

Using Data to Shape The Physician Workforce We Need

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THE CECIL G. SHEPS CENTER FOR
HEALTH SERVICES RESEARCH

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- The information, content and conclusions are those of the authors and should not be construed as the official position or policy of, nor should any endorsements be inferred by NC AHEC, HRSA, HHS or the U.S. Government



Collaborators

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In case your office calls, here is the presentation in one slide

- National “shortage narrative” detracts from focus on redesigning GME to address health disparities in access to care, particularly for underserved populations
- North Carolina as case study of “data agitators”
- Outcomes matter: we need to use data to evaluate workforce outcomes and make business case for increased investment in community-based training in needed specialties and communities
- Where do we go from here?
 - Generating evidence on HRSA’s GME programs
 - Interprofessional training and practice
- We’ll discover where Wyoming’s residents are going to practice



Fears of physician shortages grab headlines



Tuesday, April 22, 2019

HOSPITALS TECH PAYER FINANCE PRACTICES DIGITAL

Success of health reform hinges on hiring doctors by 2015

Forbes

EDITORS' PICK | Jun 26, 2020, 08:00am EDT | 7,194 views

Practices

Physician shortage: 1 could estimated at 122,000

By Jen Christ updated 5:37 PM by Joanne Finnegan | Apr 23, 2019 12:51pm

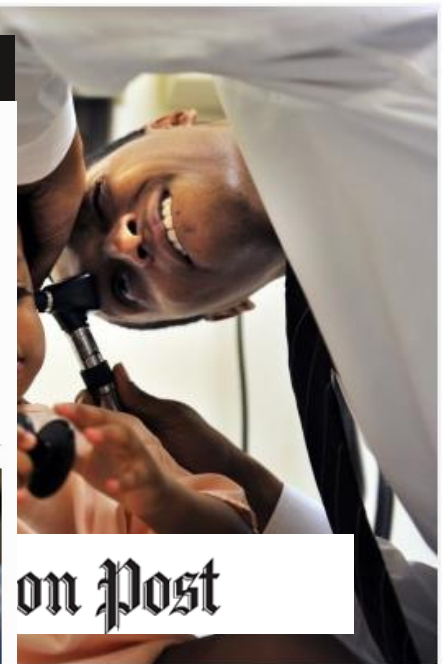


Bruce Japsen Senior Contributor @ Health
I write about healthcare business and policy

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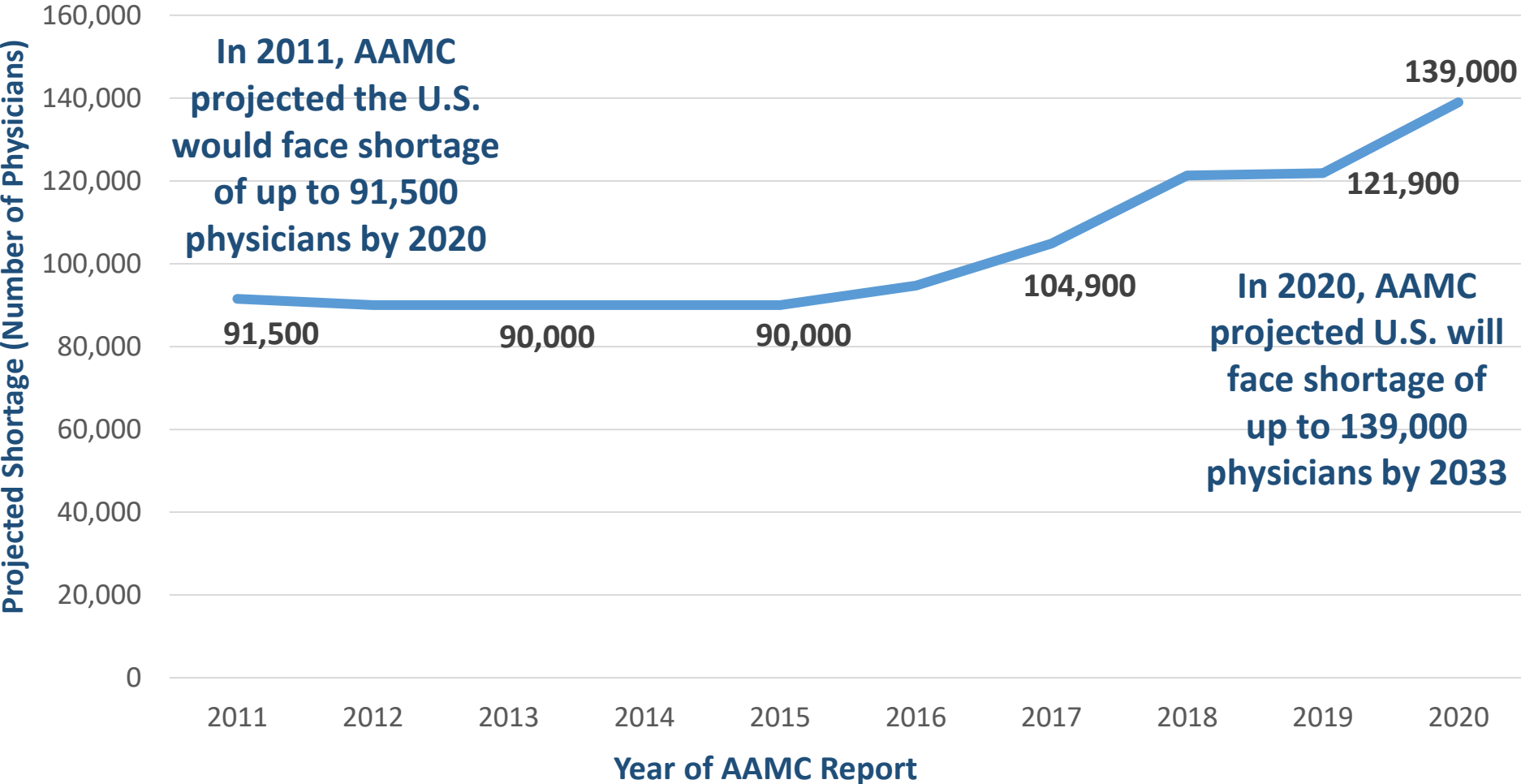


on Post

, PUT MORE
sted Physicians

Some doctors worry patients who can't get in to see primary care physicians will clog up hospital emergency rooms.

Stoked by annual AAMC reports of physician shortages in the next decade



In 2011, AAMC said physician supply would begin to decrease

PHYSICIAN SHORTAGE TO QUADRUPLE WITHIN DECADE, AAMC SAYS

healthleaders | BY CHRISTOPHER CHENEY | JANUARY 04, 2011



The numbers do not look promising.

According to an Association of American Colleges [report](#), U.S. specialties will reach a [shortage](#) of 91,500 doctors by 2020. The AAMC predicts Americans will need an estimated 45,000 primary care physicians and 46,000 surgeons and medical specialists.

"It's certainly the worse [shortage] that we'll have seen in the last 30 years," says AAMC chief advocacy officer Atul Grover.

"For the first time since the 1930s, our number [of physicians] per capita will start to drop in the next couple of years. That's less doctors per person, but at the same time, since they are aging and have more chronic illnesses, each person is going to need more healthcare and not less healthcare. That's a pretty bad situation," he says.

**It did not.
Per capita
physician
supply has
continued
to increase**

Shortage narrative gets paired with claims of a “GME Squeeze”

“While medical schools have increased enrollment by nearly 30% since 2002, the 1997 cap on Medicare support for graduate medical education (GME) has stymied the necessary commensurate increases in residency training, creating a bottleneck for the physician workforce.”

Association of American Medical Colleges. “GME Funding and Its Role in Addressing the Physician Shortage” (2018). <https://news.aamc.org/for-the-media/article/gme-funding-doctor-shortage/>



Data debunk this claim: There are no signs of a GME Squeeze

“Despite what has become an annual push by the AAMC and others for billions of dollars of new GME dollars to support more GME positions, the reality is that there has been steady growth in GME positions... [that] has more than kept pace with increases in graduating MD and DO seniors”

Graduate Medical Education Positions And Physician Supply Continue To Increase: Implications Of The 2021 Residency Match

[Edward S. Salsberg, Candice Chen](#)

MAY 21, 2021

10.1377/hblog20210518.286037



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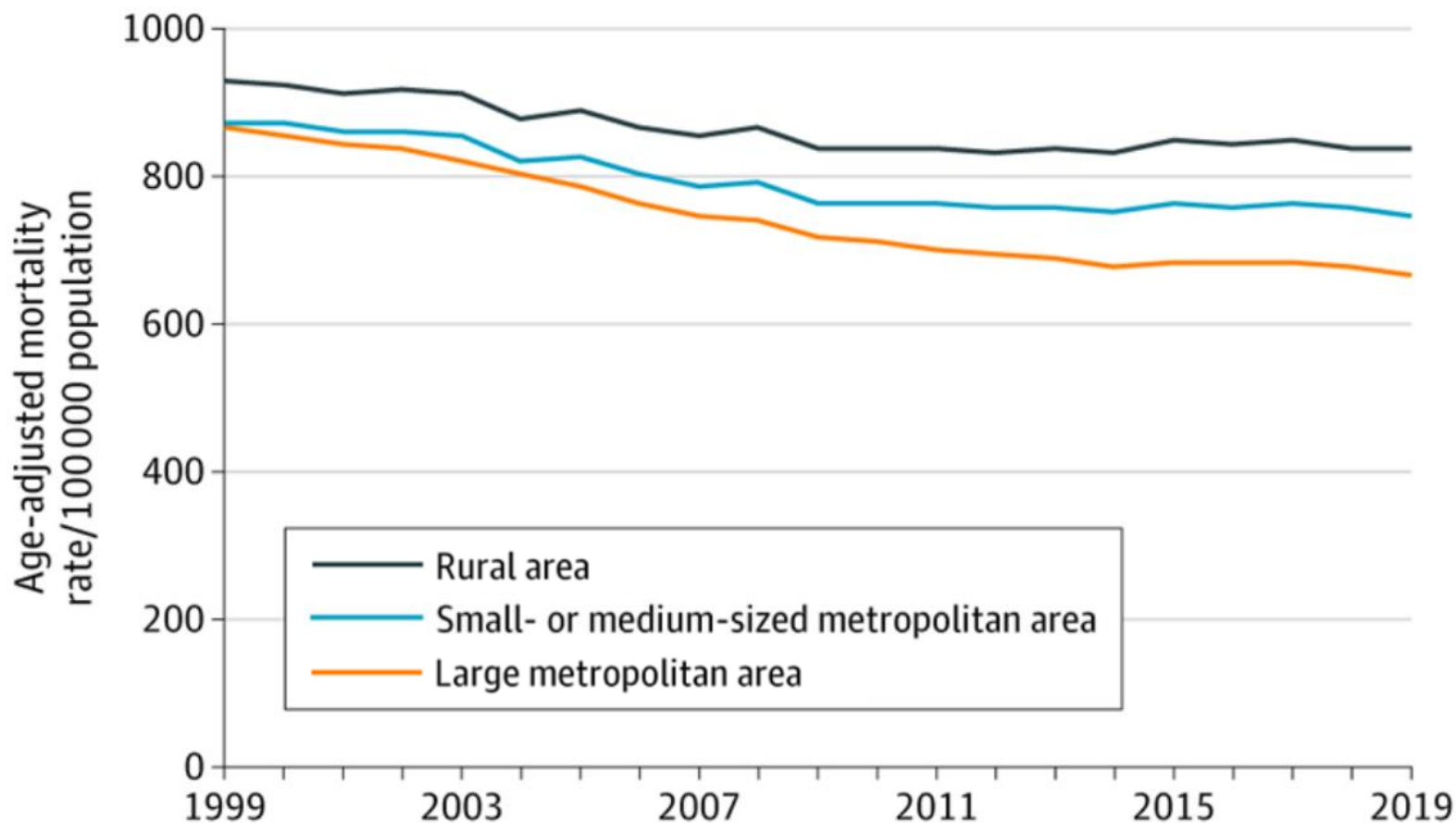
National “shortage narrative” detracts from a focus on redesigning GME to address disparities in access to care, particularly for underserved populations



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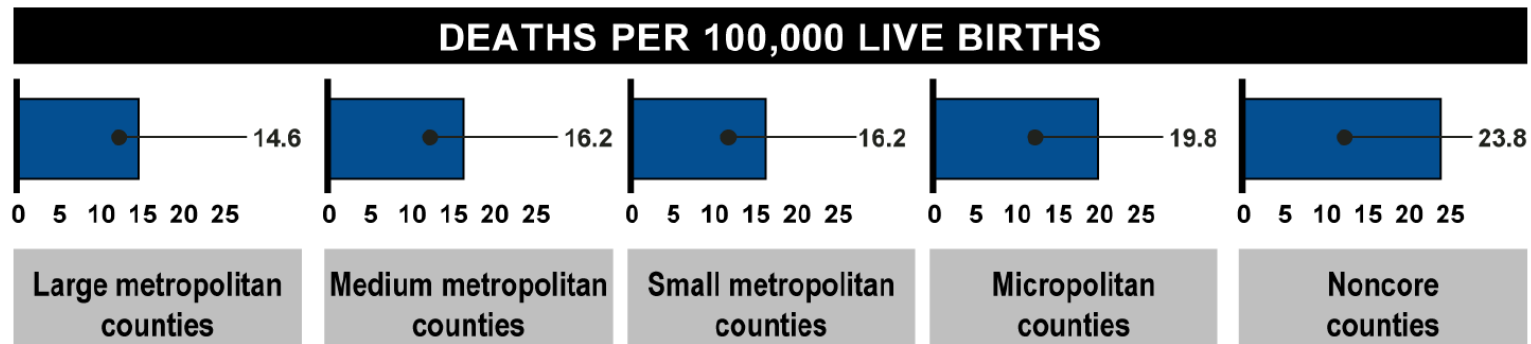
Health disparities between rural and urban areas tripled between 1999 and 2019

Figure. Mortality Trends in the US From 1999 to 2019



Pregnancy-related deaths are significantly higher in rural areas

Pregnancy-Related Mortality Ratios in Rural and Metropolitan Areas, 2011-2016



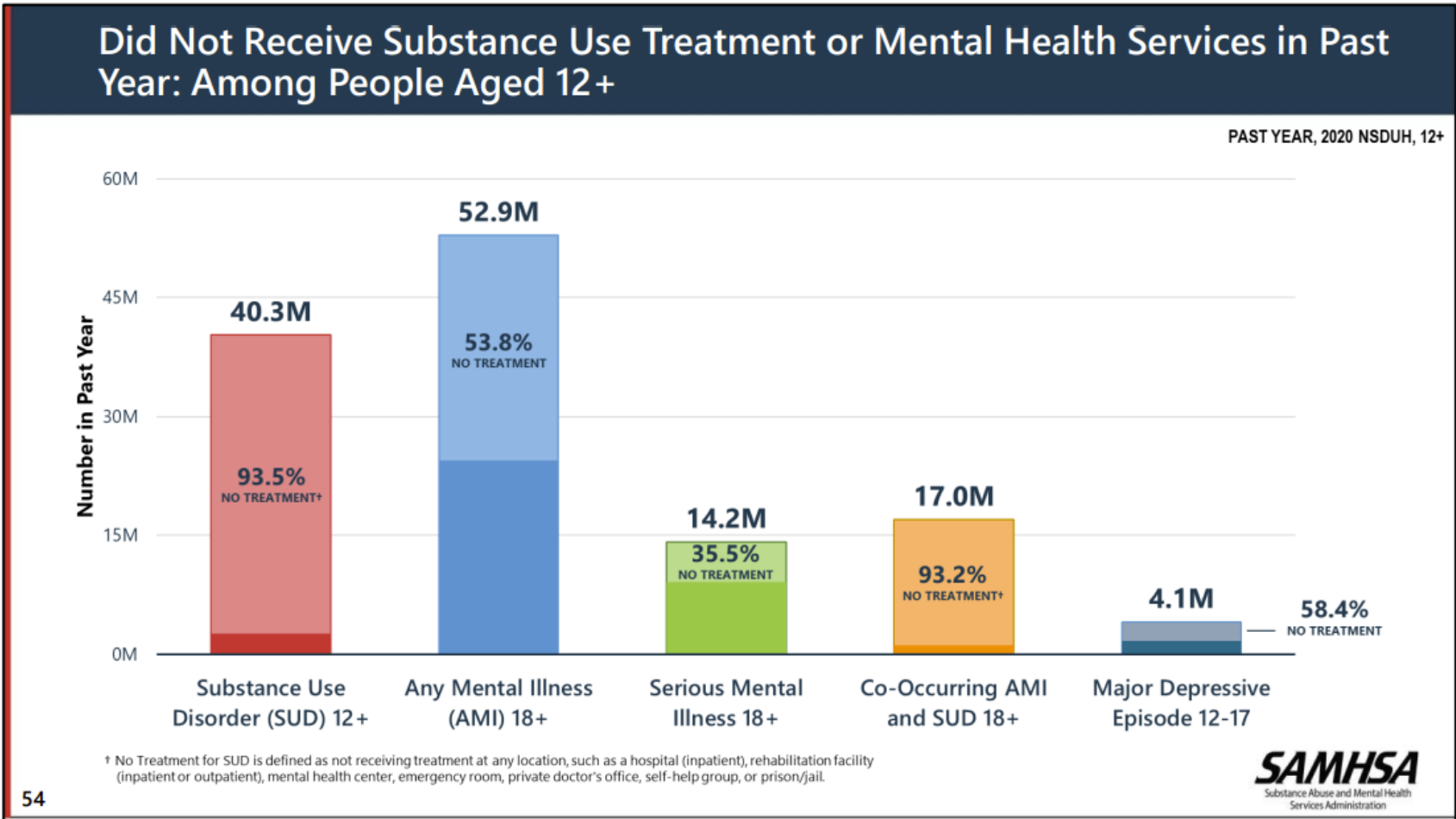
Source: Centers for Disease Control and Prevention Pregnancy Mortality Surveillance System data. | GAO-21-283

Higher mortality in rural areas with lower supply of physicians, OB/GYN specialists, and mental health providers per capita



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More than half of US population 18 & over with mental illness and children ages 12-17 with major depressive episode did not get care



How do we use data to shape the workforce we need to address population health needs?



We don't use data enough to shape the future or evaluate the past

Who are we? **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 the Cecil G. Sheps Center for Health Services Research at UNC-CH
- Independent of government and health care professionals
- Primarily grant-funded
- We do not represent a particular profession, specialty, or educational institution
- We house the NC Health Professions Data System



The North Carolina Health Professions Data System

- 42 years of continuous, complete licensure (*not survey*) data
- Licensure data on 19 health professions in NC are provided *voluntarily* by the boards—there is no legislation that requires this, there is no state appropriation
- System is independent of government or health care professionals
- A collaboration between the Sheps Center, NC AHEC and the health professions licensing boards



Categories of Health Professionals in NC Data System, 1979-present

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

Enduring Data Elements

Data elements that *usually* don't change

- Name
- Date and place of birth
- Race/ethnicity
- Gender
- Training (*degree conferred, name and location of institution attended, practice qualifications*)
- Unique identifier



Data Elements Updated Annually

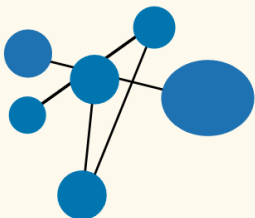
Data elements that *may* change from year to year and are updated annually:

- Employment address
- Home address
- Employment setting
- Specialty
- Activity status (*retired, active practice, not employed in profession*)
- Average hours per week at multiple practice sites
- Foreign language ability (*for select professions*)



After we clean these data, we put them into an interactive data visualization where users can access maps/graphs and track longitudinal trends

Explore



Interactive
Visualizations

Explore trends in the
NC health workforce.



Supply
Visualization

See where health
care professionals
work across the state.



Blog

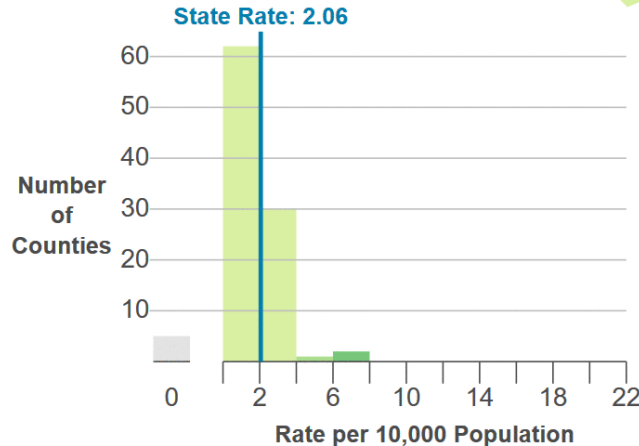
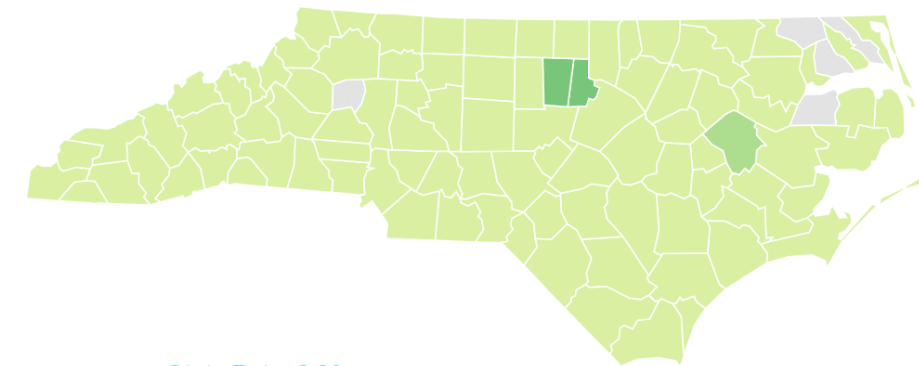
Check out our recent
blogs.

Data are available at county-level and for
AHEC, rural/urban and Medicaid regions

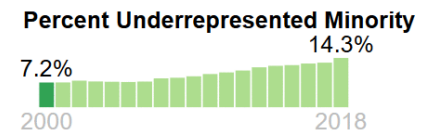
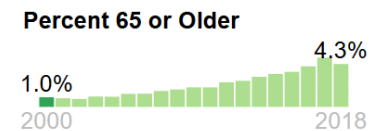
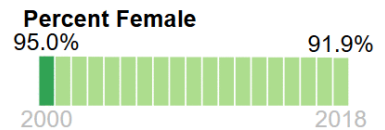
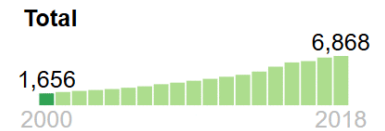
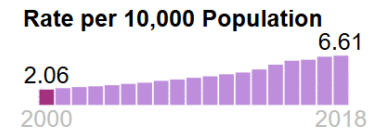
nchealthworkforce.unc.edu

Like the rapid growth in North Carolina's NP supply

Nurse Practitioners per 10,000 Population by County, North Carolina, 2000



Profession Demographics for North Carolina



**SHEPS HEALTH
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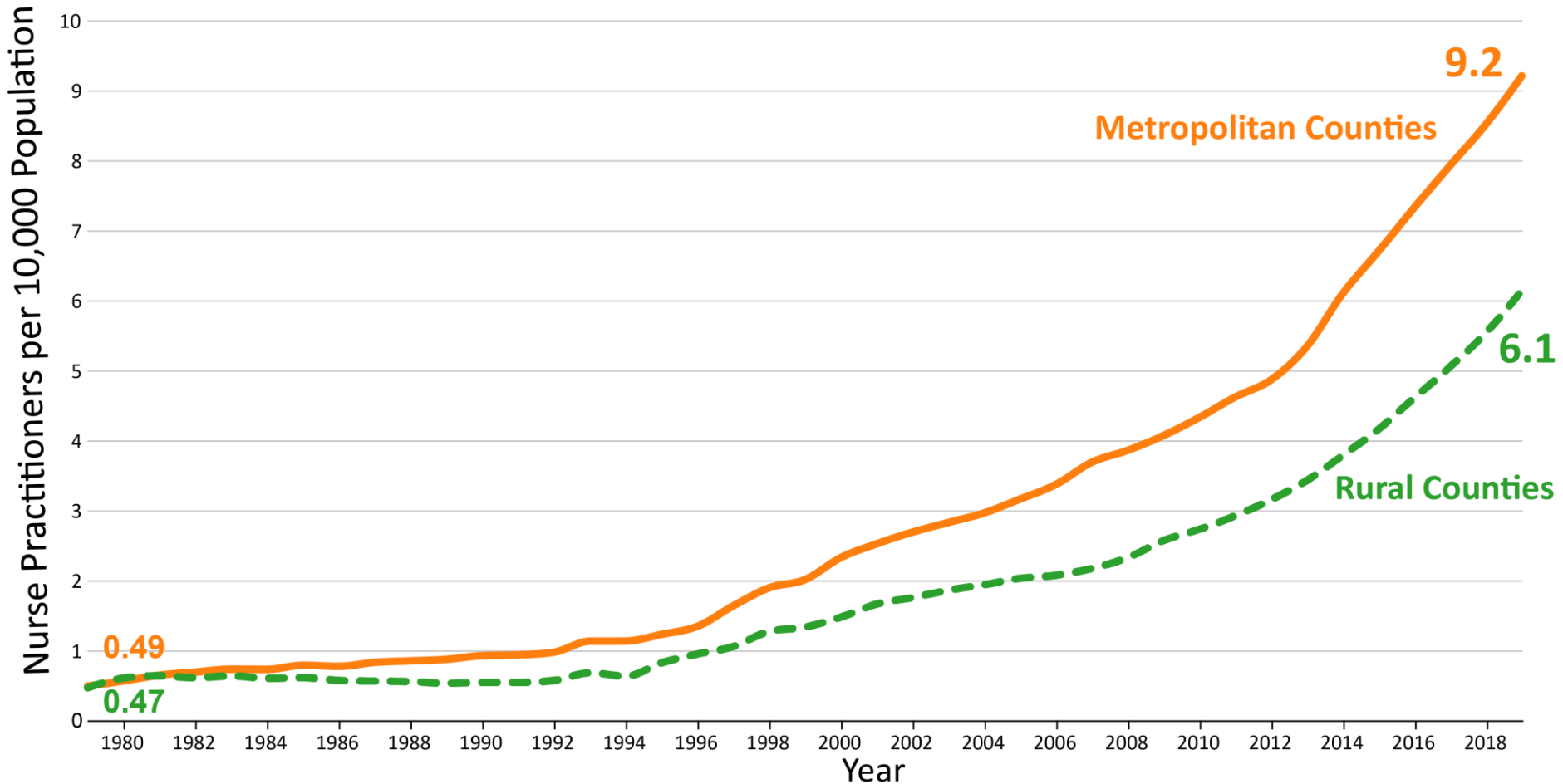
Notes: Data include active, licensed nurse practitioners in practice in North Carolina as of October 31 of each year. Nurse practitioner data are derived from the North Carolina Board of Nursing. Population census data and estimates are downloaded from the North Carolina Office of State Budget and Management 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 October 18, 2019 at <https://nchealthworkforce.unc.edu/supply/>.



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NP supply increasing in both urban and rural areas of North Carolina

Nurse Practitioners, Rate per 10,000 Population, 1979 - 2019, North Carolina

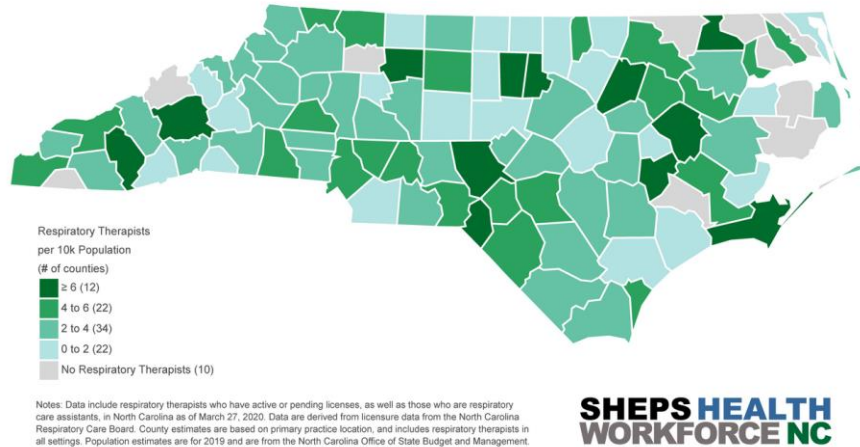


Notes: Data include active, licensed nurse practitioners in practice in North Carolina as of October 31 of each year. Physician data are derived from the North Carolina Board of Nursing. County estimates are based on primary practice location. Population census data and estimates are downloaded from the North Carolina Office of State Budget and Management and are based on US Census data. Metropolitan and nonmetropolitan/rural delineations are based on 2005 metropolitan statistical areas from the U.S. Census Bureau and U.S. Office of Management and Budget.

For those people who don't want to play with the data, we generate blogs

Figure 1. Respiratory Therapists per 10,000 Population, North Carolina, 2020

Total RTs: 4,658 | Total Population: 10,508,254 | Overall Ratio: 4.4



And highlighting inequitable access to primary care in the state

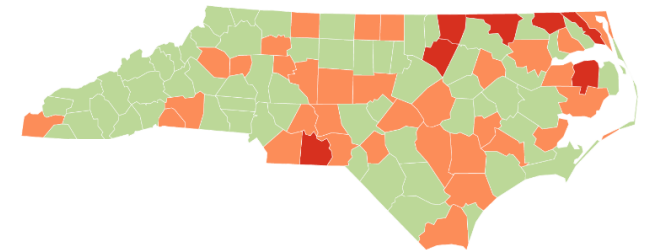
Primary Care Access in North Carolina is Not Equally Distributed

By Evan Galloway, Julie Spero, Heather Wilson
Mar 24, 2020

- Primary care practitioners per capita is one of the NC Institute of Medicine's (NCIOM) 21 health indicators for the [Healthy NC 2030](#) project.
- Access to primary care is necessary to improving the health outcomes of communities. With the recent spread of the novel [coronavirus](#) in North Carolina, primary care is critical as an entry-point to further care.
- Many rural areas of North Carolina lack adequate access to primary care providers. The disparities in access between rural and metropolitan areas have continued to grow despite an overall increase of physicians in NC, as [our previous blog](#) reported.
- On the map below, green indicates the county is meeting NCIOM's target ratio of 1 primary care provider to every 1,500 people. Currently, **60% of NC's 100 counties meet the NCIOM's target**. Seven counties were substantially below target: Anson, Northampton, Franklin, Warren, Gates, Tyrrell and Camden. Camden has a population of just over 10,000, and no primary care providers.
- Our definition of primary care clinician includes physicians, nurse practitioners (NPs), physician assistants (PAs) and certified nurse midwives (CNMs).

HPDS data were invaluable for pandemic response

Population per Primary Care Practitioner, North Carolina, 2017





Recruiting and Retaining Rural Health Providers



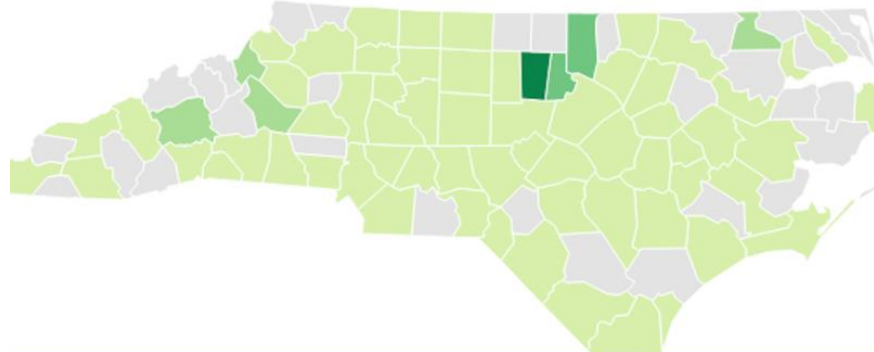
Dental therapy might not be what you think, but is it for

UNC Program Builds Rural Care Pipeline of Minority Doctors and Dentists

By LIZ SCHLEMMER & JASON DEBRUYN • AUG 1, 2018

- Share
- Tweet
- Email

Physicians with a Primary Area of Practice of Psychiatry, General per 10,000 Population by County, North Carolina, 2018



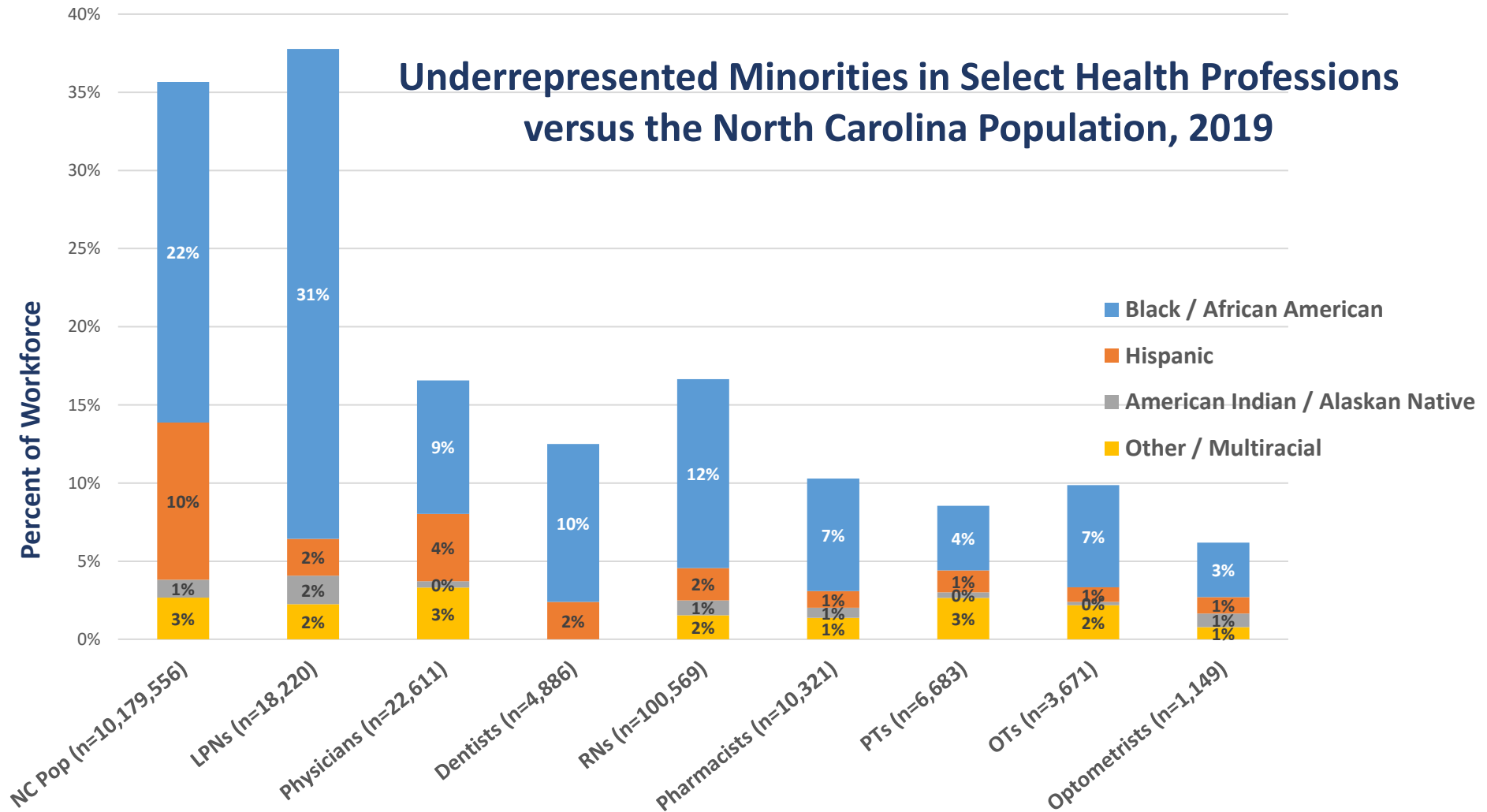
Eastern NC mental health unit slated for closure



Students in the Medical Education Development (MED) Program (left to right) Jazmine Walker, Miguel Vasquez, Gloribel Vanegas, and Joshua Walker prepare to dissect a cadaver at UNC Chapel Hill on July 5, 2018.

We take our role as “data agitators” seriously, for example: highlighting racial/ethnic disparities in the health workforce

Underrepresented Minorities in Select Health Professions versus the North Carolina Population, 2019



We use data to inform health workforce policy in the state

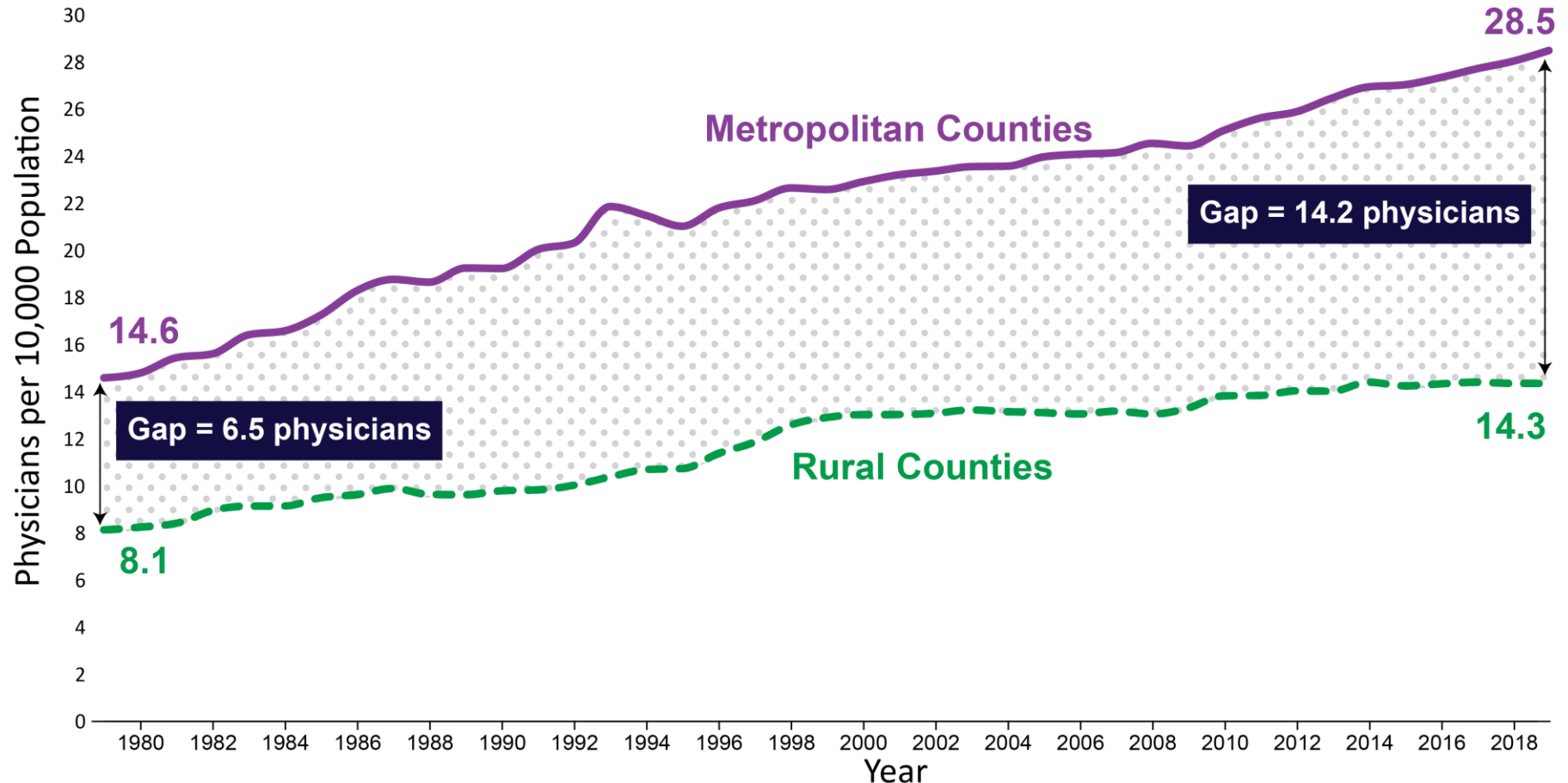


Our job is to make policy makers *love* data, *trust* data, *believe* data

To accomplish this, we “tell stories” with data

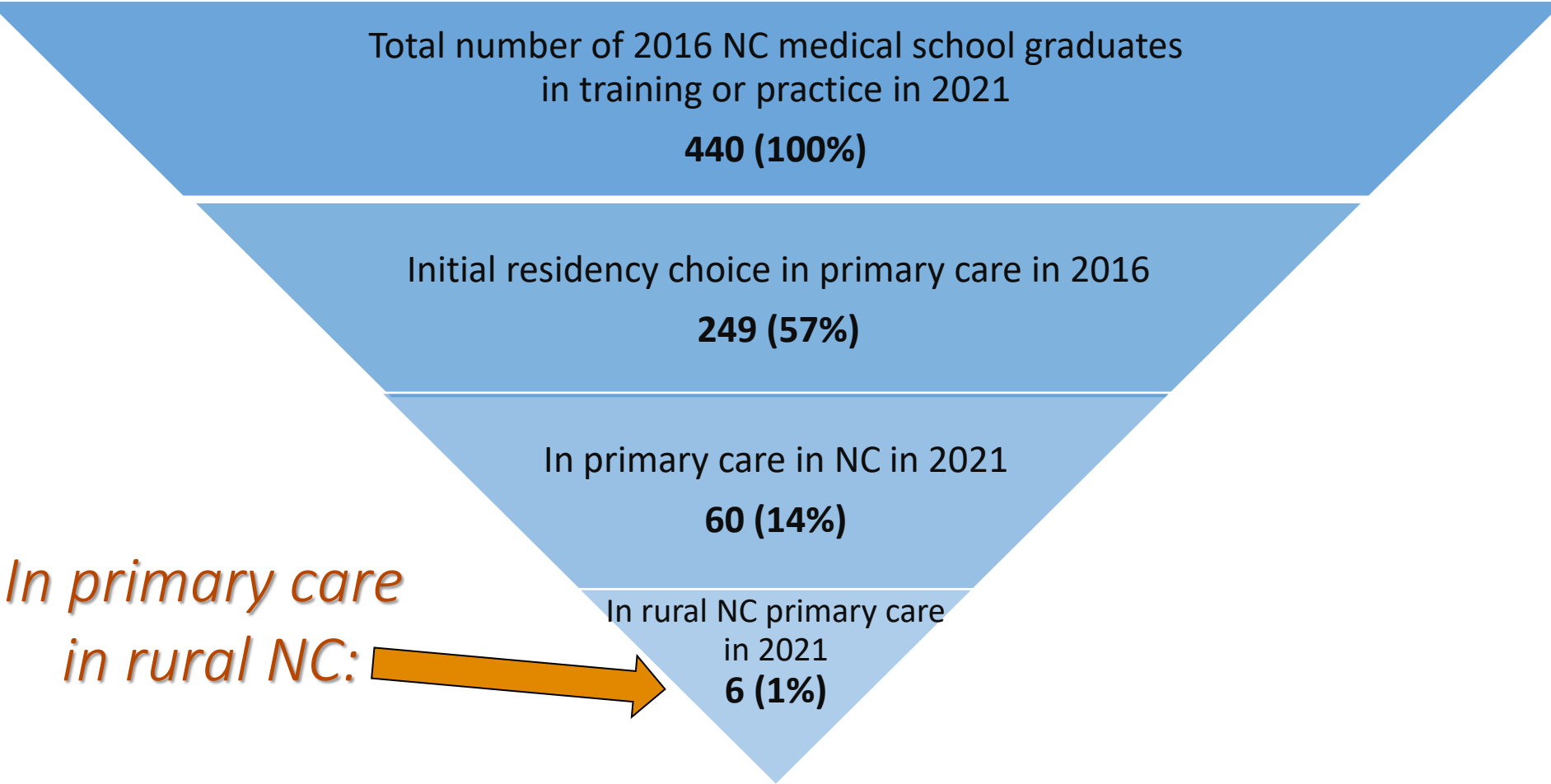
Despite overall growth in physician workforce in NC, disparities between rural and urban areas are growing

Physician per 10,000 Population for Metropolitan and Rural Counties, North Carolina, 1979 - 2019



Notes: Data include active, licensed physicians in practice in North Carolina as of October 31 of each year who are not residents-in-training and are not employed by the Federal government. Physician data are derived from the North Carolina Medical Board. County estimates are based on primary practice location. 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.

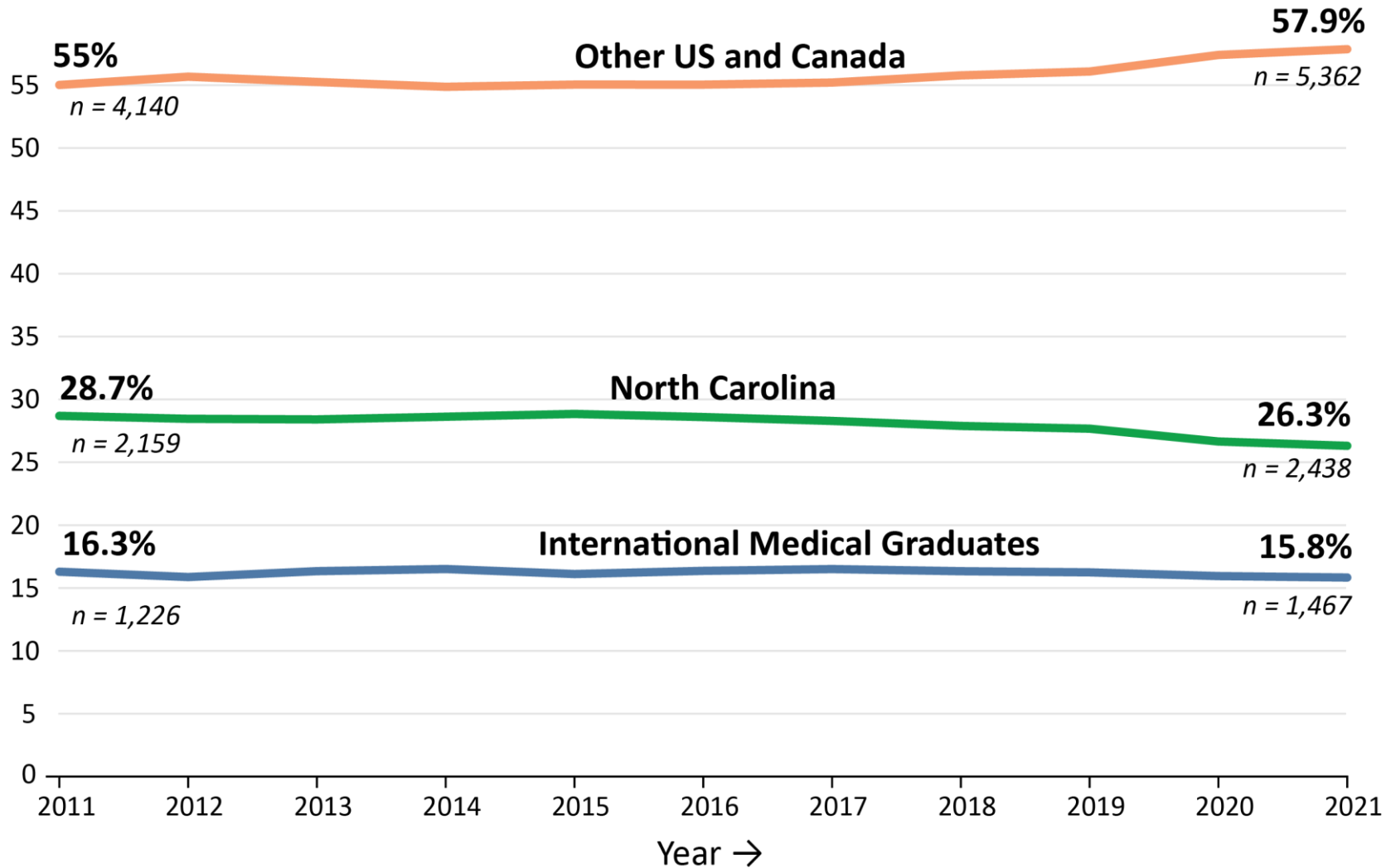
Because most medical school graduates do not practice in primary care in rural areas



Produced by the Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
Source: North Carolina Health Professions Data System with data derived from the Association of American Medical Colleges, and the NC Medical Board, 2021.
Rural source: US Census Bureau and Office of Management and Budget, July 2017. "Core Based Statistical Area" (CBSA) is the OMB's collective term for Metropolitan and Micropolitan Statistical areas. Here, nonmetropolitan counties include micropolitan and counties outside of CBSAs.

Only about ¼ of North Carolina's primary care physicians attended medical school instate

↑ Percentage of Primary Care Physicians (%)

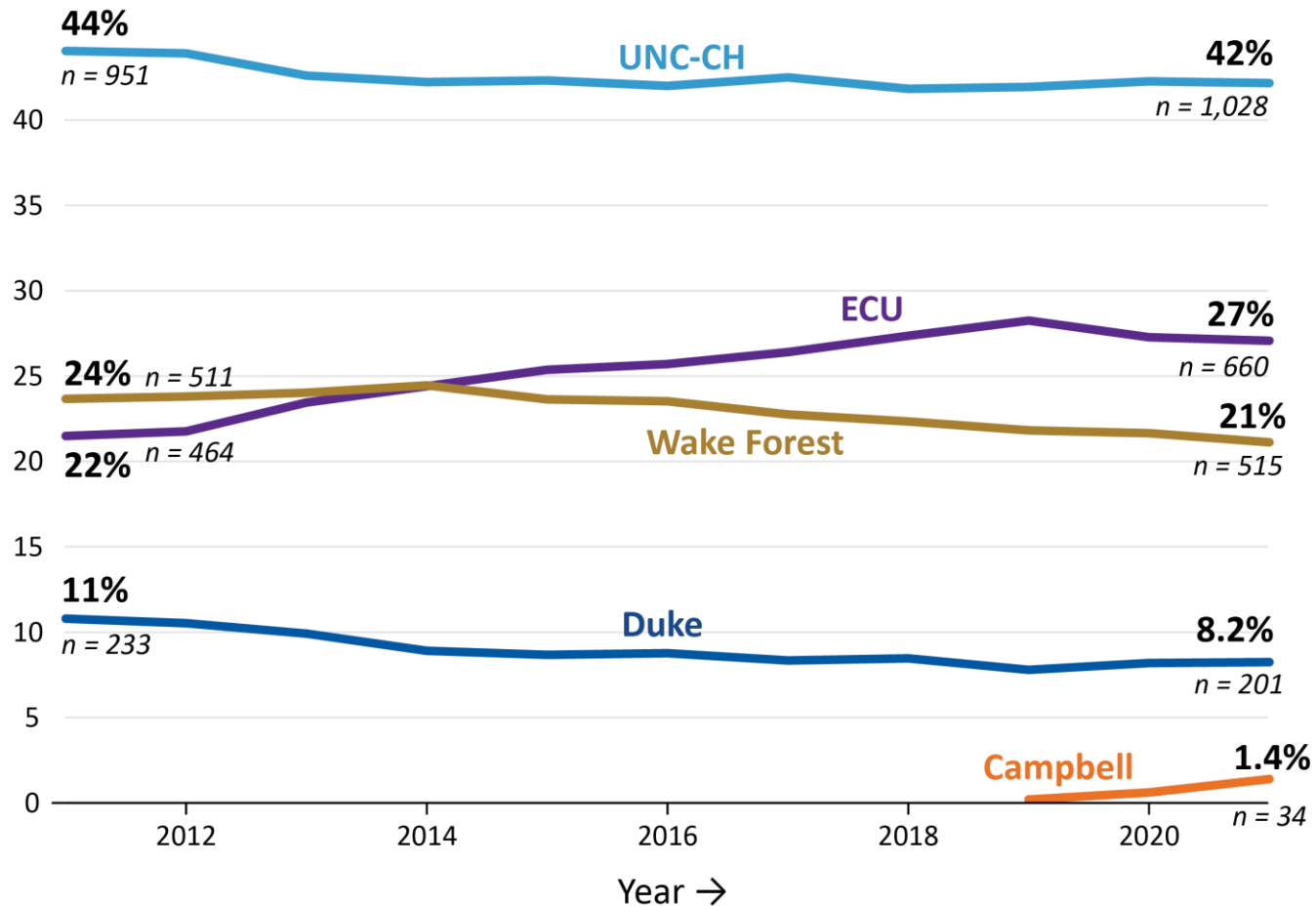


* 59 medical school countries/locations were missing.

Of those PCPs who attended medical school in NC, majority graduated from state's two public institutions

North Carolina Medical Schools of NC-Educated Primary Care Physicians Practicing in North Carolina, 2011-2021

↑ Percentage of Primary Care Physicians (%)



We also track outcomes of residency training

We tracked outcomes five years after graduation for **1,436** physicians who graduated from NC residency programs in 2012, 2013, and 2014

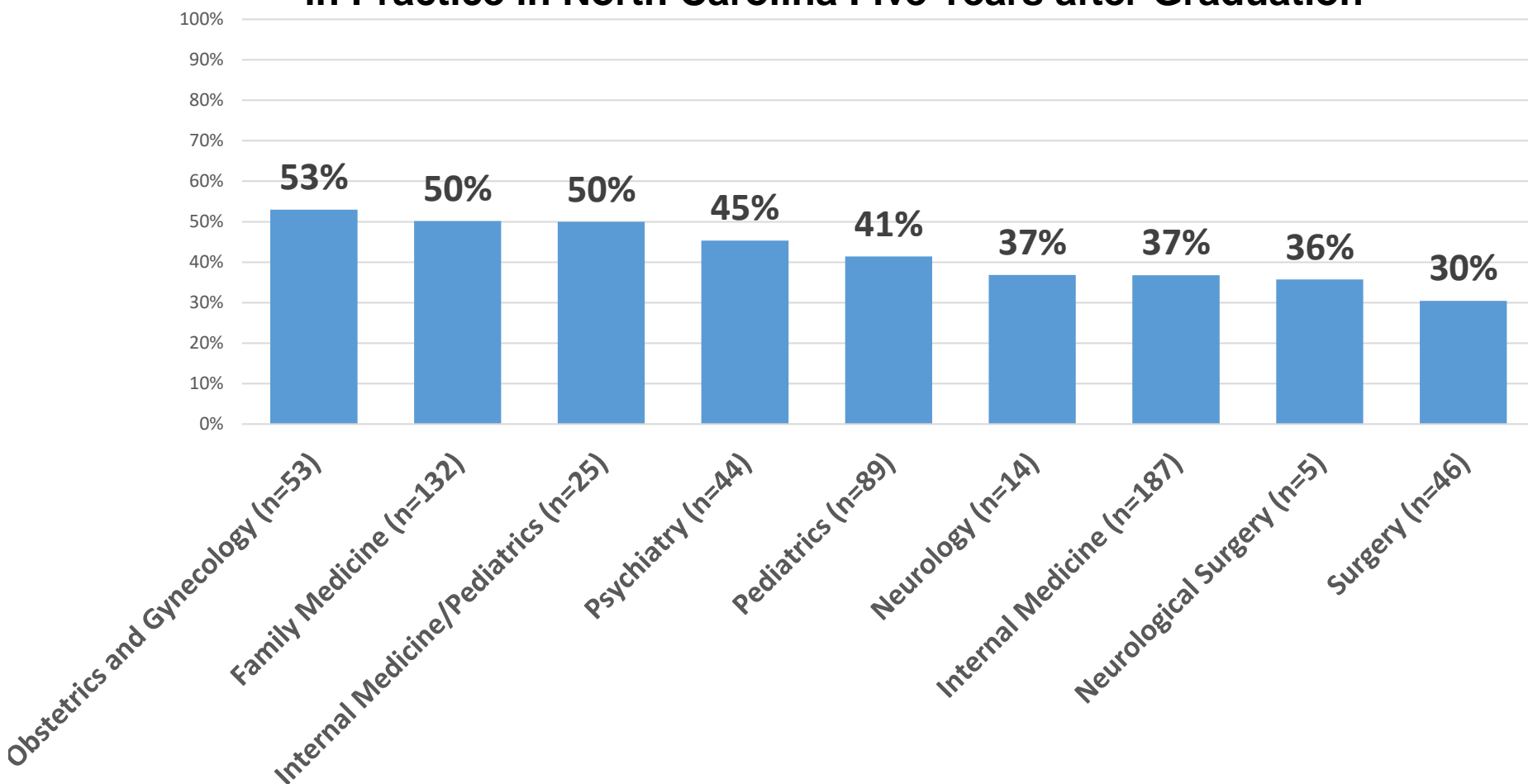


595 (41%) were in practice in North Carolina five years after graduation

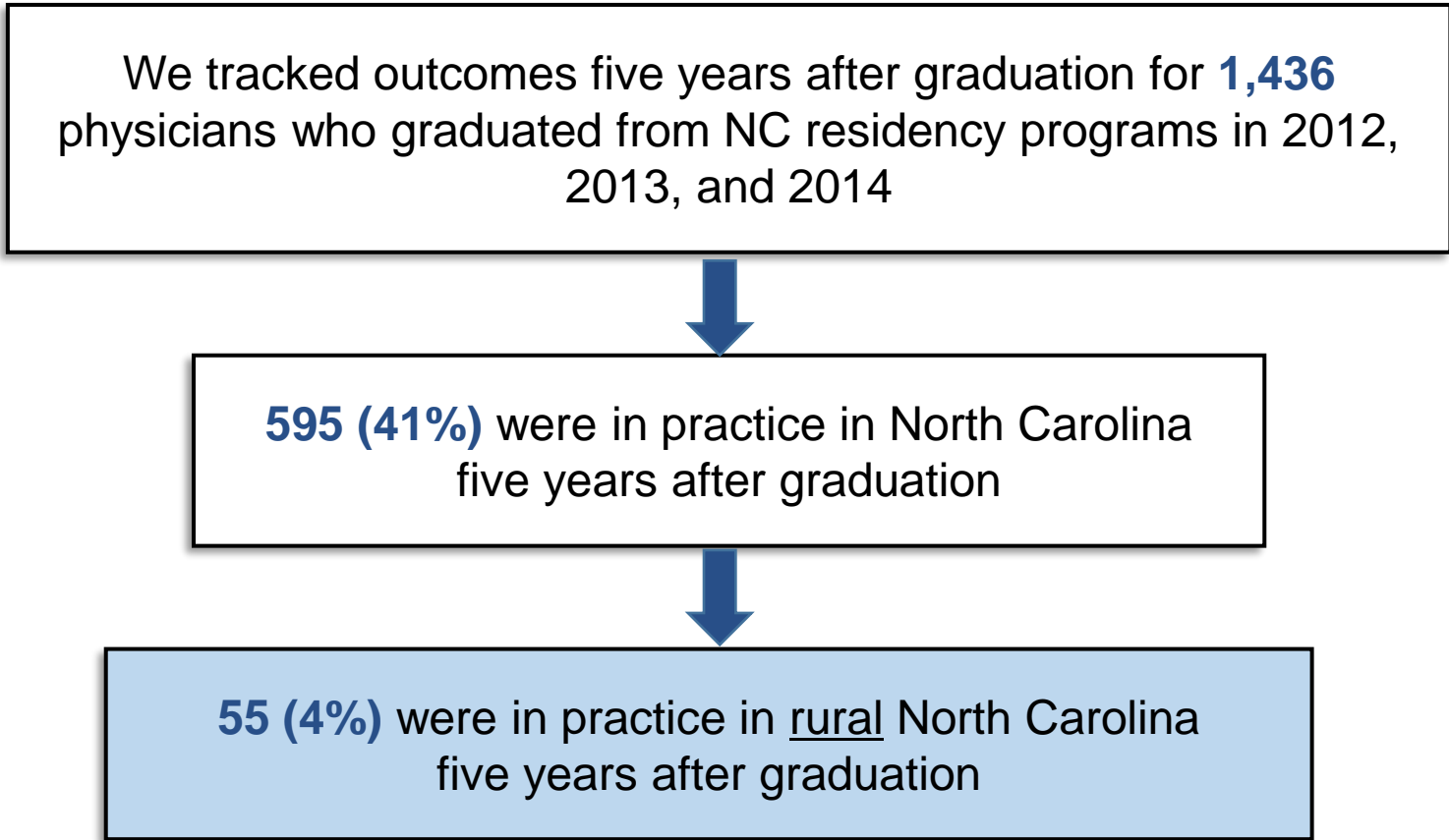
Notes: The workforce outcomes of four cohorts of residents who completed training in 2012, 2013 and 2015 were analyzed. We used North Carolina Medical Board licensure data to determine the location and primary area of practice for each physician five years after graduation, e.g., for a resident who completed training in 2012, we used 2017 NC Medical Board data to determine his/her location and primary area of practice. NC Health Professions Data System, Cecil G. Sheps Center for Health Services Research, UNC-CH, with data derived from the North Carolina Medical Board.

Most residents are not retained in state

Percent of North Carolina Residents Graduating in 2012, 2013, and 2014 in Practice in North Carolina Five Years after Graduation



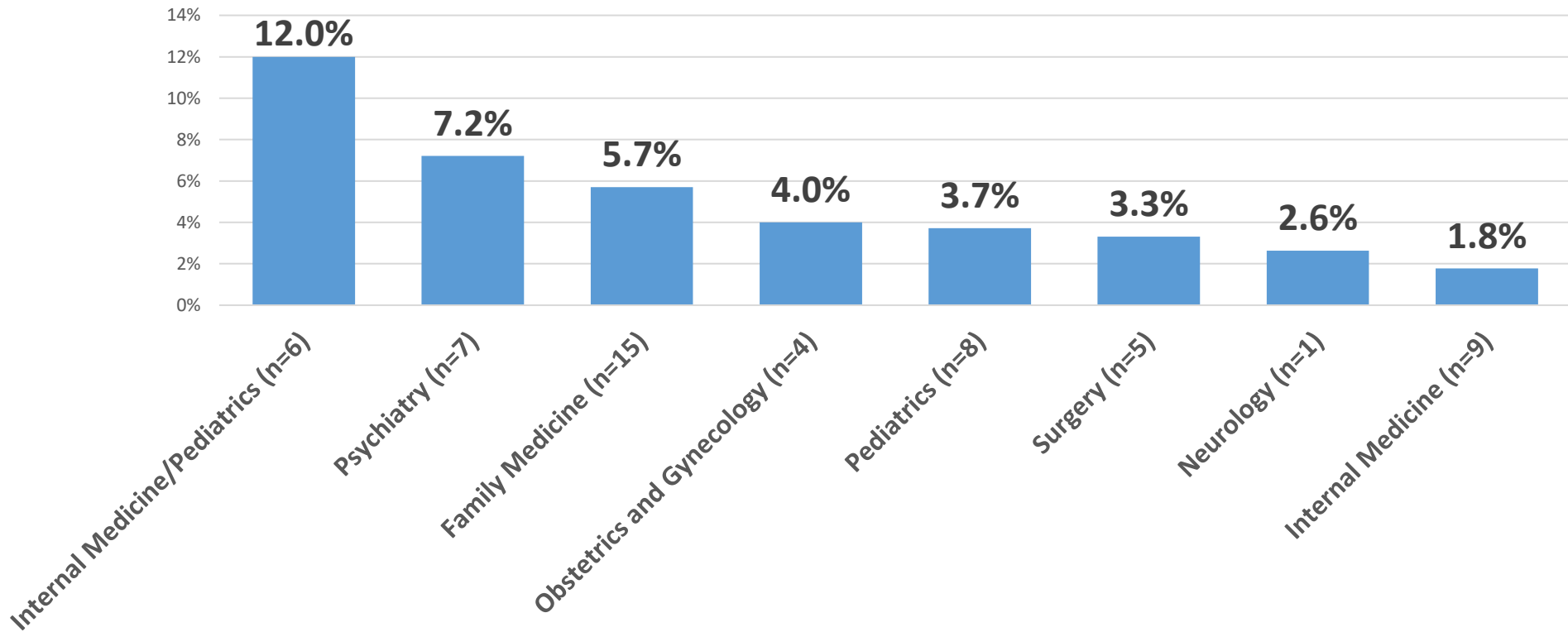
And most do not end up in rural practice



Notes: The workforce outcomes of four cohorts of residents who completed training in 2012, 2013 and 2015 were analyzed. We used North Carolina Medical Board licensure data to determine the location and primary area of practice for each physician five years after graduation, e.g., for a resident who completed training in 2008, we used 2013 NC Medical Board data to determine his/her location and primary area of practice. NC Health Professions Data System, Cecil G. Sheps Center for Health Services Research, UNC-CH, with data derived from the North Carolina Medical Board.

There is variation in rural practice by specialty

Percent of North Carolina Residents Graduating in 2012, 2013 and 2014 in Practice in Rural North Carolina Five Years after Graduation



Notes: We used North Carolina Medical Board licensure data to determine the location and primary area of practice for each physician five years after graduation, e.g., for a resident who completed training in 2012, we used 2017 NC Medical Board data to determine his/her location and primary area of practice. Rural areas are based on 2015 Office of Management and Budget metropolitan status codes and 2010 US Census Bureau Rural-Urban Commuting Area (RUCA) codes. Rural areas are either a) in a nonmetropolitan county or b) in an area within a metropolitan county that has a RUCA code of 4 or greater.

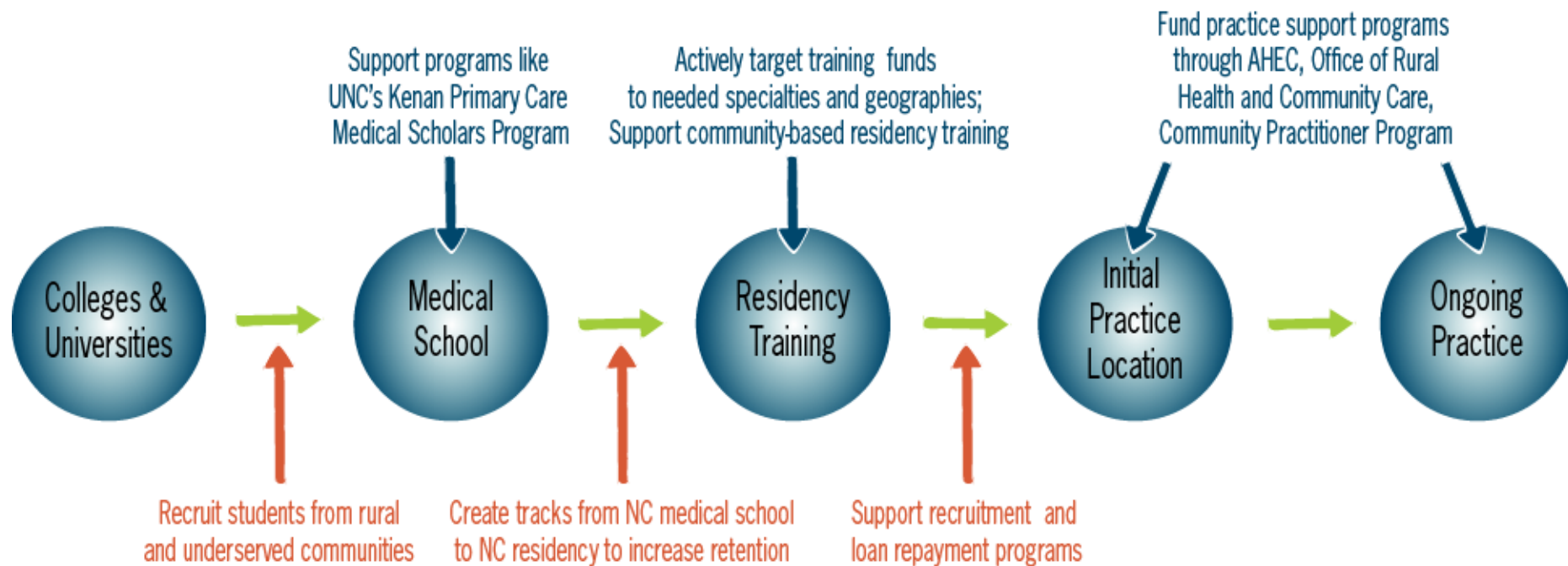
And variation in rural practice by training program

Some training programs perform better than others on percent of graduates in rural practice in NC:

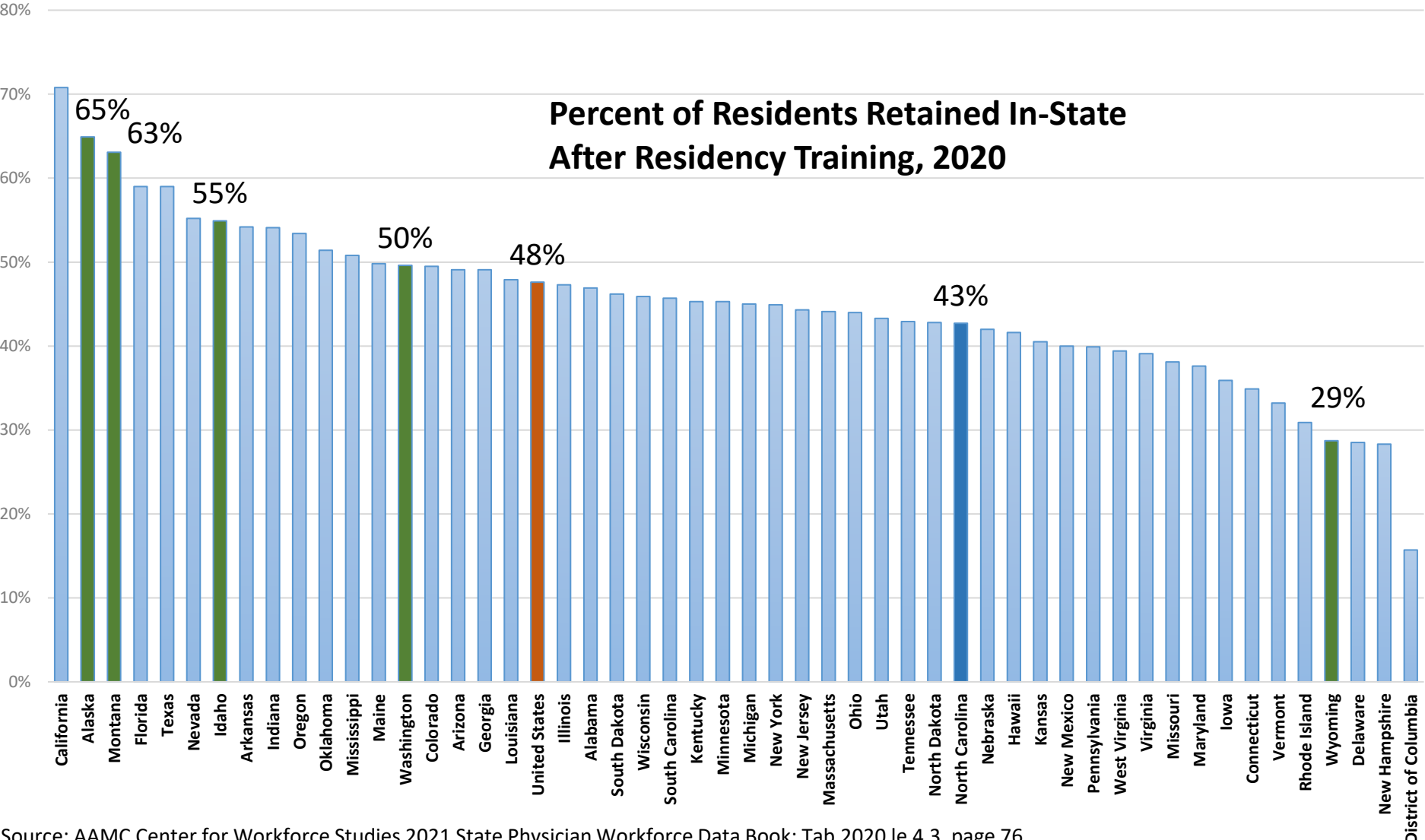
- IM/Pediatrics: average 12%, range 0 to 22%
- Psychiatry: average 7.2%; range 3% to 11%
- Family medicine: average 5.7%; range 0% to 11%
- OB/GYN: average 4%; range 0% to 20%
- Pediatrics: average 3.7%; range 0% to 8%
- Surgery: average 3.3%; range 0% to 22%
- Internal Medicine: average 1.8%; range 0% to 5%



NC data have been instrumental in leveraging funding for interventions at multiple points in physician's career trajectory



Even with these interventions, NC retains fewer residents compared to other states

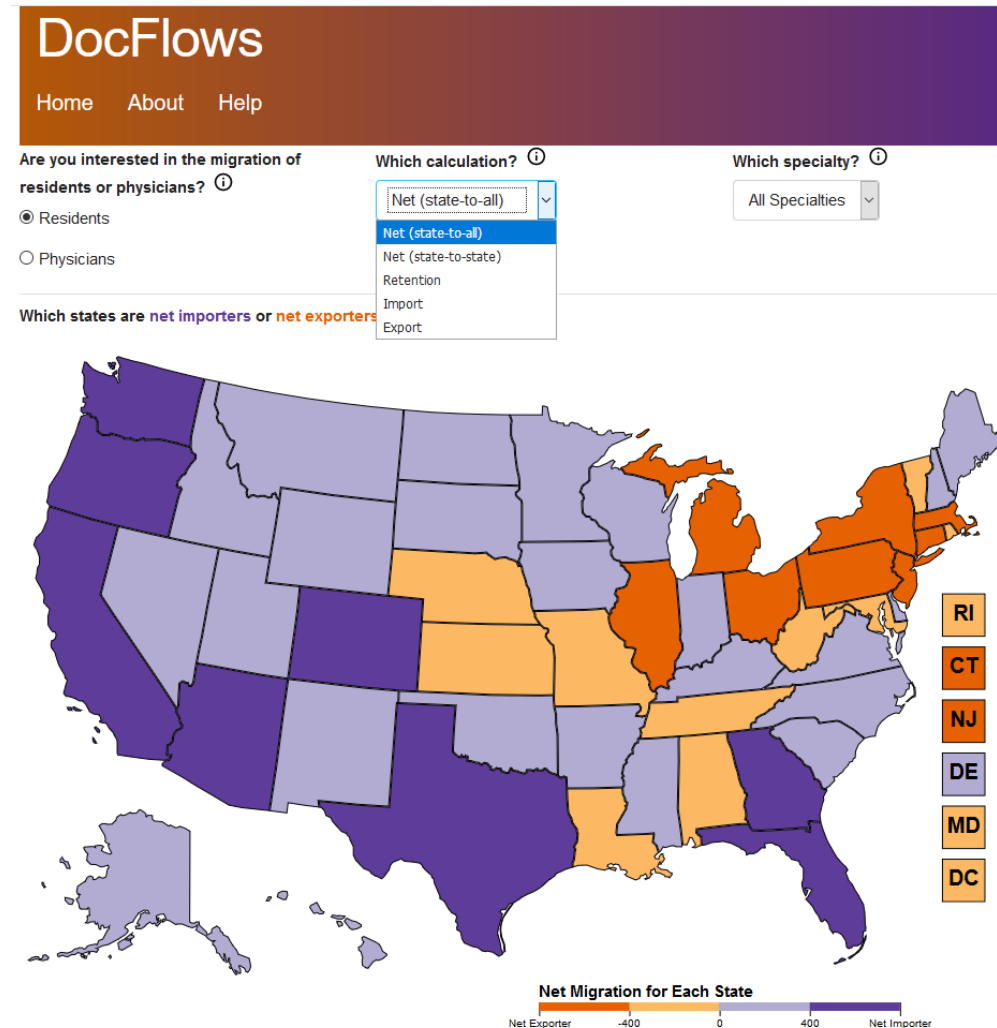


Source: AAMC Center for Workforce Studies 2021 State Physician Workforce Data Book; Tab 2020 le 4.3, page 76

We created the DocFlows App to show interstate flows of residents (and actively practicing physicians) between 2009 and 2015

- States have idea of self-sufficiency in GME but market is national
- The formal sub-title of the app is: “if I train more residents where are they likely to move?”
- It’s informally known as the app that tells me “who is stealing my residents?”

<https://docflows.unc.edu>



NC's Net Trade Balance=

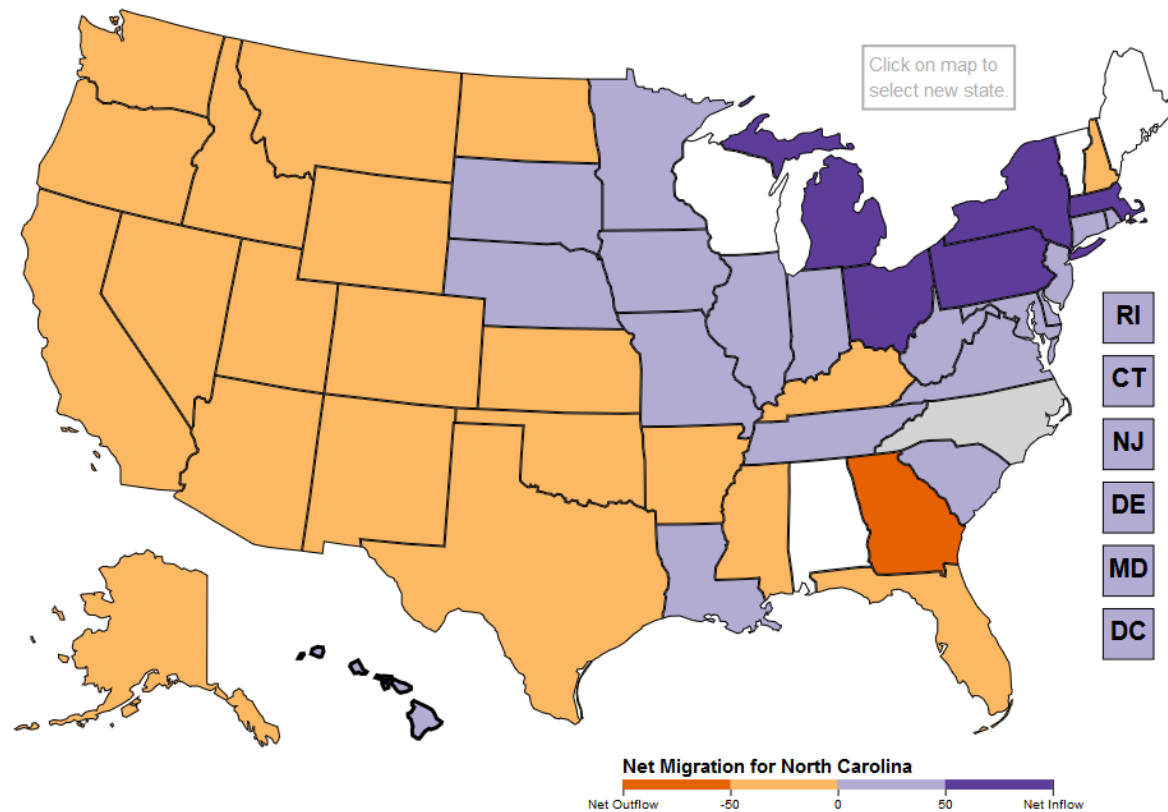
of residents NC imported from each state minus
of residents NC exported to each state

NC imports more residents from NY (190), PA (80), OH (74), MA (70), and MI (74) than it exports

NC exports more residents to GA (52), CA (48), CO (46), TX (28), and OR (27) than it imports

NC has even trade balance with AL, VT, and ME

To which states is North Carolina a net importer or net exporter of residents?



WY's Net Trade Balance=

of residents WY imported from each state minus
of residents WY exported to each state

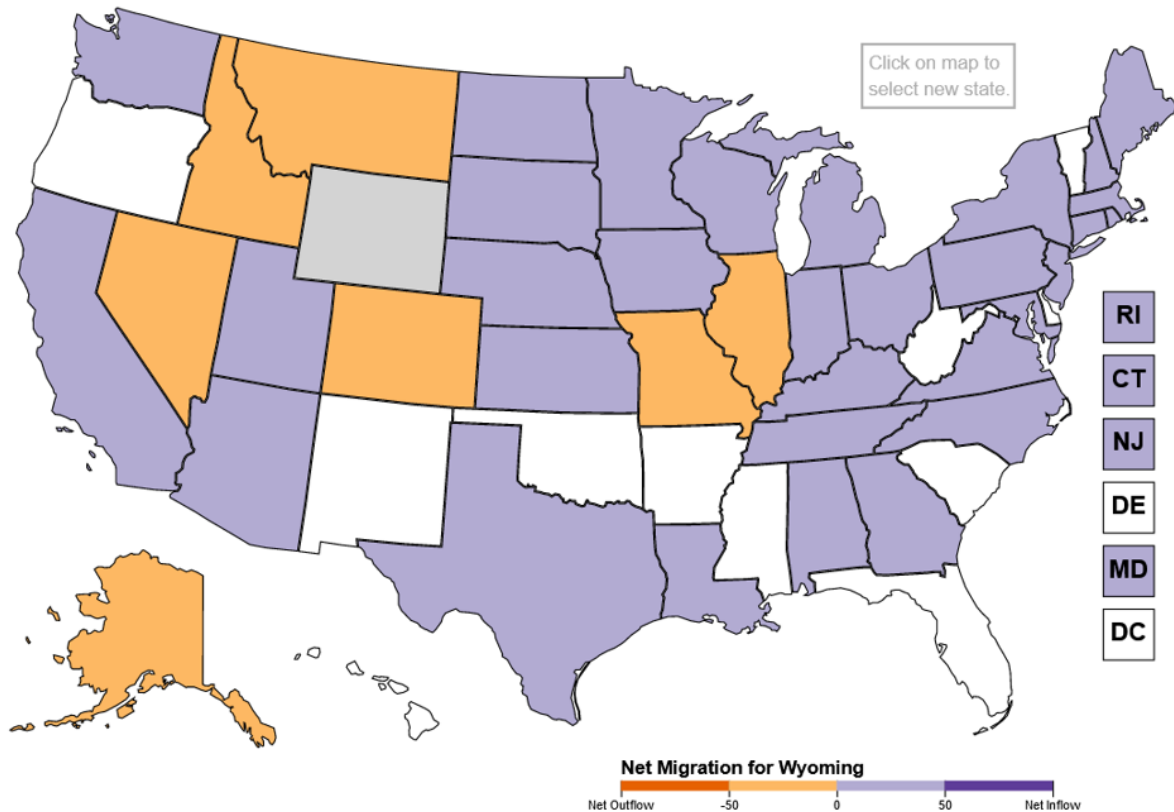
WY imports more

residents than it exports to most states with NY (10), MI (7), IA (6), OH (5), PA (5), TX (5), and WI (5) providing the greatest numbers

WY exports more residents to NV (2), MT (1), CO (1), ID (1), MO (1), AK (1), and IL (1) than it imports

WY has even trade balance with OR, NM, OK, AR, MS, SC, HI, and WV

To which states is Wyoming a net importer or net exporter of residents?



Federal efforts to reform Medicare GME have stalled but HRSA is investing in training programs in underserved areas

- Only 2% of federal residency training funds go to rural programs¹
- HRSA's Rural Residency Planning and Development (RRPD) program has awarded \$43.4M to 58 organizations across 32 states to start FM, IM, psychiatry, and general surgery residencies²
- As of July 2022, the RRPD program has received approval for at least 350 new accredited resident positions, and matched 188 physicians into these residencies



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1. US Government Accounting Office. <https://www.gao.gov/products/gao-21-329>
2. <https://www.hrsa.gov/rural-health/grants/rural-health-research-policy/rrpd>

Map: <https://www.ruralgme.org/>



HRSA's Teaching Health Center (THC) and THC Planning and Development Program also serving underserved communities

- Teaching Health Centers support training of residents in primary care (FM, IM, peds, med-peds, psychiatry, dentistry, OB/GYN, geriatrics) in community-based ambulatory care centers in underserved settings
- Since 2011, the THCGME program has supported the training of over 1,731 new primary care physicians and dentists
- Through the THCPD program, HRSA has awarded \$23.4M to 47 organizations to create **new** medical and dental THCs



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www.THCGME.org

<https://bhwh.hrsa.gov/funding/apply-grant/teaching-health-center-graduate-medical-education/awardee-map>

We are evaluating the outcomes of the RRPD and THCPD Programs

Outcomes Matter to make business case for increased investment in community-based training models in needed specialties and communities

Using data from HRSA performance reports, exit surveys, and secondary data sources, we are evaluating:

- **Workforce Outcomes** — Where are rural residents trained and where do they practice post-residency?
- **Service Expansion** — In what ways are the RRPD and THCPD programs expanding access to care?
- **Team-Based Models of Care** — Which health professionals are in training and practice in RRPD and THCPD programs and how are these teams meeting local population health needs?
- **Barriers/Enablers to Program Development** — Where has progress been made and what more needs to be done?



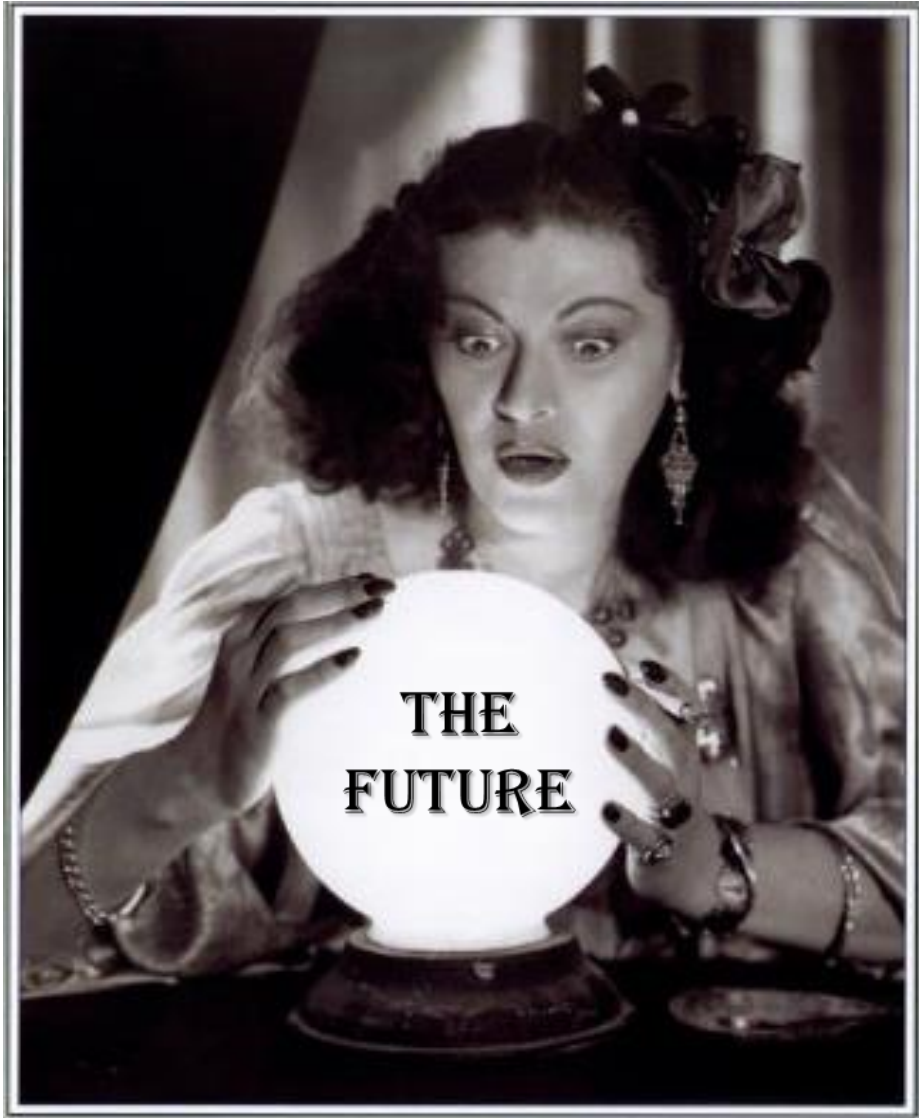
RRPD programs appear to have found “sweet spot” of residency training

We analyzed characteristics of rural communities with RRPD programs and found:

- Most RRPD programs are located in counties adjacent to metro counties
- Rural counties that have higher population density and good provider supply are more likely to have RRPD training sites
- RRPD counties had relatively high social vulnerability, with 30% of RRPD sites located in the most vulnerable 10% of counties
- RRPD programs are located in counties with more diverse populations and more Medicaid eligibles



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Health System Consolidation and Rural Hospital Acquisition

- Between 2005 and 2016, ~12% of rural hospitals merged*
- The success of urban health systems is increasingly linked to rural communities
- Academic health centers are incentivized to identify local population health needs and design interprofessional models of practice and training to meet those needs

*Williams, D., Jr, Reiter, K. L., Pink, G. H., Holmes, G. M., & Song, P. H. (2020). Rural Hospital Mergers Increased Between 2005 and 2016-What Did Those Hospitals Look Like?. *Inquiry : a journal of medical care organization, provision and financing*, 57, 46958020935666.

Invited Commentary

Improving the Health of Rural Communities Through Academic-Community Partnerships and Interprofessional Health Care and Training Models

Erin P. Fraher, PhD, MPP, Brianna Lombardi, PhD, MSW, Barbara Brandt, PhD, EdM, and Emily Hawes, PharmD

Abstract

Health disparities between rural and urban areas are widening at a time when urban health care systems are increasingly buying rural hospitals to gain market share. New payment models, shifting from fee-for-service to value-based care, are gaining traction, creating incentives for health care systems to manage the social risk factors that increase health care utilization and costs. Health system consolidation and value-based care are increasingly linking the success of urban health care systems to rural communities. Yet, despite the

models of practice in rural areas. With responsibility for training the future health workforce and major investments in research infrastructure and educational capacity, AHCs are uniquely positioned to develop interprofessional practice and training opportunities in rural areas and evaluate the cost savings and quality outcomes associated with team-based care models. To accomplish this work, AHCs will need to develop academic-community partnerships that include networks of providers and practices, non-AHC educational organizations, and

Fraher EP, Lombardi B, Brandt B, Hawes E. Improving the Health of Rural Communities Through Academic-Community Partnerships and Interprofessional Health Care and Training Models. *Acad Med*. 2022 Jun 21. doi: 10.1097/ACM.0000000000004794.

Multiple Forces at Play Are Incentivizing Use of Teams

Continuing health system consolidation

Increasing # of patients covered by Value-Based Care Contracts

Growing need to address social determinants of health driving costs

Academic Health Centers incentivized to develop community-based partnerships to address population health needs

Develop team-based models of care

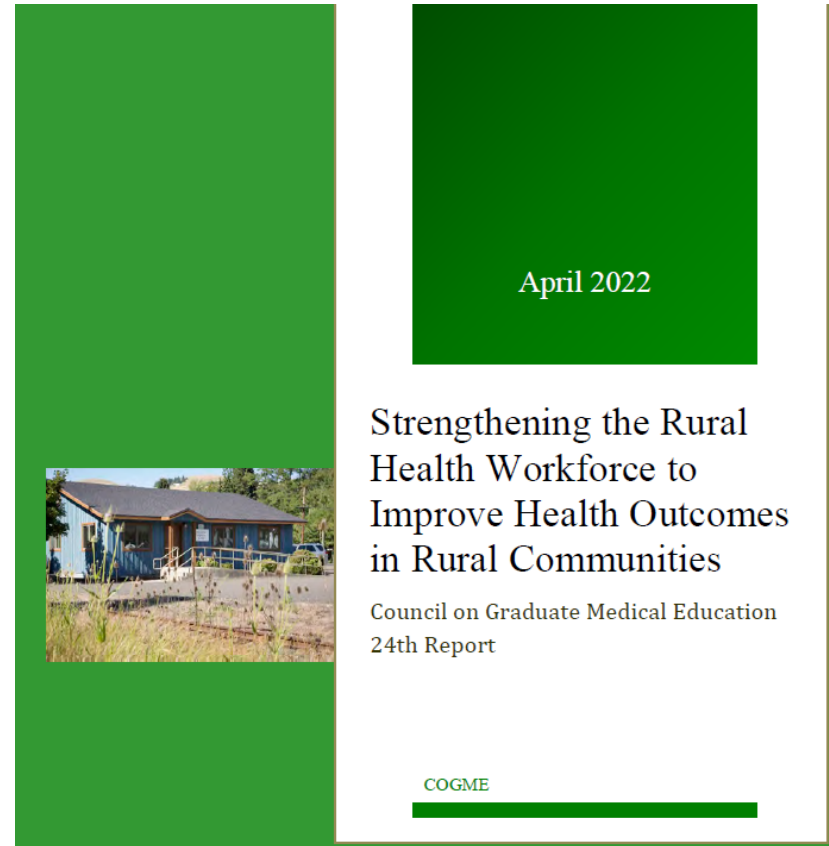
Evaluate outcomes

Document and disseminate findings

Paying for Team-Based Models Training and Practice

COGME recommends that CMS support and test sustainable alternative payment models that support team-based education and practice by:

- Enhancing coordination between HRSA and CMS to develop and test innovative payment models for rural teams
- Working with public (Medicare and Medicaid) and commercial payers to develop payment models that encourage team-based models of care



<https://www.hrsa.gov/sites/default/files/hrsa/advisory-committees/graduate-medical-edu/reports/cogme-april-2022-report0.pdf>

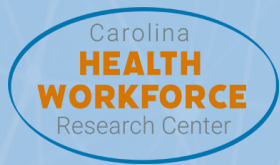
In the meantime, Medicaid funds are a source of interprofessional training funding

- On Sept 28, 2002, CMS approved 1115 waivers for Massachusetts and Oregon
- MA will, in partnership with feds, invest \$40 million over 5 years to support new behavior health student loan repayment program, primary care student loan repayment program and Family NP residency program
- Good example of leveraging Medicaid funds to address health workforce needs
- Required to fund an evaluation of impact of program on access to care



Our HRSA-funded Carolina Health Workforce Center is studying interprofessional training in RRPD programs

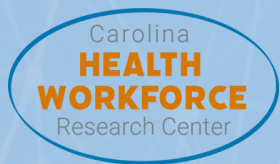
- This study will investigate:
 - the prevalence of interprofessional rural residency training in rural areas
 - the degree to which team-based training is designed around local population health needs communities
 - how value-based payment models in rural areas may influence team composition
 - the barriers and enablers of rural team-based practice
- Data: HRSA performance reports, RRPD training site characteristics, CMMI data on sites practicing in alternative payment models and interviews



The Carolina Health Workforce Research Center was just refunded by HRSA for another 5 years

This year, we'll also be studying:

1. Changes in hospital staffing mix between 2005-2021
2. Growth, geographic location, setting, and credentials of community health workers who bill for services
3. How institutional, professional and societal factors shape career satisfaction and wellbeing among physicians and trainees
4. The contributions of undergraduate historically black colleges and universities to increasing the diversity of the physician workforce
5. Whether employing social workers, community health workers, case managers, and health educators in Community Health Centers is associated with increased social risk screening



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