Toward a Better Understanding of Physician Career Transitions and Trajectories

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Disclaimer

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This presentation in one slide

- Describe our data on 21 licensed health professional groups in North Carolina
- Give examples of how the data have been used to inform health workforce policy discussions
- Outline how life course theory can improve our understanding of physician career trajectories and inform health workforce:
  - Research
  - Methods
  - Policy
- Seek your input on work-in-progress research
- Identify opportunities for future collaboration

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Who Are We?

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

THE CECIL G. SHEPS CENTER FOR HEALTH SERVICES RESEARCH

Health Workforce Research and Policy

SHEPS HEALTH WORKFORCE NC

Carolina HEALTH WORKFORCE Research Center

UNIVERSITY OF NORTH CAROLINA BEHAVIORAL HEALTH WORKFORCE RESEARCH CENTER

SHEPS HEALTH WORKFORCE NC

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
- Independent of government and health care professionals
- We do not represent a particular profession, specialty or educational institution
- Primarily grant-funded
- We collect, analyze and disseminate data on the demographic, training, practice and geographic characteristics of licensed 21 health professions

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North Carolina's Health Workforce Data

- Over 40 years of continuous licensure (***not survey***) data. Because license is required to practice, data represent complete census of the workforce in North Carolina
- Data are provided ***voluntarily*** by licensing boards—there is no legislation that requires this, there is no funding from policy makers
- Data are housed at Sheps Center but remain property of licensing board, permission sought for each "new" use

We have annual data files for 21 health professions, 1980-present

- Physicians (MDs & DOs)
- Physician Assistants
- Dentists
- Dental Hygienists
- Optometrists
- Pharmacists
- Physical Therapists
- Physical Therapist Assistants
- Respiratory Therapists (2004)
- Chiropractors
- Registered Nurses
- Licensed Practical Nurses
- Nurse Practitioners
- Certified Nurse Midwives (1985)
- Certified Registered Nurse Anesthetists (2018)
- Clinical Nurse Specialists (2018)
- Psychologists
- Psychological Associates
- Occupational Therapists (2006)
- Occupational Therapy Assistants (2006)

Dieticians joining in 2025

Data Elements that ***Usually*** Don't Change Over Time

- Unique identifier
- Date and place of birth
- Race/ethnicity
- Gender
- Basic professional degree
  (degree conferred, name and location of institution attended)

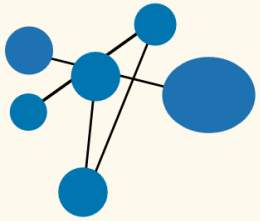
Data elements updated annually/biannually

Data elements that ***may*** change when updated :

- Activity status (*active clinical practice, not employed in profession, retired etc.)*
- Average hours per week
- Employment address
- Employment setting
- Clinical practice area
- Highest degree/certification
- Physicians:
  - Do you provide obstetric deliveries?
  - Do you provide prenatal care?

Users can access aggregate data, maps, blogs & more

Explore

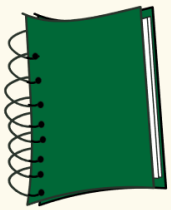


Interactive Visualizations

Explore trends in the NC health workforce.

Supply Visualization

See where health care professionals work across the state.

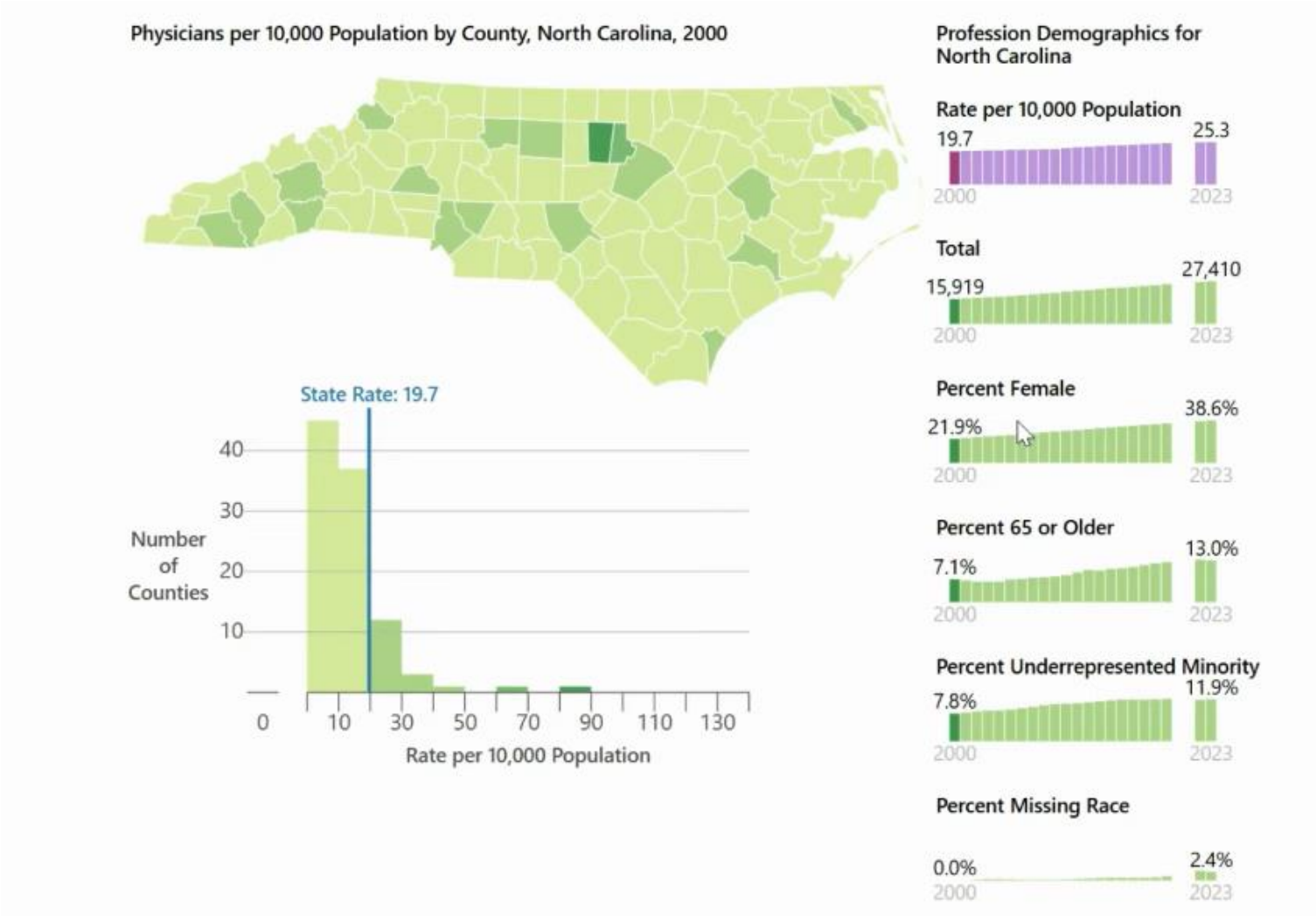


Blog

Check out our recent blogs.

nchealthworkforce.unc.edu

Interactive Data Viz Allows Users to View and Download Data



https://nchealthworkforce.unc.edu/interactive/supply/

Our data have been used to answer range of policy questions

- Are health professionals practicing where we need them?
- Will we have enough nurses?
- Are graduates retained instate?
- What employment settings are graduates working in?
- What educational programs do we need to open/expand to meet local, regional and state health needs—both now and in the future?

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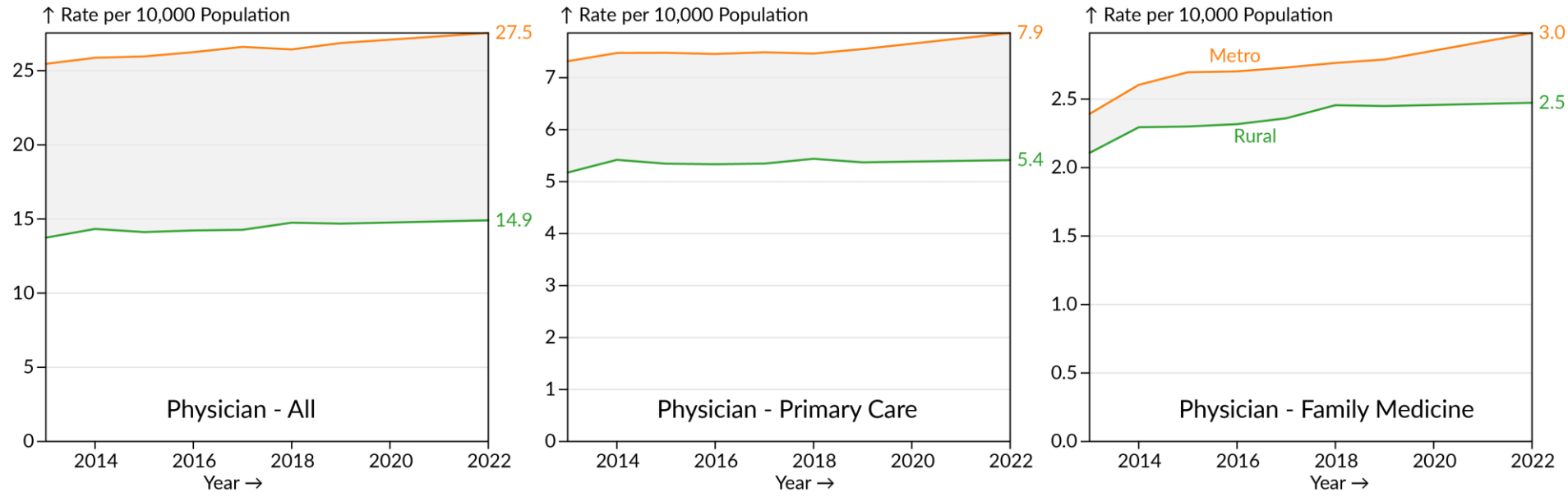
Are health professionals practicing where we need them?

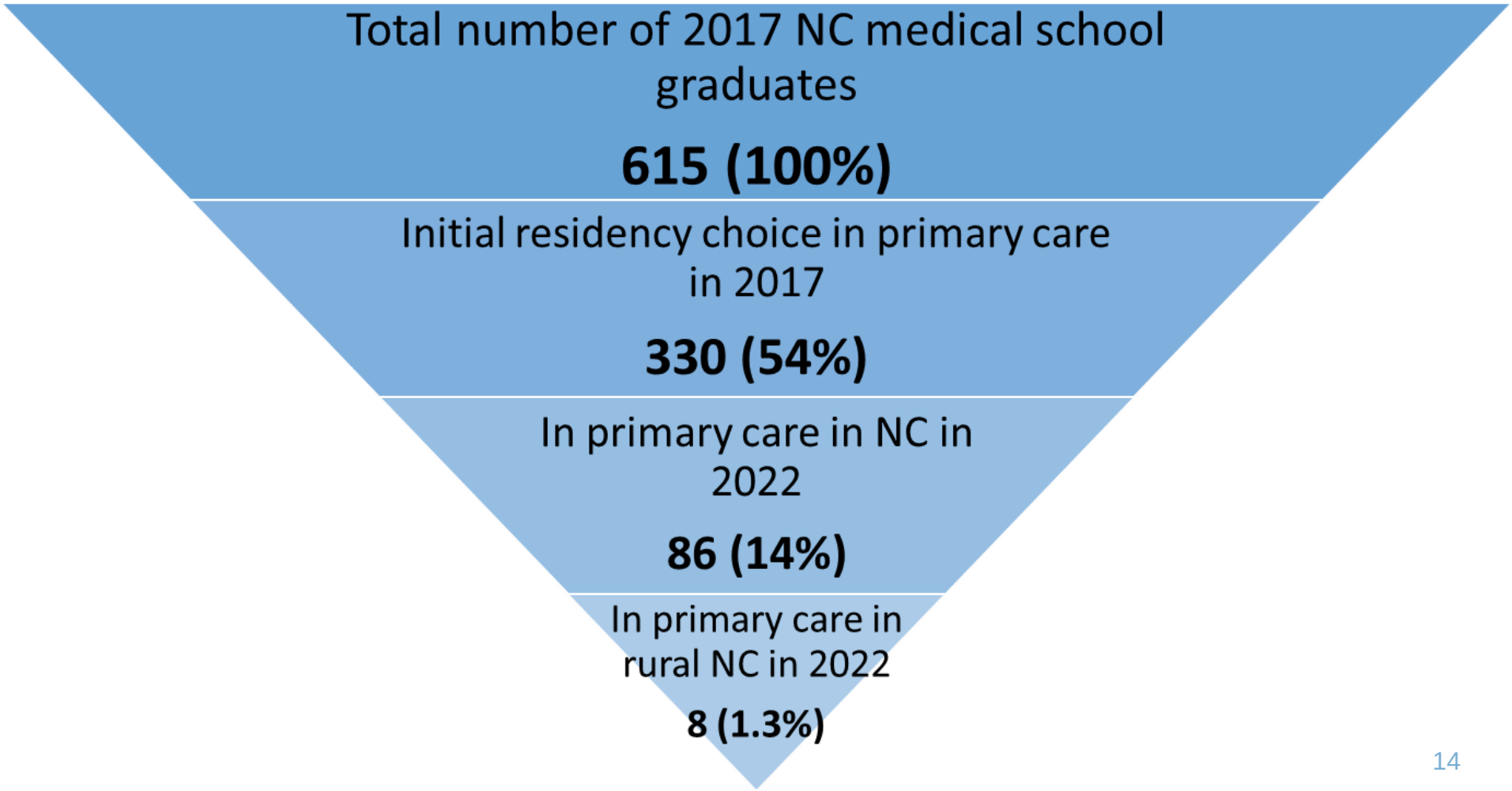
No, the gap between rural and urban areas has been increasing over time, especially for physicians



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. https://nchealthworkforce.unc.edu/

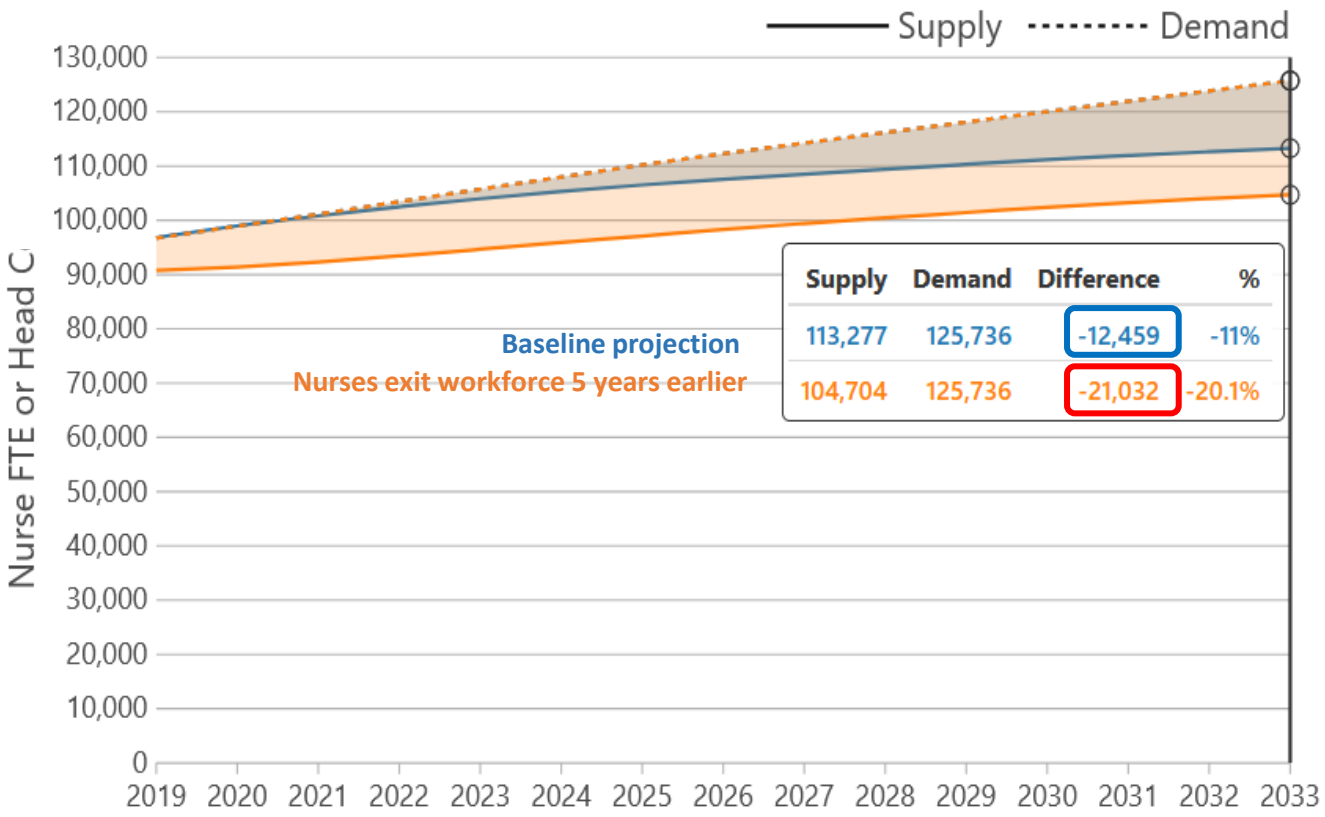
Why the growing gap?

Only 1.3% of medical students practice in rural, primary care in North Carolina 5 years after graduation



Will we have enough nurses?

Registered Nurse Supply-Demand under "Baseline" (Pre-Covid) and Early Exit Scenario

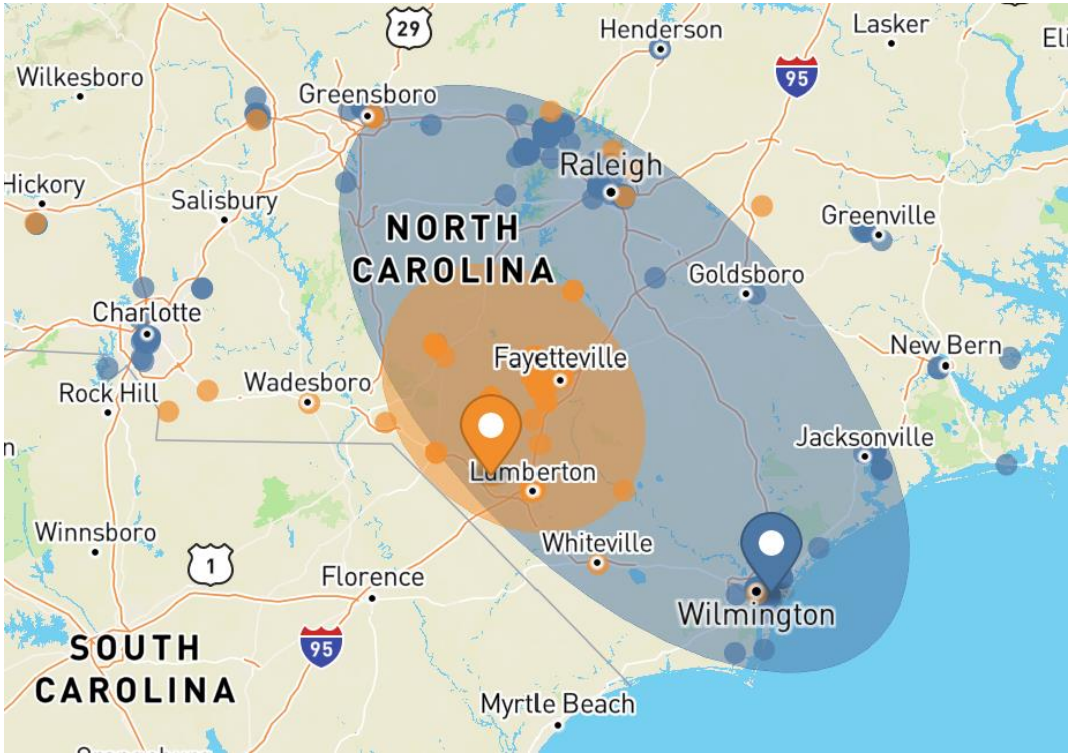


No, and if burnout or other factors cause nurses to exit the workforce five years earlier, the shortage nearly doubles

https://ncnursecast.unc.edu/

What employment settings are graduates working in?

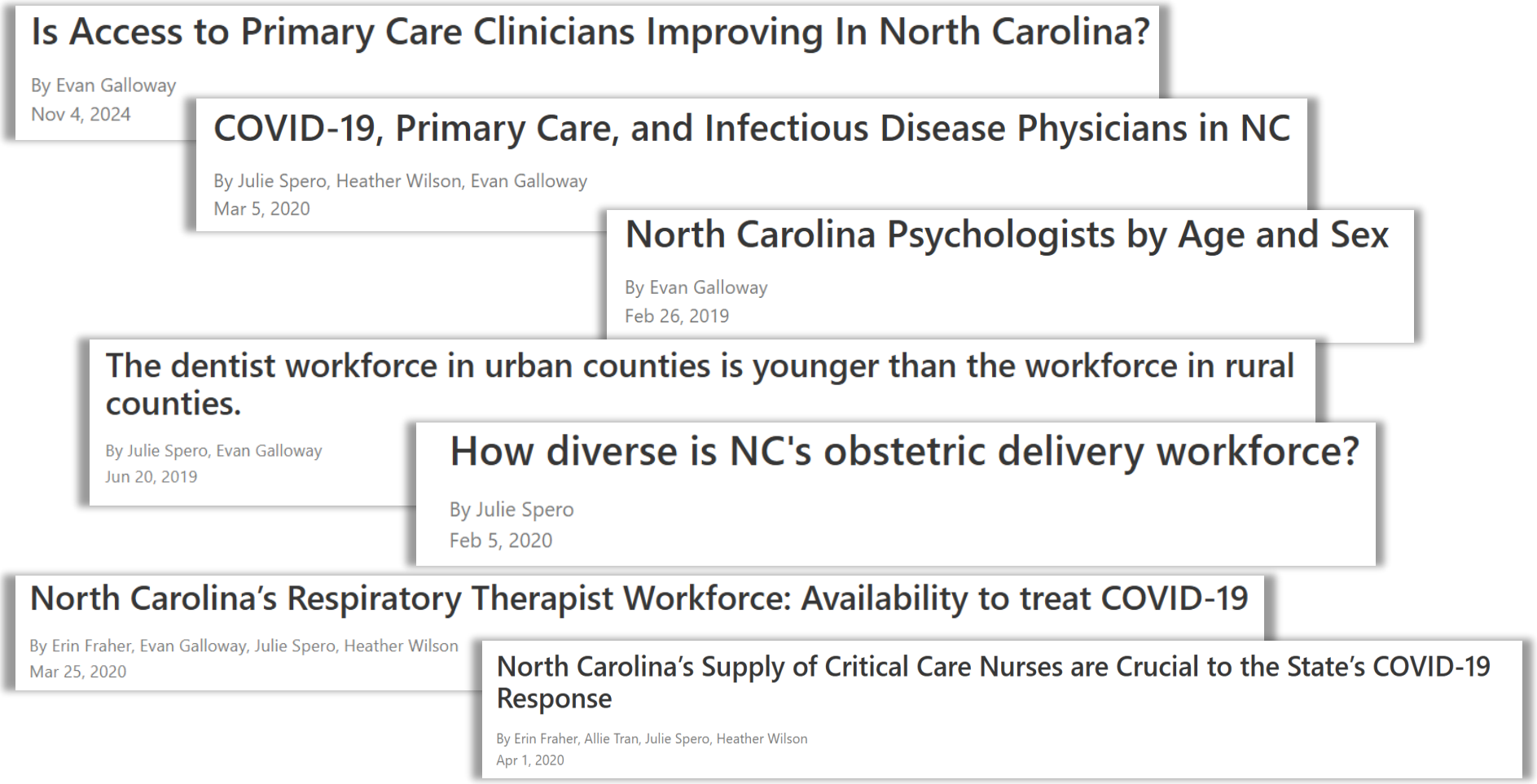
Graduate Diffusion Tool allows users to track where nurse graduates from each education program practice



Institution	Program Type	#	# Hospital (%)	# Ambulatory (%)	# Home Health / Hospice (%)	# Rural (%)	Mean Distance in Miles	Percent Retention in NC
University of North Carolina Wilmington	RN-BSN	314	273 (87%)	4 (1.3%)	3 (0.96%)	8 (2.5%)	76	85%
University of North Carolina at Pembroke	RN-BSN	104	89 (86%)	2 (1.9%)	0 (0.0%)	51 (49%)	32	77%

https://ncnursecast.unc.edu/diffusion/

We Use Data to Produce Policy-Relevant Blogs



https://nchealthworkforce.unc.edu/blog/

And policy-relevant manuscripts

N C Med J. 2024 Aug;85(6):380-388. doi: 10.18043/001c.125134.

Trends in North Carolina's Oral Health Workforce

Brooke Lombardi [1], Catherine Moore [1], Haley Simons [1], Connor Sullivan [1], Evan Galloway [1], Erin Fraher [1 2]

Affiliations + expand

PMID: 39570127 DOI: 10.18043/001c.125134

Free article

N C Med J. 2021 Jan-Feb;82(1):29-35. doi: 10.18043/ncm.82.1.29.

Using State Licensure Data to Assess North Carolina's Health Workforce COVID-19 Response Capacity

Heather Wilson [1], Evan M Galloway [2], Julie C Spero [3], Shikira Thomas [4], Julianna C Long [5], Thomas C Ricketts 3rd [6], Erin P Fraher [7]

Affiliations + expand

PMID: 33397751 DOI: 10.18043/ncm.82.1.29

Free article

N C Med J. 2019 May-Jun;80(3):163-166. doi: 10.18043/ncm.80.3.163.

Training for Future Generations: Innovations in the Medical Education of Physicians in North Carolina

Bryan Hodge [1], Karen Hyman [2], Robyn Latessa [3]

Affiliations + expand

PMID: 31072947 DOI: 10.18043/ncm.80.3.163

Free article

ELSEVIER

Nursing Outlook

Volume 65, Issue 2, March–April 2017, Pages 154-161

Article

Policy

The value of workforce data in shaping nursing workforce policy: A case study from North Carolina

Erin P. Fraher PhD, MPP

THE JOURNAL OF RURAL HEALTH

NRHA

ORIGINAL ARTICLE

Training Psychologists for Rural Practice: Exploring Opportunities and Constraints

Marisa Elena Domino PhD, Ching-Ching Claire Lin PhD, Joseph P. Morrissey PhD, Alan R. Ellis PhD, MSW, Erin Fraher PhD, MPP, Erica L. Richman PhD ... See all authors

First published: 17 April 2018 | https://doi.org/10.1111/jrh.12299 | Citations: 13

N C Med J. 2019 May-Jun;80(3):186-190. doi: 10.18043/ncm.80.3.186.

Running the Numbers: The Rapid Expansion of Nurse Practitioners and Physician Assistants in North Carolina

Julie C Spero [1], Evan M Galloway [2]

Affiliations + expand

PMID: 31072953 DOI: 10.18043/ncm.80.3.186

Free article

New Study: Primary Care Physician Career Typologies

- Drawing on cross-sectional data from 2009 and 2019, we used latent class analysis (LCA) to investigate:

  1. whether different career typologies exist in the primary care physician workforce

  2. if so, whether career typologies changed in the ten-year period before the COVID-19 pandemic (2009 and 2019); and

  3. whether a physician's generational cohort, age, gender, race/ethnicity, career stage, and medical school location were associated with different career typologies

- LCA yielded four distinct and relatively stable career typologies in both 2009 and 2019 with high levels of class separation

- Distinguishing factors between typologies include practice in a rural vs urban area, specialty, hospital and ambulatory care employment, and provision of prenatal and obstetric care.

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Fraher EP, Jensen T, Tran A, Galloway E, Weiss J, Lombardi BM. Toward a Better Understanding of Primary Care Physician Career Typologies. Under revision at Medical Care.

Next: Latent Transition Analysis Will Explore whether Physicians Change Typologies over Time

2009 Career Typologies

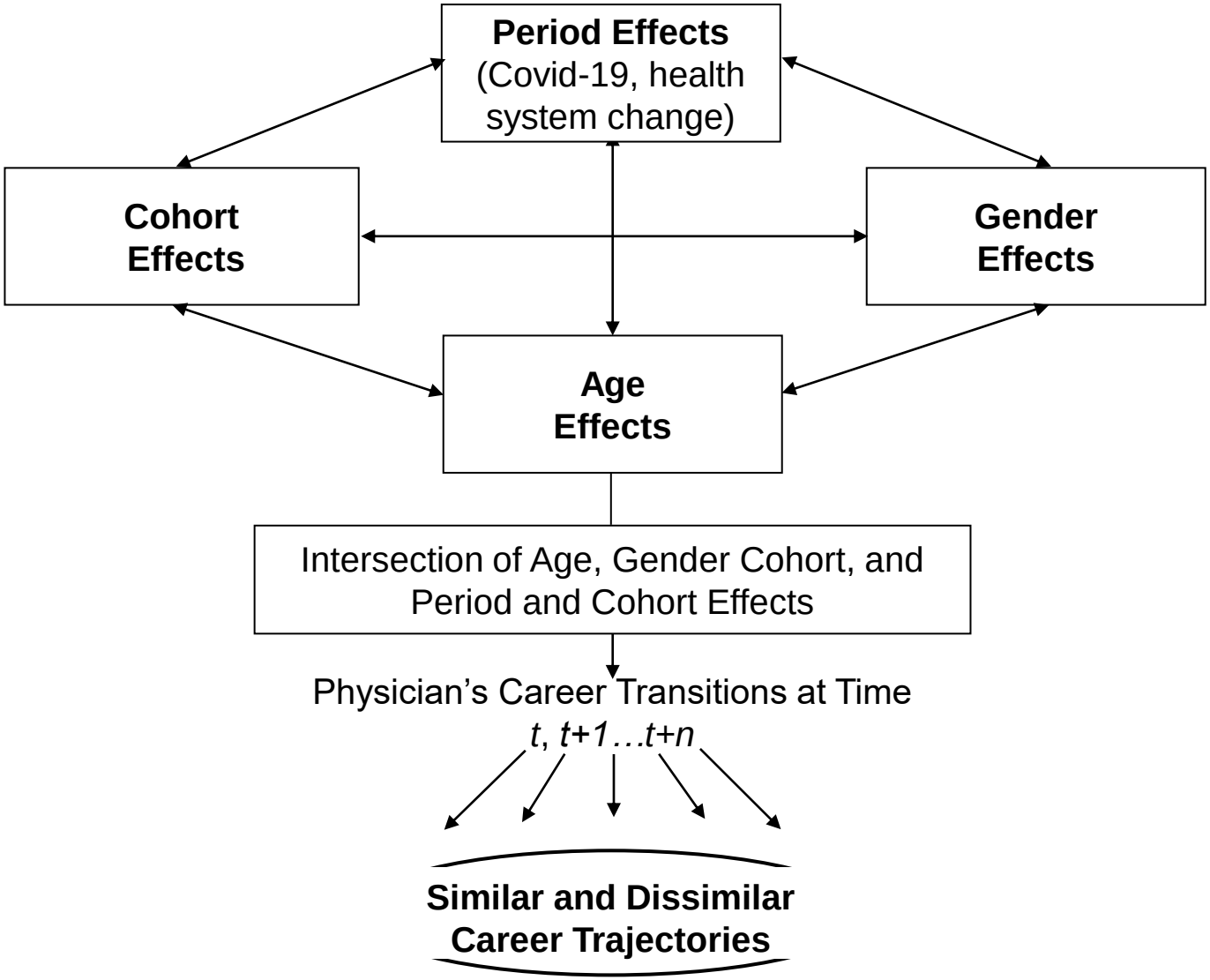
1. Internal Medicine Physicians In Urban Settings (28%)
2. Family Physicians and Pediatricians in Urban Settings (41%)
3. Mix of Physician Specialties Practicing in Rural Areas (20%)
4. Ob-Gyns and Family Physicians Providing Obstetric and Prenatal Care (11%)

Career Typology In 2019?

Of 4,617 physicians in active practice in both 2009 and 2019, what percent changed career typology?

What is the effect of gender, age, generation cohort, race/ethnicity, medical school location (foreign trained vs not), and years in practice on probability of staying in same class vs. switching?

Conceptual Model: Factors Affecting Physicians' Career Transitions and Trajectories



Adapted from model by JZ Giele and GH Elder Jr. in Methods of Life Course Research: Qualitative ad Quantitative Approaches (1998). Thousand Oaks: Sage Publications, Inc.: Pg. 11

Conceptual Framework – Life Course and Intersectionality Theories

"Life choices are contingent on the opportunities and constraints of social structure and culture" (Elder, 1998)

- Life course theory suggests that physician careers are shaped not only by individual decisions but also by social and historical forces shaping their lives and the healthcare system during the period in which they live

- Intersectionality research emphasizes importance of taking a holistic view of how individual characteristics such as a physician's age, gender, and race/ethnicity combine to produce different career choices across the life course

Elder, G. H. (1998). The life course as developmental theory. *Child Development*, *69*(1), 1-12.

The Need for a Longitudinal, Panel Study of Physician Careers

Life course theory can make contributions to workforce:

- **Research**-Enhance our understanding of how physician careers unfold—uncover patterns of similarity and dissimilarity in trajectories between male and female physicians in different generational cohorts in different time periods
- **Methods**-Move from repeated cross-sectional analyses to panel analyses, and apply new methods to health workforce research
- **Policy**-Shift from one-size-fits all approaches to shaping physician career decisions toward interventions tailored to physician age, gender, career stage and cohort

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Research Aims (still refining)

- Document changing demographic characteristics and practice patterns of physicians in North Carolina between 2005-2023

- Investigate whether practice behaviors (i.e. hours worked in patient care /week) vary by sex and age for physicians between birth cohorts and by sex within cohorts

- Identify if career typologies exist and if they differ by cohort and gender for:
  - Employment changes (FT, PT, Inactive)
  - Movement between rural vs. urban communities
  - Movement between employment settings

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Transforming Cross-Sectional Files to Panel Data Set

- Annual data from 2005-2023 were concatenated to create physician-level file (data missing from 2020 and 2021 due to data collection issues during the pandemic)
- Data cleaning and standardization of variables underway
- Creating the analytic data set takes much more time than the analysis!

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Data: Time invariant variables

Unique Physician Identifier
License Type (MD or DO)
Birth Year, City, & State
Home Country
Medical School, State, & Graduation Year
Medical School Cohort
Race/Ethnicity
Generational Cohort (derived from birth year) • Pre-WWII (pre-1928) • WWII (1928-1945) • Leading Edge Boomer (1946-1954) • Trailing Edge Boomer (1955-1964) • Gen X (1965-1980) • Gen Y (1981-2000)

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Data: Time varying variables

Year of observation (2005-2019; 2022-2023)
Age (in year observed)
Activity Status (active vs inactive in clinical care)
Primary Area of Practice (specialty)
Providing prenatal or obstetric care
Hours Per Week
Practice Setting
Geocoded Practice Address, or if unavailable, Home,
Rural Status of Practice Location
Deprivation Score of Practice Location

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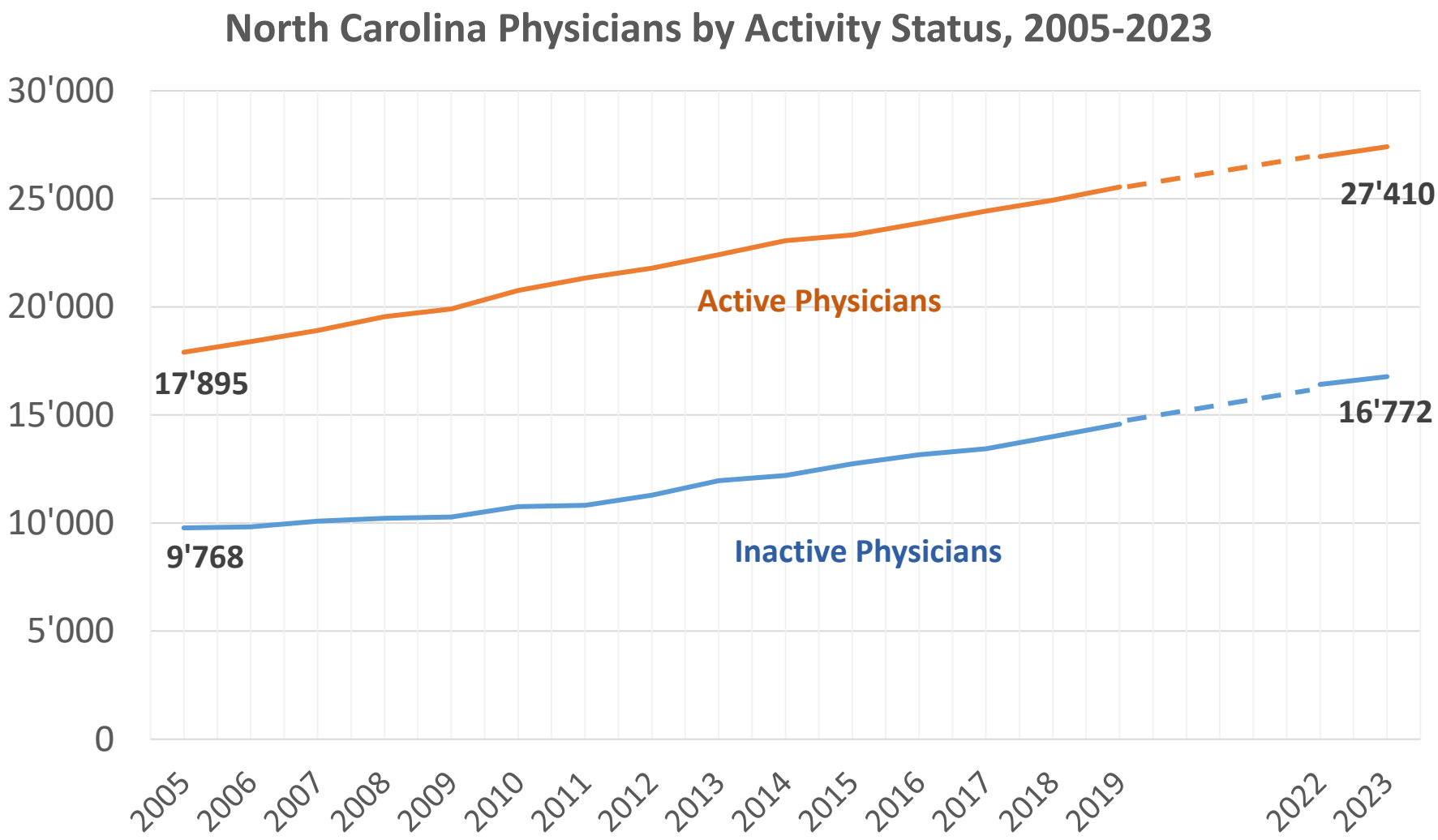
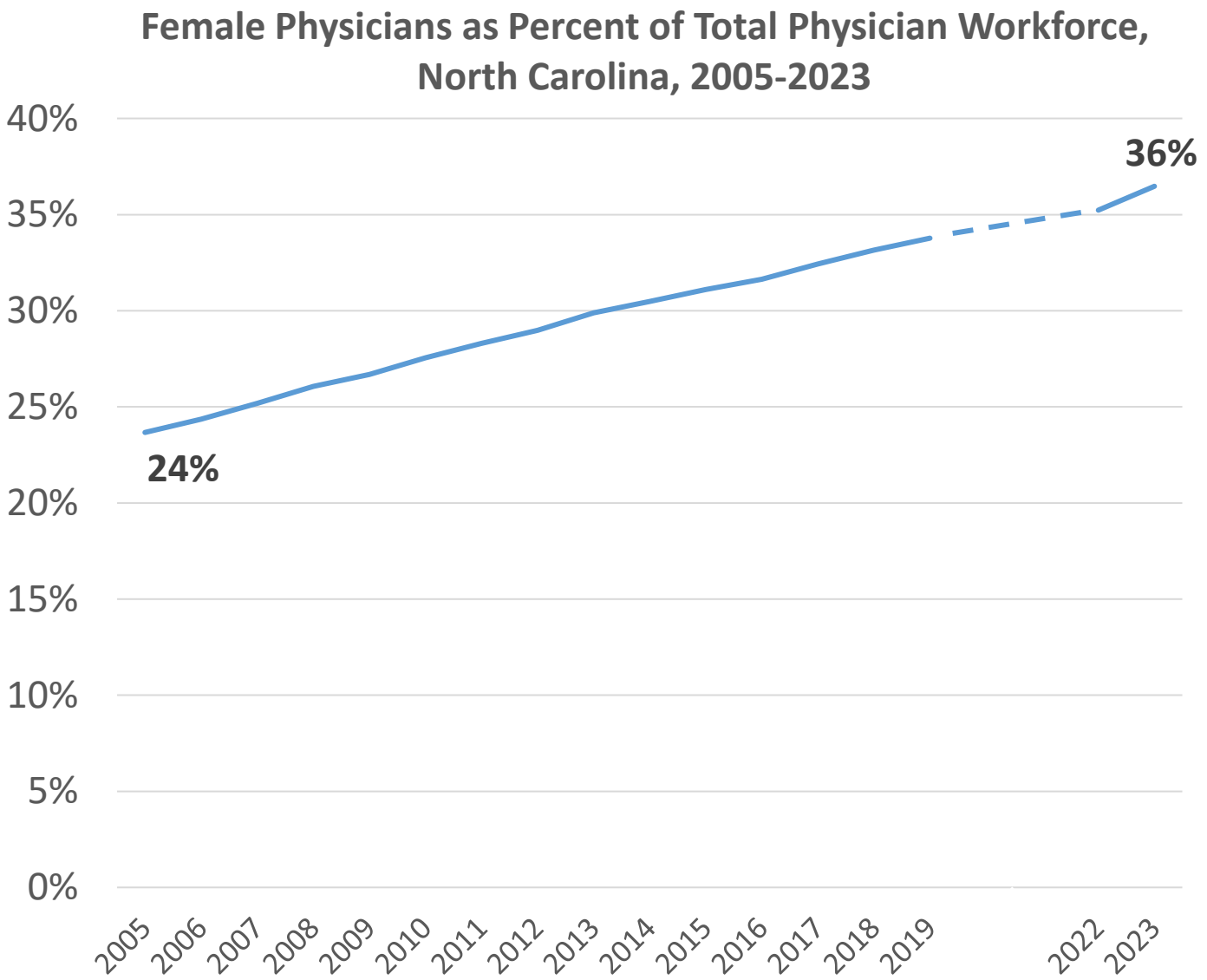
The Sample


North Carolina Physicians by Activity Status, 2005-2023
30'000
25'000
20'000
15'000
10'000
5'000
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2022
2023
Active Physicians
17'895
27'410
Inactive Physicians
9'768
16'772

Increase in Female Physicians in the Workforce



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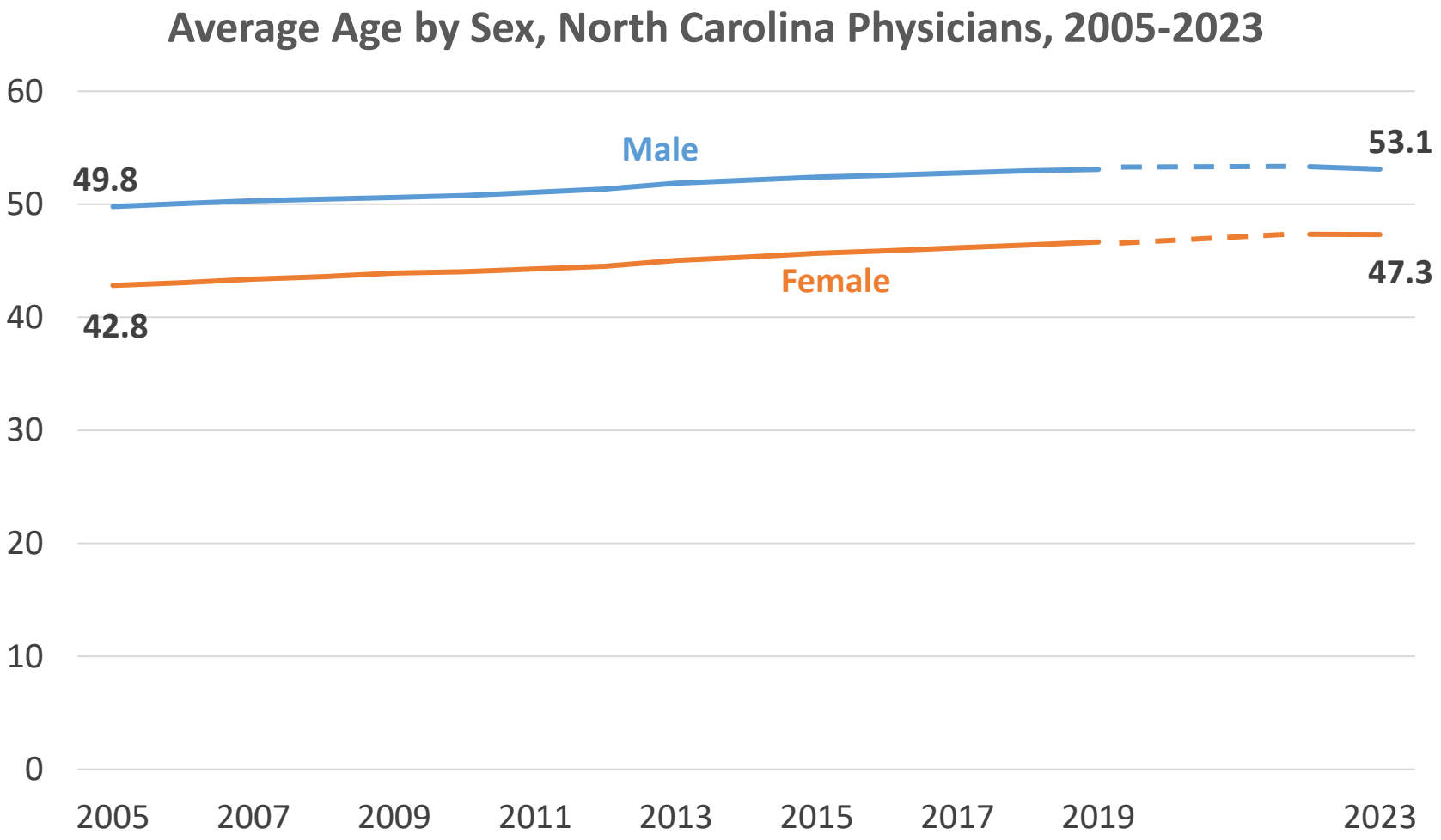
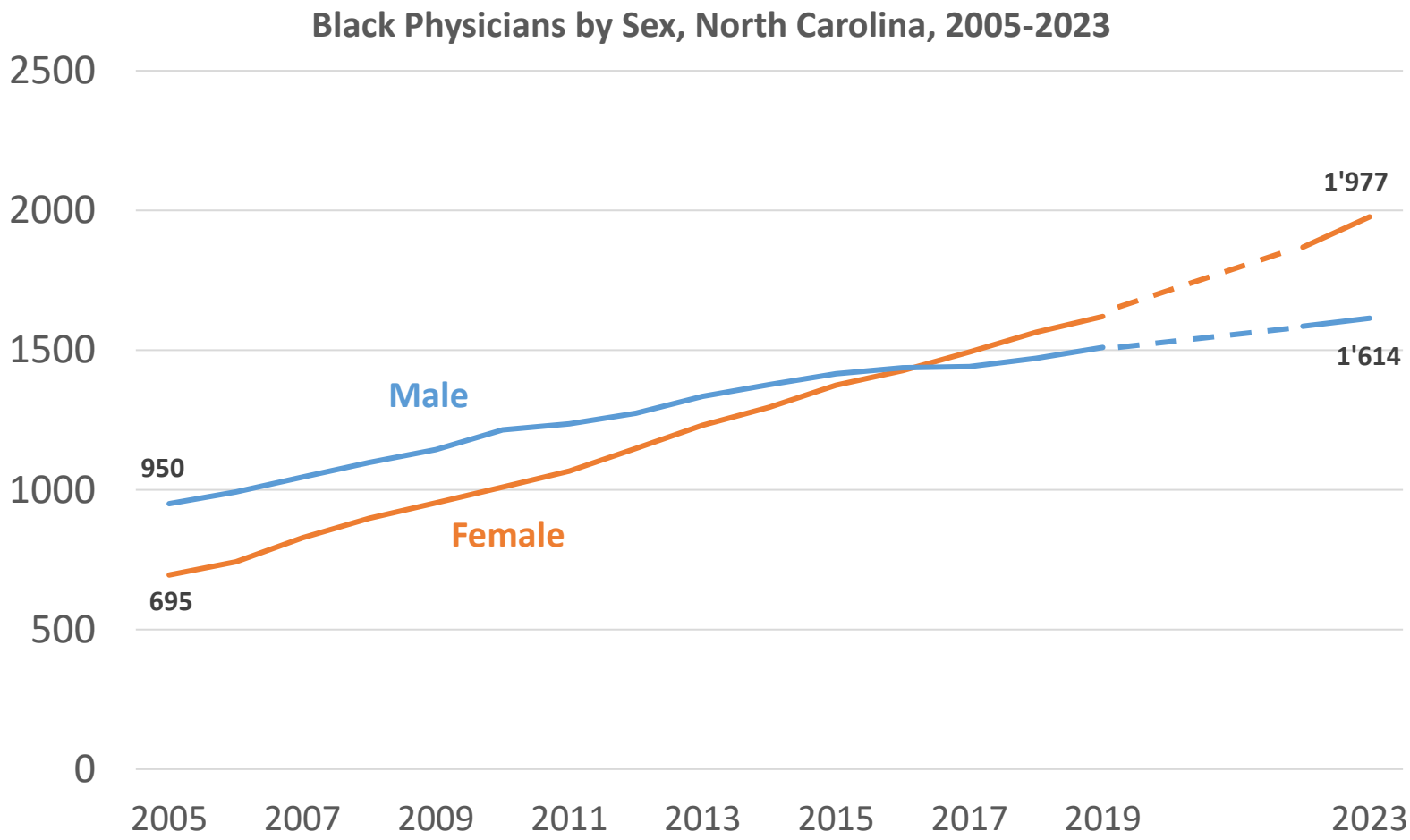
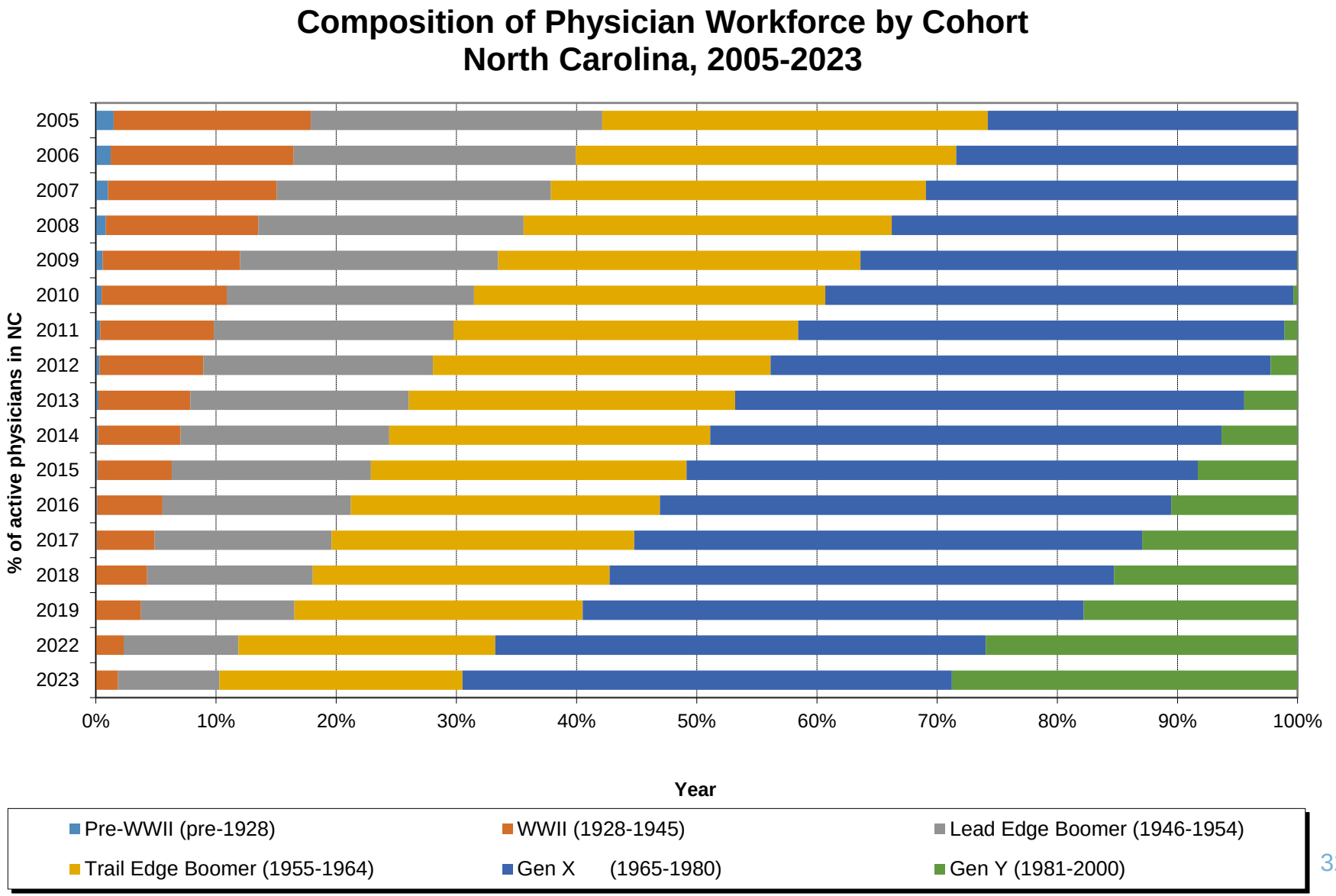
Female Physicians Are, On Average, 6-7 Years Younger than Male Colleagues



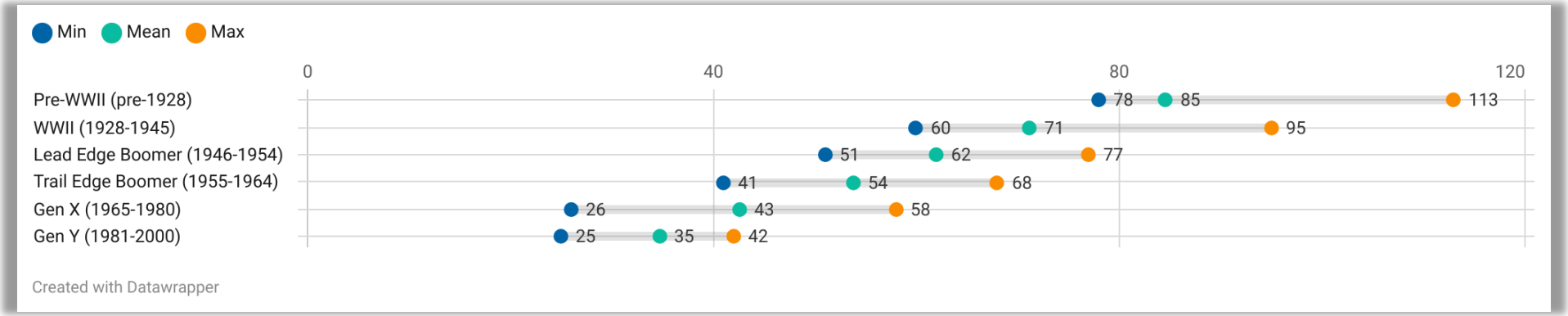
Number of Black Female Physicians Surpassed Males in North Carolina in 2017



Changing Generational Cohorts of North Carolina Physicians, 2005-2023



Age Range at Which Physicians Are Observed by Generational Cohort



Provides opportunity to examine practice behaviors of male and female physicians at same age in different cohorts

Methods: Previous Workforce Research on Physician Behaviors

- Generally used cross-sectional data or longitudinal data with few time periods
- Employed methods that model physician transitions as discrete, point-in-time decisions
- Has perpetuated three fallacies:
  - ***Life Course Fallacy***: generalized cross-sectional differences in behavior by age to future physicians
  - ***Fallacy of Cohort Centrism***: interpreted practice patterns of one cohort as predictor of how future cohorts will behave
  - ***Fallacy of Period Centrism:*** generalized findings from study conducted over one time period to other time periods

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Methods: Previous Workforce Research on Physician Behaviors

- Most workforce research assumes physicians have a linear, ordered, and age-graded career trajectory
- Physician careers are more likely dynamic and comprised of multiple transitions of different lengths depending on physician's gender and generational cohort
- Widmer and Ritschard (2009) explored "de-standardization" of occupational trajectories for men and women and found:
    - Men maintained stable and linear occupational trajectories between cohorts
    - Women's trajectories were mixed and reflected pattern of moving in and out of work

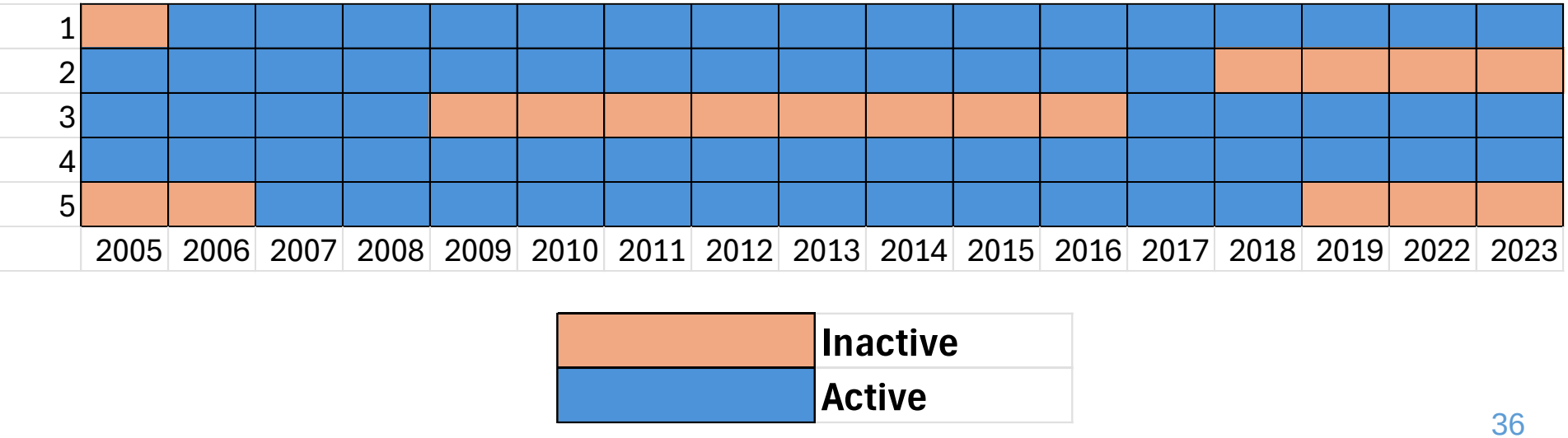
Eric D. Widmer, Gilbert Ritschard. The de-standardization of the life course: Are men and women equal?, Advances in Life Course Research, Volume 14, Issues 1–2, 2009, Pages 28-39

Methods: Investigating Sequence Analysis to Explore Trajectories

SA as exploratory way to shed light on physicians' patterns of active and inactive practice during their career

SA can help elucidate:

1. *Sequencing* of states- the order in which a physician spends time in active/inactive practice
2. *Timing* of the states-the age at which physician is in active vs inactive practice and the age at which they transition between active and inactive practice
3. *Duration* of states-the number of years physician spends in active vs inactive practice



Plan to Subset Data to Ensure Sequences of Equal Length

20% of sample (n=13,948 physicians) observed in all 17 years of data (=237,116 data years)

# of times observed	# of Physicians	%
1	7,995	11%
2	11,322	16%
3	4,719	7%
4	4,232	6%
5	3,122	4%
6	2,835	4%
7	2,570	4%
8	2,400	3%
9	2,379	3%
10	2,097	3%
11	1,882	3%
12	1,972	3%
13	1,885	3%
14	1,909	3%
15	3,300	5%
16	2,039	3%
17	13,948	20%
Total Sample	70,606	100%

Methods: Next Steps

- Using subset of physicians with 17 years of data, use sequence analysis to analyze patterns of active and inactive practice
- Investigate optimal matching techniques to measure similarity and dissimilarity of trajectories
- Use multinomial regressions with trajectories as dependent variable to discern associations with age, generational cohort, gender etc.
- Beyond sequence analysis, use survival analysis, regression and other methods to understand age, cohort and gender effects on hours worked and practice in rural communities

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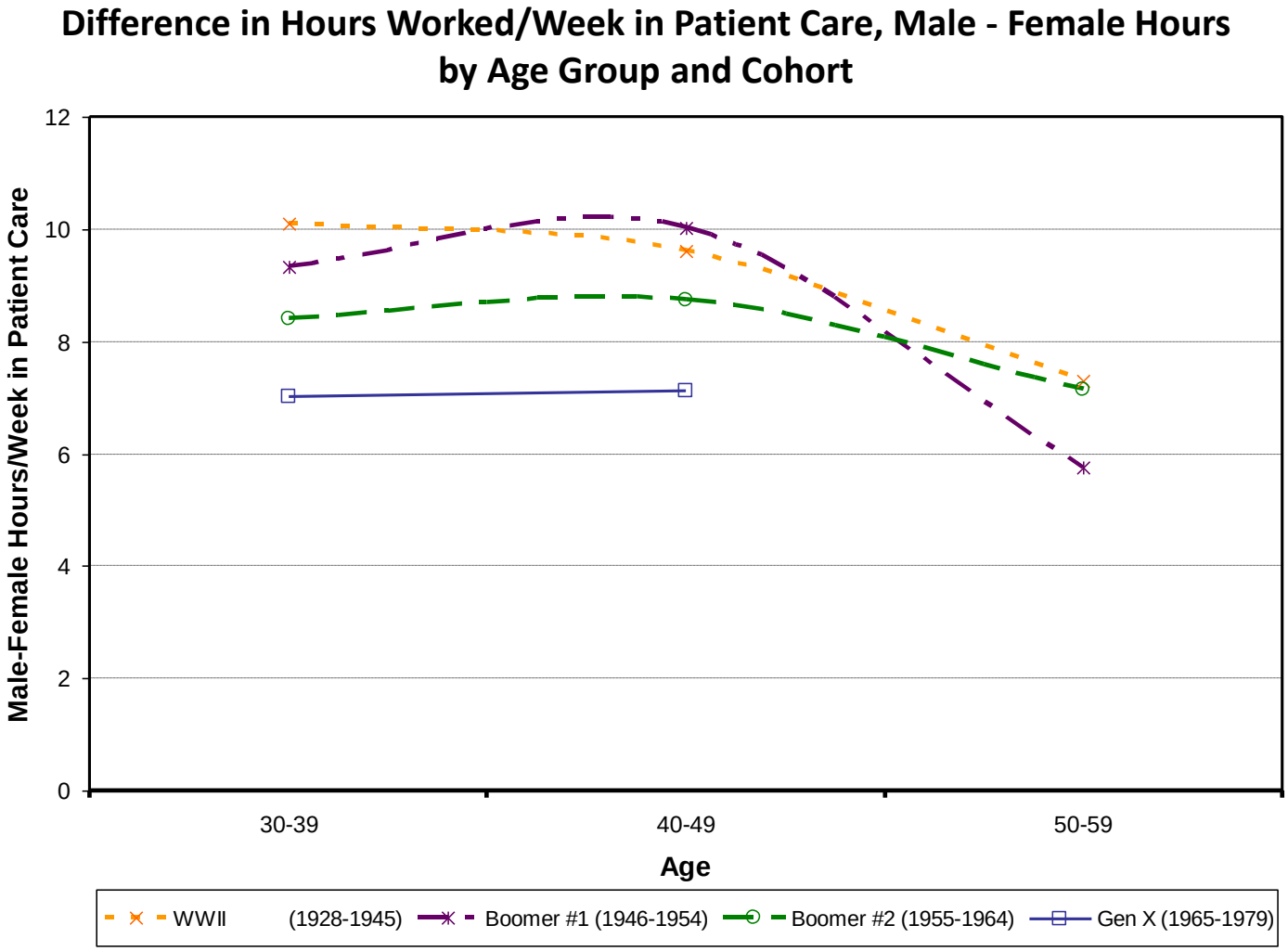
Dissertation Found Difference In Hours Worked Between Male and Female Physicians is Shrinking in Later Cohorts between 1980-2005



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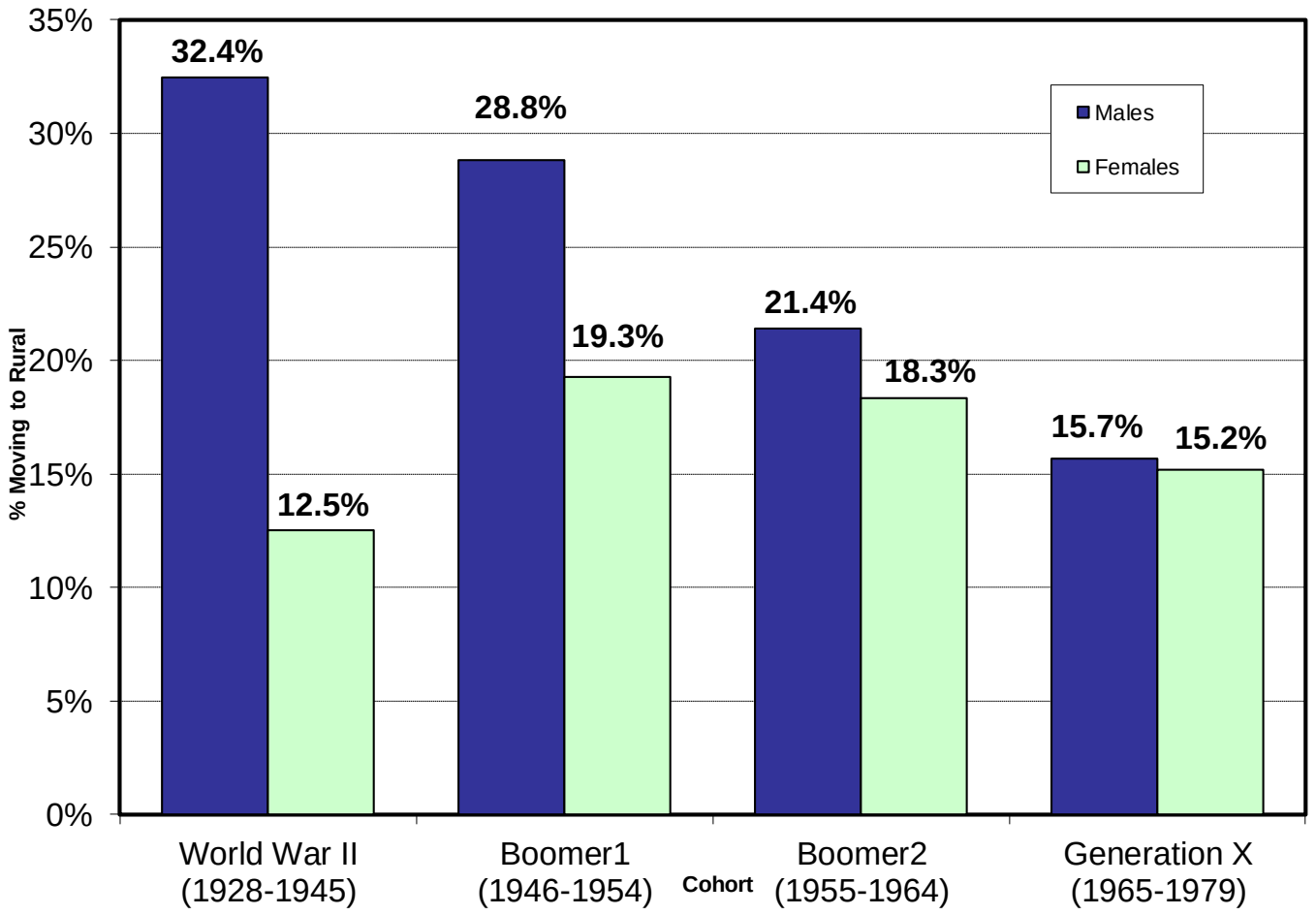
Applying This Knowledge to the "Vexing" Problem of Modeling Workforce Supply

- Findings suggest effect of age and gender on hours worked is not constant between birth cohorts
- Workforce models may produce biased estimates if cohort effects not considered
- Much ado made about gender effect but gender effect converging

Predicted Probability Of Moving to Rural County by Gender and Cohort: Gender Effect Converging for Physicians 30-39 Years of Age in More Recent Cohorts



A Better Understanding of Physician Careers Needed to Craft Effective Policy

- Current policy interventions are not as dynamic as physicians' careers they seek to influence
- Assume effects of age and gender on practice behaviors are fixed and static over time
- Employ a "one-size fits all" approach
- Incentives not tailored to physician age, career stage and cohort
- Generally aimed at affecting decisions early in career trajectory
- Mid- to later career physicians experience transitions that are not well documented or understood

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