

Understanding How the Diffusion of Physicians Affects Areas of Underservice

The central hypothesis of this analysis is that physician diffusion can be estimated (anticipated) based on the characteristics of the places physicians go to and come from as well as from the **characteristics** of the **physicians**.



The Policy Angle:

We can combine places and people with the best programs to optimize recruitment and retention in rural underserved areas (for primary care)

Policies/Programs:

- Recruitment of people with likelihood of going into rural, primary care
- Recruitment via focused content in rural settings or applicable to rural problems
- Recruitment via loan repayment, scholarships, incentives, potential support
- Retention via bonus payments
- Retention via practice support

Overlap of Selected Federal Programs and the "Life Course"



	TPCMD	NHSC Loan t	NHSC Scholarship	Bioterror Trng Cur	PH Training Center	HETCS	Burdick	NPDB	AHEC	PH Trainees	HADM	Prev Med	SLRP	Allied Health	НСОР	Dental PubH	
TPCMD Program		Н	Н	L	L	М	М	L	Η	L	L	Η	Η	L	Η	L	
NHSC Loan Repayment Program	Η		Н	L	L	Н	Η	L	Н	L	L	М	Η	L	Н	L	
NHSC Scholarship Program	Н	Н		L	L	Н	Н	L	Н	L	L	М	Н	L	Н	L	
Bioterrorism Training and Curr Dev	Μ	L	L		Н	Н	Μ	L	Н	Н	М	М	L	М	L	L	
PH Training Center Program	L	L	L	М		Н	М	L	Н	Н	Н	М	L	L	М	М	
Health Education Training Centers	М	М	Н	М	Н		Н	L	Н	М	М	М	Н	L	Н	М	
Quentin N. Burdick Rural Intdis Prog	Μ	М	М	L	М	Н		L	Н	М	М	М	Н	Н	Н	М	
Nat. Practitioner Data Bank	L	L	L	L	L	Μ	L		Μ	L	L	М	L	L	L	L	ľ
AHEC Program	Н	Н	Н	Н	М	Н	Н	L		М	М	Н	Н	Н	Н	М	1
Public Health Traineeships	L	L	L	М	Н	Μ	М	L	М		Н	Μ	М	L	М	Н	
Health Administration Traineeships	L	L	L	М	Н	М	М	L	Н	Н		М	Н	L	Н	М	
Prev Medicine Residency Program	Н	Н	М	L	М	Н	Μ	L	Н	Н	L		М	L	Н	L	
State Loan Repayment Program	Н	Н	Н	L	М	Н	Н	L	Н	Н	L	М		М	Н	М	
Allied Health Projects	L	L	L	L	М	М	Н	L	Н	L	L	L	М		Н	М	
Health Careers Opportunity Program	М	Н	М	L	М	М	Μ	L	Н	М	М	М	Н	М		М	
Dental Public H Resid Training Prog	L	М	L	L	М	Μ	L	L	Μ	L	L	L	М	М	L		
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Matrix of Program **Overlap**

High, Medium or Low interaction

Recruitment



Bob Konrad calls programs:

Mercenary, Military or Missionary

Program Mechanisms-what HRSA and other programs do to influence distribution and supply Compulsion/Coercion (military*) NHSC, SLRP, J-1Visa obligation Normative (missionary*) PROP, Rural Interdisciplinary Title VII-VIII, Geriatric Training Otilitarian (mercenary*) Bonus payments, J-1Visa-Incentive for employer

The Analysis

Data & Stuff

- AMA concatenated files, 206-2013 (with reference/comparison to 2011)
- HPSA files (ZIP, County, AHRF, "Kitchen Sink")
- GIS basemaps for adjacency and distance
- ZIP imputed files (Medicare stuff)

• Tried to use PCSA files, but....

A comment on the concatenated files

- Physician records in AMA Masterfile have a unique ID
- Data are updated annually on perhaps 30% of records
- The data "lag" a bit, when a doctor moves, the data may catch up in 3years, or in 3 days...

All docs, preliminary findings...

620,390 active in 2006 *and* 2013 (Excl fed, res, <80)

& **185,207 (29.8%)** moved to a different county over 7 years

620,096 active in 2006 *and* 2011 (Excl fed, res, <80)

& 158,709 (25.5%) moved to a different county over 5 years

Conclusions (Diffusion Version1)

- Physician supply is **dynamic**
- Policies should recognize the dynamic nature of the supply when considering:
 - Evaluation of programs (e.g.: retention rates in context of normal flows)
 - Placement (prepare physicians for inevitable geographic change)
 - The economic argument that diffusion meets needs is confirmed but conditioned
- So what? Which policy is implicated?

Total movement increased from 213,750 to 290,030

36.4% of all docs active in both series

Move Count	у		
		2006-2011	
2006-2013	no	yes	total
no	474,469	31,993	506,462
yes	108,263	181,757	290,020
total	582,732	213,750	796,482

let's see who were movers

A prelim regression of any county move, r²=.088

movefips0613	coeff.	std. err.	t	p>t	95%L	95%U
yr2011_primcare	-0.0648155	0.0011749	-55.17	0	-0.0671183	-0.0625127
yr2011_surgeon	-0.0439563	0.001372	-32.04	0	-0.0466455	-0.0412672
yr2011_doflg	0.0223312	0.0020921	+10.67	0	0.0182307	0.0264318
yr2011_age	-0.0123393	0.0000473	-260.82	0	-0.012432	-0.0122466
female	0.0053607	0.0011596	+4.62	0	0.0030878	0.0076335
_cons	1.005935	0.002567	391.87	0	1.000903	1.010966

Simplified Results: any county move, r²=.088

movefips0613	t
Primary Care	-55.17
Surgeons	-32.04
Osteopathic MD	+10.67
Age	-260.82
Female	+4.62
_cons	391.87

Would it be good to know...

- Who goes into and out of a HPSA
- What type of place loses or gains docs?
- Then what?
 - Probability place x gets physician y. П x | y
 - Is there a threshold for place x conditional on $\sum (\pi y)$ probabilities
- These calculations can be done, via regression analysis of movers versus non movers, yes?

Domains of Factors Affecting Recruitment and Retention Into Underserved Communities



Others have been and are working on this

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A State-to-State Diffusion Matrix (squint and you can see your state)

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Net LOSS vs GAIN, total MDs 2006-2011



Migration into North Carolina



http://www.nytimes.com/interactive/2014/08/13/upshot/where-people-in-each-state-wereborn.html?action=click&contentCollection=The%20Upshot&module=RelatedCoverage®io n=Marginalia&pgtype=article#North_Carolina



Figure 2. Percent Change in Primary Care Physician to Population Ratio, 2010-2013, US Counties

Source: Carolina Health Workforce Research Center, Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with data derived from the American Medical Association Physician Masterfile, 2010-2013.



Categorizing Flows as Dependent Variables

		2013	
2006	To Urban	To Rural (Whole County) HPSA	To Rural (Whole County) NON HPSA
From Urban	240,831	1,386	412
From Rural HPSA	1,960	1,806	83
From Rural NON HPSA	655	109	571



Attend US Public Med School Age (years) Resident in 2006 Female USMG vs IMG Osteopath

Per ben. Medicare payment 2007 Std. Medicare payment 2013 Number of CAHs in county, 2011 FQHCS in county, 2012 NHSC Site in county 2013 Infant Mortality Rate, 2006-20 Per capita income, 2012 Unemployment rate, 2012 County area, (Sq miles) Pop to Primary care 2012 Change in PC-Pop ratio 2010-12 Percent with no Health Ins, 2012

People

Place & Program

AND SO....THE ENVELOPE PLEASE

Results for Factors Affecting Recruitment and Retention Into Underserved Communities The NEGATIVE SIDE



Results for Factors Affecting Recruitment and Retention Into Underserved Communities The POSITIVE SIDE



Power of prediction

18%-25%

Recruitment

Is that enough to provoke Person investment?

Retention