Building physician workforce projections that don't simply answer the question "how many doctors do we need?"

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Presentation overview

- A brief history of physician projection models (we haven't done it well)
- What makes our model different
- Whirlwind tour of the model's methods
- What we've contributed to the field: methods and findings
- Challenges in messaging model findings
- Future research needed

This project is funded by a grant from The Physicians Foundation.

A brief history of workforce projection models

- Most models aim to answer question of too many or too few health professionals
- Reactions to model findings are diffuse and fragmented
  - Training institutions see opportunities for expansion
  - Specialty groups push to “strengthen” programs
  - Reactions are “unexpectedly cumulative”
- Result: we lurch from oversupply to shortage, especially true in nursing!
- Silo-based projections by profession or specialty

This project is funded by a grant from The Physicians Foundation.

OK, maybe this isn't so brief because here's some more history on models

- Limited/no "what if" scenarios
- Developed, and used, for advocacy purposes
- Proprietary (read: black box) & uncustomizable models
- Lack friendly and interactive user interface

This project is funded by a grant from The Physicians Foundation.

What we hope to contribute to this longstanding (and often contentious!) debate (1)

- **Start with different question:** what services will patients need versus how many doctors/NPs/PAs/etc will we need?
- **Move away from silo-based modeling**: incorporate plasticity which recognizes providers have flexible, dynamic and overlapping scopes of practice
- **Display data in interactive format:** web-based model is transparent and designed to be customized, challenged and improved
- **Seek different outcome:** designed to engage stakeholders in using data to understand local workforce challenges and develop policies to address them

This project is funded by a grant from The Physicians Foundation.

What we hope we are contributing to this longstanding (and often contentious!) debate (2)

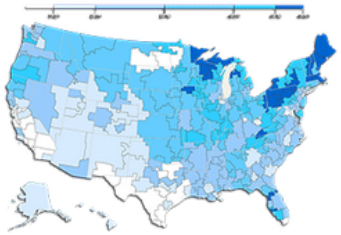
- **Change narrative/mindset** — workforce models as tool, not an answer.
- **3 models** — supply, utilization, relative capacity (a.k.a. “surplus/shortage”)
- **3 types of visualizations** — maps, line charts and population pyramids
- **3 geographic levels**— national, state and sub-state level
- **Alternate futures** — “what if” scenarios regarding Medicaid expansion in all states, physician FTEs, retirement, use of NPs and PAs, and redistributing graduate medical education (GME)

This project is funded by a grant from The Physicians Foundation.

https://www2.shepscenter.unc.edu/workforce

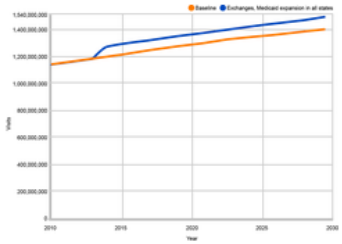
FutureDocs Forecasting Tool

HOME | ABOUT THE PROJECT | THE MODEL | HELP | CONTACT



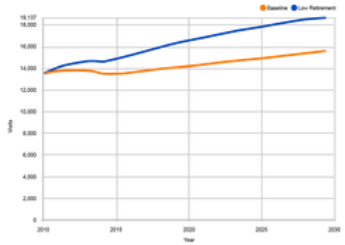
VISUALIZE DATA AT STATE AND SUB-STATE LEVELS

Use the tool to view physician supply, healthcare service use, and shortages/surpluses at the national, state, and sub-state levels.



PROJECT THE EFFECT OF MEDICAID EXPANSION

Use the tool to project how the utilization of health care services will change under different assumptions about Medicaid expansion.



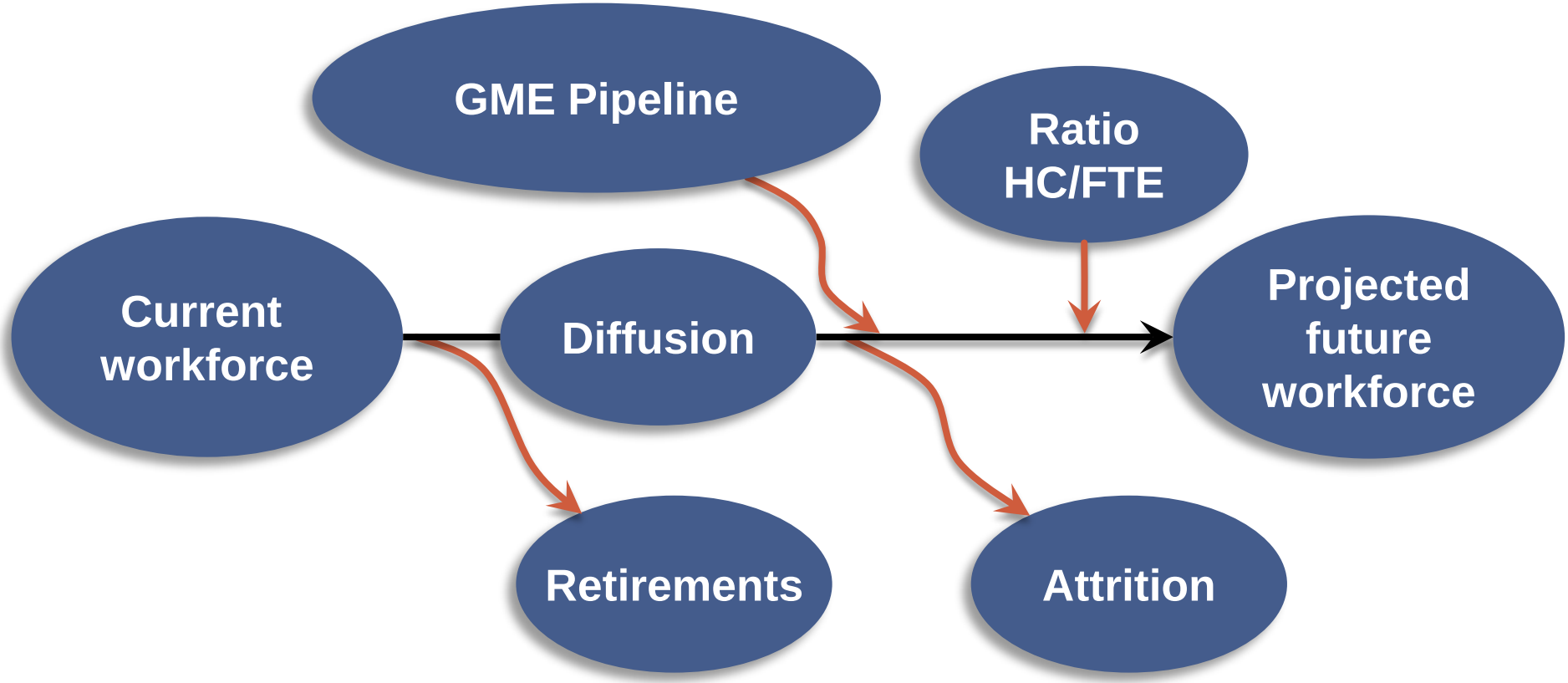
UTILIZATION, SUPPLY, SHORTAGE/SURPLUS TO 2030

Use the tool to examine how physician supply, healthcare service use, and shortages/surpluses will change between 2011-2030 under different scenarios.

BUILD YOUR MODEL

This project is funded by a grant from The Physicians Foundation.

But it's not just a pretty (inter)face…
We model supply like the real world



This project is funded by a grant from The Physicians Foundation.

Model's supply side innovations

Supply Side Innovations

- Collapse 200+ specialties in 36 "buckets"
- Model patient care hours (patient care FTE)
- First model to include detailed GME training pathways, including sub-specialization trends
- Accounts for physician moves after residency training and during career

This project is funded by a grant from The Physicians Foundation.

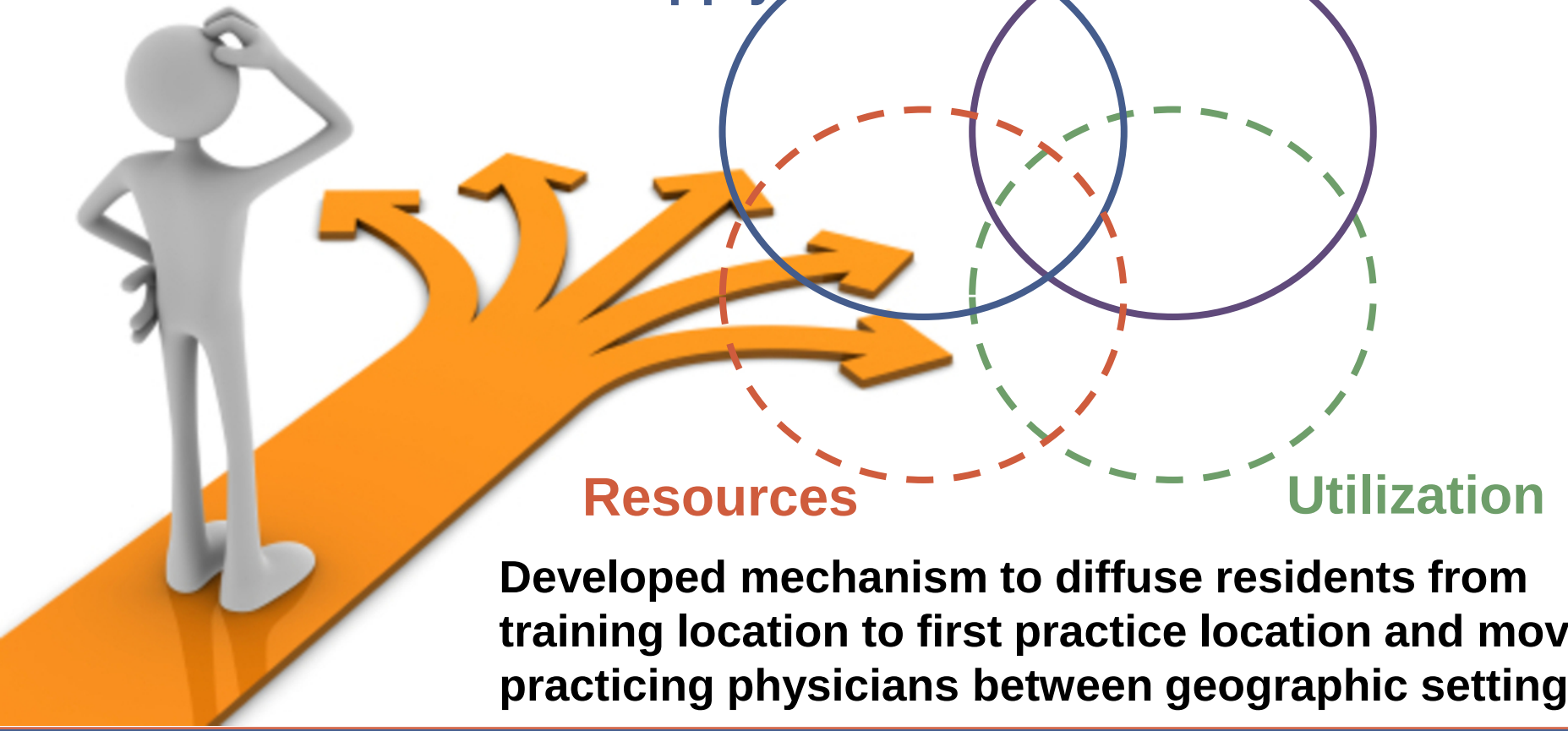
Developed sub-state unit of geography, Tertiary Service Areas (TSAs)

To capture sub-state variation, created TSAs

- Based on Dartmouth's Hospital Referral Regions
- But our TSAs are based on counties, not ZIP codes
- TSAs are markets that encompass primary and specialty care services
- Health system consolidation, ACOs and ACO-like structures create need for regional-based data

This project is funded by a grant from The Physicians Foundation.

We model geographic diffusion of residents and active physicians



Developed mechanism to diffuse residents from training location to first practice location and move practicing physicians between geographic settings

This project is funded by a grant from the Physicians Foundation.

Model's innovations in forecasting future health care utilization

Created Clinical Service Areas (CSAs) to capture why and where people seek care

- **19 Clinical Service Areas** (e.g., oncology, circulatory conditions, endocrinology, mental health, preventative care, etc.)
- Modeled use of health care in **3 settings**:
  - outpatient (including physician offices and hospital outpatient settings)
  - inpatient settings
  - emergency departments

This project is funded by a grant from The Physicians Foundation.

Sources for data on utilization

- Primary data source is Medical Expenditure Panel Survey (MEPS)
  - Annual survey by AHRQ, contains setting and CCS for approximately 30,000 individuals per year
  - Combined multiple years
- Used indirect estimation methods to forecast effect of key factors known to influence utilization, and develop *areal* rates:
  - **Sociodemographics**: age, income, insurance coverage;
  - **Health & Risk**: obesity, smoking, etc. (e.g. BRFSS)

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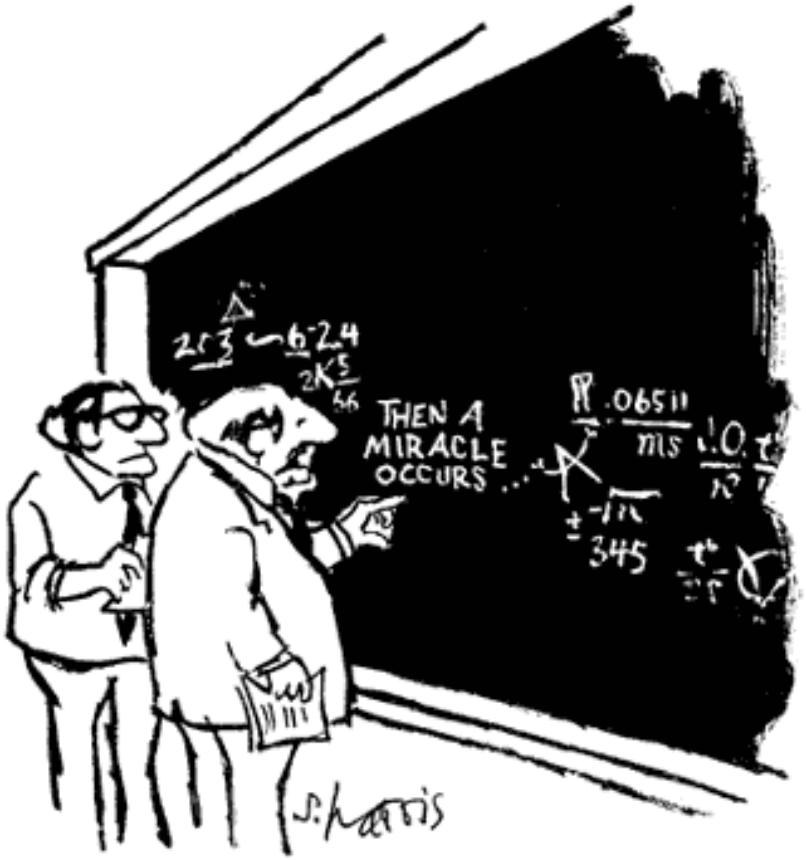
Plasticity matrix brings supply and utilization together by mapping physicians to services



"I think you should be more explicit here in step two."

- **Starting question**: what health services will patients need?
- **Next question**: which physician specialties can provide those services?
- **Innovation**: plasticity matrix maps services provided by physicians in different specialties to patients' visits

This project is funded by a grant from The Physicians Foundation.

Plasticity—Providers and Services: A sample matrix for outpatient settings

Number of outpatient visits, select specialties and CSAs

Specialties	Circulatory	Digestive	Endocrine/ Immunity	Genitourinary	Infectious	Neoplasms	Respiratory	Other CSAs
Cardiology	29,000,000	213,801	555,052	96,113	22,694	141,362	482,472	6,961,828
Dermatology	182,456	95,999	59,350	44,899	1,800,000	12,000,000	166,972	16,940,570
Internal Medicine	19,000,000	2,800,000	7,600,000	1,600,000	830,328	1,500,000	5,000,000	30,572,797
Endocrinology	580,980	140,846	8,300,000	110,968	20,264	599,928	70,317	1,948,831
Family Medicine	57,000,000	12,000,000	26,000,000	8,100,000	5,200,000	3,300,000	35,000,000	146,877,717
Gastroenterology	458,087	8,700,000	242,921	129,172	659,723	1,100,000	89,227	6,929,699
Other specialties	12,813,059	12,938,816	10,304,506	32,984,241	7,436,774	39,439,345	40,083,489	413,929,716
Total visits	119,034,582	36,889,462	53,061,829	43,065,393	15,969,783	58,080,635	80,892,477	624,161,158

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Plasticity—Providers and Services: A sample matrix for outpatient settings

Number of outpatient visits, select specialties and CSAs

Specialties	Circulatory	Digestive	Endocrine/ Immunity	Genitourinary	Infectious	Neoplasms	Respiratory	Other CSAs
Cardiology	24%	213,801	555,052	96,113	22,694	141,362	482,472	6,961,828
Dermatology	0%	95,999	59,350	44,899	1,800,000	12,000,000	166,972	16,940,570
Internal Medicine	16%	2,800,000	7,600,000	1,600,000	830,328	1,500,000	5,000,000	30,572,797
Endocrinology	0%	140,846	8,300,000	110,968	20,264	599,928	70,317	1,948,831
Family Medicine	48%	12,000,000	26,000,000	8,100,000	5,200,000	3,300,000	35,000,000	146,877,717
Gastroenterology	0%	8,700,000	242,921	129,172	659,723	1,100,000	89,227	6,929,699
Other specialties	11%	12,938,816	10,304,506	32,984,241	7,436,774	39,439,345	40,083,489	413,929,716
Total visits	100%	36,889,462	53,061,829	43,065,393	15,969,783	58,080,635	80,892,477	624,161,158

Within a CSA, how are outpatient visits distributed across specialties?

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Plasticity—Providers and Services: A sample matrix for outpatient settings

Number of outpatient visits provided per FTE per year, select specialties and CSAs

	Circulatory	Digestive	Endocrine/ Immunity	Genitourinary	Infectious	Neoplasms	Respiratory	Other CSAs	Total
Cardiology	2,095	0	40	0	0	0	34	368	2,537
Dermatology	32	0	0	0	317	2,116	0	2,936	5,401
Internal Medicine	322	47	128	0	0	0	84	440	1,021
Endocrinology	163	39	2,328	31	0	168	0	442	3,171
Family Medicine	936	197	427	133	85	54	575	2,356	4,763
Gastroenterology	58	1,108	30	0	84	140	0	796	2,216

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Plasticity—Providers and Services: A sample matrix for outpatient settings

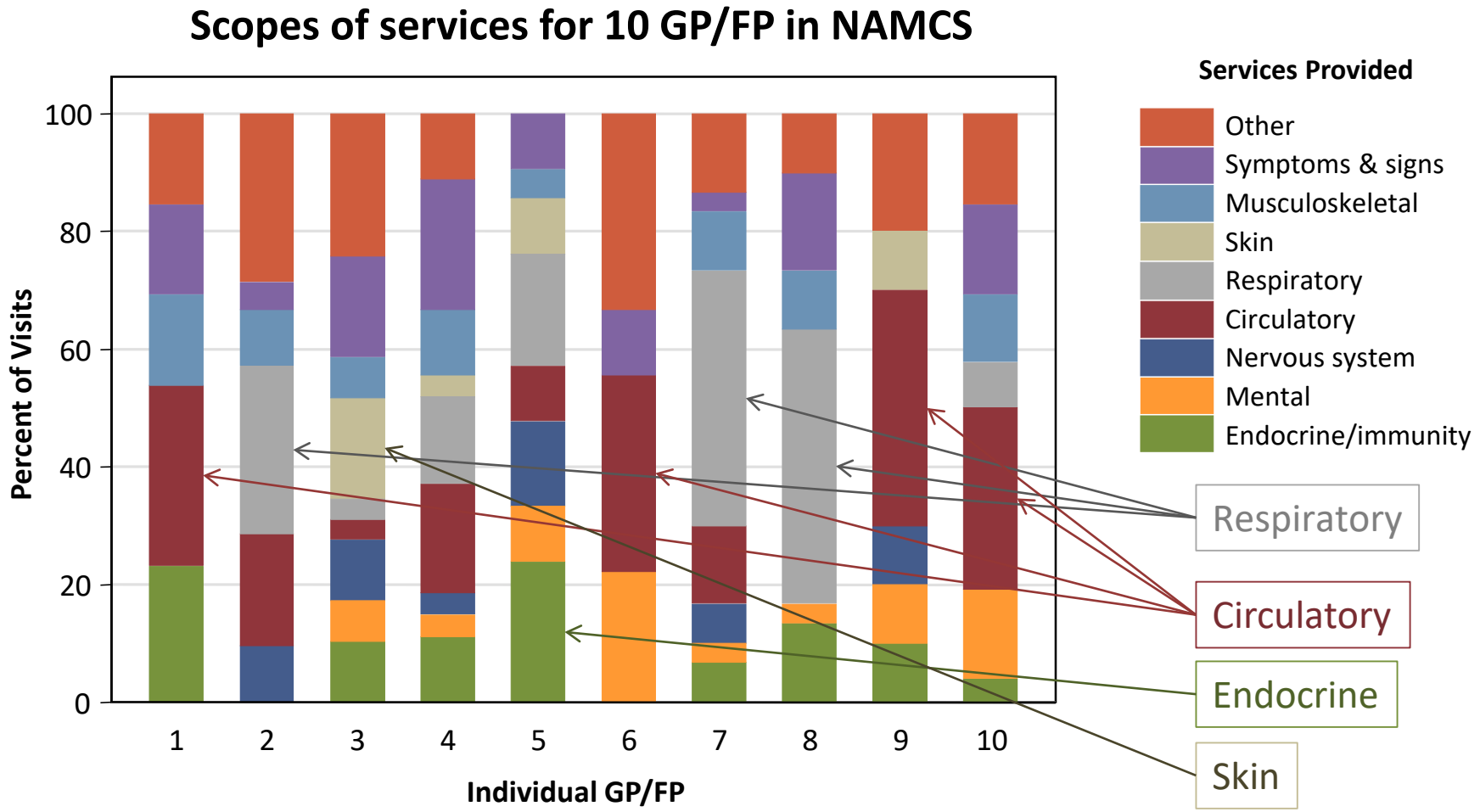
Number of outpatient visits provided per FTE per year, select specialties and CSAs

	Circulatory	Digestive	Endocrine/ Immunity	Genitourinary	Infectious	Neoplasms	Respiratory	Other CSAs	Total
Cardiology	**83%**	**0%**	**2%**	**0%**	**0%**	**0%**	**1%**	**15%**	**100%**
Dermatology	32	0	0	0	317	2116	0	2936	5401
Internal Medicine	322	47	128	0	0	0	84	440	1021
Endocrinology	163	39	2328	31	0	168	0	442	3171
Family Medicine	**20%**	**4%**	**9%**	**3%**	**2%**	**1%**	**12%**	**49%**	**100%**
Gastroenterology	58	1108	30	0	84	140	0	796	2216

Within a specialty, how are visits distributed across CSAs?

This project is funded by a grant from The Physicians Foundation.

A random sample of ten GPs/FPs has heterogenous scopes of services



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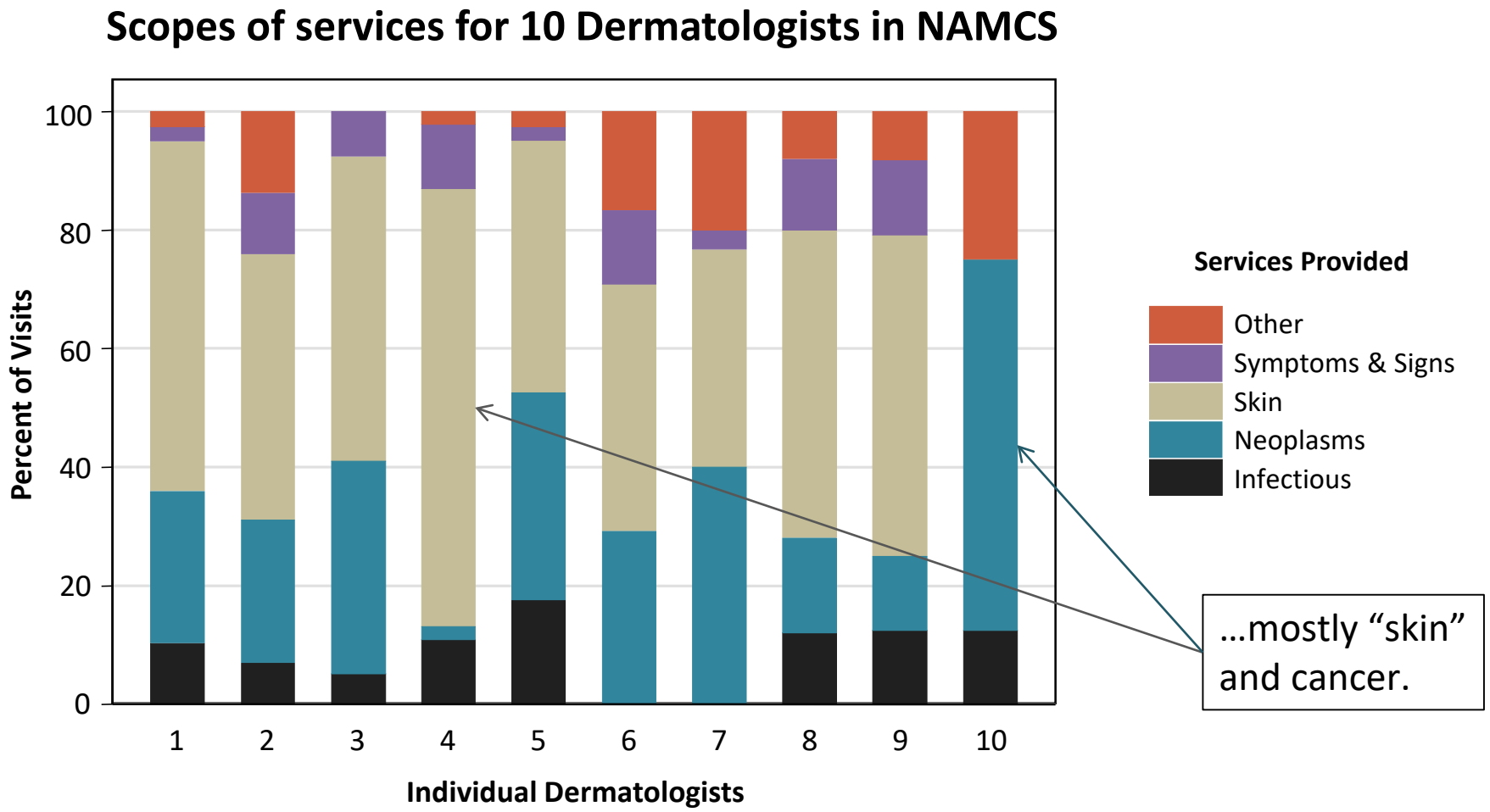
…But dermatologists provide relatively similar scopes of services



This project is funded by a grant from The Physicians Foundation.

These innovations turn workforce modeling upside down

- ***Current version*** of model does not produce estimate of ***counts of physicians needed*** by specialty
- Instead, it asks: what are patients' needs for care and how can those needs be met by different workforce configurations in different geographies?

This project is funded by a grant from The Physicians Foundation.

"Relative Capacity": Indicator of how well physician supply matches utilization

Model calculates **"relative capacity"**—
for visits in 19 clinical service areas at state and TSA level

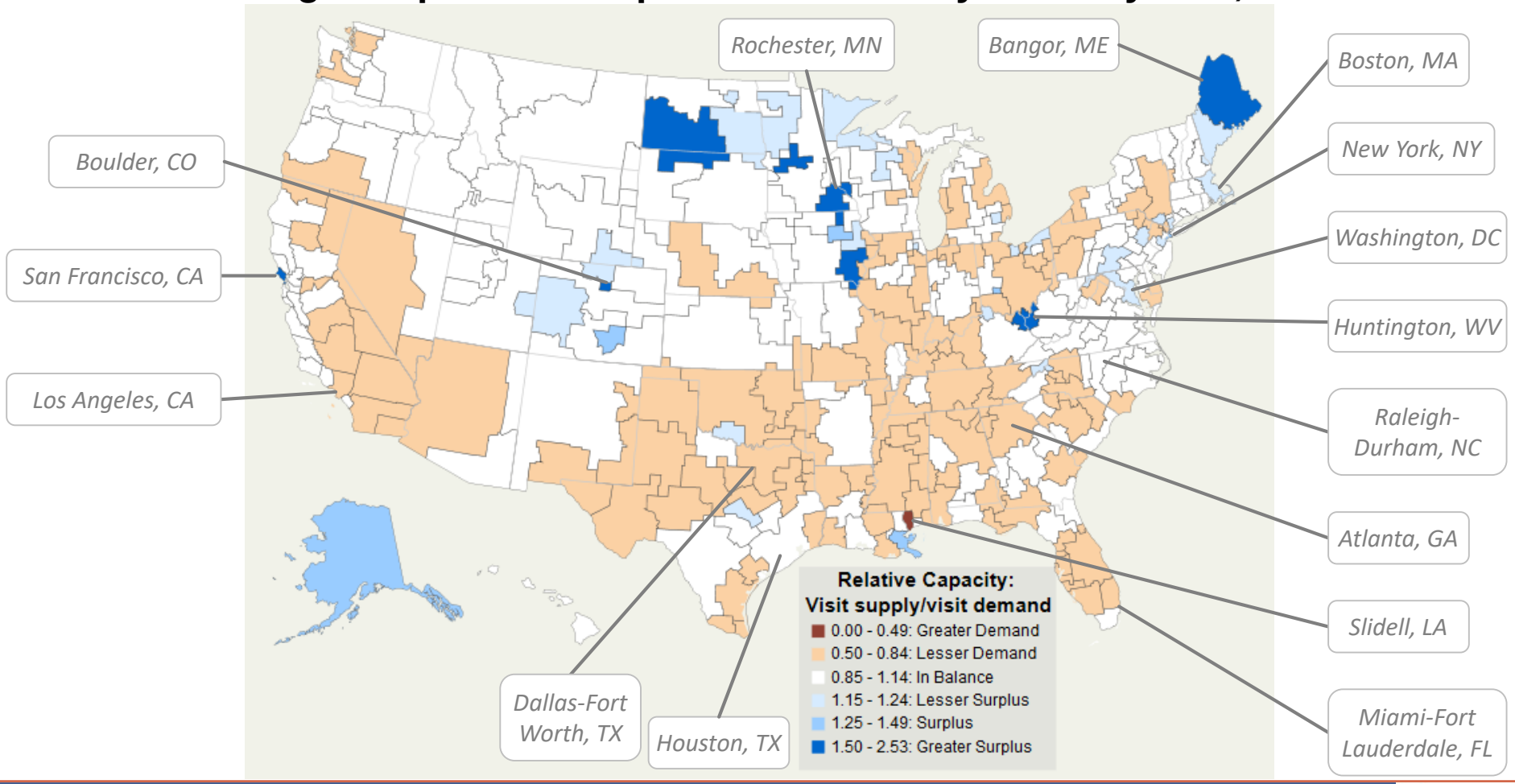
= supply of visits physicians in that TSA/State can provide
utilization of visits needed by population in TSA/State

<.85=shortage .85-1.15=in balance >1.15=surplus

This project is funded by a grant from The Physicians Foundation.

You end up with a picture that shows capacity of workforce to meet demand for different types of health services

Shortage/Surplus for Outpatient Circulatory Visits by TSA, 2014

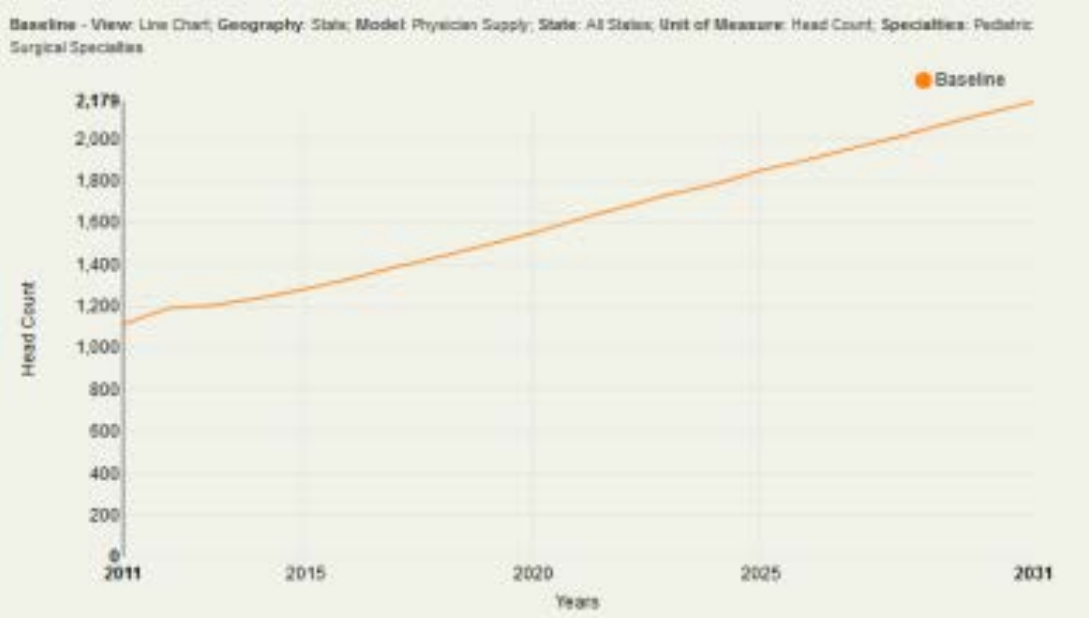


This project is funded by a grant from The Physicians Foundation.

Model produced some unexpected results

- Model showed doubling of supply of pediatric surgeons
- So, why, then is there a sense of shortage?

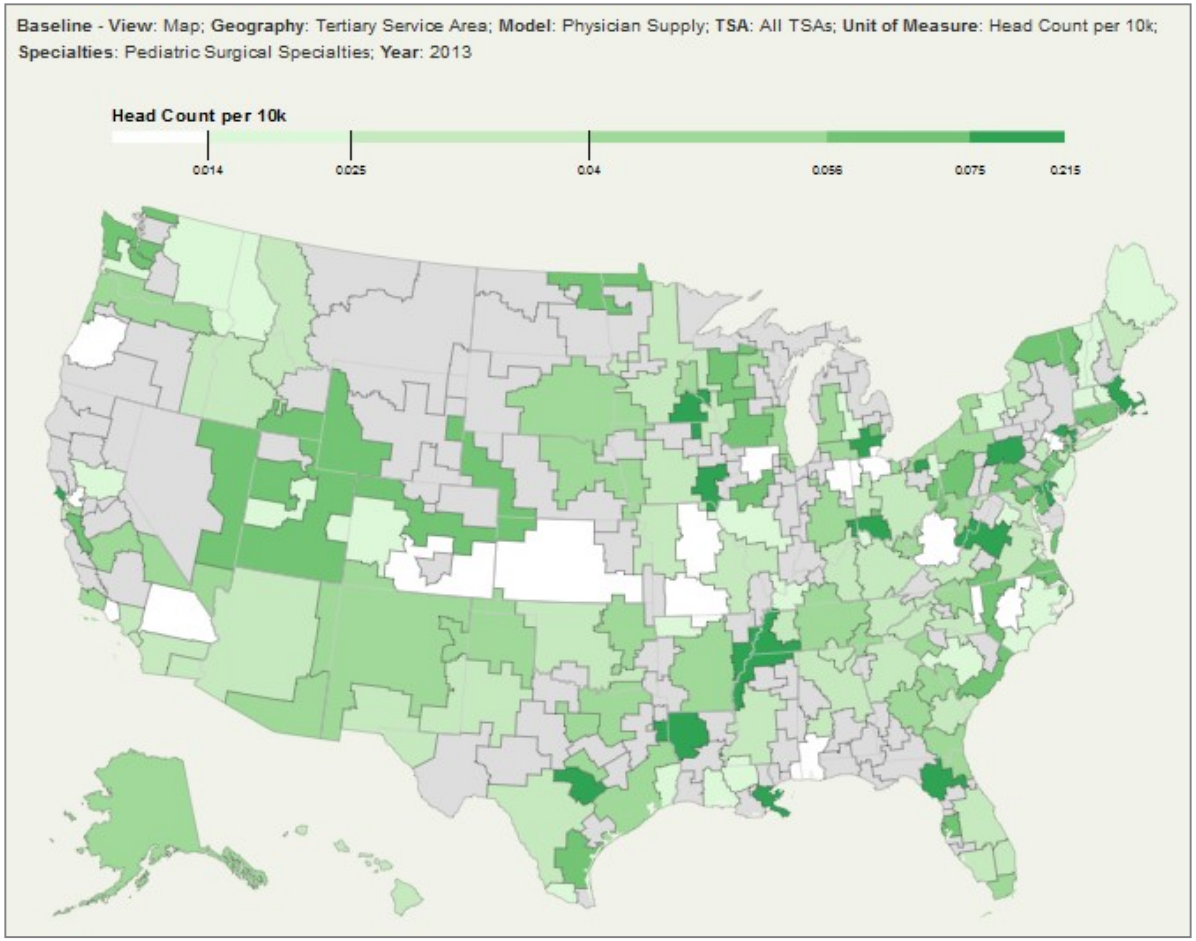
Head Count of Pediatric Surgical Specialties,
All States, 2011-2030



This project is funded by a grant from The Physicians Foundation.

Evidence of "clustering" of pediatric surgeons — is this a "shortage" or distribution issue?

Head Count per 10,000 Population, Pediatric Surgical Specialties, 2013



This project is funded by a grant from The Physicians Foundation.

A case study of plasticity in practice: plastic surgeons and general surgeons

- Plasticity is *dynamic* process. Distribution of work among specialists and generalists changes over time
- As number of pediatric surgeons has increased:
  - Practicing pediatric surgeons have taken on more pediatric general surgery cases
  - Pediatric surgeons in training have "soaked up" pediatric surgery cases, even non-complex ones
  - Fewer general surgeons in training and in practice seeing pediatric cases

This project is funded by a grant from The Physicians Foundation.

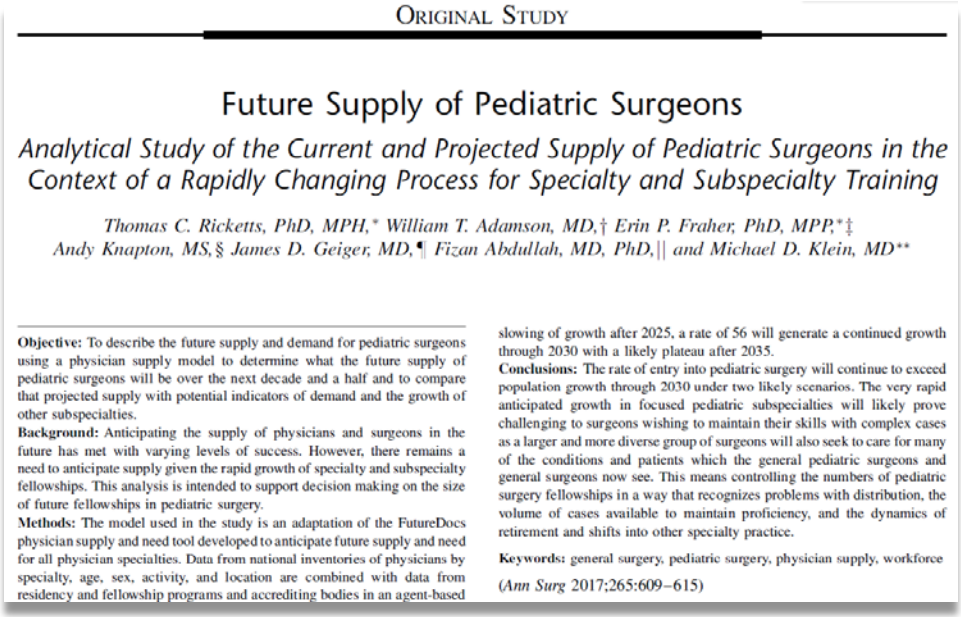
Plasticity reframes issue

- What if perceived shortage of pediatric surgeons is actually a shortage of general surgeons doing pediatric cases?
- And what does the likely future oversupply of pediatric surgeons mean to specialty?
- They worry there will not be volume of cases needed to train new residents and maintain skills of existing pediatric surgeons

This project is funded by a grant from The Physicians Foundation.

Worked with American Pediatric Surgical Association to interpret meaning of findings

- Clinical input has been critical to interpret data in "real world" context and use model findings to implement change
- Recommended decreasing number of pediatric surgery fellowships
- And shifting focus to address geographic imbalances of workforce



ORIGINAL STUDY

Future Supply of Pediatric Surgeons

Analytical Study of the Current and Projected Supply of Pediatric Surgeons in the Context of a Rapidly Changing Process for Specialty and Subspecialty Training

Thomas C. Ricketts, PhD, MPH, William T. Adamson, MD,† Erin P. Fraher, PhD, MPP,*‡ Andy Knapton, MS,§ James D. Geiger, MD,¶ Fizan Abdullah, MD, PhD,|| and Michael D. Klein, MD***

Objective: To describe the future supply and demand for pediatric surgeons using a physician supply model to determine what the future supply of pediatric surgeons will be over the next decade and a half and to compare that projected supply with potential indicators of demand and the growth of other subspecialties.

Background: Anticipating the supply of physicians and surgeons in the future has met with varying levels of success. However, there remains a need to anticipate supply given the rapid growth of specialty and subspecialty fellowships. This analysis is intended to support decision making on the size of future fellowships in pediatric surgery.

Methods: The model used in the study is an adaptation of the FutureDocs physician supply and need tool developed to anticipate future supply and need for all physician specialties. Data from national inventories of physicians by specialty, age, sex, activity, and location are combined with data from residency and fellowship programs and accrediting bodies in an agent-based

slowing of growth after 2025, a rate of 56 will generate a continued growth through 2030 with a likely plateau after 2035.

Conclusions: The rate of entry into pediatric surgery will continue to exceed population growth through 2030 under two likely scenarios. The very rapid anticipated growth in focused pediatric subspecialties will likely prove challenging to surgeons wishing to maintain their skills with complex cases as a larger and more diverse group of surgeons will also seek to care for many of the conditions and patients which the general pediatric surgeons and general surgeons now see. This means controlling the numbers of pediatric surgery fellowships in a way that recognizes problems with distribution, the volume of cases available to maintain proficiency, and the dynamics of retirement and shifts into other specialty practice.

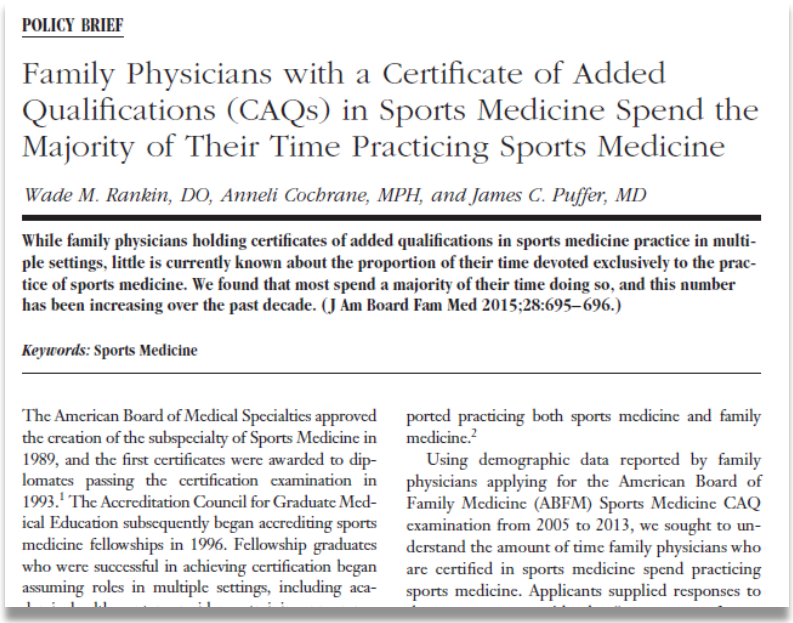
Keywords: general surgery, pediatric surgery, physician supply, workforce

(*Ann Surg* 2017;265:609–615)

Ricketts TC, Adamson WT, Fraher EP, Knapton A, Geiger JD, Abdullah F, Klein MD. Future Supply of Pediatric Surgeons: Analytical Study of the Current and Projected Supply of Pediatric Surgeons in the Context of a Rapidly Changing Process for Specialty and Subspecialty Training. *Ann Surg*. 2017:265;609-615.

This project is funded by a grant from The Physicians Foundation.

And it's not just surgery. Evidence that family physicians are becoming less plastic



POLICY BRIEF

Family Physicians with a Certificate of Added Qualifications (CAQs) in Sports Medicine Spend the Majority of Their Time Practicing Sports Medicine

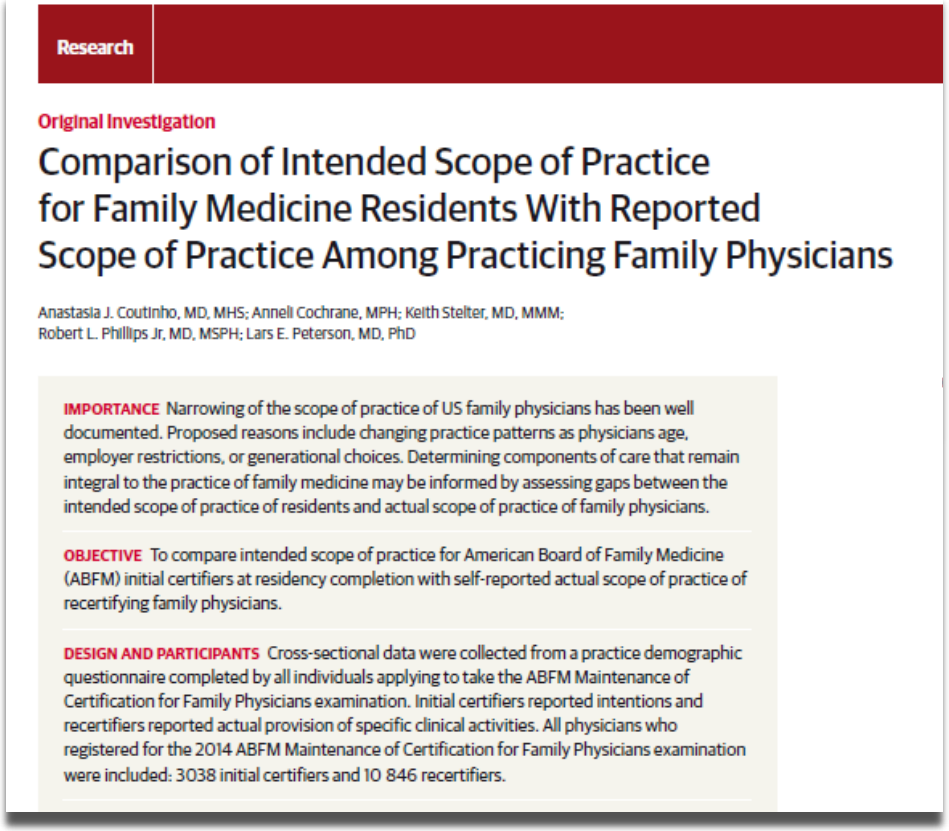
Wade M. Rankin, DO, Anneli Cochrane, MPH, and James C. Puffer, MD

While family physicians holding certificates of added qualifications in sports medicine practice in multiple settings, little is currently known about the proportion of their time devoted exclusively to the practice of sports medicine. We found that most spend a majority of their time doing so, and this number has been increasing over the past decade. (J Am Board Fam Med 2015;28:695–696.)

Keywords: **Sports Medicine**

The American Board of Medical Specialties approved the creation of the subspecialty of Sports Medicine in 1989, and the first certificates were awarded to diplomates passing the certification examination in 1993.[1] The Accreditation Council for Graduate Medical Education subsequently began accrediting sports medicine fellowships in 1996. Fellowship graduates who were successful in achieving certification began assuming roles in multiple settings, including academic [illegible] ported practicing both sports medicine and family medicine.[2]

Using demographic data reported by family physicians applying for the American Board of Family Medicine (ABFM) Sports Medicine CAQ examination from 2005 to 2013, we sought to understand the amount of time family physicians who are certified in sports medicine spend practicing sports medicine. Applicants supplied responses to



Research

Original Investigation

Comparison of Intended Scope of Practice for Family Medicine Residents With Reported Scope of Practice Among Practicing Family Physicians

Anastasia J. Coutinho, MD, MHS; Anneli Cochrane, MPH; Keith Stelter, MD, MMM; Robert L. Phillips Jr, MD, MSPH; Lars E. Peterson, MD, PhD

IMPORTANCE Narrowing of the scope of practice of US family physicians has been well documented. Proposed reasons include changing practice patterns as physicians age, employer restrictions, or generational choices. Determining components of care that remain integral to the practice of family medicine may be informed by assessing gaps between the intended scope of practice of residents and actual scope of practice of family physicians.

OBJECTIVE To compare intended scope of practice for American Board of Family Medicine (ABFM) initial certifiers at residency completion with self-reported actual scope of practice of recertifying family physicians.

DESIGN AND PARTICIPANTS Cross-sectional data were collected from a practice demographic questionnaire completed by all individuals applying to take the ABFM Maintenance of Certification for Family Physicians examination. Initial certifiers reported intentions and recertifiers reported actual provision of specific clinical activities. All physicians who registered for the 2014 ABFM Maintenance of Certification for Family Physicians examination were included: 3038 initial certifiers and 10 846 recertifiers.

Rankin WM, Cochrane A, Puffer J. (2015). Family Physicians with Certificate of Added Qualifications (CAQs) in Sports Medicine Spend the Majority of the Their Time Practicing Sports Medicine. *JABFM*. 28(6): 695-696.

Coutinho AJ, Cochrane A, Stelter K, Phillips RL and Peterson LE. (2015) Comparison of Intended Scope of Practice for Family Medicine Residents with Reported Scope of Practice Among Practicing Family Physicians. *JAMA.* 314 (22): 2364-2372

This project is funded by a grant from The Physicians Foundation.

Takeaways from plasticity

- Model currently accounts for between specialty plasticity
- Plasticity matrix based on national practice patterns
- But we know there are local differences due to variation in:
  - local supply and balance of care provided by specialty vs generalist physicians
  - supply and scope of practice of Nurse Practitioners and Physician Assistants
  - Institutional/practice-level decisions about deployment of health workforce

This project is funded by a grant from The Physicians Foundation.

Plasticity extensions

- Future versions of model could account for between profession plasticity
- For different types of health care services (mental health, geriatrics, primary care etc.), how much care and which types of services could be shifted between physicians, NPs, PAs and other professionals?
- Can we model this using plasticity matrix?
- Would this be useful framework for health systems, practices, and human resource managers to understand how to deploy/retrain/retool existing workforce to meet demand?

This project is funded by a grant from The Physicians Foundation.

Theoretical plasticity matrix in primary care

Sample tasks in primary care	Primary Care Physician	NP	PA	RN	LPN	MA	Social Worker
Visit Planning							
Order or queue up tests							
Direct Patient Care							
Perform diabetes foot exams							
Refill or pend medications based on standing orders							
Documentation							
Record chief complaint and/or basic history							
Scribing during examination/visit							
Patient Education, Coaching or Counseling							
Screen for depression							
Use motivational interviewing to assist patients in goal setting							
Educate patients with chronic disease on preventive care							
Population Health							
Identify patients in need of preventive screening							
Find patients with diabetes overdue for A1c and pend A1c order							

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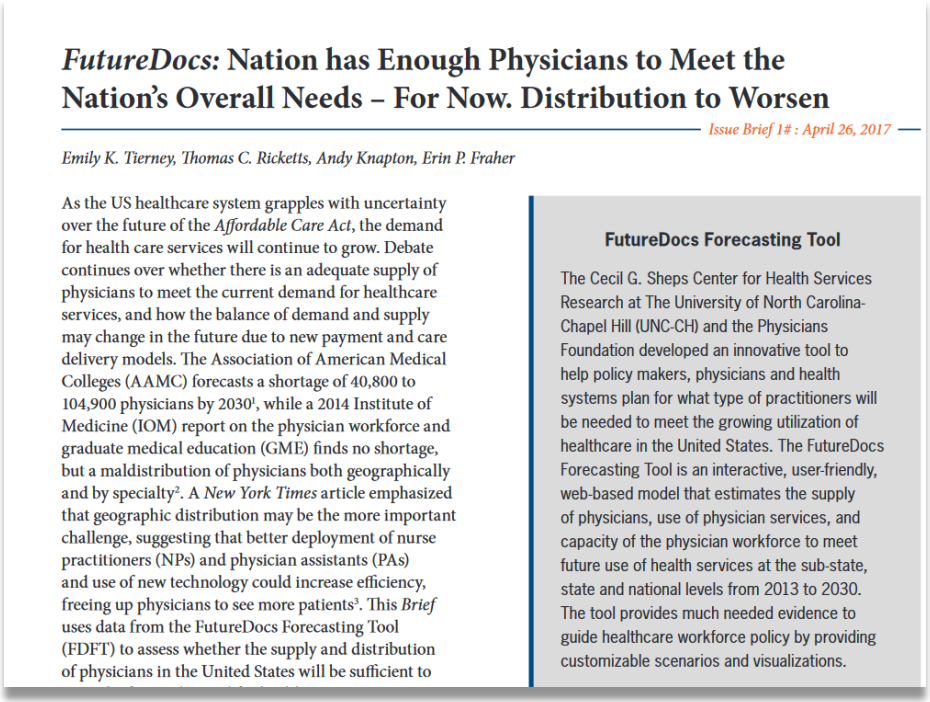
Moving from theory to practice: If you build it (a model), will they come?

I've learned the hard way: the answer is NO!

Image from JoeyBLS at en.wikipedia

We built a Mazzerati that no one knew how to drive

- Launched model in 2014
- Lots of hits (by consultants and health systems) but didn't initially reach policy audience
- Realized that we needed to interpret and contextualize findings, not assume people would do this themselves
- Now releasing series of policy briefs



***FutureDocs:* Nation has Enough Physicians to Meet the Nation's Overall Needs – For Now. Distribution to Worsen**

Issue Brief 1# : April 26, 2017

Emily K. Tierney, Thomas C. Ricketts, Andy Knapton, Erin P. Fraher

As the US healthcare system grapples with uncertainty over the future of the *Affordable Care Act*, the demand for health care services will continue to grow. Debate continues over whether there is an adequate supply of physicians to meet the current demand for healthcare services, and how the balance of demand and supply may change in the future due to new payment and care delivery models. The Association of American Medical Colleges (AAMC) forecasts a shortage of 40,800 to 104,900 physicians by 2030[1], while a 2014 Institute of Medicine (IOM) report on the physician workforce and graduate medical education (GME) finds no shortage, but a maldistribution of physicians both geographically and by specialty[2]. A *New York Times* article emphasized that geographic distribution may be the more important challenge, suggesting that better deployment of nurse practitioners (NPs) and physician assistants (PAs) and use of new technology could increase efficiency, freeing up physicians to see more patients[3]. This *Brief* uses data from the FutureDocs Forecasting Tool (FDFT) to assess whether the supply and distribution of physicians in the United States will be sufficient to

FutureDocs Forecasting Tool

The Cecil G. Sheps Center for Health Services Research at The University of North Carolina-Chapel Hill (UNC-CH) and the Physicians Foundation developed an innovative tool to help policy makers, physicians and health systems plan for what type of practitioners will be needed to meet the growing utilization of healthcare in the United States. The FutureDocs Forecasting Tool is an interactive, user-friendly, web-based model that estimates the supply of physicians, use of physician services, and capacity of the physician workforce to meet future use of health services at the sub-state, state and national levels from 2013 to 2030. The tool provides much needed evidence to guide healthcare workforce policy by providing customizable scenarios and visualizations.

http://www.shepscenter.unc.edu/wp-content/uploads/2017/04/FutureDocs_IssueBrief1_April2017.pdf

This project is funded by a grant from The Physicians Foundation.

And we're getting papers out on some of the model's innovative methods

Article

The Contribution of "Plasticity" to Modeling How a Community's Need for Health Care Services Can Be Met by Different Configurations of Physicians

George M. Holmes, PhD, Marisa Morrison, Donald E. Pathman, MD, MPH, and Erin Fraher, PhD, MPP

Abstract

This article introduces the concept of "plasticity" to health care workforce modeling and policy analysis. The authors define plasticity as the notion that individual physicians within the same specialty each provide a different scope of service, while the scope of service of physicians in different specialties may overlap. This notion represents a departure from the current, silo-based conception of physician supply as physician headcounts by specialty; the implication is that multiple configurations of physicians (and, by further application, other health care professionals) can meet a community's utilization of health care services.

Within-specialty plasticity and between-specialty plasticity are two facets of plasticity. Within-specialty plasticity is the idea that individual physicians within the same specialty may each provide a different mix and scope of services, and between-specialty plasticity is the idea that patterns of service provision overlap across specialties. Changes in physician specialty supply in a community affect both the between-specialty and within-specialty plasticity of that community's physicians. Notably, some physician specialties are more "plastic" than others.

The authors demonstrate how to implement a plasticity matrix by assessing the sufficiency of physician supply in a specific community (Wayne County, North Carolina). Additional literature and data can provide further insights into the influences on (and of) plasticity, improving this approach and expanding it to include task-shifting across health care professions.

A common approach in physician workforce modeling and policy analysis is to assess whether there is a physician shortage by considering each individual specialty to be distinct, defined by the different training experienced by and unique scope of services provided by its practitioners.[1-4] This "siloed" conception of specialties ignores the reality that the scope of medical services that physicians of different specialties provide often overlaps. This traditional approach also treats all physicians within a single specialty as identical and therefore interchangeable, even though individuals within a given specialty offer different mixes of services because of their particular training and interests.

An alternative health care workforce modeling approach exists. (In this article, we refer to "physicians" for expositional simplicity, although the model could easily be extended to other clinicians such as physician assistants and advanced practice nurses. We use "providers" or "workforce" to refer to this broader group.) The for multiple combinations of physician specialties to provide a specified group of medical services but still recognizes that certain specialties are more likely to provide certain types of health care services.

Heterogeneity in the services provided within a specialty also characterizes physician practice. For instance, some internists devote a greater proportion of their visits to respiratory conditions, whereas others focus more on circulatory conditions. Few researchers have conducted scholarly work exploring either within-specialty heterogeneity or between-specialty service overlap, despite the importance of these realities to the solutions that could flow from physician workforce models. We suggest that these related concepts represent two facets of *physician plasticity*. This article's objective is to describe the concept of plasticity

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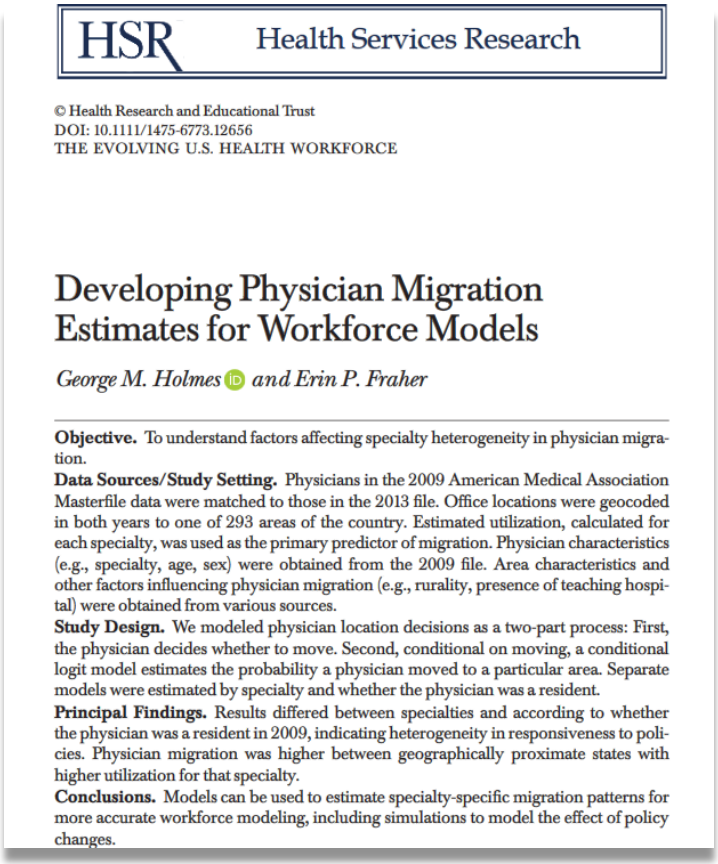
Holmes GM, Morrison M, Pathman DE, Fraher E. *Academic Medicine.* 2013;88:1877-1882.



HSR Health Services Research

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THE EVOLVING U.S. HEALTH WORKFORCE

Developing Physician Migration Estimates for Workforce Models

George M. Holmes and Erin P. Fraher

Objective. To understand factors affecting specialty heterogeneity in physician migration.

Data Sources/Study Setting. Physicians in the 2009 American Medical Association Masterfile data were matched to those in the 2013 file. Office locations were geocoded in both years to one of 293 areas of the country. Estimated utilization, calculated for each specialty, was used as the primary predictor of migration. Physician characteristics (e.g., specialty, age, sex) were obtained from the 2009 file. Area characteristics and other factors influencing physician migration (e.g., rurality, presence of teaching hospital) were obtained from various sources.

Study Design. We modeled physician location decisions as a two-part process: First, the physician decides whether to move. Second, conditional on moving, a conditional logit model estimates the probability a physician moved to a particular area. Separate models were estimated by specialty and whether the physician was a resident.

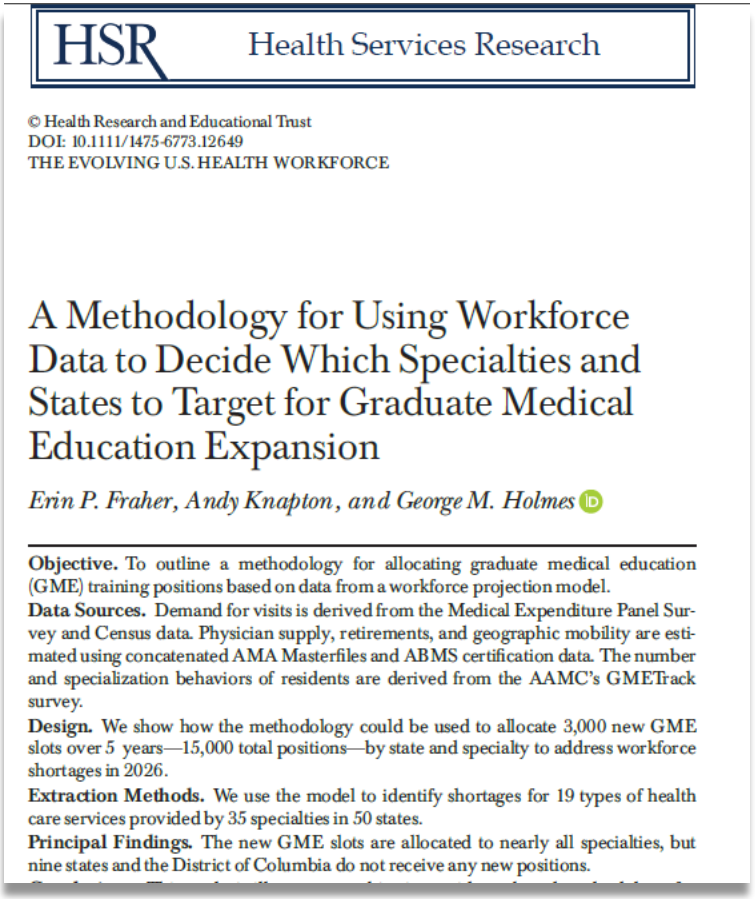
Principal Findings. Results differed between specialties and according to whether the physician was a resident in 2009, indicating heterogeneity in responsiveness to policies. Physician migration was higher between geographically proximate states with higher utilization for that specialty.

Conclusions. Models can be used to estimate specialty-specific migration patterns for more accurate workforce modeling, including simulations to model the effect of policy changes.

Holmes GM, Fraher EP. *HSR*. 2017 Feb;52 Suppl 1:529-545.

And findings

- Model findings suggest need to expand GME in states with:
  - Poor health outcomes and high health care utilization (AR, MS, AL)
  - Large, growing populations (TX, CA)
  - Aging populations (FL)
  - Low resident/population numbers (ID, WY, MT, AK, NV)
- "Generalist" specialties and cardiology received largest # of slots
- Wanted to use model to determine how to redistribute GME but that was like touching the 3rd rail



HSR Health Services Research

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THE EVOLVING U.S. HEALTH WORKFORCE

A Methodology for Using Workforce Data to Decide Which Specialties and States to Target for Graduate Medical Education Expansion

Erin P. Fraher, Andy Knapton, and George M. Holmes

Objective. To outline a methodology for allocating graduate medical education (GME) training positions based on data from a workforce projection model.
Data Sources. Demand for visits is derived from the Medical Expenditure Panel Survey and Census data. Physician supply, retirements, and geographic mobility are estimated using concatenated AMA Masterfiles and ABMS certification data. The number and specialization behaviors of residents are derived from the AAMC's GMETrack survey.
Design. We show how the methodology could be used to allocate 3,000 new GME slots over 5 years—15,000 total positions—by state and specialty to address workforce shortages in 2026.
Extraction Methods. We use the model to identify shortages for 19 types of health care services provided by 35 specialties in 50 states.
Principal Findings. The new GME slots are allocated to nearly all specialties, but nine states and the District of Columbia do not receive any new positions.

Fraher EP, Knapton A, Holmes GM. *HSR*. 2017 Feb;52 Suppl 1:508-528.

Which has made us realize that models require careful messaging of findings

Messaging findings requires courage and savvy because models sometimes:

- run counter to advocacy agendas and/or prevailing narrative
- reveal "uncomfortable truths"
- use new methods that feel uncertain to reviewers

At their best, models are objective, create new knowledge, spur policy action, educate stakeholders

This project is funded by a grant from The Physicians Foundation.

Things I've learned from modeling physicians

- We tried to ask a different question: what services will patients need versus how many doctors will we need?
  - ***People still wanted to know "how many doctors will we need?"***
- Developed plasticity matrix to allow different configurations of physician specialties and NPs/PAs to meet demand for different types of services
  - ***(Some) people had allergic reactions to talk of "substitution"***
- Our model found overall supply sufficient, major issues of distribution by specialty and geography
  - ***People, especially the press, like shortage headlines***

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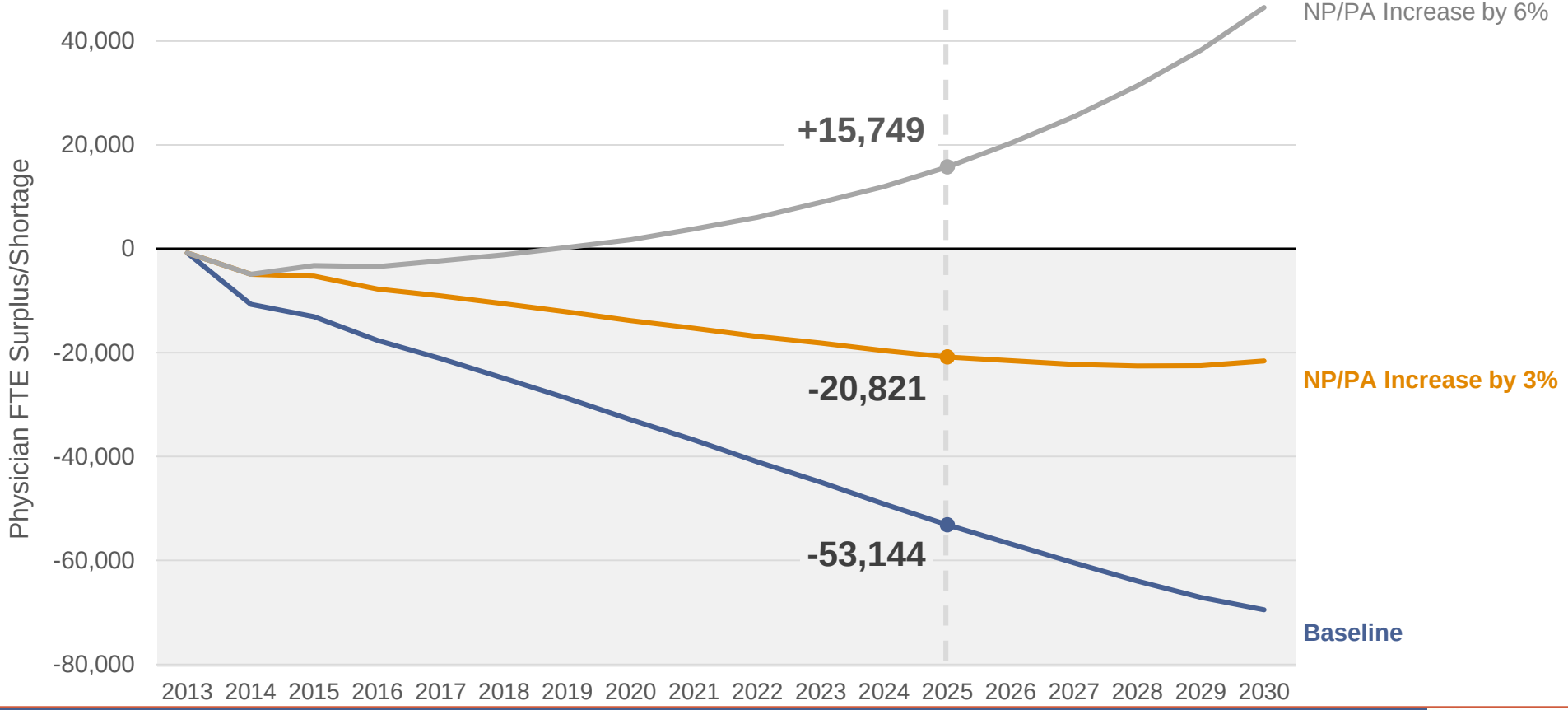
So now we're using plasticity matrix to convert visits utilized to FTEs needed

With no change in plasticity, expected growth in NPs and PAs causes physician shortage to become surplus in 2020



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Future research needed:
We don't have good data on NP/PA plasticity

How will rapid increase in NP and PA supply affect:

- **NPs and PA plasticity?**
  Will they simply provide more visits for the same types of clinical services or will they widen their scopes of practice?

- **Physician plasticity?**
  Will physicians continue to provide the same type of services, presumably concentrating on more complex cases, or will they alter the types of services they provide?

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Future research needed:
The local and dynamic nature of plasticity

- Can we use claims data to better understand factors that drive variations in local plasticity?

- Need to design quantitative and qualitative studies to understand how plasticity changes:
  - over time as the balance of services between generalists/specialists and between professions shifts
  - when new practitioners enter/exit practice in a local area
  - as care delivery and payment models change incentives
  - technology creates new roles and eliminates others

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Future research needed:
How does plasticity vary within specialty/profession?

Individuals within same specialty/profession will have different scopes of services depending on:

- demographic characteristics (age, gender) and personal preferences
- length of time since completing training, certifications held
- rural/urban location
- proximity to other providers with overlapping and/or competing services
- patient population served
- organizational/practice level deployment decisions

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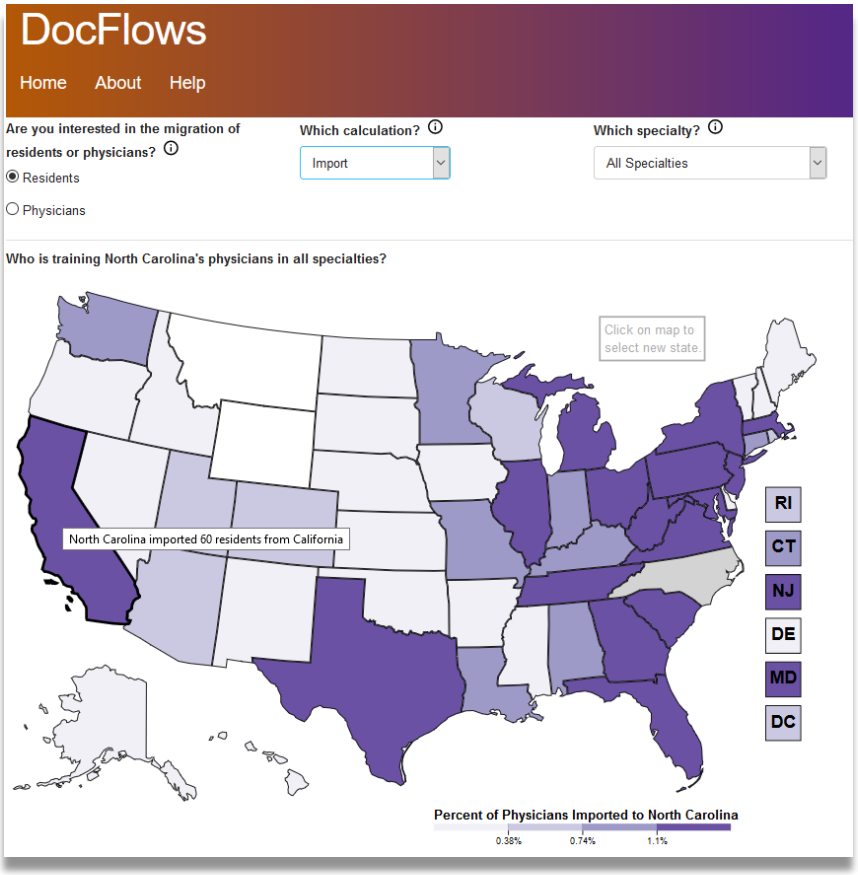
In the meantime, we're going to continue to build data visualization tools and find new ways to use them to engage policy makers



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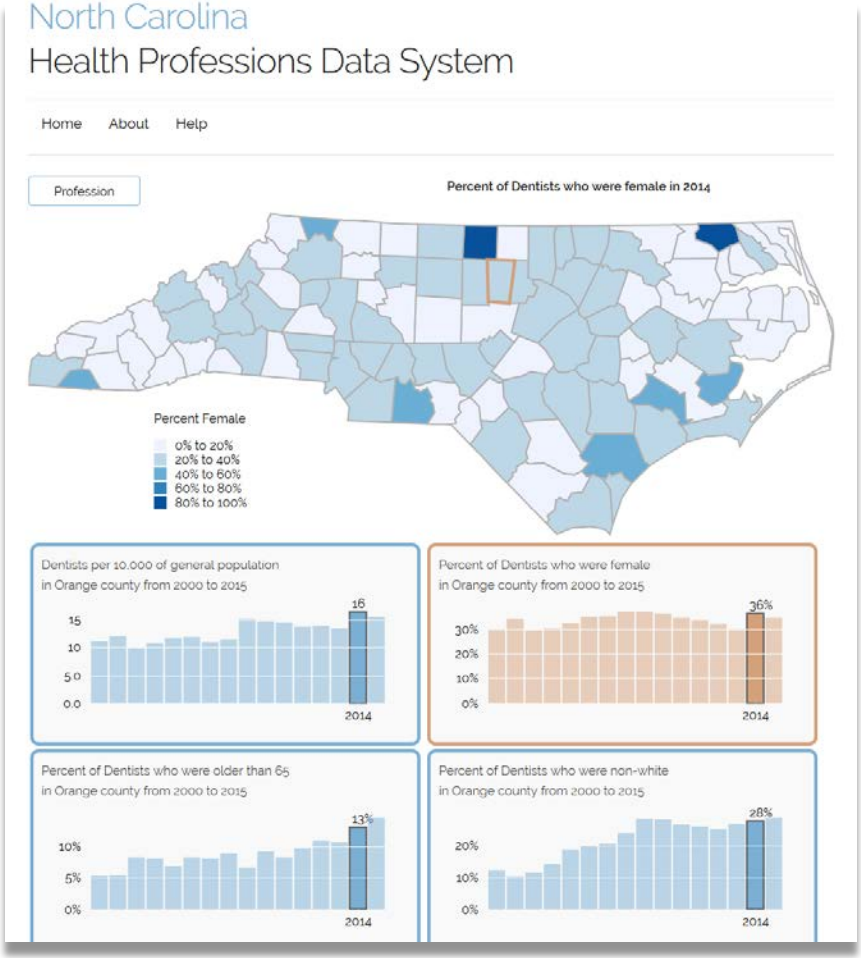

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