Exploring Healthcare Worker Mobility in the US: A Spatial Perspective

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Background

- **Healthcare workforce is critical, but face serious challenges**
  - U.S. faces acute health workforce shortages pre and post COVID-19
  - Physician shortage in primary care: More are entering specialized fields
  - Rural areas experience more problems
- **Healthcare equity** is related to
  - Barriers-to-care from patient side
  - Structural capacity of local healthcare professionals
- **Shaping access to healthcare**
  - Spatial distribution of healthcare workers is increasingly important

Research Motivations

- Present comprehensive empirical evidence
- Answer the research question
  - How the characteristics of the destinations and neighboring areas influence healthcare worker migration?
- Implication for public policies
  - To aid policy makers and healthcare industry stakeholders in better addressing healthcare workforce mobility and meet community healthcare needs

Methods

OLS models

$$y = X\beta + \varepsilon$$

Origin Destination

***y*: migration from origin to destination**

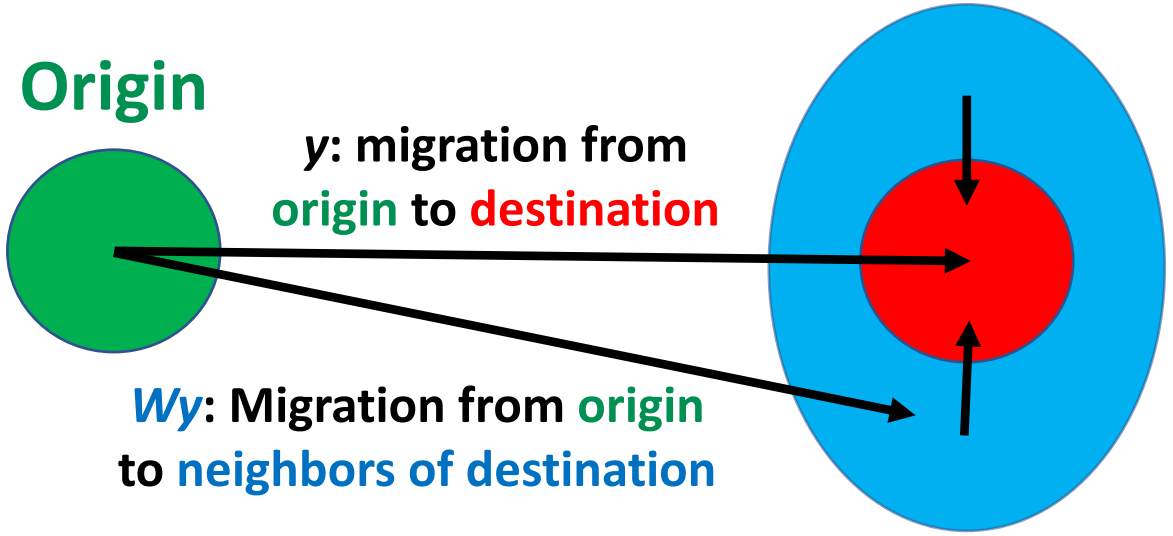
Spatial models
(general nesting spatial model)

$$y = X\beta + \varepsilon + \rho Wy + WX\gamma + \lambda Wu$$

Destination

***WX*: Observed characteristics of neighbors of destination**

Origin



***y*: migration from origin to destination**

***Wy*: Migration from origin to neighbors of destination**

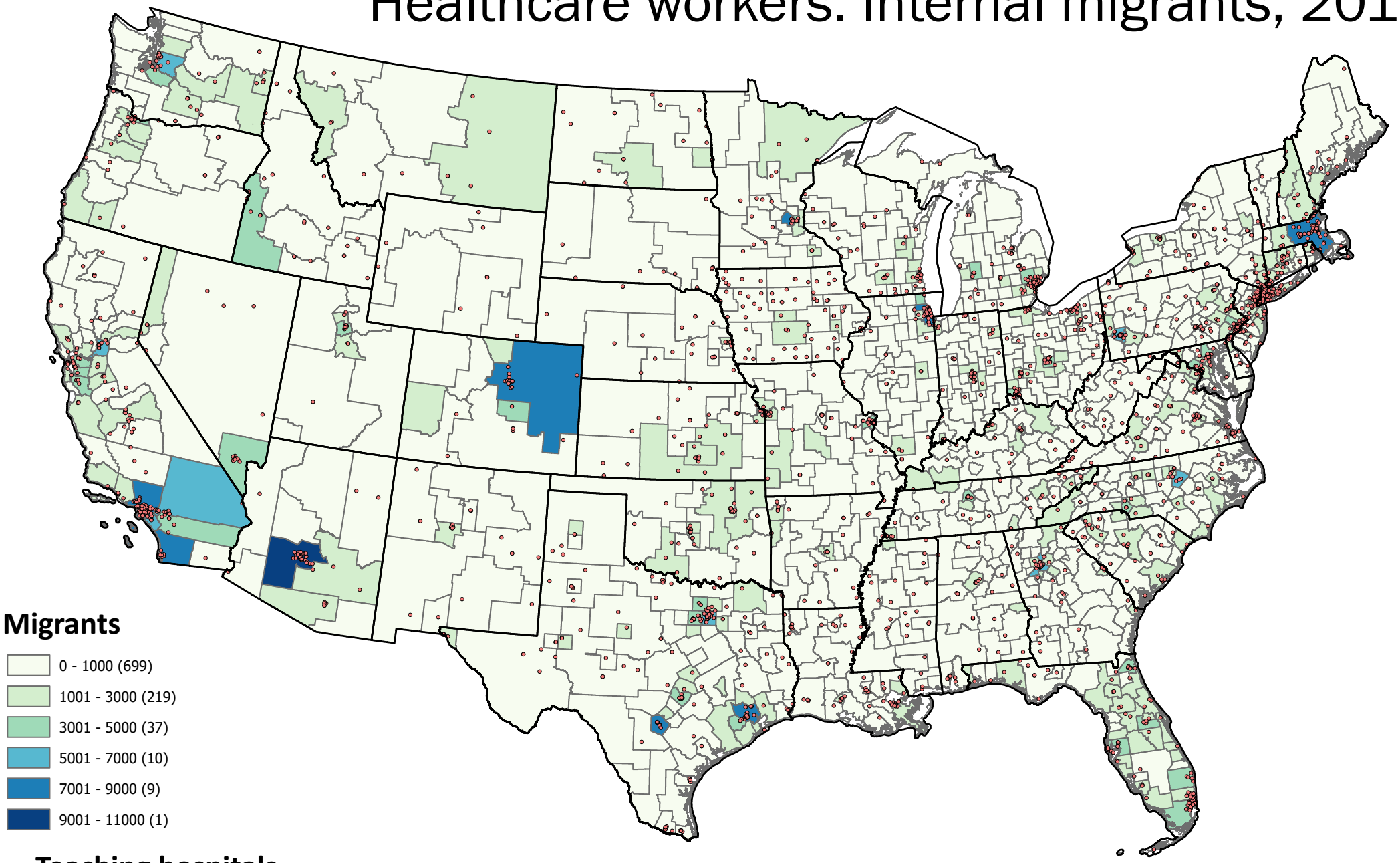
***Wu*: Unobserved characteristics of neighbors of destination**

Geographical units: 1,005 groups of Public Use Microdata Areas (MIGPUMAs)

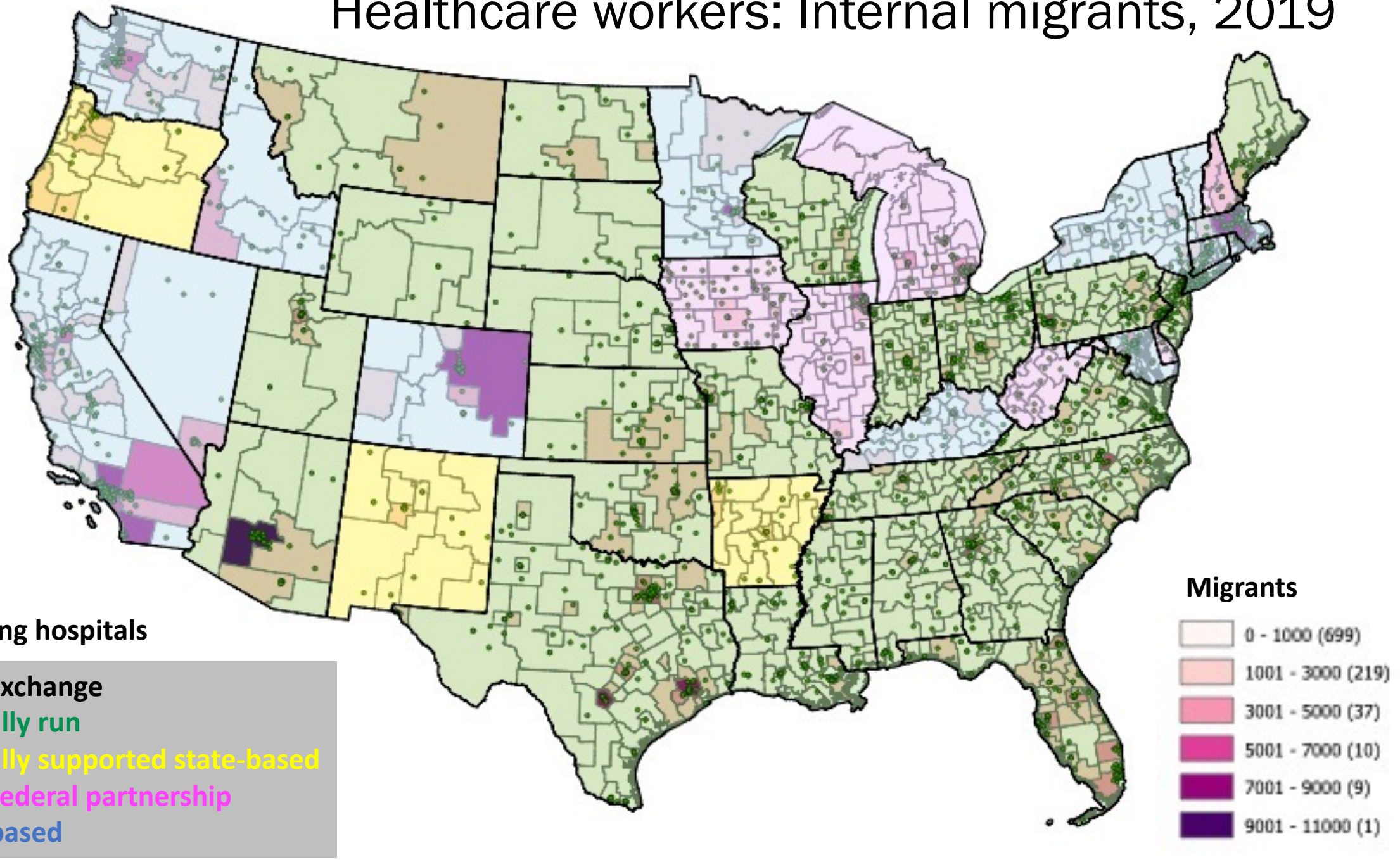
Data, 2014–2018

- Micro level (economic)
  - Area median family income *(American Community Survey)*
  - Area median wage for healthcare workers *(American Community Survey)*
- Meso level (social, relational network, organizational)
  - Migration of non-healthcare population to the area *(American Community Survey)*
  - Area population per primary care physician *(UW County Health Rankings and Roadmaps)*
  - Number of teaching hospitals within area *(Center for Medicare and Medicaid Services)*
  - Average financials (days-cash-on-hand) of contained teaching hospitals *(American Hospital Association, only up to 2018)*
- Macro level (structural, policy landscape)
  - Proportion of uninsured population in the area *(UW County Health Rankings and Roadmaps)*
  - Affordable Care Act (ACA) provisions: Healthcare exchange market type and Medicaid expansion *(Kaiser Family Foundation)*

Healthcare workers: Internal migrants, 2019



Healthcare workers: Internal migrants, 2019

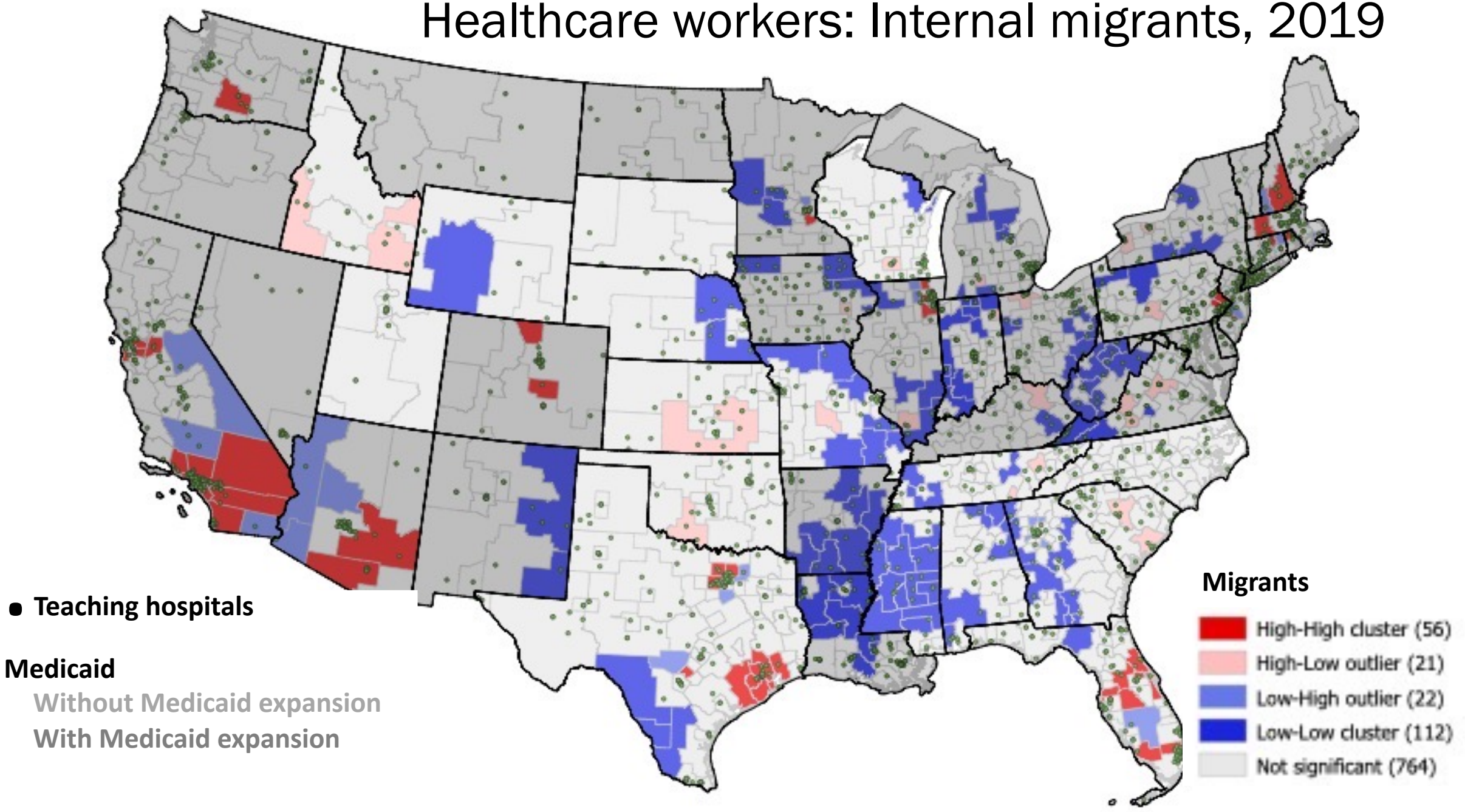


- Teaching hospitals

Type of exchange

- Federally run
- Federally supported state-based
- State-federal partnership
- State based

Healthcare workers: Internal migrants, 2019



- **Teaching hospitals**

Medicaid

- **Without Medicaid expansion**
- **With Medicaid expansion**

Models, 2014

Dependent variable

- Log of healthcare migration

Spatial models

- Lag of dependent variables
- Lag of independent variable
- Lag of error

Affordable Care Act (ACA) Provisions	OLS	Spatial Models		
		Direct Effect	Indirect Effect	Total Effect
Model 1 (Health Exchange)				
Federal exchange (ref.)	ref.	ref.	ref.	ref.
State exchange	0.045	0.204**	–0.147	0.057
Model 2 (Medicaid Expansion)				
No Medicaid expansion (ref.)	ref.	ref.	ref.	ref.
Medicaid expansion	0.038	0.179**	–0.105	0.074
Model 3 (Interaction)				
Federal exchange without Medicaid expansion (ref.)	ref.	ref.	ref.	ref.
Federal exchange with Medicaid expansion	0.073	0.165	–0.065	0.100
State exchange with and without Medicaid expansion	0.057	0.233**	–0.150	0.083

Effects on Healthcare Worker Migration, 2014–2018

- Micro level
  - Healthcare wages and family income: No significant effects

- Meso level
  - Migration of non-healthcare workers: Significant positive direct effects
  - Population-per-physician: Significant negative direct effects
  - Number of teaching hospitals in the area: Positive direct effects
  - Finances of teaching hospitals (days-cash-on-hand): No clear effects

- Macro level
  - Proportion of uninsured population: Significance decreases over time
  - ACA provisions: Mixed outcomes

Conclusions

- Higher wages in potential destinations may not necessarily be the main motivation for healthcare professionals
- The initial implementation of the key ACA provisions appear to have had a positive impact on attracting healthcare workers
  - As ACA becomes less consistent, effects on healthcare workers have become increasingly unclear
- Measuring teaching hospitals purely by financial metrics may not necessarily make them more attractive to healthcare workers
  - Our additional estimates with location of teaching hospitals indicate that they serve as spokes to connect and support the healthcare system

Contributions

- Spatial models recognize that healthcare is a social process
- Incorporating healthcare workforce issues into the study of health geography can lead to a more comprehensive understanding of the spatial distribution of health outcome
- Understanding the healthcare workforce migration and distribution helps plug the hole in the missing geographies of health care