

# Toward developing a better understanding of how physicians change clinical focus during the course of their career

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FOR HEALTH SERVICES RESEARCH



# In case your office calls, here's the presentation in two slides: Slide 1

- **The context**: Rapid health system change underway. Much debate has centered on:
  - numbers of physicians needed, not content of practice
  - redesigning curriculum for students in pipeline  
not retooling the existing workforce
- **A whirlwind tour of our physician workforce model**:  
Our team has developed web-based, interactive physician projection model
  - Uses “plasticity” methodology to map supply (physician services provided to patients) to demand (types of health care services patients utilize)
  - Plasticity acknowledges physicians flexibly adjust scope of services they provide according to training, practice context and personal preferences

# In case your office calls, here's the presentation in two slides: Slide 2

- **Case studies of plasticity in surgery and family medicine:** evidence of narrowing scope of services and a shift of services away from generalists to specialists
- **A case of data envy:** increased collection/analysis of MOC data would:
  - inform your work at ABMS by connecting practice delivery changes to education and certification
  - improve our understanding of adequacy of workforce to meet population health needs and where there may be emerging access issues

# The Context: Workforce planning for a rapidly changing health system

- **Lots of people asking:** “How can we align payment incentives and new models of care to achieve the triple aim?”
- **Not enough people asking:** “How can we transform our health workforce to achieve the triple aim? ”
- Rapid health system change **requires retooling:**
  - the skills and competencies of the health workforce
  - the questions health workforce researchers ask and answer
  - the types of programs we develop and implement to create a flexible, adaptable, and continuously learning workforce

# The Context: Maybe new models not showing expected results because workforce not included in redesign?

- Lots of enthusiasm for new models of care but limited understanding of implications for workforce planning and policy
- New models of care may not be showing expected outcomes because workforce not systematically included in redesign efforts
- Workers with the right skills and training are integral to the ability of new models of care to constrain costs and improve care (Bodenheimer and Berry-Millett, 2009)
- But instead of focusing on retooling workforce, much policy debate is on whether we will have the right number of physicians by specialty

Sources: Bodenheimer T, Berry-Millett R. Care management of patients with complex health care needs. Princeton, NJ: Robert Wood Johnson Foundation; 2009.

# Instead we need to focus on changing content of practice and reconfiguring education to respond to changes

*“Revolutionary changes in the nature and form of health care delivery are reverberating backward into...education as leaders of the new practice organizations demand that the educational mission be responsive to their needs for practitioners who can work with teams in more flexible and changing organizations...”*

- But education system is lagging because it remains largely insulated from care delivery reform
- Need closer linkages between health care delivery and education and certification systems—including MOC

Source: Ricketts T, Fraher E. Reconfiguring health workforce policy so that education, training, and actual delivery of care are closely connected. *Health Aff (Millwood)*. 2013 Nov;32(11):1874-80.

# Because the workforce already employed in the system will be the ones to transform care

- To date, most workforce policy focus has been on redesigning educational curriculum for students in the pipeline
- **But it is the 18 million workers already in the system who will transform care**
- Rapid health system change requires not only producing “shiny new graduates” but also upgrading skills of existing workforce
- Transformative pace of health system change will require developing training and certification systems that support “career flexibility”

# Career flexibility and ongoing training will be critical to support system transformation

- “Clinicians want well-defined career frameworks that provide flexibility to change roles and settings, develop new capabilities and alter their professional focus in response to the changing healthcare environment, the needs of patients and their own aspirations” (NHS England)
- It all sounds good but what does it mean for:
  - workforce analysts trying to gauge sufficiency of workforce to meet health care needs of population?
  - ABMS to ensure existing physician workforce has knowledge, experience and skills needed in practice?



# So while news of physician shortages grab headlines

The New York Times

Tuesday, April 22, 2014 Today's Paper Personalize Your Weather

Success of health reform hinges on hiring 30,000 primary care doctors by 2015

## Doctor shortage, increased demand could crash health care system

By Jen Christensen, CNN  
updated 5:37 PM EDT, Wed October 2, 2013



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



The Washington Post

...in the U.S., put more  
...On Exhausted Physicians



DOCTOR!  
Lots  
By DANII

# These estimates of shortfalls by specialty overlook reality of practice

- Physicians flexibly adjust scope of services they provide according to training, practice context and personal preferences
- Counting heads overlooks real world practice where there is:
  - between specialty plasticity – physicians in different specialties provide overlapping scopes of services
  - within specialty plasticity – physicians within the same specialty have different practice patterns
- We have developed a workforce projection model that allows for between specialty plasticity
- Hope to account for within specialty plasticity in Version 2 of model

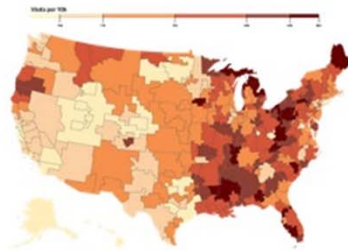
# Using plasticity turns workforce modeling upside down

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



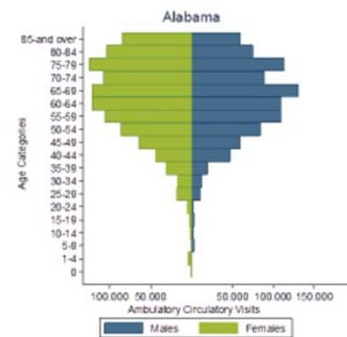
# Introducing FutureDocs: An Open Source Physician Projection Model

## FutureDocs Forecasting Tool Draft

[HOME](#)[ABOUT THE PROJECT](#)[THE MODEL](#)[HELP](#)[CONTACT](#)

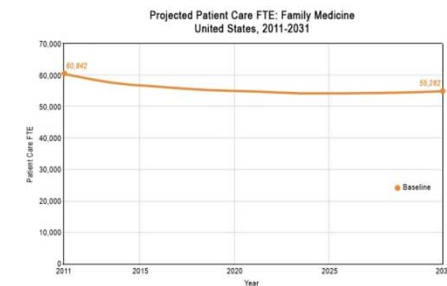
### VISUALIZE DATA THROUGH GEOGRAPHIC COMPARISONS

Use the tool to view the supply, utilization, and adequacy of the physician workforce at the state and sub-state level.



### PROJECT DEMOGRAPHIC SHIFTS IN SUPPLY AND UTILIZATION

Use the tool to project how physician supply and health care utilization differs by age and gender now and in the future.



### UTILIZATION, SUPPLY, SHORTAGE/SURPLUS TO 2030

Use the tool to examine how the use of health care services and physician supply by specialty will change between 2011-2030.

[BUILD YOUR MODEL](#)



# Collaborators and funders

## Core Team:

Andy Knapton

Mark Holmes

Tom Ricketts

Don Pathman

Marisa Morrison

Katie Gaul

Josh Knop

## Collaborator:

North Carolina Medical  
Society Foundation



## Funder:

The Physicians Foundation



# What the funders wanted

Initial funding from the **American College of Surgeons** to develop surgery supply model

Subsequent funding from the **Physicians Foundation** for ***Version 1*** to:

- generate “workable” and “practical” solutions to physician shortages/imbbalances
- engage clinicians
- build “science” of workforce policy at federal, state and local levels

# The Journey: Project expanded as we progressed and we “discovered” innovations

## Supply Side Innovation

- Originally proposed modeling 5-8 specialties
  - Ended up collapsing 315 AMA specialties into 35 specialty groups
  - Categorization done based on training pathways and ABMS certifications
- Created detailed GME training pathways
  - numbers entering training by state and specialty
  - numbers switching into other specialties
  - variations in length of training and attrition

# Innovation: Clinical Service Areas (CSAs) to capture how people seek care

## Utilization Side Innovation

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



# Innovation: Developed Tertiary Service Areas (TSAs) to capture sub-state workforce trends

## Geographic Innovation

- Based on Dartmouth's Hospital Referral Regions
- Our TSAs are based on counties, not ZIP codes
- TSAs are markets that encompass primary and specialty care services
- Health system consolidation and ACOs and ACO-like structures argue for regions

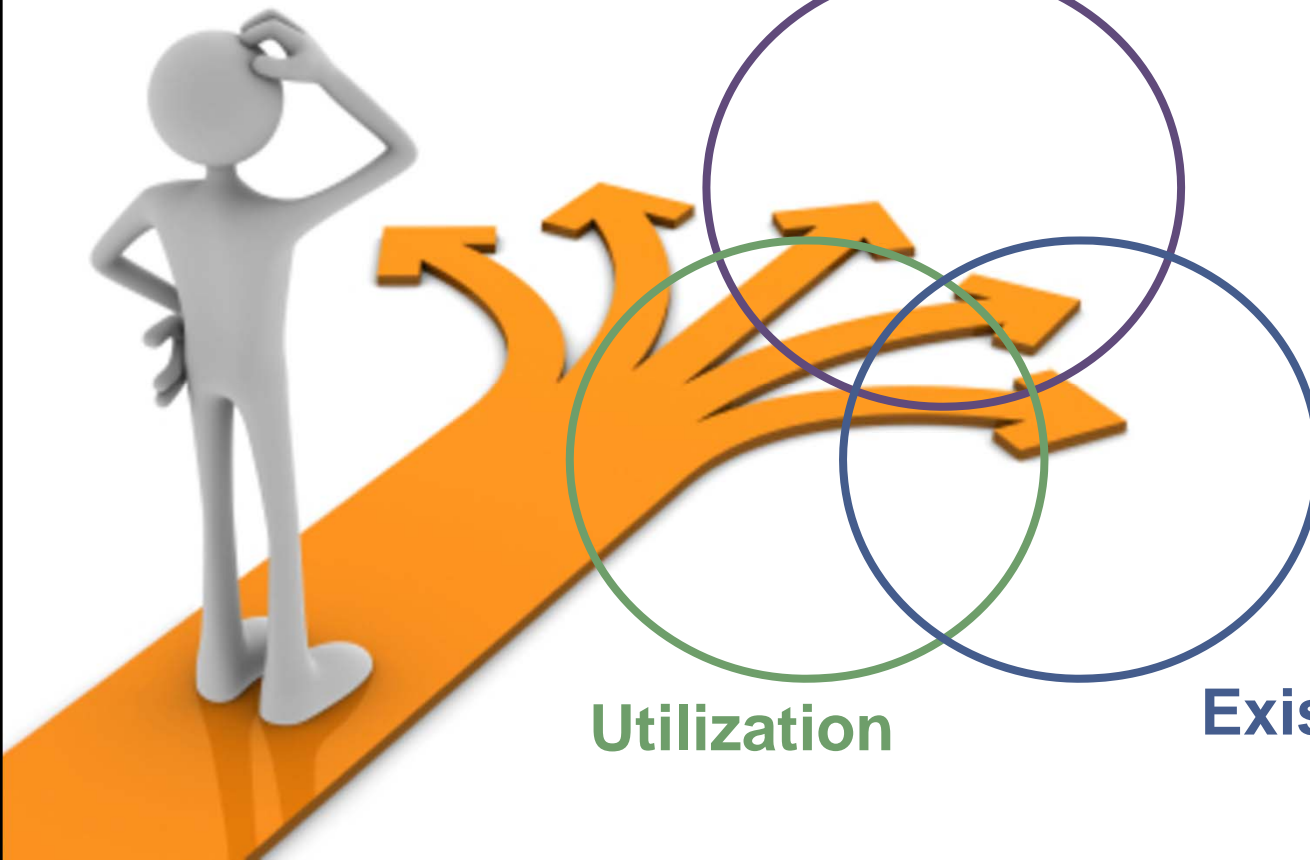
# Innovation: Modeling geographic diffusion according to “push” and “pull” factors

## Historical Diffusion

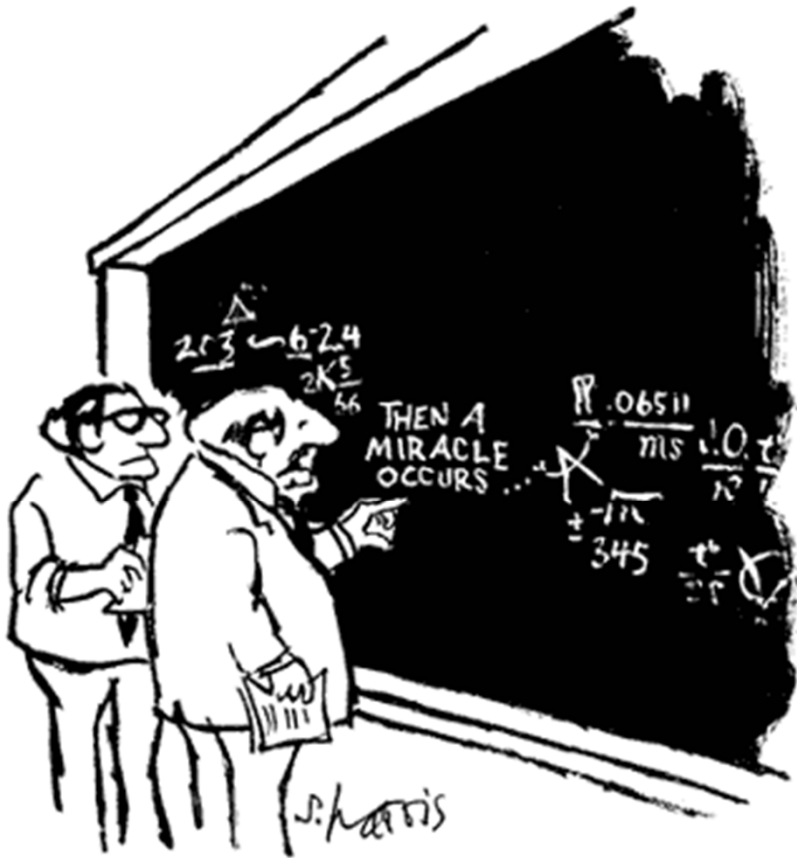
Developed way to diffuse residents from training location to first practice location and move practicing physicians between geographic settings

Utilization

Existing Supply



# Plasticity matrix brings supply and utilization together by mapping providers to services



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

- Key decision: no silo-based (specialty specific) modeling
- Recognize the “fungibility” of services across specialties
- But how do you model a specialist’s range of services in different settings?

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

Number of outpatient visits, select specialties and CSAs

<u>Specialties</u>	<u>Circulatory</u>	<u>Digestive</u>	<u>Endocrine/ Immunity</u>	<u>Genitourinary</u>	<u>Infectious</u>	<u>Neoplasms</u>	<u>Respiratory</u>	<u>Other CSAs</u>
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

# 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

*For a given type of health services, how are outpatient visits distributed across specialties?*

# 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
<b>Cardiology</b>	2,095	0	40	0	0	0	34	368	2,537
<b>Dermatology</b>	32	0	0	0	317	2,116	0	2,936	5,401
<b>Internal Medicine</b>	322	47	128	0	0	0	84	440	1,021
<b>Endocrinology</b>	163	39	2,328	31	0	168	0	442	3,171
<b>Family Medicine</b>	936	197	427	133	85	54	575	2,356	4,763
<b>Gastroenterology</b>	58	1,108	30	0	84	140	0	796	2,216

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

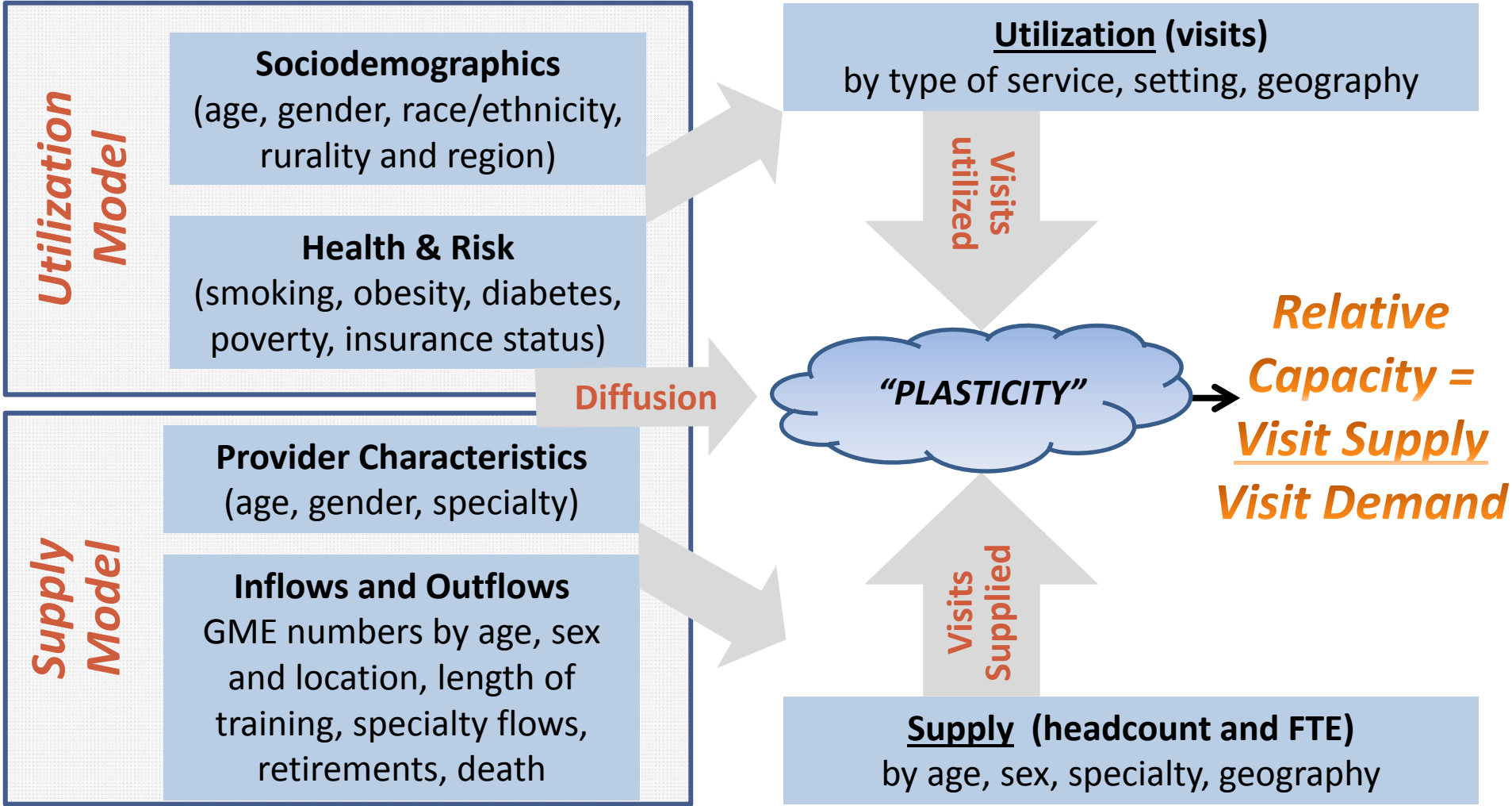
Number of outpatient visits provided per FTE  
per year, select specialties and CSAs

	Circulatory	Digestive	Endocrine/ Immunity	Genitourinary	Infectious	Neoplasms	Respiratory	Other CSAs	Total
<b>Cardiology</b>	<b>83%</b>	<b>0%</b>	<b>2%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>1%</b>	<b>15%</b>	<b>100%</b>
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
<b>Family Medicine</b>	<b>20%</b>	<b>4%</b>	<b>9%</b>	<b>3%</b>	<b>2%</b>	<b>1%</b>	<b>12%</b>	<b>49%</b>	<b>100%</b>
Gastroenterology	58	1108	30	0	84	140	0	796	2216

*Within a specialty, how are visits distributed across health services?*



# The Model in a Picture





# “Relative Capacity”: Indicator of how well physician supply matches utilization of visits

Model calculates “**relative capacity**” —a measure for each clinical service area in each geography

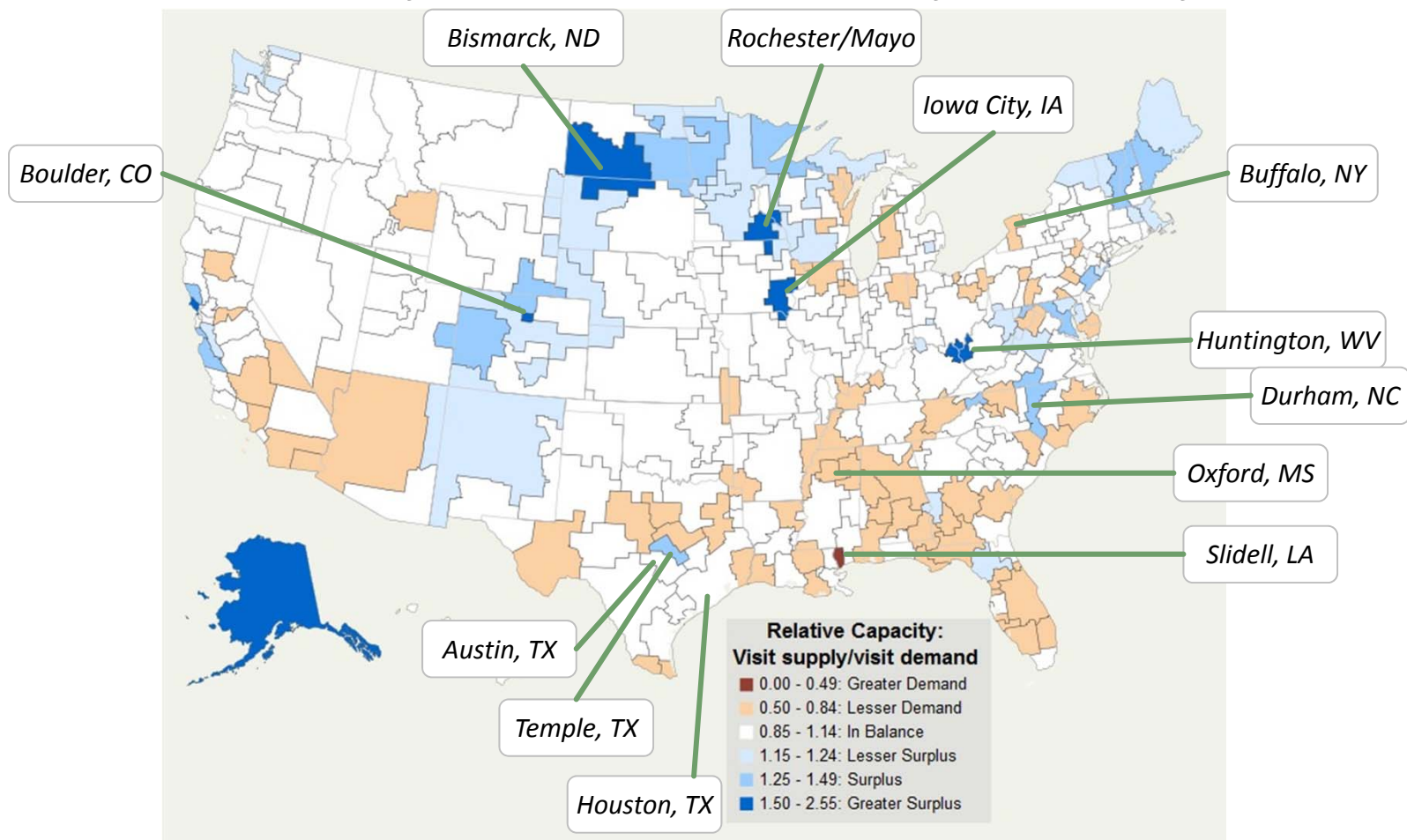
= supply of visits physicians in that TSA/State can provide  
utilization of visits needed by population in TSA/State

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



# In the end, you end up with a picture that shows capacity of workforce to meet demand for circulatory visits

## Relative Capacity for Outpatient Circulatory Services by TSA

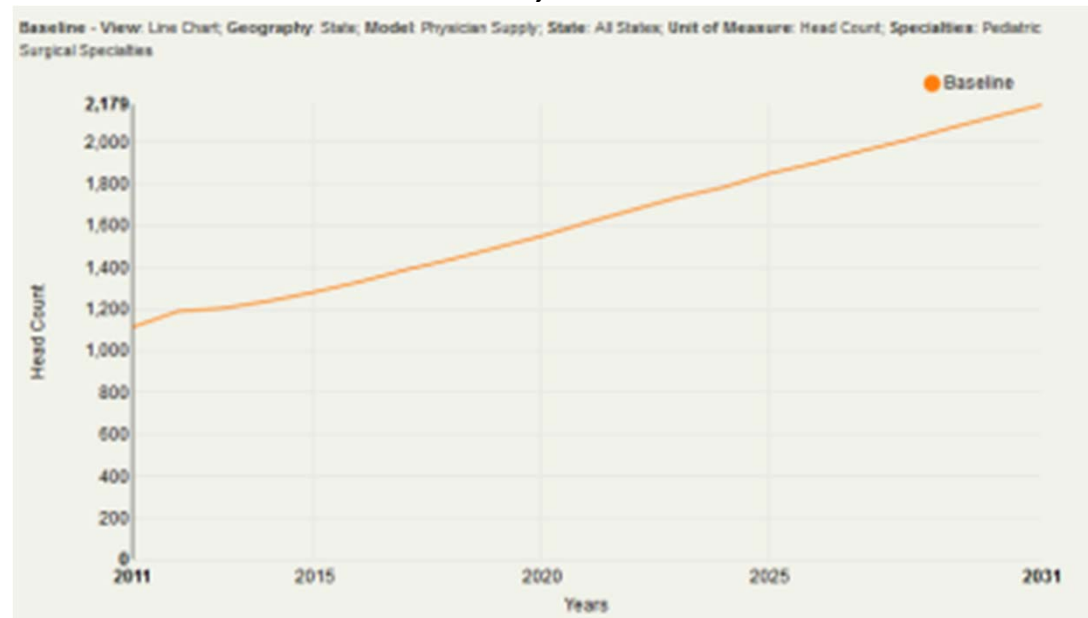


# Model produced some unexpected results

**Do you think we have a shortage of pediatric surgeons?**

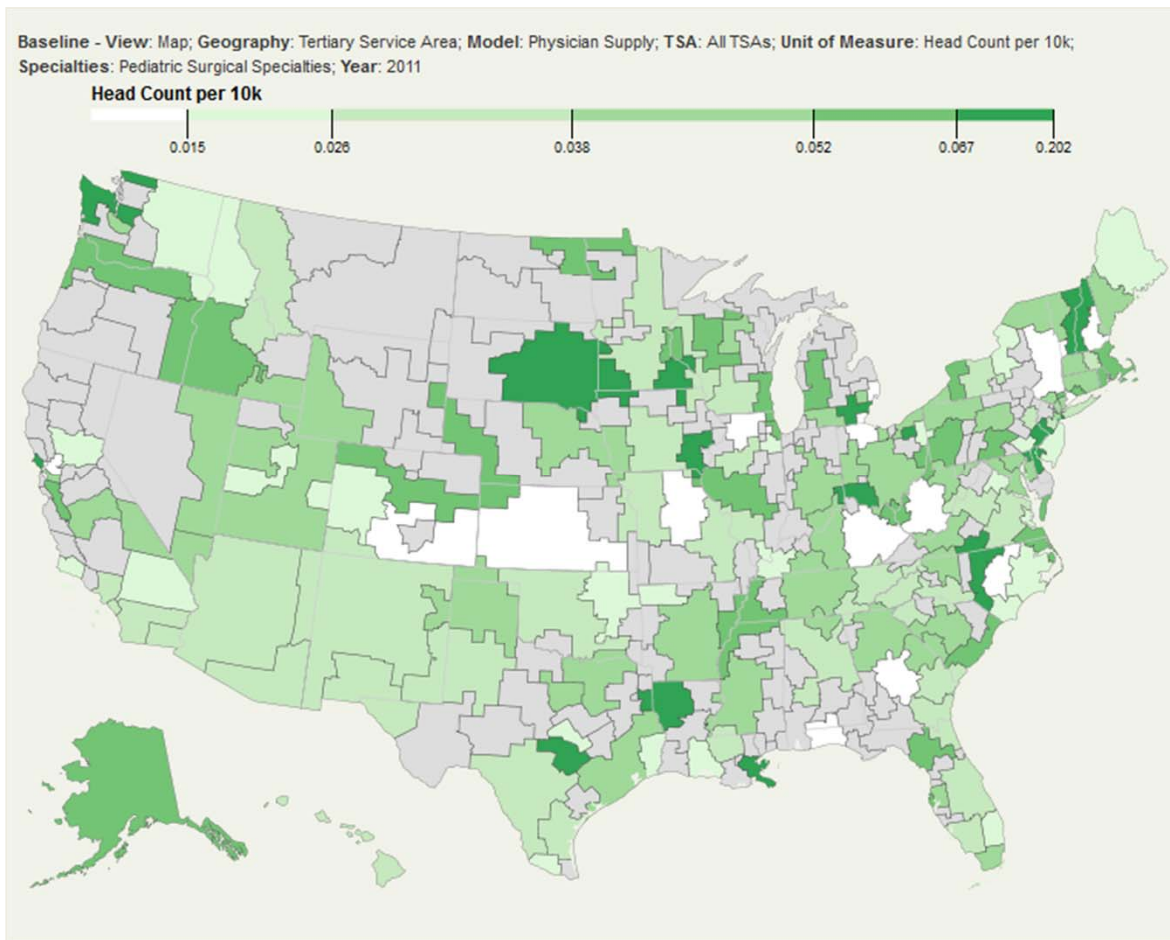
- Model shows rapid growth of pediatric surgeons
- So, why is there a sense of shortage?

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



# Evidence of “clustering” of pediatric surgeons — is “shortage” a distribution issue?

## Head Count per 10,000 Population, Pediatric Surgical Specialties, 2011



# Plasticity suggests a different answer

- What if perceived shortage of pediatric surgeons is actually a shortage of general surgeons doing pediatric cases?
- ABMS data MOC data would help us better understand:
  - Do general surgeons do fewer pediatric cases now than in past?
  - What kinds of pediatric surgery cases do they do?  
Appendectomies, hernias, and other non-complex cases?
  - How does a general surgeon's age, training, practice location (rurality?) and personal preferences affect ability and willingness to do pediatric surgery?

# Plasticity is dynamic process- distribution of work among specialists changes as relative numbers of specialists change

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- As number of pediatric surgeons has increased, are fewer general surgeons in training seeing pediatric cases?
- As number of pediatric surgeons has increased, are there enough complex cases for pediatric surgeons to gain (and maintain) competence in complex and rare cases?

# Analysis of ABS case logs show dynamic plasticity between vascular and general surgery

Work by Valentine et al (2013) using ABS case logs from 2007-2009 suggests changing plasticity between vascular surgery and general surgery:

- 33% of all vascular procedures performed by general surgeons, but only 1 in 4 did any vascular procedures
- general surgeons certifying at 10 years performed fewer vascular cases than those recertifying at 20 years
- vascular surgeons certifying at 10 years performed more vascular cases than those recertifying at 20 years
- Trend of vascular cases shifting from GS to VS will accelerate with technology (endovascular), changes in training (direct entry) and progressive specialization

Source: Valentine RJ, Rhodes RS, Jone A, Biester A. Evolving Patterns of Vascular Surgery Care in the United States: A Report from the American Board of Surgery. *J Am Coll Surg* 2013;216:886-893.

# Plasticity of surgical oncology services between generalist and specialist surgeons

Study of surgical oncology care in North Carolina found that 48% of surgical oncology procedures were performed by general surgeons (Stitzenberg et al, 2014). And:

- General surgeons more likely to treat common malignancies such as breast and colon cancers
- Surgical oncologists more likely to see less common malignancies such as pancreatic and esophageal cancers
- Findings dovetail with ABS subspecialty certificate in advanced surgical oncology:
  - Intent is to recognize need for small number (~40/year) surgeons with expertise in rare, unusual or complex cancers.
  - Recognizes majority of other cancers will be treated by general surgeons

Source: Stitzenberg KB, Chang Y, Louie R, Groves JS, Durham D, Fraher EP. Improving our understanding of the surgical oncology workforce. *Ann Surg.* 2014;259(3):556-62.



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

- Family physicians spend ~10% of time caring for children but percentage of FPs caring for children declined from 78% in 2000 to 68% in 2009 (Bazemore et al 2012)
- Reasons for narrowing scope could include crowding out of peds patients by elderly, low Medicaid reimbursement rates, FPs seeing fewer peds patients in training so don't feel confident in ability to meet diverse needs of pediatric primary care (Shipman 2012)

Bazemore AW, Makaroff LA, Puffer JC, Parhat P, Phillips RL, Xierali IM, Rinaldo J. Declining number of family physicians are caring for children. *JABFM*. 2012; 25(2): 139-40.

Shipman SA. Family Physicians Closing Their Doors to Children: Considering the Implications. *JABFM*. 2012; 25(2): 141-2.

# MOC data also reveal less maternity care and considerable narrowing/variation in scope of services provided

- Tong et al (2013) analyzed ABFM MOC data and found that percent of FPs providing maternity care had declined from 23.3% in 2000 to 9.3% in 2010
- Bazemore et al (2011) analyzed Part III MOC data to gauge breadth of primary care services provided by FPs. Study found:
  - Narrowing breadth-less than 40% of FPs were offering more than half of clinical services considered to comprise a “full basket” of family medicine services
  - Considerable variation in services offered between family physicians

Bazemore AW, Petterson S, Nicole Johnson N, Xierali IM, Phillips RL, Rinaldo J, Puffer JC, Green LA. What Services Do Family Physicians Provide in a Time of Primary Care Transition? *JABFM*. 2011; 24(6):635-636.

Tong ST, Makaroff LA, Xierali IM, Puffer JC, Newton WP, Bazemore AW. Family Physicians in the Maternity Care Workforce: Factors Influencing Declining Trends. *Matern Child Health J*. 2013; 17: 1576-81.

# Within specialty variation is critical to understand

- Our model makes innovative contribution in acknowledging overlapping scopes of services provided by physicians in different specialties
- Version 1: allows different specialty configurations in different geographies to meet demand for same types of health care needs
- But it does not account for within specialty variation. Version 2 could allow physicians to alter their practice patterns to soak up unmet demand or shift away from saturated services or
- But how to estimate the factors that affect a physician's individual-level plasticity?

# We need better data and more research to understand factors affecting within specialty variation

## Could use MOC data to investigate how multiple factors affect individual physician's scope of services:

- Individual effects - age, gender, training, ABMS certificates held, time since graduation and initial certification
- Contextual effects - patient population, health system organization, rurality, density of physicians in overlapping/competing specialties
- Period effects - health system reorganization, technological change, changing training pathways, MOC implementation
- Cohort effects - 80 hour work week, changing training paradigms, lifestyle considerations

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