

# The Dentist Workforce in NC: Distribution, Diversity, and Educating the Future Workforce

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***Program on Health Workforce Research and Policy***

**NC Dental Public Health Educational Conference**

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# **Who we are and what we do**

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# North Carolina Health Professions Data System (HPDS)

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**Mission:** to provide timely, objective data and analysis to inform health workforce policy in North Carolina and the United States

- Based at Cecil G. Sheps Center for Health Services Research at UNC-CH, but mission is statewide
- A collaboration between the Sheps Center, NC AHEC and the health professions licensing boards
- System is independent of government and health care professionals

# North Carolina's health workforce data system is a national model

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- 38 years of continuous, complete licensure (***not survey***) data on 19 health professions from 11 boards
- Data are provided ***voluntarily*** by the boards—there is no legislation that requires this and there is no appropriation
- Data housed at Sheps but remain property of licensing board, permission sought for each “new” use

**System would not exist without data  
and support of licensure boards**

# Key takeaways from this presentation

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- Rethinking dentist access
  - Dentist-to-population ratios
  - Other ways to measure access
- Progress to be made on diversity in the dentist workforce
- Dental schools help shape NC's workforce
- What questions should we be asking about how to get oral health care to all North Carolinians?



# Beyond the statistics: Missions of Mercy Clinics

- Portable dental clinics
- Provided services to 55,000 North Carolinians since 2003
- “We try to see as many people as possible, but the demand is overwhelming”<sup>1</sup>



Photo Credit: NC Dental Society

1. NC Dental Society NC Missions of Mercy Clinics Webpage. Accessed 30 Jan 2018 at: <http://www.ncdental.org/member-center/getinvolved/nc-missions-of-mercy>

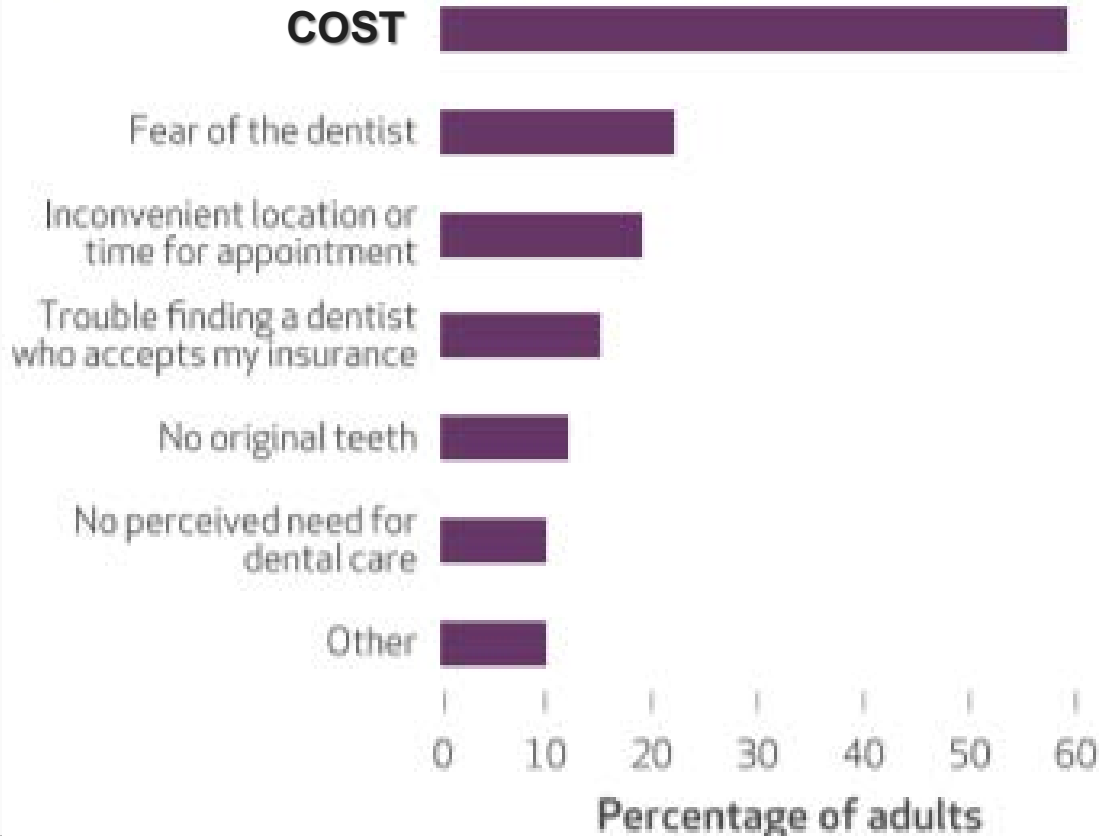
# What is “access” to dental care?

I am a patient with an oral health need. Can I get care?

- Supply → Is there a provider available?
- Cost → Can I afford care?
- Location → Can I get there?
- Language → Can I communicate with the provider?
- Context → Will the provider understand my background?

# Cost is the #1 reason adults don't seek dental care

Top reasons given by 14,962 adults for not having visited the dentist in the past 12 months, 2015 , United States



Source: Vujicic M, Buchmueller T, Klein R. 2016. Dental care presents the highest level of financial barriers, compared to other types of health care services. *Health Affairs* 35: 2176-2182.

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**But let's get back to provider  
availability...**

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# Dentist shortage or surplus?

- HRSA projects a national **shortage** of dentists in all 50 states by 2025<sup>1</sup>
  - NC dentist shortage will increase from 270 (2012) to 459 (2025)
  - Assumes demand for dental services remains unchanged
- Eklund & Bailit (2017) project a national **surplus** of dentists in 2040<sup>2</sup>
  - Assumes less oral health need per capita in pop, and dentists seeing more patients per year

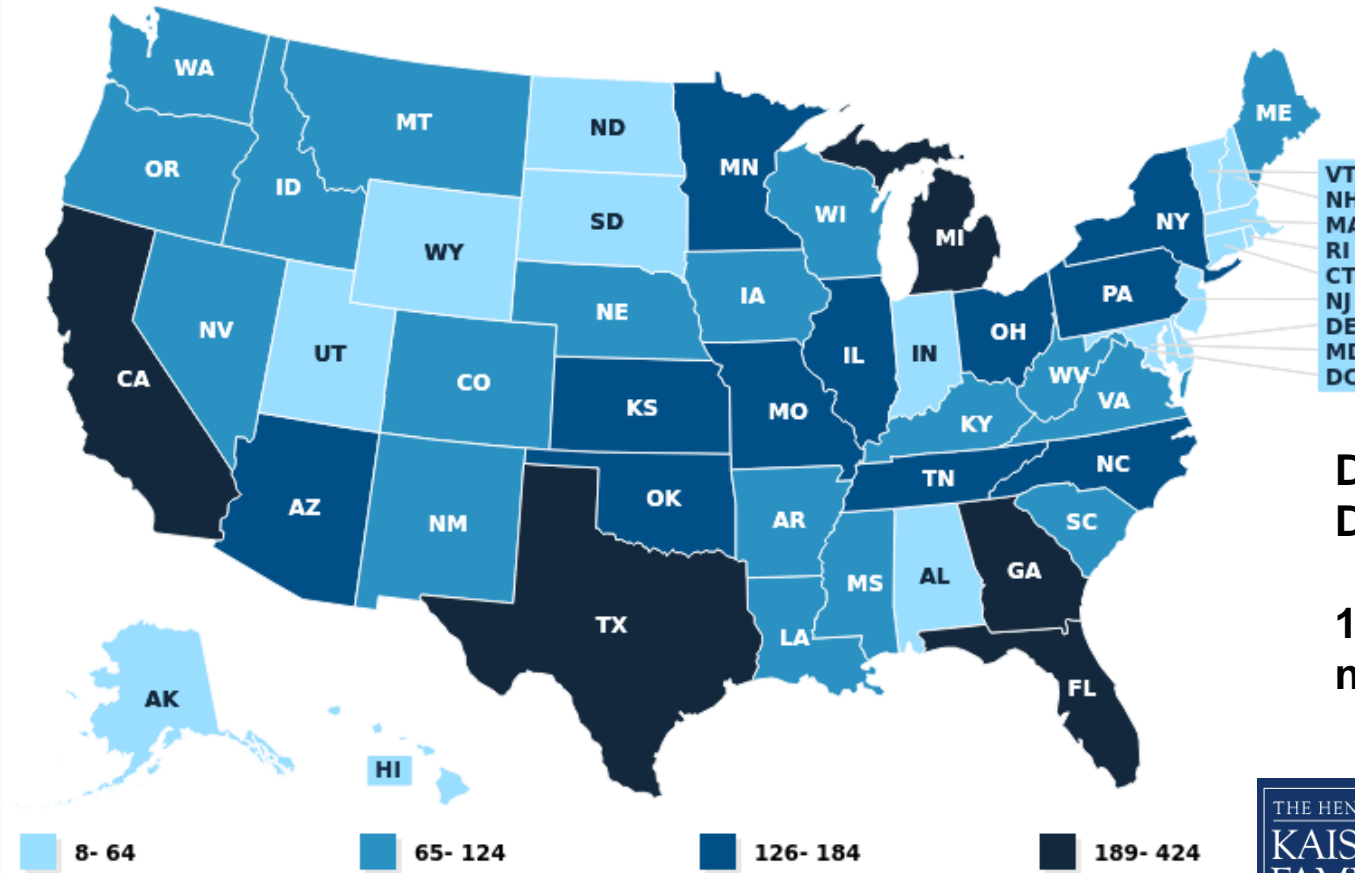
1. U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. National and State-Level Projections of Dentists and Dental Hygienists in the U.S., 2012-2025. Rockville, Maryland, 2015. Accessed 30 Jan 2018 at: <https://bhwh.hrsa.gov/sites/default/files/bhw/nchwa/projections/nationalstatelevelprojectionsdentists.pdf>

2. Eklund SA, Bailit HL. Estimating the number of dentists needed in 2040. *J Dent Educ*, 2017. 81(8): es146-es152.



# Dental Health Professional Shortage Areas (DHPSAs)

Dental Care Health Professional Shortage Areas (HPSAs): Total Dental Care HPSA Designations, as of December 31, 2016



**DHPSA= Fewer than 1  
Dentist per 5,000 pop.**

**1 to 4,000 if high  
needs community**

SOURCE: Kaiser Family Foundation's State Health Facts.



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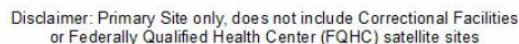
# DHPSAs in NC

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- NC had 140 DHPSAs as of Dec 31, 2016
- 2.06 million North Carolinians live in a DHPSA (19% of total NC population)
- 305 dentists needed to remove DHPSA status

Source: Kaiser Family Foundation Website. State Health Facts. Dental Care Health Professional Shortage Areas, as of December 31, 2016. Accessed 30 Jan 2018 at: <https://www.kff.org/other/state-indicator/dental-care-health-professional-shortage-areas-hpsas/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Percent%20of%20Need%20Met%22,%22sort%22:%22desc%22%7D>

**North Carolina Office of Rural Health  
Dental Health - Health Professional Shortage Areas (HPSA)**



*Rural Health*  
HEALTH AND HUMAN SERVICES

# Access to providers in rural areas reduces ED use for dental visits

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“Higher density of dental providers was associated with lower rates of dental ED visits by patients with Medicaid in rural counties, but not in urban counties.”<sup>1</sup>

1. Fingar KR, Smith MW, Davies S, McDonald KM, Stocks C, Raven M. 2015. Medicaid dental coverage alone may not lower rates of dental emergency department visits. *Health Affairs* 34(8), 1349-1357.

# Oral Health Need in NC

- In NC in 2014, 2.5% of ED visits were related to dental conditions, compared to 1-2% in US<sup>1</sup>
- Disproportional use of ED for dental reasons for patients who:
  - Live in a non-metropolitan (rural) area
  - Are self-pay or Medicaid insured
  - Identify as Black

1. Zizzi A. A retrospective analysis of dental provider distribution and emergency department use for dental care in North Carolina. Unpublished master's paper submitted to UNC-CH School of Public Health 8 May 2017.

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# **The Dental Workforce in NC**

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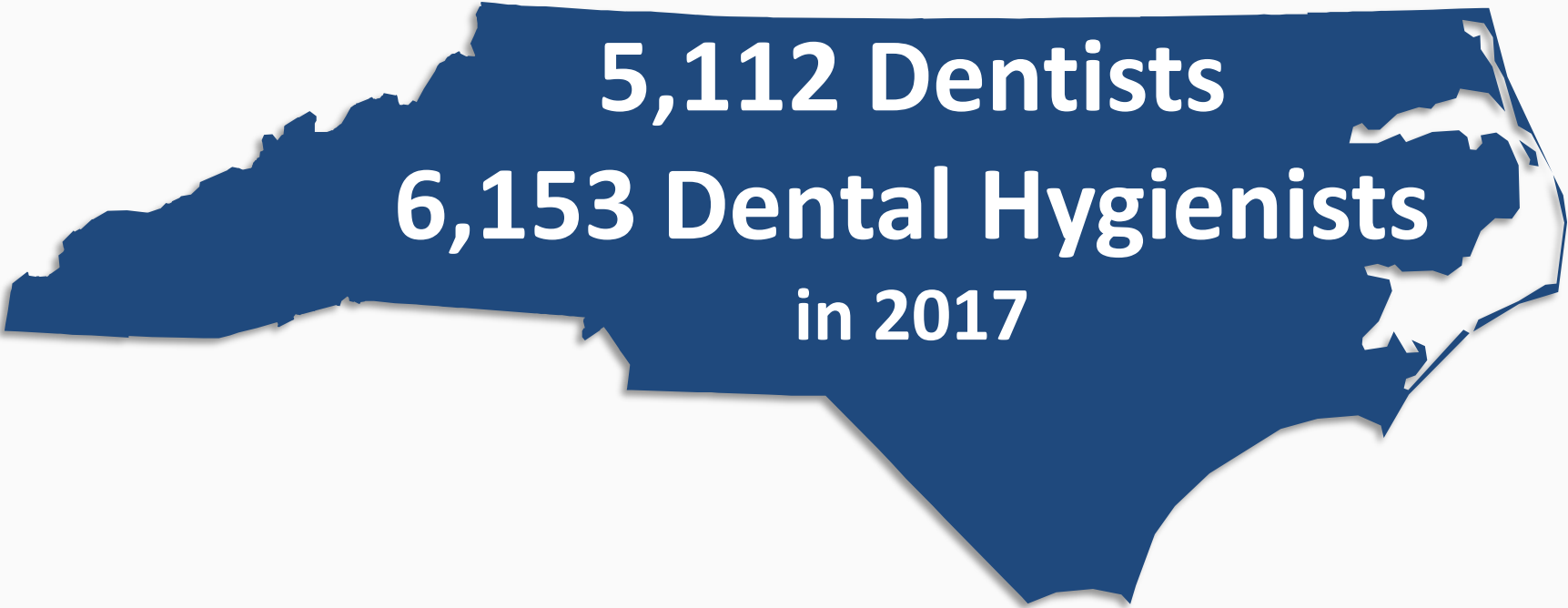


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# How many dentists and dental hygienists work in NC?

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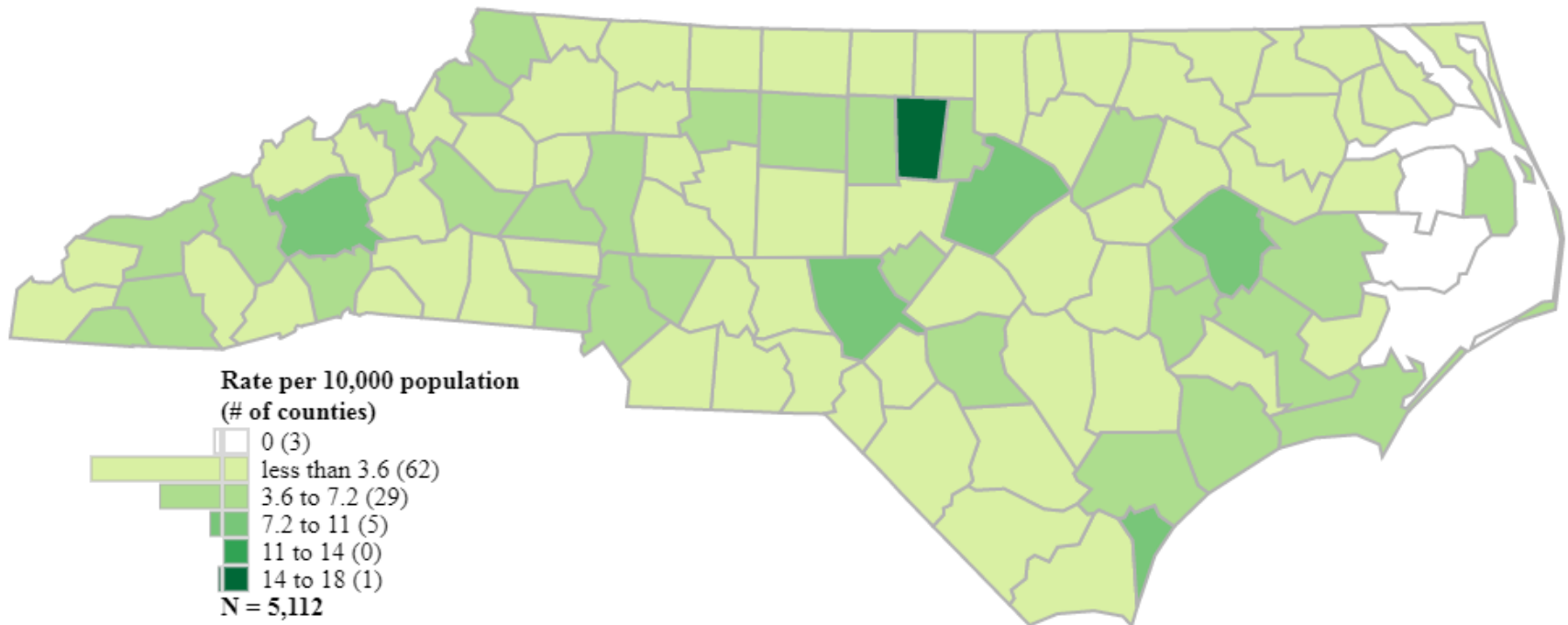


**5,112 Dentists**  
**6,153 Dental Hygienists**  
**in 2017**

Sources: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Dental Examiners, 2017. Data include all, active, in-state dentists and dental hygienists.

# Here's a map

**Dentists per 10,000 Population in 2017**



Notes: Data include active, licensed dentists in practice in North Carolina as of October 31 of each year. Dentist data are derived from the North Carolina State Board of Dental Examiners. Population census data and estimates are downloaded from the North Carolina Office of State Budget and Management via NC LINC and are based on US Census data. Source: North Carolina Health Professions Data System, Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Created January 26, 2018 at <https://nchealthworkforce.sirs.unc.edu/>.



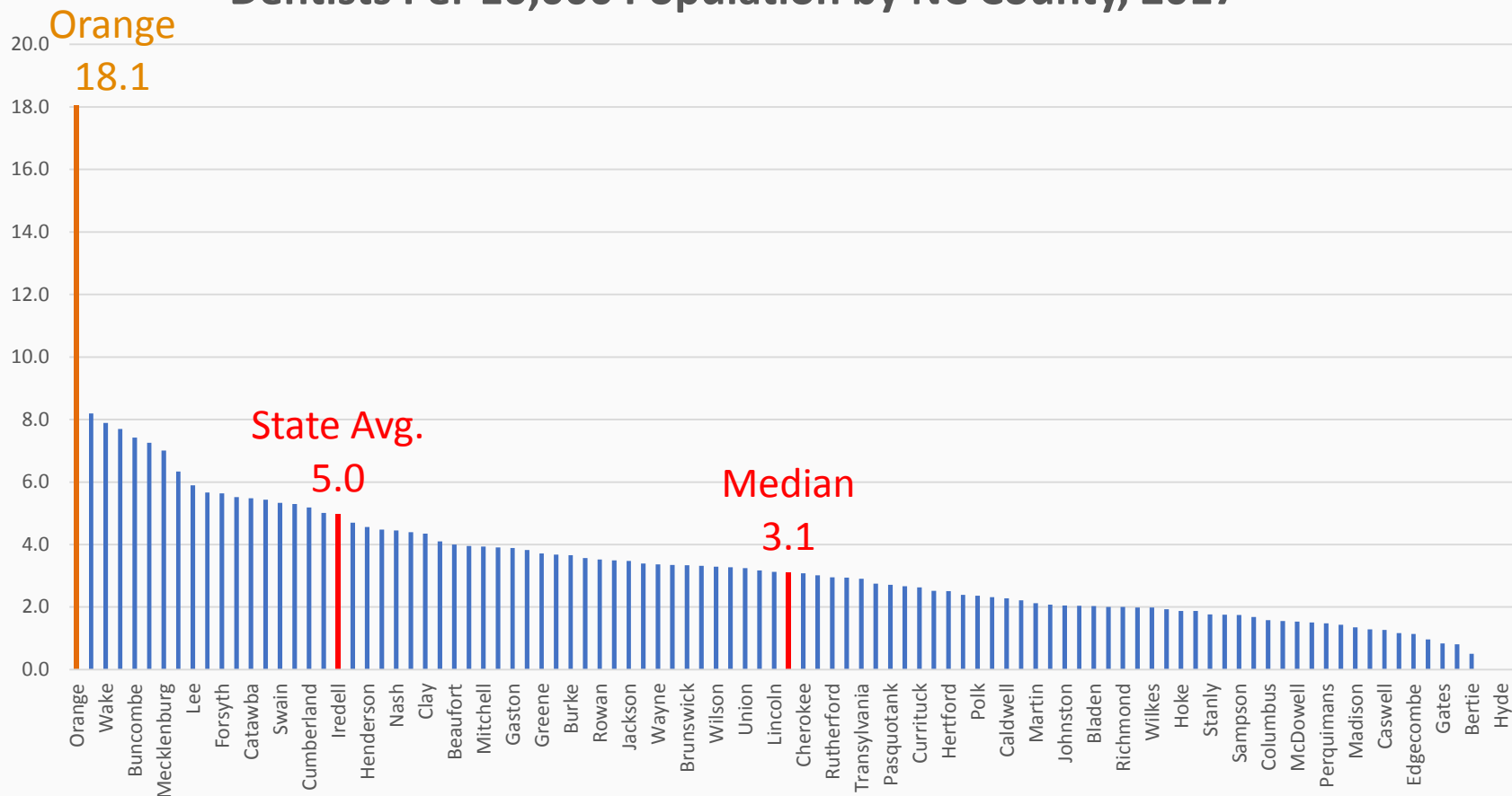
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# Orange County is an outlier

Dentists Per 10,000 Population by NC County, 2017



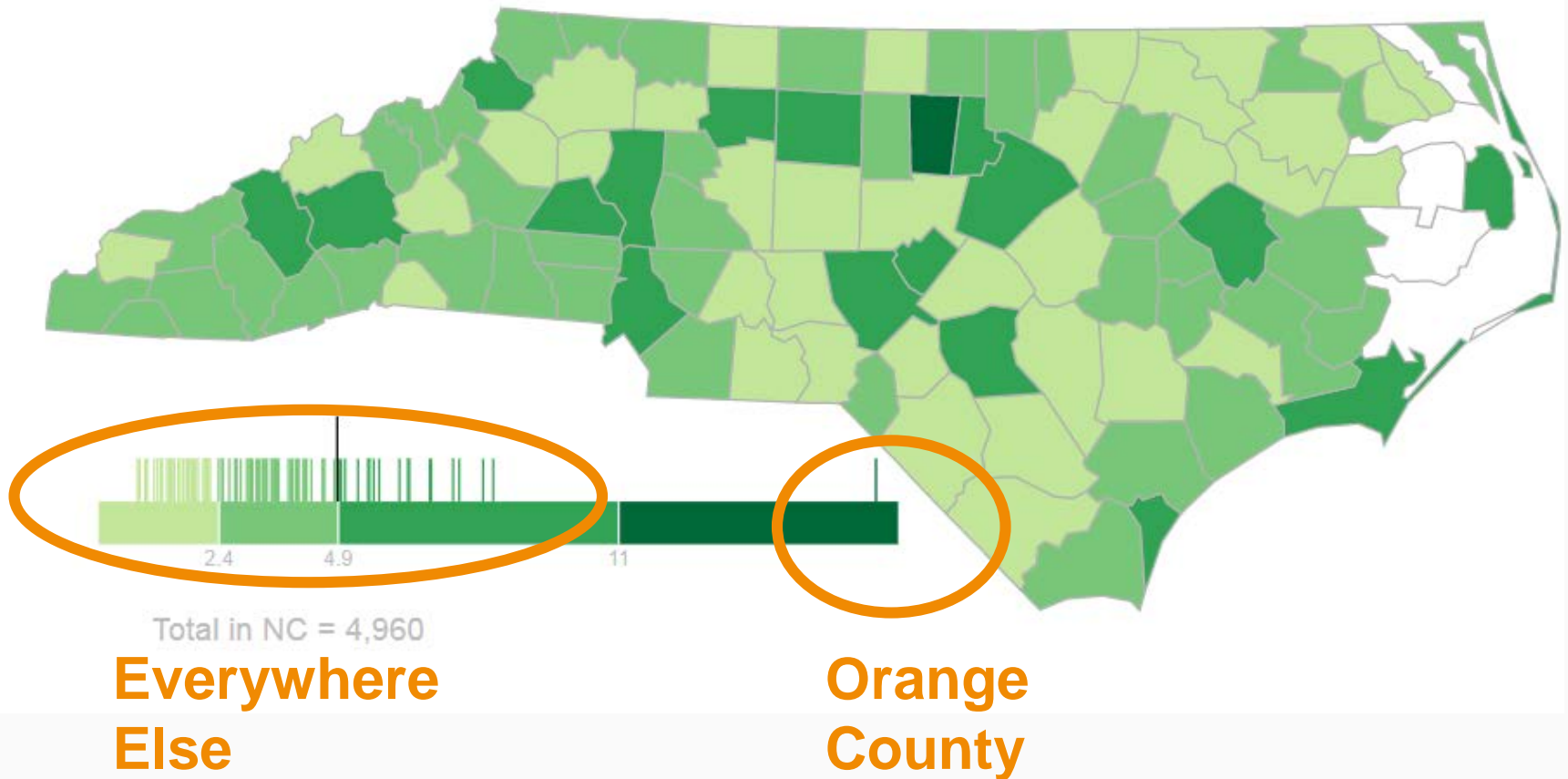
# (But that doesn't mean everyone in Orange County gets the dental care they need)

- 22% of respondents reported difficulty accessing dental care
- This access issue is not captured by the dentist-to-population ratio



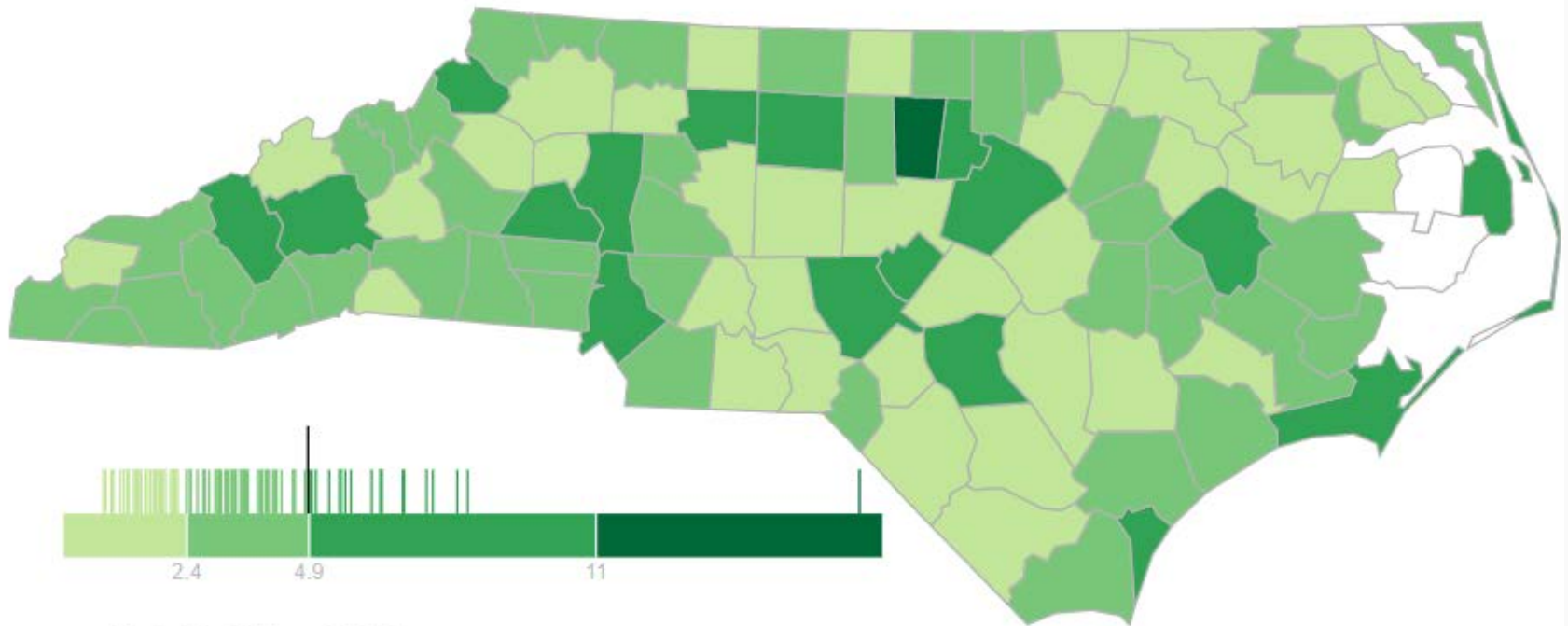
# Here's a Better Map

## Dentists Per 10,000 Population in 2016



# NC's Dentists are concentrated in one-fifth of the state's counties

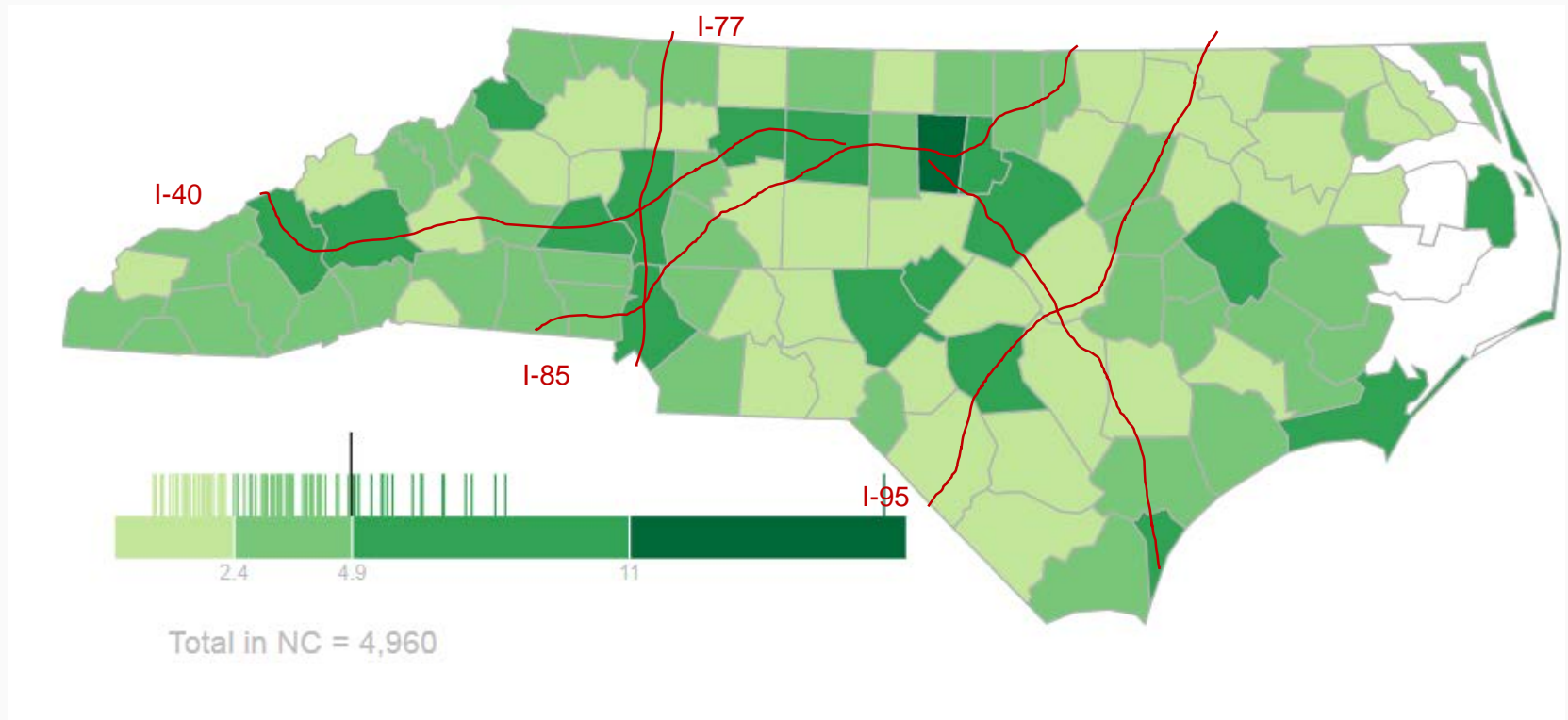
## Dentists Per 10,000 Population in 2016



Total in NC = 4,960

# Rural Areas Tend to Have Fewer Dentists Per Capita

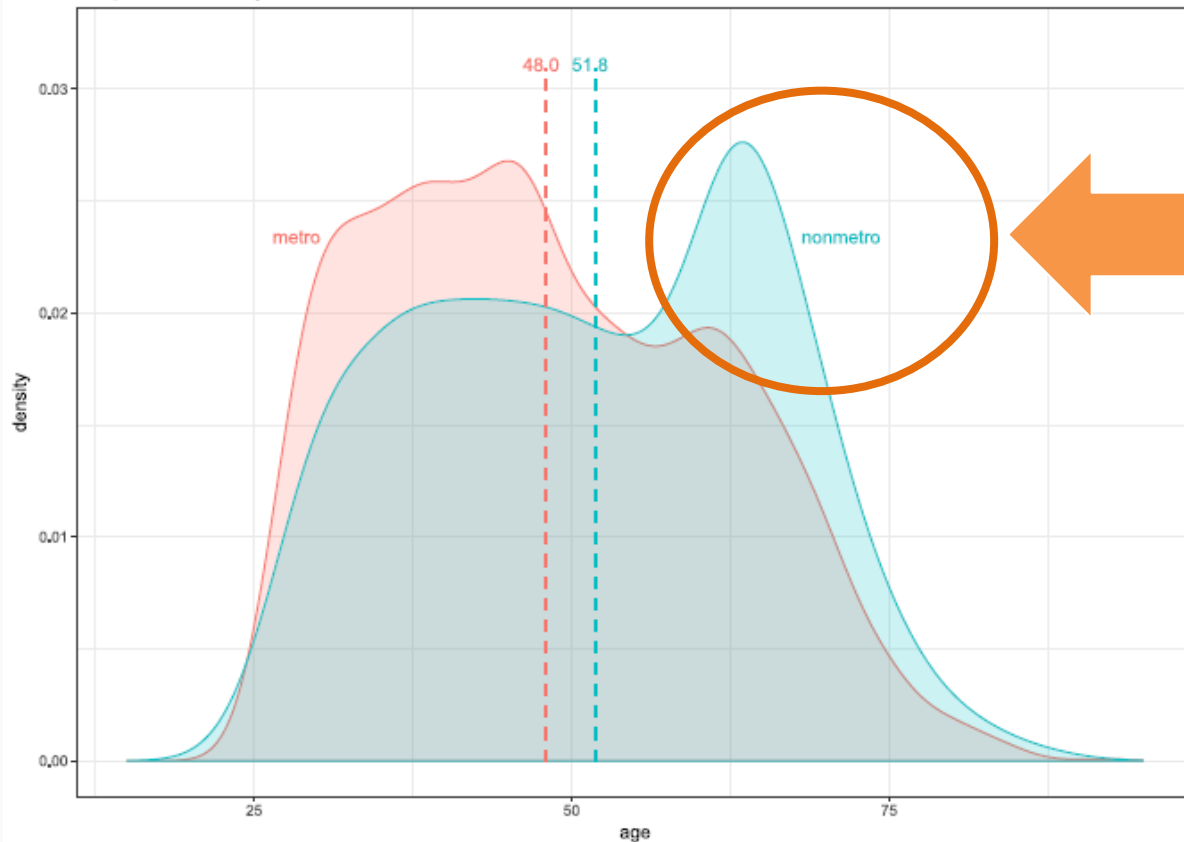
Dentists Per 10,000 Population in 2016



# Rural dentists are older

Dentist Age Distribution by Metro or Nonmetro Practice Location, North Carolina, 2017

Group mean indicated by dotted line.



What's this?

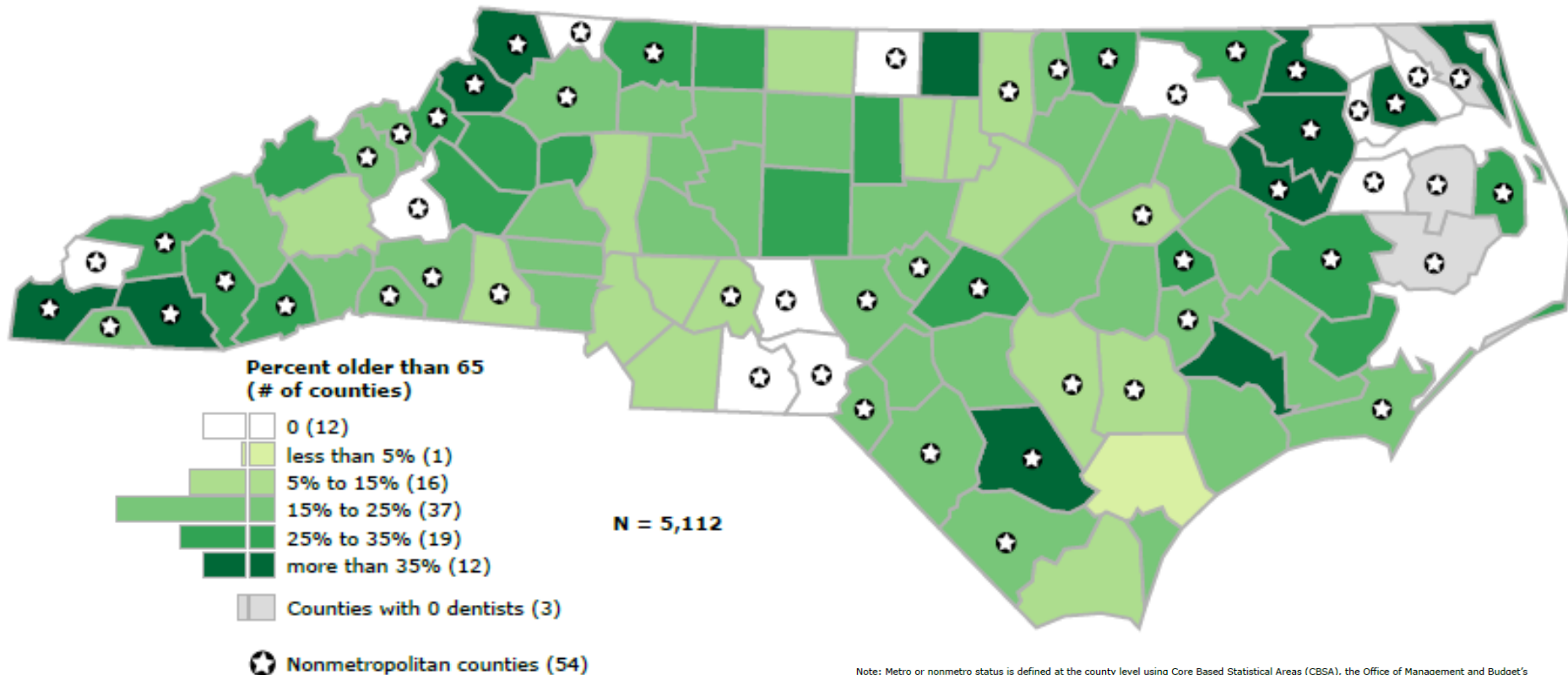
Note: Metro or nonmetro status is defined at the county level using Core Based Statistical Areas (CBSA), the Office of Management and Budget's collective term for Metropolitan and Micropolitan Statistical areas. Here, nonmetropolitan counties include micropolitan and counties outside of CBSAs. Data include active, in-state dentists licensed and practicing in North Carolina as of October 31, 2017.

Sources: North Carolina Health Professions Data System, <https://nchealthworkforce.sirs.unc.edu>, with data derived from the North Carolina State Board of Dental Examiners, 2017. 2010 Office of Management and Budget (OMB) Standards for Delineating Metropolitan and Micropolitan Statistical Areas, July 2015 Delineation file.

Produced by: The Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

# In 12 counties, one-third of the dentist workforce older than 65

Percent of Dentists in North Carolina Counties who were 65 or Older in 2017



Note: Metro or nonmetro status is defined at the county level using Core Based Statistical Areas (CBSA), the Office of Management and Budget's collective term for Metropolitan and Micropolitan Statistical areas. Here, nonmetropolitan counties include micropolitan and counties outside of CBSAs. Data include active, in-state dentists licensed and practicing in North Carolina as of October 31, 2017.

Sources: North Carolina Health Professions Data System, <https://nchealthworkforce.sirs.unc.edu>, with data derived from the North Carolina State Board of Dental Examiners, 2017. 2010 Office of Management and Budget (OMB) Standards for Delineating Metropolitan and Micropolitan Statistical Areas, July 2015 Delineation file.

Produced by: The Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

# Positive news: NC has gained dentists per capita, although still below national average

**Dentists Working in Dentistry per 10,000 Population**

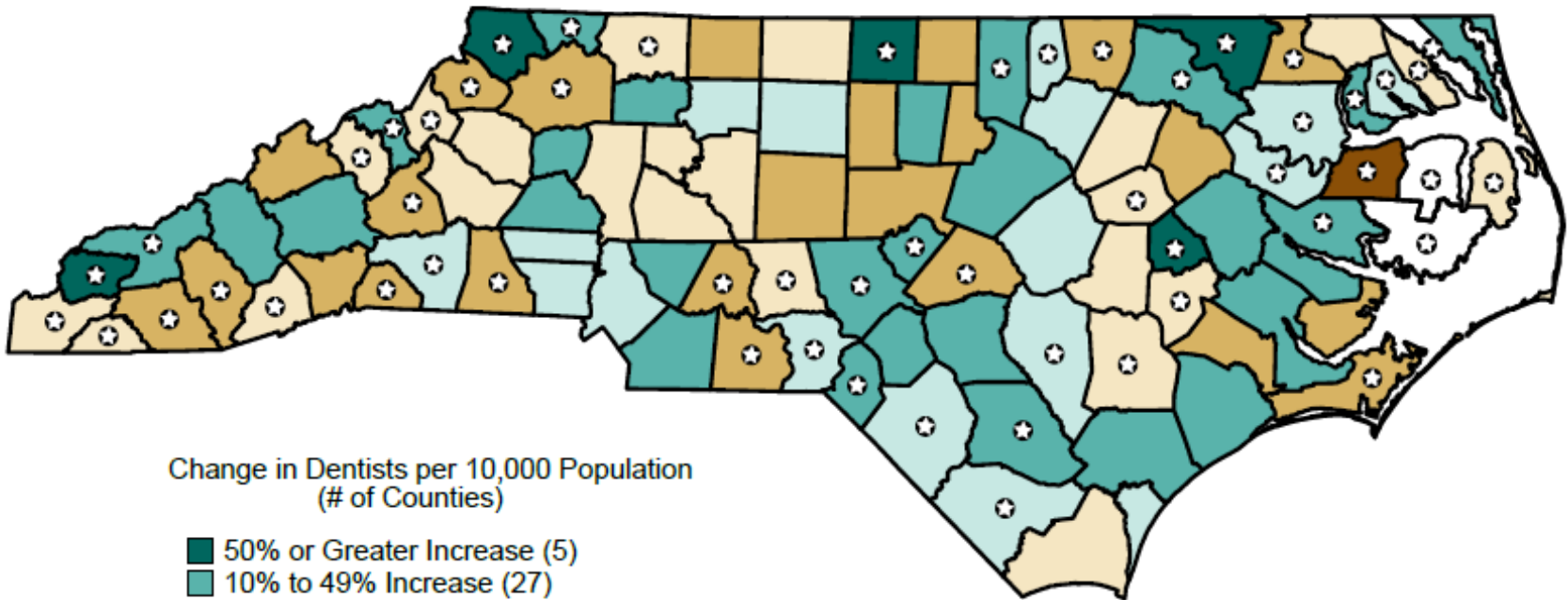
	2001		2013		2017	
	Rank	Ratio	Rank	Ratio	Rank	Ratio
<b>United States</b>		<b>5.7</b>		<b>6.0</b>		<b>6.1</b>
<b>North Carolina</b>	<b>47</b>	4.2	<b>44</b>	4.8	<b>37</b>	5.1

Source: Supply of Dentists in the U.S.: 2001-2017 (XLSX - Published January 2018).  
American Dental Association, Health Policy Institute analysis of ADA masterfile.  
Downloaded 1/30/2018 from <https://www.ada.org/en/science-research/health-policy-institute/data-center/supply-and-profile-of-dentists>



# Growth in the dental workforce in NC has been uneven

Change in Dentists per 10,000 Population  
North Carolina, 2013-2017

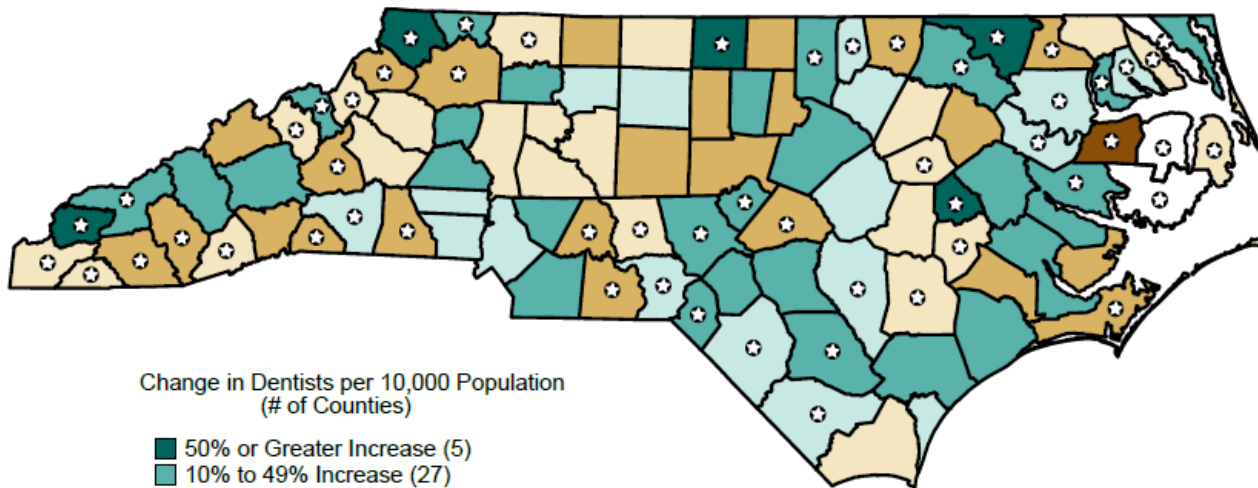


Source: North Carolina Health Professions Data System, with data derived from the NC State Board of Dental Examiners, 2013 & 2017. Nonmetropolitan definition derived from Office of Management and Budget CBSA delineation file, July, 2015.

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

# 551 dentists gained statewide between 2013-2017

Change in Dentists per 10,000 Population  
North Carolina, 2013-2017



12% total increase  
statewide  
+ movement  
between counties

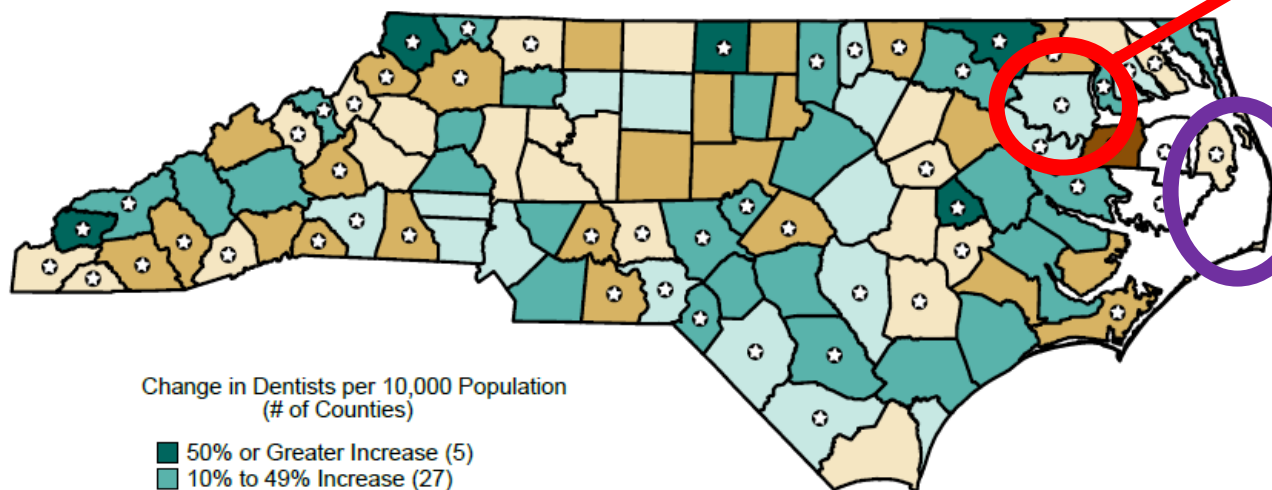
- 45 counties gained one or more dentists
- 34 counties lost one or more dentists
- 21 counties had no change

Source: North Carolina Health Professions Data System, with data derived from the NC State Board of Dental Examiners, 2013 & 2017. Nonmetropolitan definition derived from Office of Management and Budget CBSA delineation file, July, 2015.

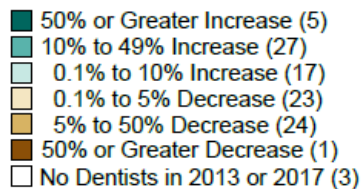
Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

# Some changes are due to population shifts

Change in Dentists per 10,000 Population  
North Carolina, 2013-2017



Change in Dentists per 10,000 Population  
(# of Counties)



★ Nonmetropolitan County

## Bertie County:

- 3% pop decrease
- 0 additional dentists

## Dare County:

- 4% pop increase
- 0 additional dentists

Source: North Carolina Health Professions Data System, with data derived from the NC State Board of Dental Examiners, 2013 & 2017. Nonmetropolitan definition derived from Office of Management and Budget CBSA delineation file, July, 2015.

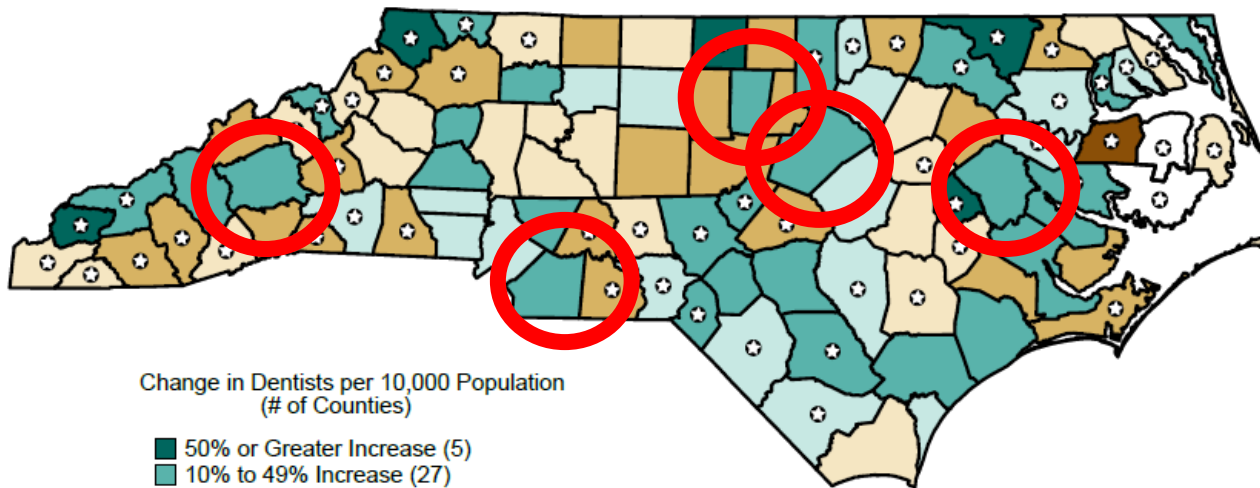
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# 72% of NC's dentist workforce growth occurred in 5 counties

Change in Dentists per 10,000 Population  
North Carolina, 2013-2017



- Buncombe
- Mecklenburg
- Orange
- Pitt
- Wake

\*n=397 of 551 dentists gained statewide

Source: North Carolina Health Professions Data System, with data derived from the NC State Board of Dental Examiners, 2013 & 2017. Nonmetropolitan definition derived from Office of Management and Budget CBSA delineation file, July, 2015.

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

# To summarize...

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- Dentist-to-population ratios have been the standard metric to estimate access to oral health services
- Concern about availability of dentists in rural areas on NC, particularly with rural dentists getting older
- Even in areas saturated with dentists (ex. Orange County) patients have difficulty accessing dental care
- We need to think about access in a more nuanced way

# We need a better way to measure access to oral health

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Access is more than “is there a provider nearby?”

From a workforce perspective:

- Accept Medicaid? Sliding fees?
- Culturally competent? Understand patient context?
- Office accessible by public transport? Hours that work for patients?
- Etc.

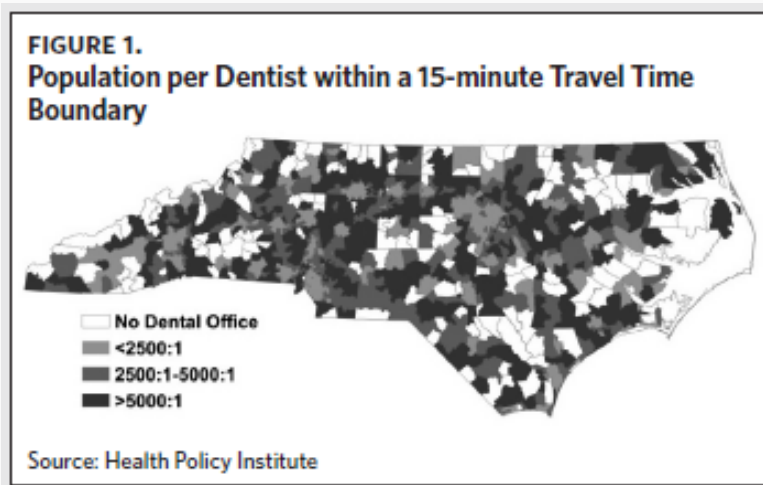
# Q. Why haven't we done a better job measuring access?

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A. Because it is hard to get the data to do these analyses

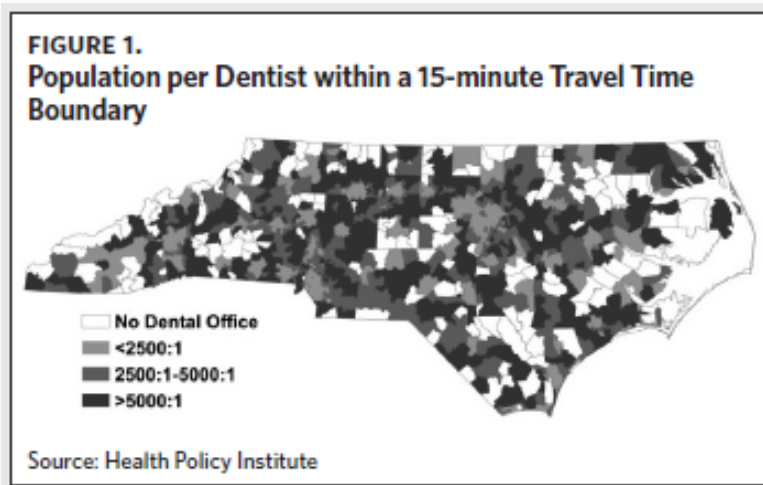
# 2017 NCMJ Article: Medicaid/CHIP Dentists within 15 minute travel time

- Unit of geography = census tract
  - Much smaller than county
- Practice location for dentists enrolled in Medicaid
- Accounts for travel times for patients



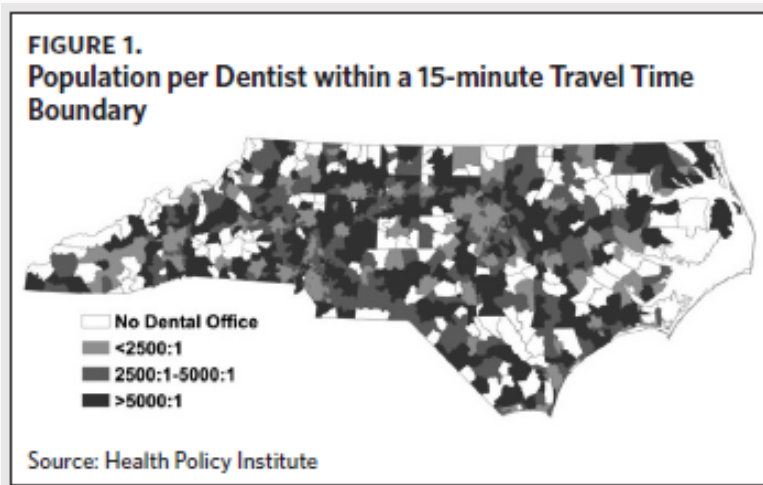
# 2017 NCMJ Article: Medicaid/CHIP Dentists within 15 minute travel time

- Reason to be skeptical about conclusion that 90% of NC kids within 15 mins of Medicaid dentist
  - Limited by data availability on meaningful participation in Medicaid
  - Proximity  $\neq$  Service Use



# NCMJ Article: Medicaid/CHIP Dentists within 15 minute travel time

- **BUT**: this is a more nuanced way to measure access to dentist services for a specific population
- Vujicic & colleagues working to refine methods & data sources to improve accuracy



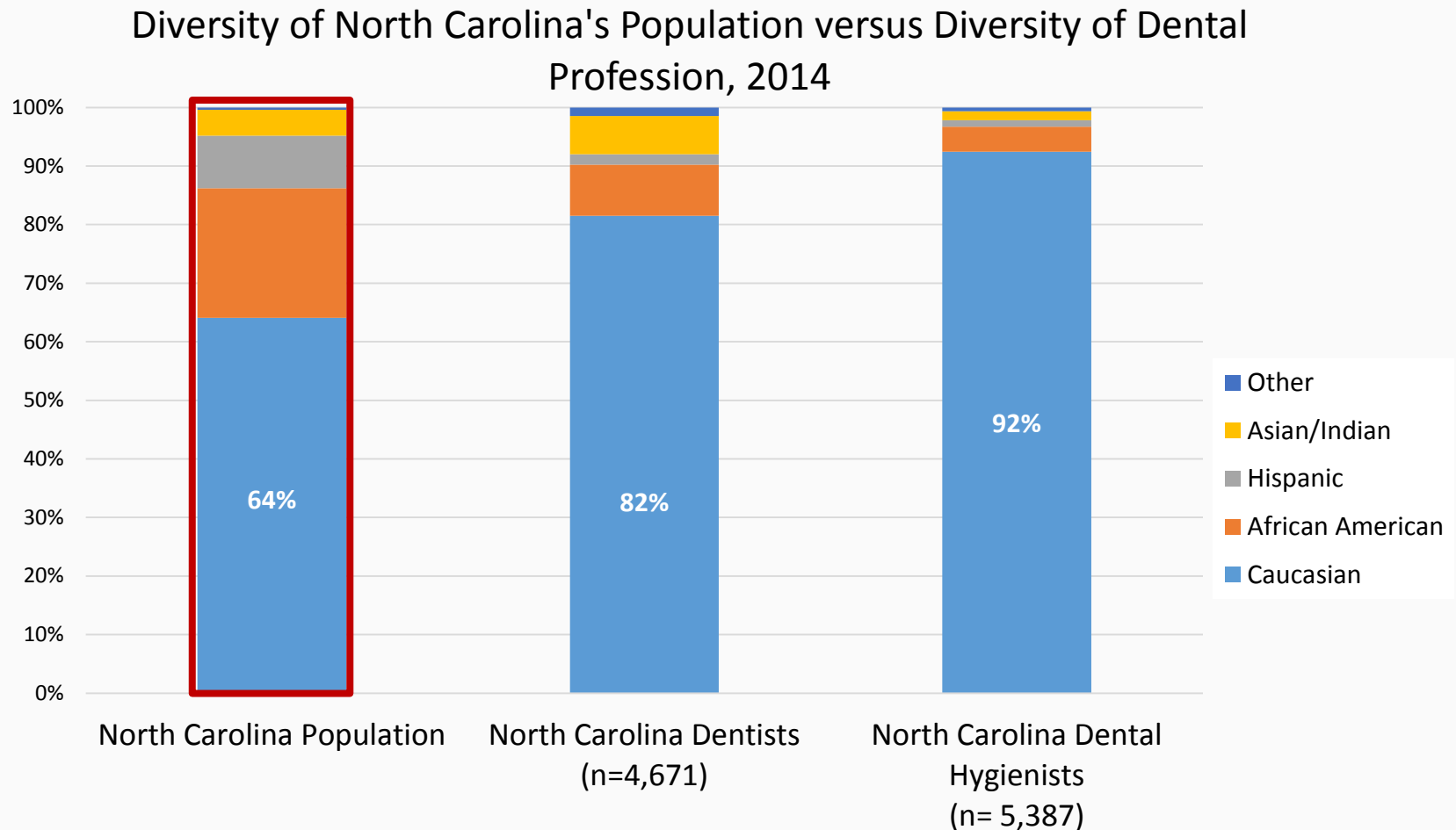
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# **Racial & Ethnic Diversity**

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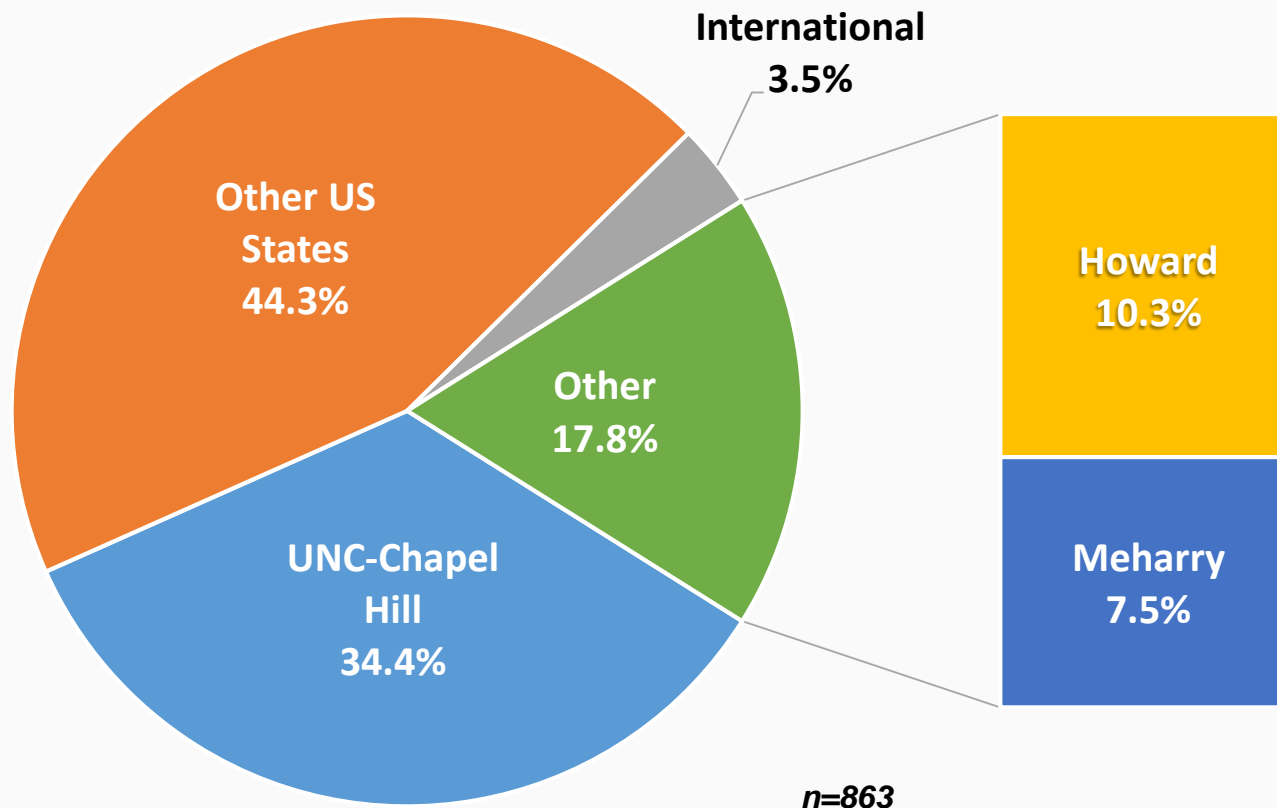
# Race/Ethnicity of dentist and dental hygienist workforce falls short of matching population diversity



Source: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2014. Data include active, in-state dentists and dental hygienists as of October 31. 10 dentists and 411 dental hygienists missing race information were omitted from analyses. Population data from US Census..

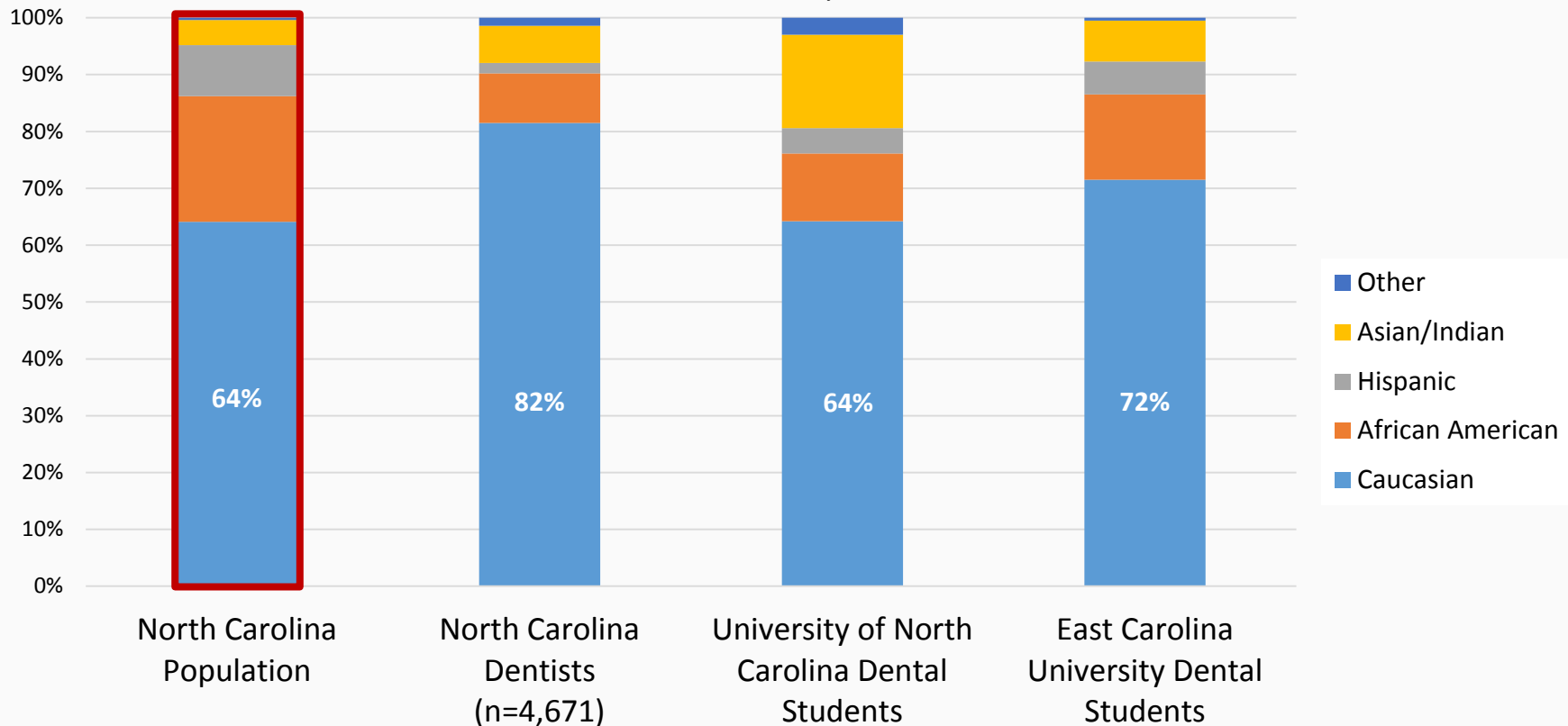
# Most of NC's non-white dentists were educated out of state

**Non-White Dentists by School  
North Carolina, 2014**



# UNC and ECU dental students more closely reflect NC's diverse population

Diversity of North Carolina's Population versus Diversity of NC Dentists and Dental Students, 2014



Source: North Carolina Health Professions Data System with data derived from the North Carolina State Board of Dental Examiners, 2014. Data include active, in-state dentists and dental hygienists as of October 31. 10 dentists and 411 dental hygienists missing race information were omitted from analyses. Population data from US Census. Student data from University of North Carolina at Chapel Hill and East Carolina University for the graduating classes of 2015-2019.

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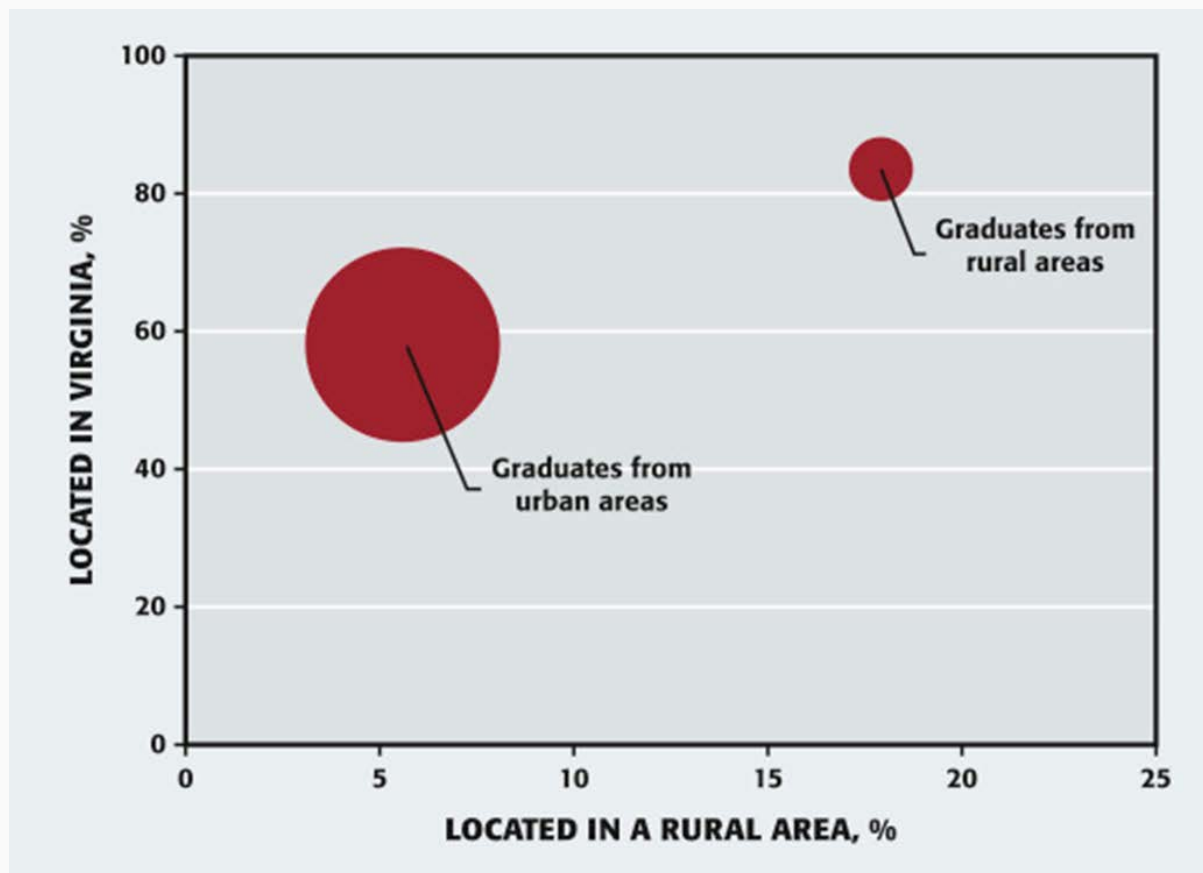
# **Education as a Policy Lever for Dentist Access in Rural Areas**

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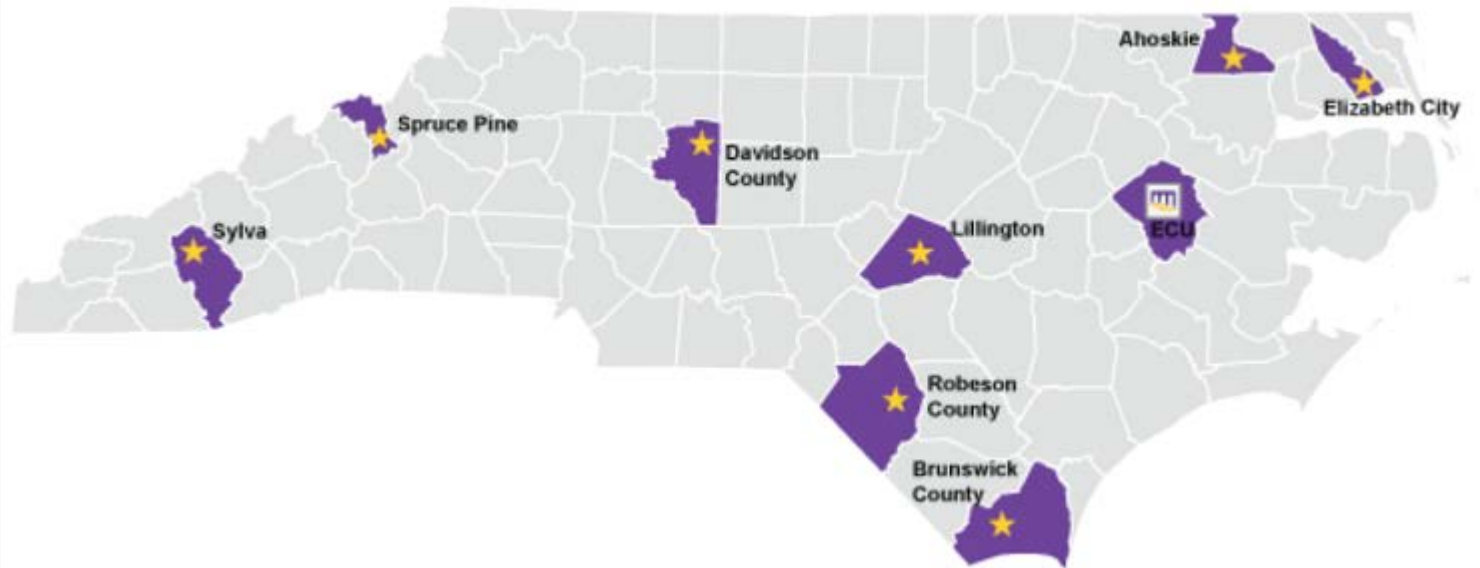
# Dentists from rural places are more likely to practice in rural places

**Virginia Commonwealth University Dental School Graduates practicing in VA and in rural areas, classes of 2000-2014**

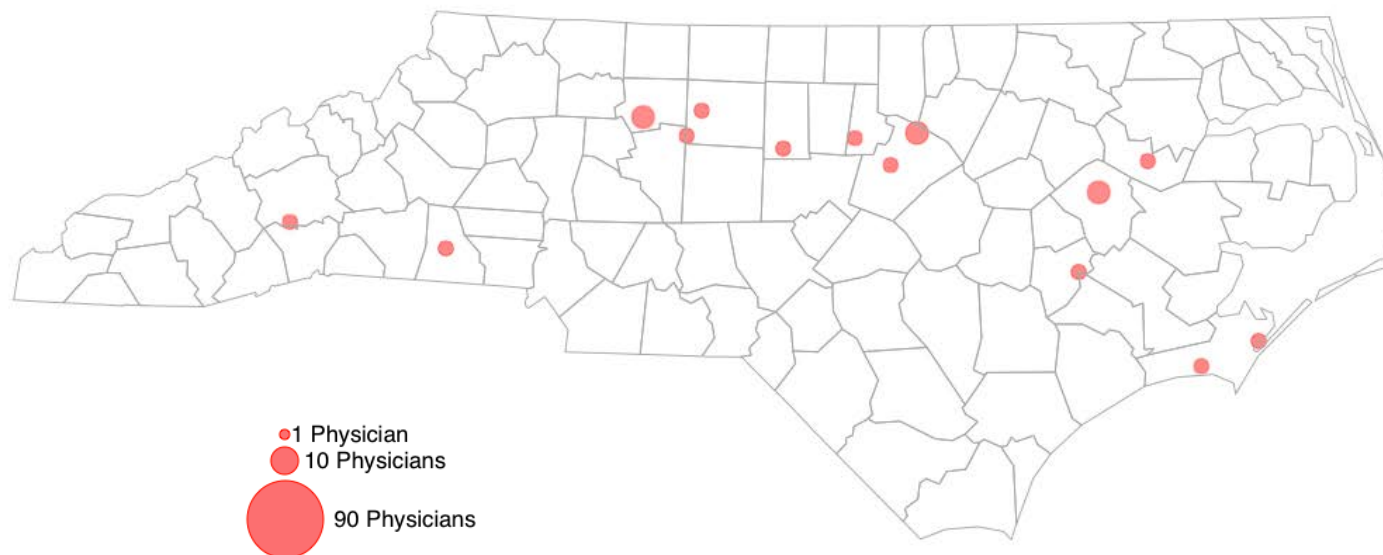


# How will ECU's Dental School affect NC's dentist supply?

- Admit students who are NC residents
- Mission focused on underserved communities: train in Community Service Learning Centers
- 1<sup>st</sup> class graduated 2015 = it's too early to evaluate outcomes

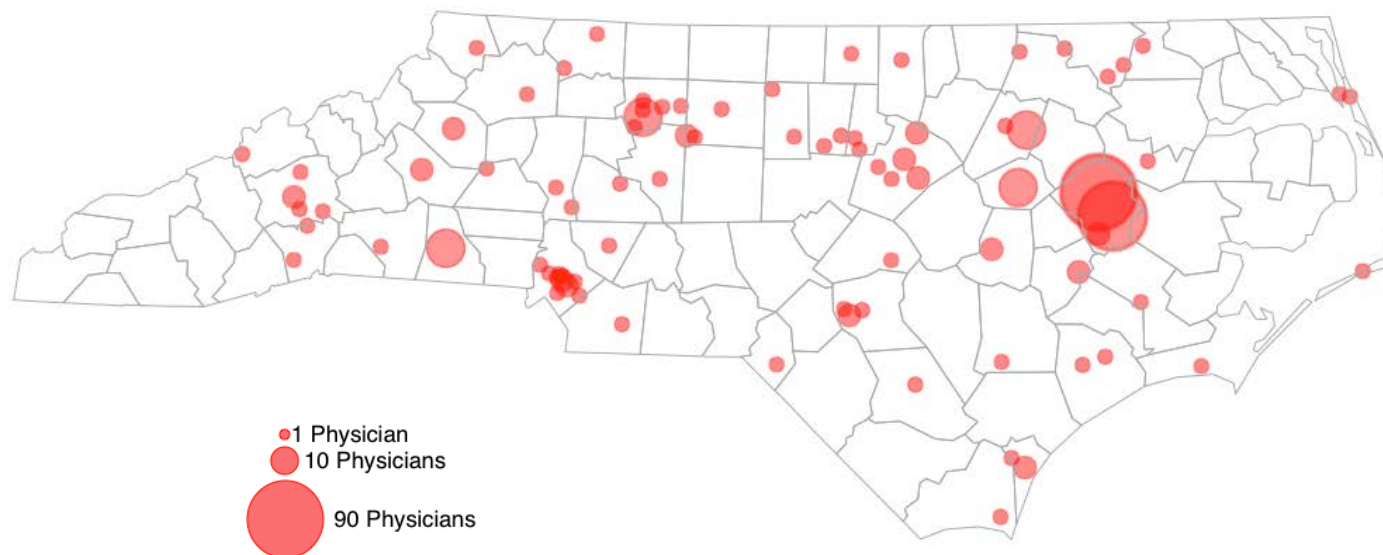


# Graduates of Brody School of Medicine at East Carolina University 1985



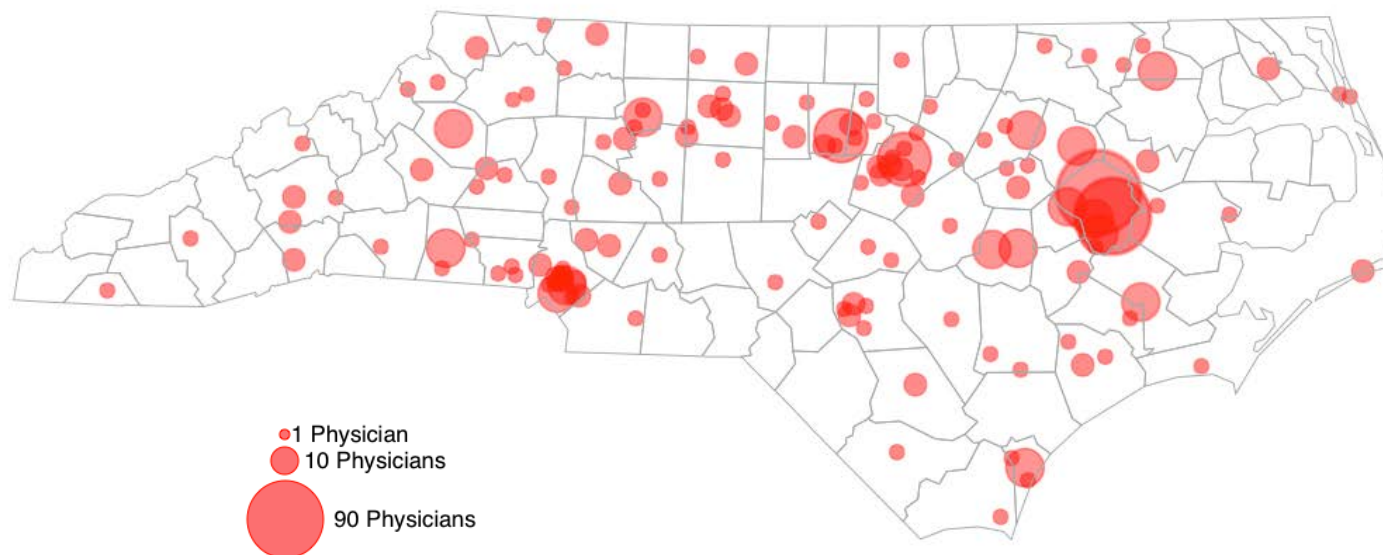
Produced by the Program on Health Workforce Research and Policy at the Cecil G. Sheps Center at UNC-CH, 2017. Data are derived from the North Carolina Medical Board annual licensure file as of October 31 of year indicated. Data include physicians in active practice in North Carolina who are not employed by the federal government and are not in residency training.

# Graduates of Brody School of Medicine at East Carolina University 1990



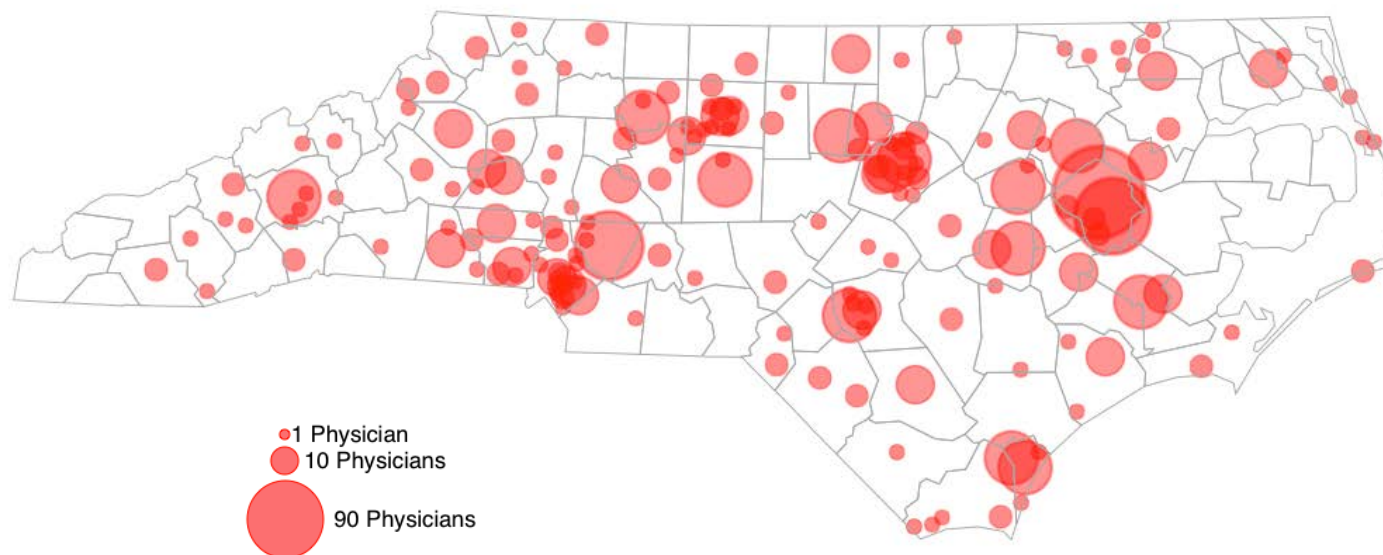
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# Graduates of Brody School of Medicine at East Carolina University 1995



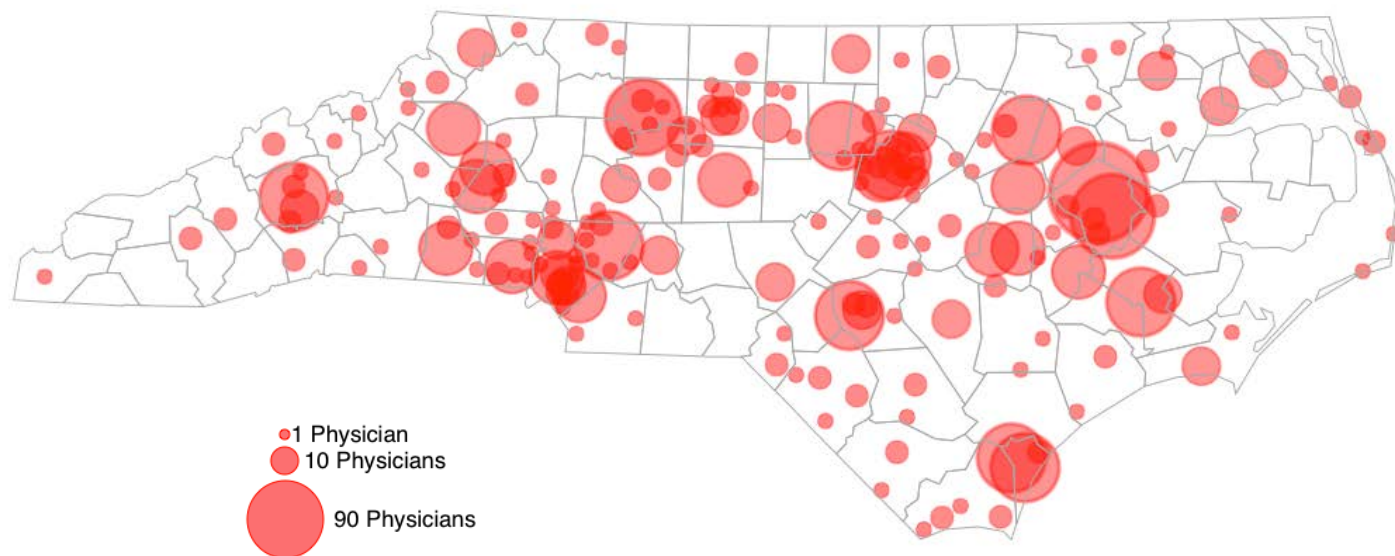
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# Graduates of Brody School of Medicine at East Carolina University 2000



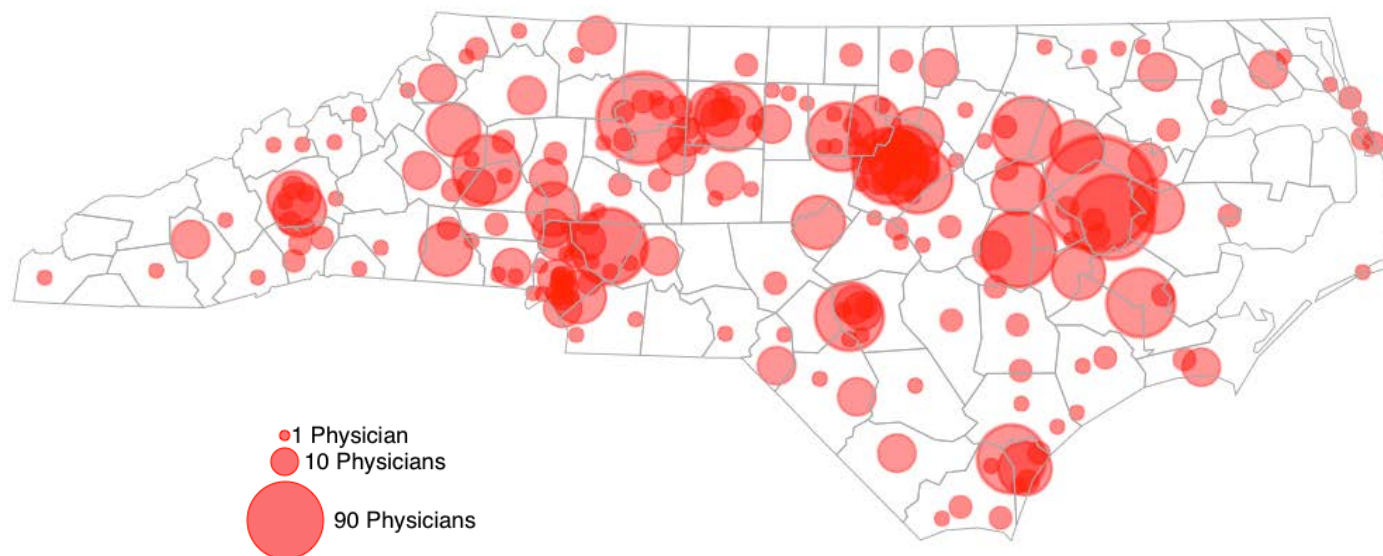
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# Graduates of Brody School of Medicine at East Carolina University 2005



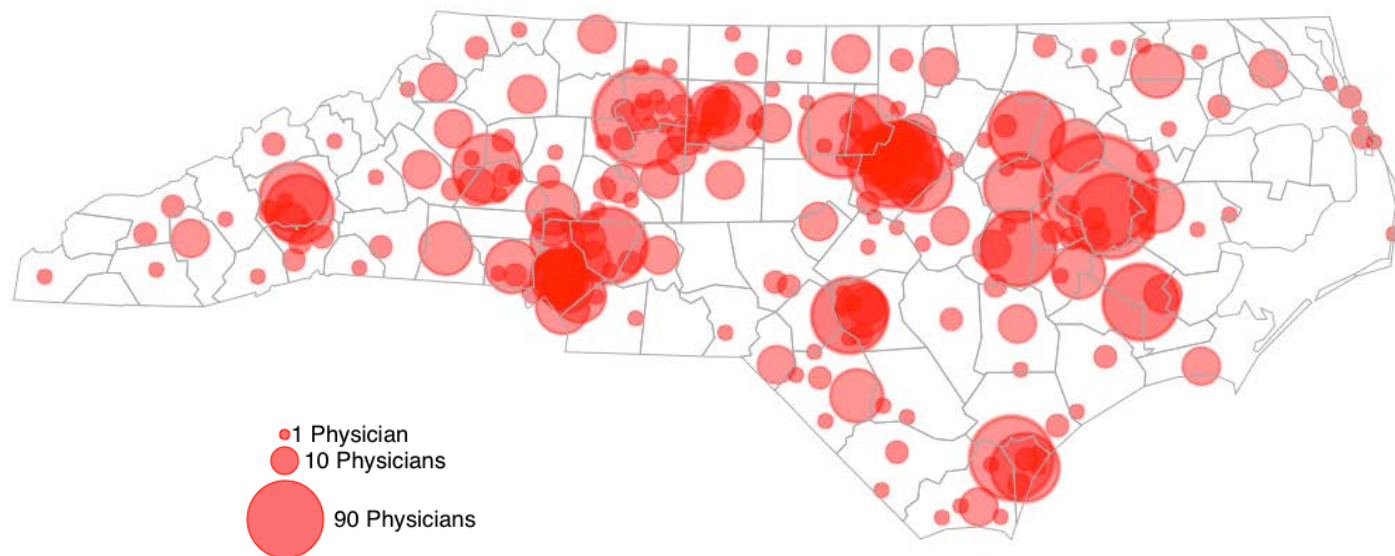
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# Graduates of Brody School of Medicine at East Carolina University 2010



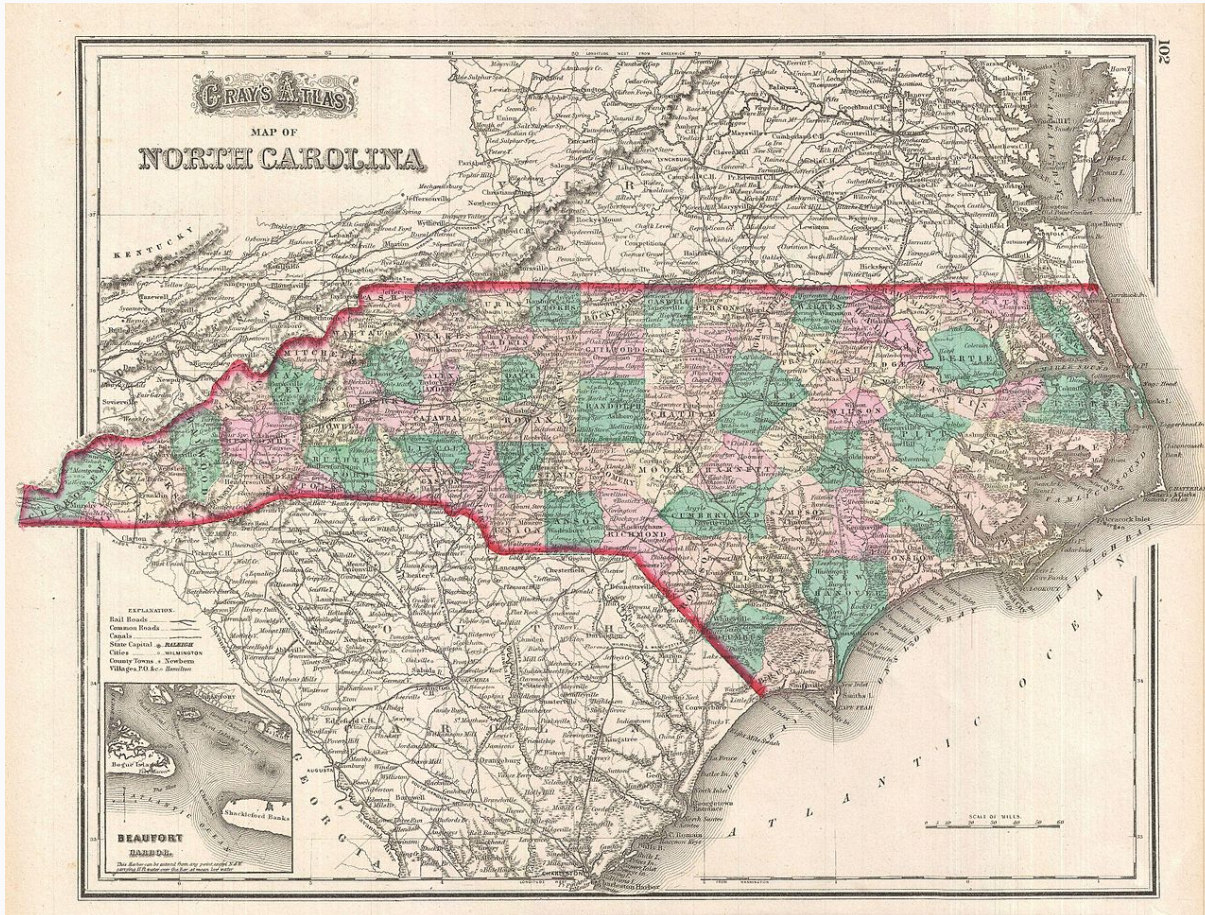
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# Graduates of Brody School of Medicine at East Carolina University 2015



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# How can we improve access to oral health services in NC?



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# **The questions we should be asking...**

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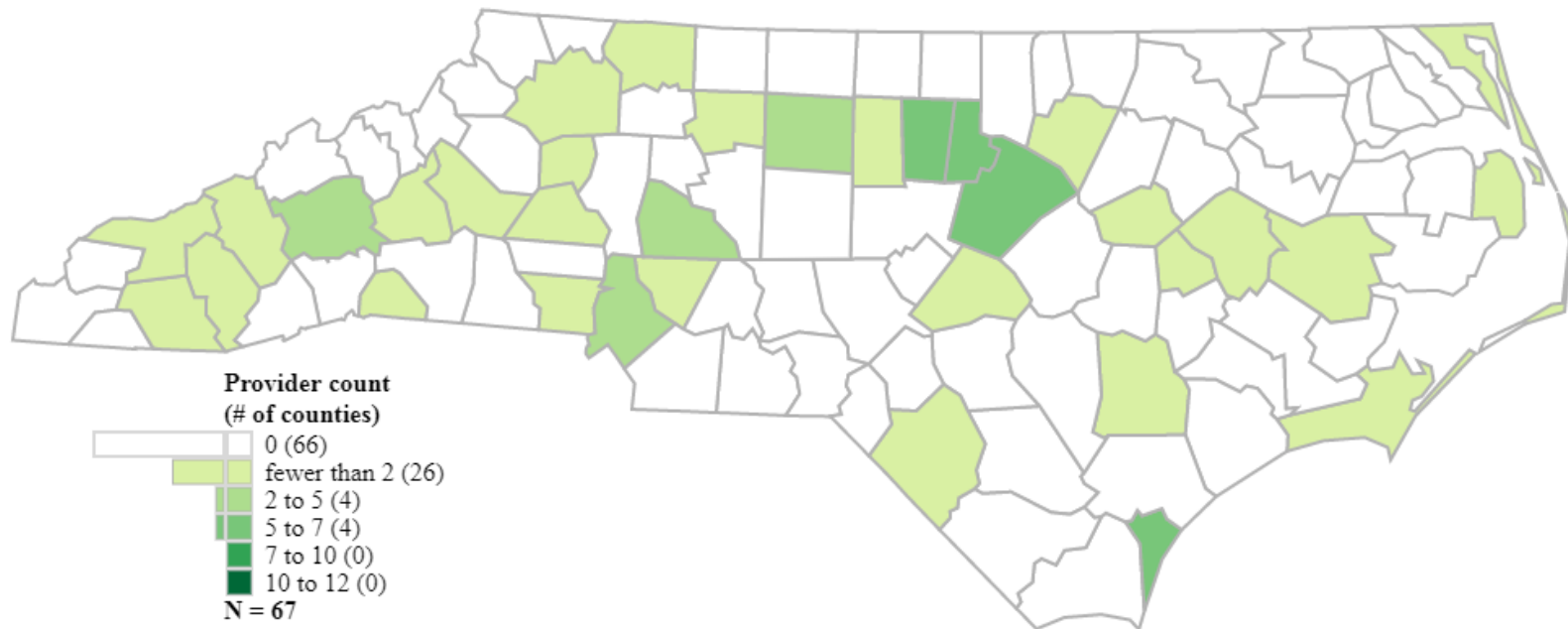
# Education

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- Who are we admitting to dental school?
  - Consider rural backgrounds, diversity?
- Learning opportunities in rural/underserved communities?
  - UNC DISC Program, ECU Service Learning Centers
- Education in dental public health?
  - How are special populations different?

# Public Health Dentists, 2017 (n=67)

Total Number of Dentists with a Specialty of Dental Public Health in 2017



Notes: Data include active, licensed dentists in practice in North Carolina as of October 31 of each year. Dentist data are derived from the North Carolina State Board of Dental Examiners. Population census data and estimates are downloaded from the North Carolina Office of State Budget and Management via NC LINC and are based on US Census data. Source: North Carolina Health Professions Data System, Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Created January 31, 2018 at <https://nchealthworkforce.sirs.unc.edu/>.



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# Is public funding targeted to state oral health needs?

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- Adequate funding for dental public health positions?
- Maximizing the impact of loan repayment programs?
  - State and Federal

# Can we use Medicaid as a lever for improved access?

- NC is one of 15 states where Medicaid offers adults “extensive” dental benefits<sup>1</sup>
- In 2012, fewer than 50% of NC’s dentists accepted Medicaid patients<sup>2</sup>
  - Just a quarter were ‘significant providers,’ billing \$10,000 or more<sup>2</sup>
  - Medicaid runs at a loss for some providers
- NC hasn’t raised reimbursement rates since 2008
  - Data show a correlation between increased Medicaid dental fees for kids and utilization<sup>3</sup>

1. Chazin S. Dental Coverage and Access for Adults in Medicaid: Opportunities for States. Center for Healthcare Strategies, Inc. Powerpoint presented February 17, 2015. Accessed 16 Sept 2016 from: [http://www.chcs.org/media/Dental-Coverage-and-Access-for-Adults-in-Medicaid\\_Opportunities-for-States\\_Final\\_4-20-2015\\_revised.pdf](http://www.chcs.org/media/Dental-Coverage-and-Access-for-Adults-in-Medicaid_Opportunities-for-States_Final_4-20-2015_revised.pdf)
2. Casey MW. The State of Medicaid and SHIP Dental Services in North Carolina. Powerpoint presented on December 14, 2012 at the Taskforce on Children's Preventive Oral Health Services, NCIOM. Accessed 16 September 2016 from: [http://www.nciom.org/wp-content/uploads/2012/11/OH\\_Casey\\_12-14-12.pdf](http://www.nciom.org/wp-content/uploads/2012/11/OH_Casey_12-14-12.pdf)
3. Beasoglou et. al. Impact of fee increases on dental utilization rates for children living in Connecticut and enrolled in Medicaid. JADA, 2015. 146(1):52-60.

# Thinking beyond dentists: who is on the patient's oral healthcare team?

Dental	Interprofessional/ Non-Dental
Dentists	Primary Care Physicians, NPs, PAs
Dental Hygienists	Patient Centered Medical Home (PCMH) Staff
Dental Assistants	ED staff (triage)
Dental Laboratory Technicians	Social Workers, Care managers
Community Dental Health Coordinators	
Dental Therapists	

Move to Accountable Care Organizations (ACOs): how does oral healthcare fit within whole person care?

# Integrating Oral Health Care into Primary Care

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- Move dental care out of 'siloed' model?
- Train primary care team & designate someone responsible for oral health
  - Physician, NP/PA, Nurse, LPN, Medical Assistant
  - Screen for oral health risk & examine mouth
  - Oral hygiene training and patient referral
  - Apply fluoride varnish
- NP in dentist office? Dental Hygienist in PCMH?
- Tele-dentistry?

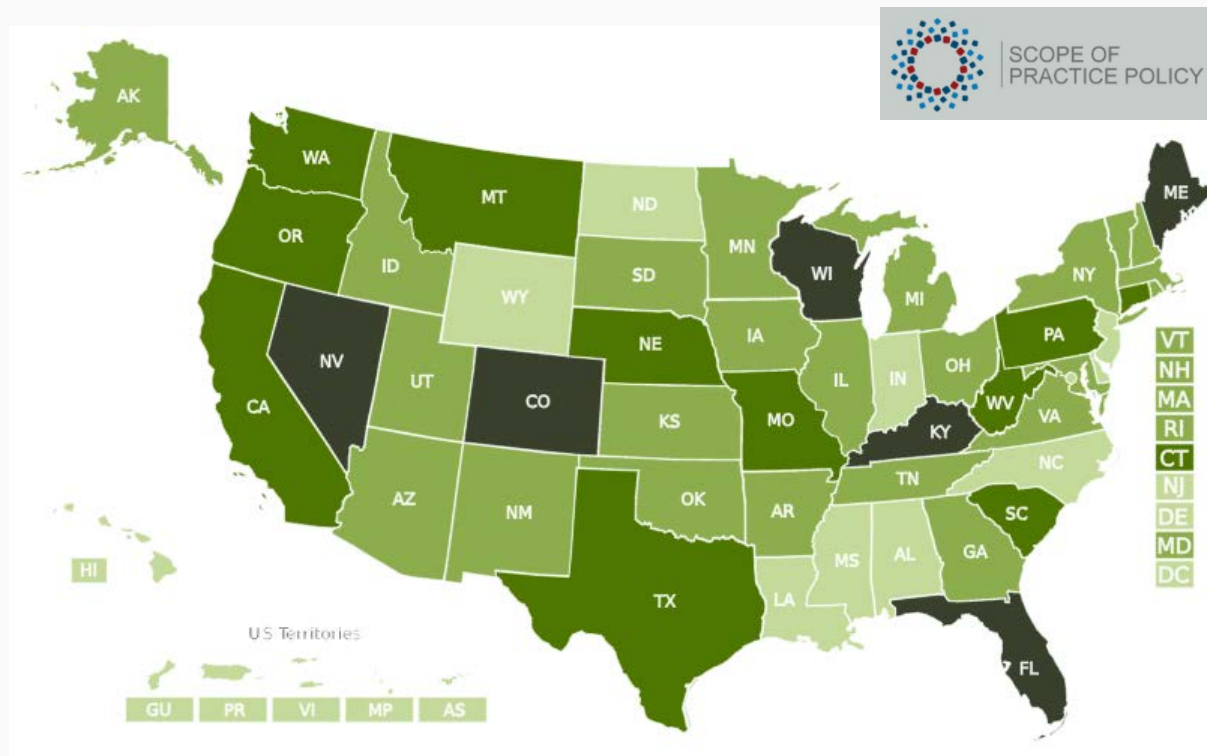


# Dental Hygienists

- State laws vary regarding where hygienists can practice independently and what services they can provide
- “Direct access” hygienists assess and treat patients without specific authorization/ presence of a dentist on-site
- States where hygienists practice independently in public health settings have more FQHCs that deliver dental services<sup>1</sup>

1. Maxey HL, Norwood CW, Liu Z. 2016. State policy environment and the dental safety net: a case study of processional practice environment' effect on dental service availability in Federally Qualified Health Centers. J Pub Health Dent. Epub.

# Direct Access Dental Hygienists, 2017



No direct access



Education or practice hours required

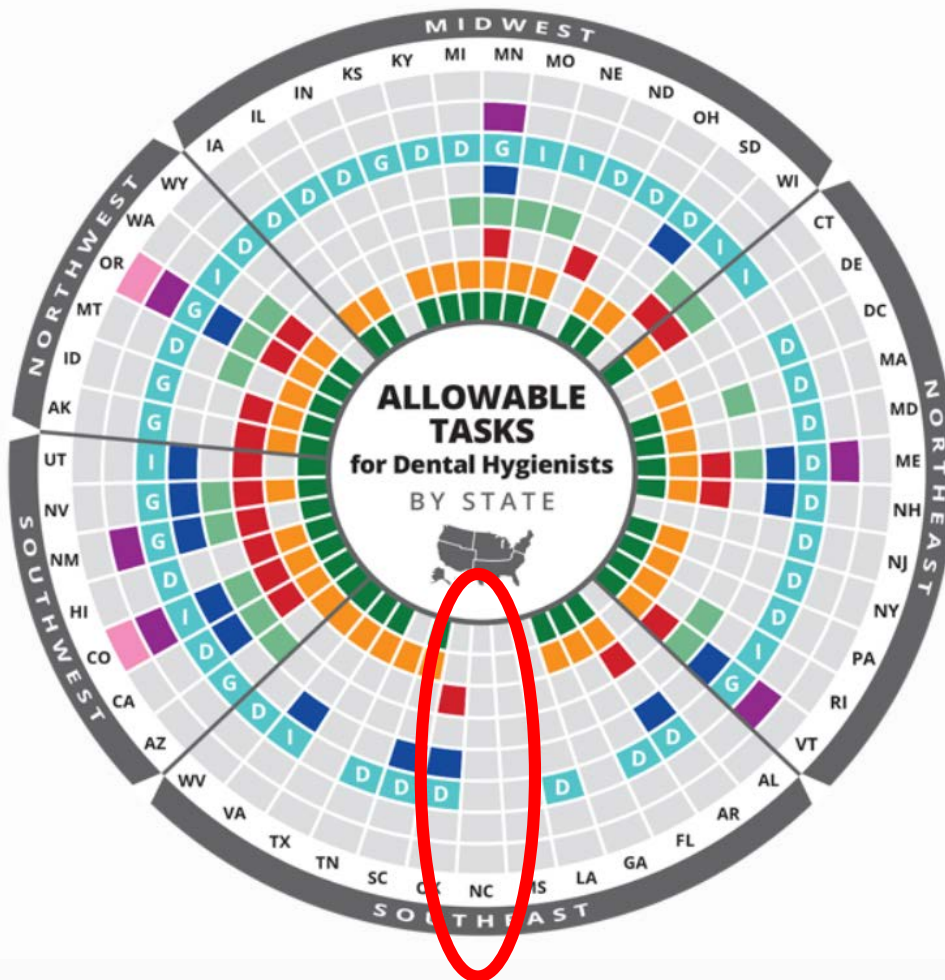


Collaborative agreement or supervision required



No supervision required

# Compared to other states, NC has a restrictive dental hygiene practice act



- Dental Hygiene Diagnosis
- Prescriptive Authority
- Local Anesthesia
- D Direct I Indirect\* G General
- Supervision of Dental Assistants
- Direct Medicaid Reimbursement
- Dental Hygiene Treatment Planning
- Provision of Sealants
- Direct Access to Prophylaxis
- Not Allowed / No Law



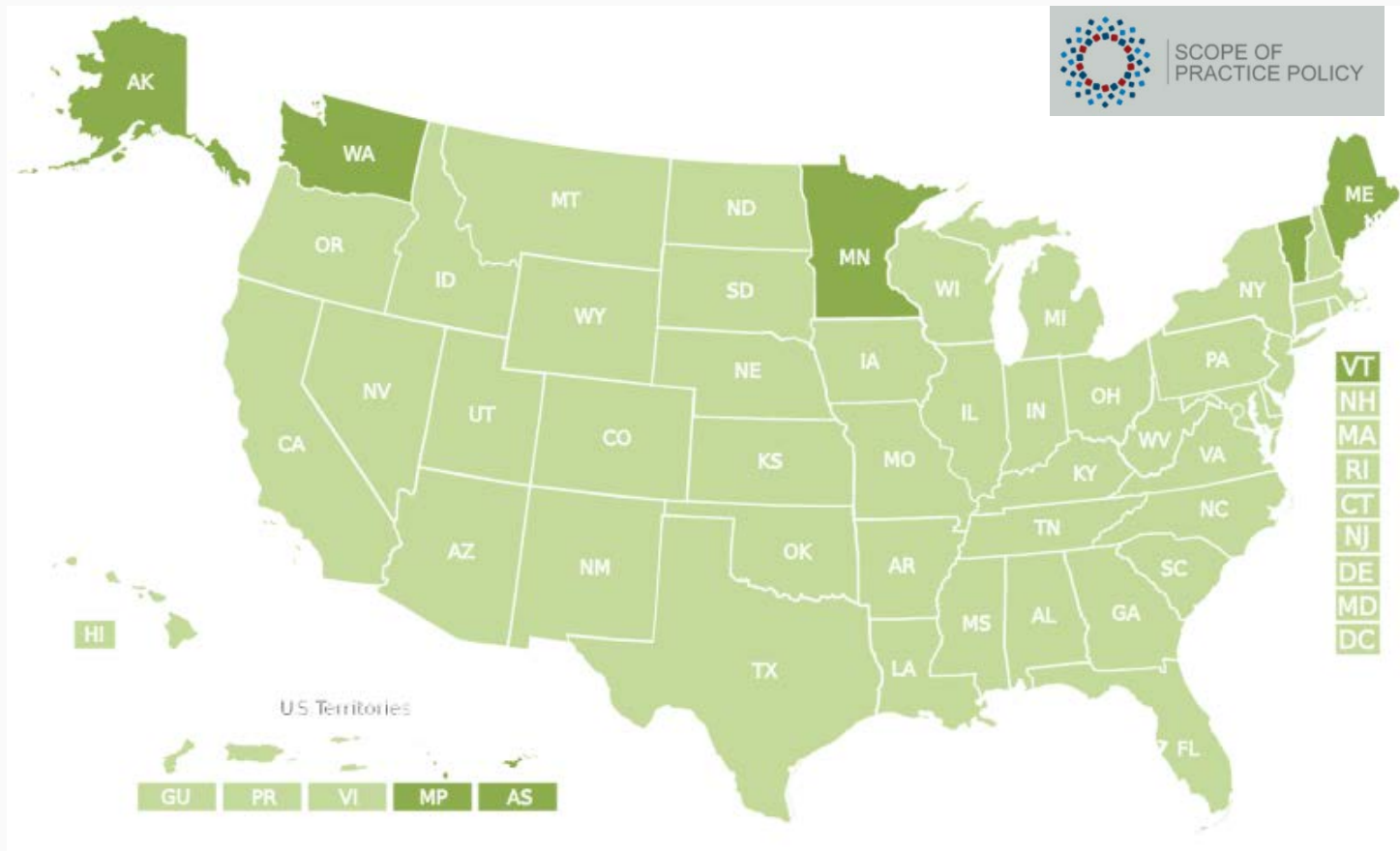
<http://www.oralhealthworkforce.org/resources/variation-in-dental-hygiene-scope-of-practice-by-state/> Accessed 2/1/2018

# Dental Therapists

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- Provide preventive and restorative care
  - Oral exams, restorations, simple extractions, place crowns, etc.
  - Refer more complicated services to dentist
- Fewer than 100 practice in the United States
- See article for summary of dental therapist legislation in AK, ME, MN, VT:
  - Koppelman, J., Vitzthum, K., & Simon, L. 2016. Expanding Where Dental Therapists Can Practice Could Increase Americans' Access To Cost-Efficient Care. *Health Affairs*, 35(12), 2200-2206.

# Dental Therapists, 2017



Map credit: <http://scopeofpracticepolicy.org/practitioners/oral-health-providers/> Accessed 2/1/18

# Questions?

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