UNC-CH School of Dentistry
(\% of Counties)

- All Dentists are UNC Graduates (10)
- 75.0% to 99.9% (14)
- 50.0% to 74.9% (43)
- 13.3% to 49.9% (28)
- No UNC Graduates (2)
- No Active Dentists (3)
- Nonmetropolitan County (60)

N=2,207

Note: Data include all active, in-state dentists licensed in North Carolina as of October 31, 2011. Training location was missing for 11 dentists. Core Based Statistical Areas are current as of the December 2009 update. Nonmetropolitan counties include micropolitan and counties outside of CBSAs. Source: NC HPDS, with data derived from the NC State Board of Dental Examiners, 2011; US Census Bureau and Office of Management and Budget, December 2009. Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
But new UNC-CH grads less likely to practice in rural areas

Practice Location of Newly Licensed Dentists, North Carolina, 2009

<table>
<thead>
<tr>
<th>Category</th>
<th>Nonmetro (%)</th>
<th>Metro (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New UNC-CH grad n=57</td>
<td>9</td>
<td>91</td>
</tr>
<tr>
<td>New out-of-state grad n=61</td>
<td>14</td>
<td>86</td>
</tr>
<tr>
<td>Licensed by credential n=38</td>
<td>16</td>
<td>84</td>
</tr>
</tbody>
</table>

Source: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2009. Figures include active, instate dentists licensed in North Carolina as of October 31, 2009.
Percent of women in workforce increasing

Percentage of Dentists Who Are Female, North Carolina, 1999-2011

Source: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 1999-2011.
Male dentists are older than female dentists

Active NC Dentists by Age and Sex, 2010

Sources: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2010.
Biggest driver of workforce supply is FTE: Male dentists’ hours peak in mid-40s, Female dentists peak in mid-50s

Average Number of Hours Worked per Week by Age and Sex, North Carolina Dentists, 2010

Sources: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2010. Figures include active, instate dentists licensed in North Carolina as of October 31 of the respective year.
Race/Ethnicity of dentist and dental hygienist workforce falls short of matching population diversity

Diversity of North Carolina’s Population vs. Diversity of Selected Health Professions, 2009

Sources: North Carolina Health Professions Data System with data derived from the respective licensing board, 2009. Data include active, instate health professionals, and active, instate, non-federal, non-resident-in-training physicians.
Most of NC’s non-white dentists educated out of state

Non-White Dentists by School
North Carolina, 2009

- 36.5% UNC-Chapel Hill
- 43.5% Other U.S. States
- 20.0% HBCU
- 13.4% Howard
- 6.6% Meharry

n=635

Sources: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2009. Figures include active, instate dentists licensed in North Carolina as of October 31 of the respective year.
About three out of four North Carolina dentists are in general practice

<table>
<thead>
<tr>
<th>Specialty</th>
<th>2011 Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Practice</td>
<td>78% (3,278)</td>
<td></td>
</tr>
<tr>
<td>Orthodontics</td>
<td>6% (254)</td>
<td></td>
</tr>
<tr>
<td>Pediatric Dentistry</td>
<td>4% (160)</td>
<td></td>
</tr>
<tr>
<td>Oral Surgery</td>
<td>4% (159)</td>
<td></td>
</tr>
<tr>
<td>Endodontics</td>
<td>3% (116)</td>
<td></td>
</tr>
<tr>
<td>Periodontics</td>
<td>2% (106)</td>
<td></td>
</tr>
<tr>
<td>Public Health</td>
<td>2% (70)</td>
<td></td>
</tr>
<tr>
<td>Prosthodontics</td>
<td>1% (52)</td>
<td></td>
</tr>
<tr>
<td>Oral/Maxillofacial Radiology</td>
<td>&lt;1% (8)</td>
<td></td>
</tr>
</tbody>
</table>

Sources: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2011. Counts include active, instate dentists licensed in North Carolina as of October 31, 2011.
Pediatric and public health dentists are fastest growing specialties

Percent Growth by Dental Specialty, 2000-2010

- General Dentistry: 29% growth, +729
- Endodontics: 67% growth, +46
- Pedodontics: 103% growth, +77
- Dental public health: 144% growth, +39

Average dental workforce growth: 31%

Sources: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2000-2010.
Projections and Implications
What will dentist workforce look like in 20 years?

Projected Supply of Dentists per 10,000 Population, North Carolina, 2010-2021

Source: NC Health Professions Data System, Cecil G. Sheps Center for Health Service Research, UNC-CH, January 2012.
Notes: Base case shows scenario with no enrollment increases. Base year for projection (2010) uses data derived from the NC State Board of Dental Examiners and includes all active and instate dentists in that year. 90% retention rate assumed overall. 65% retention rate for UNC-CH based on average of 5 years data from UNC-CH grads. Model accounts for in and out-migration and aging of the workforce. Population estimates and projections are from LINC, accessed April 12, 2011. As of March 12, 2012 neither UNC nor ECU are expanding dental school class size.
Measuring return on investment of public funds spent on education

• Recent policy focus on measuring the “social accountability” of medical education

• Importance of tracking graduates and using data to inform program planning and workforce policy

• What is role of NC’s medical schools in improving supply, distribution and diversity of the workforce?

• Since 1993, Sheps Center and AHEC have tracked medical students, now working to extend this work to include medical residents
Medical Student Tracking

- 1993: North Carolina Legislature concerned about primary care shortage
- Required four medical schools to develop programs to increase percentage of primary care graduates
- Set goal for UNC and ECU at 60%
- Set goal for Duke and Wake Forest at 50%
- Required that the Board of Governors track progress and report regularly to General Assembly
NC medical students: Retention of graduates in primary care after five years

**What is Class of 2005 Doing in 2010?**

<table>
<thead>
<tr>
<th>School</th>
<th>2005 Graduates</th>
<th>% in Primary Care (Anywhere in US)</th>
<th>% in Primary Care (in NC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duke</td>
<td>78</td>
<td>23%</td>
<td>8%</td>
</tr>
<tr>
<td>ECU</td>
<td>73</td>
<td>59%</td>
<td>41%</td>
</tr>
<tr>
<td>UNC-Chapel Hill</td>
<td>152</td>
<td>38%</td>
<td>21%</td>
</tr>
<tr>
<td>Wake Forest</td>
<td>105</td>
<td>37%</td>
<td>17%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>408</strong></td>
<td><strong>38%</strong></td>
<td><strong>21%</strong></td>
</tr>
</tbody>
</table>

Source: Duke Office of Medical Education, UNC-CH Office of Student Affairs, ECU Office of Medical Education, Wake Forest University SOM Office of Student Affairs, Association of American Medical Colleges, and the NC Medical Board.

Prepared by the North Carolina Health Professions Data System and the North Carolina AHEC Program.
Retention in North Carolina of Class of 2005 in 2010: Primary Care

NC Medical Students: Retention in Primary Care in NC’s Rural Areas

Total Number of 2005 graduates in training of practice as of 2010:

408

Initial residency choice of primary care
261 (64%)

In training/practice in primary care in 2010:
155 (38%)

In primary care in NC in 2010:
86 (21%)

In PC in rural NC:
10 (2%)

Class of 2005
(N=422 graduates)

Source: North Carolina Health Professions Data System with data derived from the Duke Office of Medical Education, UNC-CH Office of Student Affairs, ECU Office of Medical Education, Wake Forest University SOM Office of Student Affairs, Association of American Medical Colleges, and the NC Medical Board, 2011.
Transformed health system will require transformed workforce

Health systems, AHEC, universities, community colleges, regulators, professional bodies need to work together to prepare

- Health professionals already in the workforce to:
  - take on new roles
  - shift to community settings
  - alter the types of services they provide

- New types of health professionals with competencies required in new models of care

- New graduates and existing workers to better function in team-based models of care
Questions?

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Program on Health Workforce Research & Policy
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http://www.healthworkforce.unc.edu