Physicians in North Carolina: Sufficiency, Shortage or “Stress”

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The Current Policy Context

- **Demand side**: aging population, increase in chronic disease, insurance expansions, rising patient expectations

- **Supply Side**: health workforce overall is growing, professions operate in silos, turf wars abound, and productivity is lagging

With, or without health reform, cost and quality pressures will change the physician workforce
Questions

• Can we trust the numbers?
  – **YES**, North Carolina has the most accurate and trustworthy inventory of physician data

• What is a shortage of physicians?
  – Economic: When the prices of service rises because there is less of it available
  – Clinical: When people cannot get needed care because there aren’t enough doctors

• How can we know a shortage exists?
  – Sick people get sicker? People take more time to get to a doctor?
The State of the State: Let’s Drown (or Swim) in a lot of Data
NC Lags US in Physicians per Population

US 23 per 10,000
NC 22 per 10,000
NC Doctor Supply has grown faster than NC Population

The chart shows the comparison between Population Growth Rate and Physician Growth Rate from 2002 to 2011. The Physician Growth Rate has consistently been higher than the Population Growth Rate, indicating a faster growth in the number of doctors compared to the population.
## Doctor Supply is Dynamic: 2002-2009

<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>2002</td>
<td>16,734</td>
<td>1,568</td>
<td>1,212</td>
<td>17,090</td>
<td>356</td>
</tr>
<tr>
<td>2003</td>
<td>17,090</td>
<td>1,430</td>
<td>1,171</td>
<td>17,349</td>
<td>259</td>
</tr>
<tr>
<td>2004</td>
<td>17,349</td>
<td>1,550</td>
<td>1,004</td>
<td>18,349</td>
<td>546</td>
</tr>
<tr>
<td>2005</td>
<td>17,895</td>
<td>1,951</td>
<td>1,450</td>
<td>19,346</td>
<td>501</td>
</tr>
<tr>
<td>2006</td>
<td>18,396</td>
<td>1,659</td>
<td>1,142</td>
<td>19,538</td>
<td>533</td>
</tr>
<tr>
<td>2007</td>
<td>18,913</td>
<td>1,822</td>
<td>1,193</td>
<td>19,905</td>
<td>629</td>
</tr>
<tr>
<td>2008</td>
<td>19,542</td>
<td>1,808</td>
<td>1,449</td>
<td>20,990</td>
<td>441</td>
</tr>
</tbody>
</table>


Counts include active, instate, non-federal physicians. Note: Newly licensed physicians are those who are new to file with a license date in the current or previous year. New Active physicians are those who were licensed in NC in an earlier year but were either inactive or active out of state in the previous year.
Doctor Supply is Older Males and Younger Females

Note: Figures includes active, instate, nonfederal, non-resident-in-training physicians licensed in North Carolina as of October 31, 2009.
Source: 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 Medical Board, 2009.
NC Bucks National Trend: More Rapid Increase in Primary Care Physicians

Percentage Growth Since 1990 of Physicians and Primary Care Physicians per 10,000 Population, North Carolina, 1991-2009

Sources: North Carolina Health Professions Data System with data derived from the North Carolina Medical Board, 1979 to 2009; North Carolina Office of State Planning. Figures include all licensed, active, instate, non-federal, non-resident-in-training physicians.
And Despite Overall Growth, Persistent Maldistribution

**Notes:** Figures include all active, instate, nonfederal, non-resident-in-training physicians licensed as of October 31st of the respective year. Primary care physicians include those indicating a primary specialty of family practice, general practice, internal medicine, Ob/Gyn or pediatrics. Persistent HPSAs are those designated as HPSAs by HRSA from 1999 through 2005, or in 6 of the last 7 releases of HPSA definitions.

**Sources:** North Carolina Health Professions Data System, 1979 to 2010; HRSA, Bureau of Health Professions; Area Resource File; US Census Bureau; North Carolina Office of State Planning. Figures include all licensed, active, instate, non-federal, non-resident-in-training physicians.
Primary Care Health Professional Shortage Areas (HPSAs)
North Carolina, 2012

HPSA Status, 2012
(# of Counties)

- Not a HPSA (55)
- Special Population or Part County HPSA (35)
- Single County HPSA (10)

Source: Bureau of Health Professions, Shortage Designation Branch, HRSA, August 2012.
Produced by the North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
Where do doctors in North Carolina come from?
Total Enrollment and Residency Status of First Year Students
North Carolina and Neighboring States’ Medical Schools, 2010-2011

Produced by the North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
Post Graduate Residency Programs: AKA “Teaching Hospitals”

- 10 programs in North Carolina. 2,681 residents in training
  - UNC Hospitals 714
  - Duke Hospitals 709
  - Wake Forest Baptist 506
  - ECU Pitt County 294
  - Charlotte AHEC 254
  - Other AHECs 204

- Nationally 8,967 programs with 111,600 Trainees
  - 65% US Grads, 27% IMGs, 7% Dos
North Carolina’s Physicians Come from Outside the State

Medical School Location of Primary Care Physicians Practicing in North Carolina, 1990-2010

- **Other US and Canada**
  - 1990: 57.2%
  - 2010: 55.7%
  - N = 2,509
  - N = 5,001

- **North Carolina**
  - 1990: 36.2%
  - 2010: 27.7%
  - N = 1,587
  - N = 2,484

- **International Medical Graduates**
  - 1990: 6.6%
  - 2010: 16.7%
  - N = 289
  - N = 1,496

Sources: North Carolina Health Professions Data System with data derived from the North Carolina Medical Board, 1990 to 2010; Figures include all licensed, active, instate, non-federal, non-resident-in-training physicians.
Distribution of Physicians Active in 2006 Who Graduated from a North Carolina Medical School

Metropolitan Status
(# of Counties)
- Nonmetropolitan (60)
- Metropolitan (40)
- County Boundary

Legend
(# of Physicians; N = 18,396)
- 1 Dot = 1 Physician, UNC-CH Graduate (2,110)
- 1 Dot = 1 Physician, ECU Graduate (710)
- 1 Dot = 1 Physician, WFU Graduate (1,223)
- 1 Dot = 1 Physician, Duke Graduate (825)
- 1 Dot = 1 Physician, Other Medical School Graduate (13,528)

Source: NC Health Professions Data System with data derived from the NC Medical Board, 2006; AMA Masterfile, 2005; US Census Bureau, 2006.
Notes: Data are for active, in-state, non-federal, non-resident-in-training physicians who were licensed as of October 2006. Training data were missing for 55 physicians. Dots are scattered randomly within the zip code area (ZCTA). Different colored dots may overlap. One dot represents one physician.
Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
Distribution of Active Primary Care Physicians
Who Graduated from a North Carolina Residency Program
AHEC and Academic Medical Center Programs, North Carolina, 2006

Legend
(# of Physicians)
• 1 Dot = 1 AHEC Active Primary Care Physician (938)
• 1 Dot = 1 Academic Medical Center Active Primary Care Physician (2,027)

Metropolitan Status
(# of Counties)
- Nonmetropolitan (60)
- Metropolitan (40)

Produced by: North Carolina Health Professions Data System.
Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Source: NC Health Professions Data System; NC Area Health Education Centers Program, 2006; US Census Bureau, 2007.
Data are for active, in-state, non-federal, non-resident-in-training physicians indicating primary care specialties of FP, GP, IM, Ob/Gyn or Pediatrics, who were licensed as of October 2006 with residency graduation dates from 1972 and later. Internship data were used if residency data were missing.

*Note: Core Based Statistical Areas are current as of the December 2006 update. Nonmetropolitan counties include micropolitan and counties outside of CBSAs.
Percent of All Active Physicians* in 2010 who Graduated from a School of Medicine in North Carolina

Proportion of NC Medical Graduates

Source: 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 Medical Board, 2010.

“Counts include active, instate, nonfederal, non-resident-in-training MDs and DOs currently practicing in North Carolina who graduated from ECU, Duke, UNC-CH or Wake Forest University Schools of Medicine. Graduates from schools outside of North Carolina are counted as “other.”
Percent of All Active Primary Care Physicians* in 2010
who Graduated from a School of Medicine in North Carolina

Proportion of NC Medical Graduates in Primary Care

Total North Carolina Graduates: 2,484
Total PC Physicians: 9,017

Source: 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 Medical Board, 2010.

*Counts include active, instate, nonfederal, non-resident-in-training MDs and DOs currently practicing in
North Carolina who graduated from ECU, Duke, UNC-CH or Wake Forest University Schools of Medicine.
Graduates from schools outside of North Carolina are counted as "other." Primary care physicians include
physicians indicating a primary specialty of family practice, general practice, internal medicine, ob-gyn or pediatrics.
Percent of Active Pharmacists in 2008 Graduating from a School of Pharmacy in North Carolina

Percent of Pharmacists by School
1,100
550
110

UNC
Campbell
Wingate
Outside of NC

Size of circle represents total number of active pharmacists in the county. Size of slices indicates percent of these pharmacists by school.

*Pharmacists included are active or have unknown activity status.
Source: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Pharmacy, 2008.
Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
NC’s Trade Surplus/Deficit: Medical Students

Blue: Import more than we export
Orange: Export more than we import

Net Import/Export
Net exporter of med grads to 18 states
Net importer of med grads from 30 states & DC

Up to 672 Gained
Up to 406 Lost
0 - No Gain/Loss

-17
US/Military
201
Canada
2,613
Other Foreign
50
Puerto Rico

Data Source: AMA 2009 Physician Masterfile.
Notes: Includes only clinically active, non-federal, non-resident in training, non-locum tenens physicians. One physician practicing in North Carolina was missing medical school state. Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

NC imports 6,939 more medical students than it exports.
Contribution of NC Medical Schools to NC Supply

North Carolina Medical School for Primary Care Physicians Practicing in North Carolina, 1990-2010

How will this look when Campbell starts graduating 150 students per year?

Sources: North Carolina Health Professions Data System with data derived from the North Carolina Medical Board, 1990 to 2010; Figures include all licensed, active, instate, non-federal, non-resident-in-training physicians.
Graduate Training by Med School Affiliated Hospitals

Class of 2011: Distribution of NC Medical Student Residencies

- **UNC-CH** (n=147)
  - Psychiatry: 5%
  - General Surgery: 5%
  - Other: 35%
  - Primary Care: 54%

- **Wake Forest** (n=118)
  - Psychiatry: 6%
  - General Surgery: 1%
  - Other: 49%
  - Primary Care: 44%

- **Duke** (n=94)
  - Psychiatry: 4%
  - General Surgery: 3%
  - Other: 57%
  - Primary Care: 35%

- **ECU** (n=68)
  - Psychiatry: 9%
  - General Surgery: 6%
  - Other: 28%
  - Primary Care: 57%

Prepared by the North Carolina Health Professions Data System and the North Carolina AHEC Program.

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.
Why Do We Care Where Physicians Trained?

Because it affects specialty choice, practice location and workforce diversity
## NC Medical Students: Retention of Graduates in Primary Care After Five Years

<table>
<thead>
<tr>
<th>School</th>
<th>2005 Graduates</th>
<th>% Initially Selecting PC Specialty</th>
<th>2010: % in Primary Care (Anywhere in US)</th>
<th>2010: % in Primary Care (in NC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duke</td>
<td>78</td>
<td>60%</td>
<td>23%</td>
<td>8%</td>
</tr>
<tr>
<td>ECU</td>
<td>73</td>
<td>82%</td>
<td>59%</td>
<td>41%</td>
</tr>
<tr>
<td>UNC</td>
<td>152</td>
<td>60%</td>
<td>38%</td>
<td>21%</td>
</tr>
<tr>
<td>Wake Forest</td>
<td>105</td>
<td>60%</td>
<td>37%</td>
<td>17%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>408</strong></td>
<td><strong>64%</strong></td>
<td><strong>38%</strong></td>
<td><strong>21%</strong></td>
</tr>
</tbody>
</table>

Prepared by the North Carolina Health Professions Data System and the North Carolina AHEC Program.

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.
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 NC med school graduates in training or practice as of 2010:

408

Initial residency in 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.
Declining Interest in and “Leakage” from Primary Care Over Time

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.
And Where Physician Completed a Residency Even More Important Predictor of Retention in NC

46% of physicians who complete an NC AHEC residency stay in North Carolina to practice

compared to

31% of physicians who complete a non-AHEC residency stay in North Carolina to practice

Source: NC Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with data derived from the American Medical Association Masterfile, 2011. "Active” includes federal, as well as non-patient care activities such as teaching, research, administration, etc.
## AHEC-Trained Residents More Likely to Practice in Rural Areas

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Residency Type</th>
<th>Practicing in NC, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% in Metro Area</td>
</tr>
<tr>
<td>ALL</td>
<td>AHEC</td>
<td>85%</td>
</tr>
<tr>
<td></td>
<td>Non-AHEC</td>
<td>88%</td>
</tr>
<tr>
<td>Primary Care</td>
<td>AHEC</td>
<td>85%</td>
</tr>
<tr>
<td></td>
<td>Non-AHEC</td>
<td>85%</td>
</tr>
<tr>
<td>General Surg</td>
<td>AHEC</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>Non-AHEC</td>
<td>81%</td>
</tr>
</tbody>
</table>

Of the active and practicing physicians who completed a NC AHEC residency, 1,491 (46%) are practicing in NC and 1,739 (54%) are practicing outside of NC.

Of the active and practicing physicians who completed a NC Non-AHEC residency, 6,092 (31%) are practicing in NC and 13,639 (69%) are practicing outside of NC.

Note: Primary Care includes the following specialties: Family Medicine, Internal Medicine, Obstetrics and Gynecology, and Pediatrics.

Source: NC Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with data derived from the American Medical Association Masterfile, 2011. "Active" includes federal, as well as non-patient care activities such as teaching, research, administration, etc.
And More Likely to Choose Primary Care

Source: NC Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with data derived from the American Medical Association Masterfile, 2011. "Active" includes federal, as well as non-patient care activities such as teaching, research, administration, etc.
But Who Counts as “Primary Care”?
Who does Primary Care?

Percentage of Total Clinical Care Hours Spent in Primary Care
North Carolina, 1999-2008

- Family Medicine/General Practice: 90.6% in 1999, 89.8% in 2008
- Pediatrics: 80.2% in 1999, 81.1% in 2008
- Internal Medicine: 74.3% in 1999, 72.3% in 2008
- OB/GYN: 40.5% in 1999, 45.8% in 2008

Source: NC Health Professions Data System with data derived from the North Carolina Medical Board. Data are for active, in-state, non-federal, non-resident-in-training physicians licensed by the NC Medical Board as of October of each year. Data are self-reported at time of initial licensure and subsequent renewal.
But, Specialists Also Provide Primary Care

Percentage of Clinical Care Hours Spent in Primary Care, North Carolina, 1999-2008

Primary Care Physicians
- 1999: 76.5%
- 2008: 76.7%

Non-Primary Care Physicians
- 1999: 24.1%
- 2008: 22.9%

Source: NC Health Professions Data System with data derived from the North Carolina Medical Board. Data are for active, in-state, non-federal, non-resident-in-training physicians licensed by the NC Medical Board as of October of each year. Data are self-reported at time of initial licensure and subsequent renewal.
Are NPs and PAs the Answer to Physician Supply Stress?

### Percentage Growth Since 1990 of Physicians, PAs and NPs per 10,000 Population, North Carolina, 1991-2009

- **Nurse Practitioners**: 357%
- **Physician Assistants**: 202%
- **Physicians**: 32%

**Source:** NC Health Professions Data System with data derived from the North Carolina Medical Board. Data are for active, in-state, non-federal, non-resident-in-training physicians licensed by the NC Medical Board as of October of each year. Data are self-reported at time of initial licensure and subsequent renewal.
How Many NPs are in Primary Care?
Depends on Definitions

Defining Primary Care Nurse Practitioner Specialty, NC, 1997-2010:
Comparison of Certification and Supervisory Definitions

Notes: Data for primary specialty ("supervisory") include active, in-state NPs indicating a primary specialty of family practice, general practice, internal medicine, Ob/Gyn, or pediatrics, who were licensed in NC as of October 31 of the respective year. Data for physician extender type ("certification") include active-instate NPs indicating a physician extender type of family nurse practitioner, adult nurse practitioner, ob/gyn nurse or pediatric nurse practitioner who were licensed as of October 31 of the respective year.

Source: 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 NC Medical Board.
And PAs are Increasingly Specializing

Physician Assistants in Specialty vs. Primary Care, North Carolina, 1996-2009

Notes: Data include active, instate physician assistants licensed in NC as of October 31 of the respective year. Primary care includes family practice, general practice, internal medicine, Ob/Gyn, or pediatrics.

Source: 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 NC Medical Board.
General Surgery has both supply and distribution issues.
Half of NC’s Counties Qualify as Mental Health Professional Shortage Areas

Psychiatrist Full-Time Equivalents per 10,000 Population
North Carolina, 2008

Note: Psychiatrists include active, instate, nonfederal, non-resident-in-training physicians who indicate a primary specialty of psychiatry, child psychiatry, psychoanalysis, psychosomatic Medicine, addiction/chemical dependency, forensic psychiatry, or geriatric psychiatry, and secondary specialties in psychiatry, child psychiatry and forensic psychiatry.
Work Harder? More Health Workers are Doing Less

- Of $2.6 trillion spent nationally on health care, 56% is wages for health workers.
- Workforce is LESS productive now than it was 20 years ago...

IF WE NEED MORE PEOPLE, WHAT KINDS OF PEOPLE?
Diversity and Workforce Needs

In context of emerging workforce shortfalls and maldistribution:

- Are we adequately accessing a talented pool of workers?
- Is there access to education and upward job mobility?

A transformed health care system will emphasize population health, reducing health disparities, and community-based models of care.

Can we accomplish this system without increasing workforce diversity?
Race/Ethnicity of Practitioners Falls Short of Matching Population Diversity
Health Professions are Diversifying Over Time at Different Rates

Change in Non-White Diversity of Selected Health Professions, North Carolina: 1994-2009

- Dental Hygienists
- Certified Registered Nurse Anesthetists
- Surgeons
- Physical Therapy Assistants
- Primary Care Physician
- Registered Nurse
- Licensed Practical Nurse
- Pharmacists
- Dentists
- North Carolina

Health professions are diversifying over time at different rates, as evidenced by the increase in the percentage of non-white individuals in these professions from 1994 to 2009.
Majority of NC’s Non-White Primary Care Physicians Educated in Other States and Countries

Non-White Primary Care Physicians by School
North Carolina, 2009

- 42.0% IMG
- 33.5% Other U.S. schools (non-HBCU)
- 17.6% NC
- 5.5% HBCU
- 2.6% Howard
- 2.2% Meharry
- 0.8% Morehouse

n=2,250
North Carolina does “planning” for workforce

State has long history of workforce planning:

• Well-established AHEC

• Strong public community college and university system

• History of collaboration and trust

• Better data and analytical capacity than most states

• Strong base from which to move forward
North Carolina’s Workforce Planning: The Critique

- Starts from professional, silo-based perspective
- Little accountability for matching workforce to population health needs
- Limited employer involvement
- Generally not interdisciplinary
- Reactive, heavy reliance on market
- Lacks coordination
Health Workforce Planning in North Carolina the Traditional Way
Result is a “Compromised” Workforce Planning System

- Resembles “a version of Goldilocks written by Albert Camus” with approaches that are either “too hot, or too cold, but never just right” (Grumbach, *Health Affairs* 2002; 21(5): 13-27)

- Often lurches from oversupply to shortage

- Generates “vigorou[s]” disagreements about what constitutes an adequate supply, distribution and “right” mix of health providers

- Data not linked to policy action