Crowding in or Crowding out? Uncompensated Care and Hospital Participation in Community Health Networks

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Systems for Action
National Coordinating Center
Systems and Services Research to Build a Culture of Health

How to build delivery & financing systems that improve population health?

- Designed to achieve large-scale health improvement: neighborhoods, communities, regions
- Improve means AND reduce variances (health equity)
- Target fundamental and multiple determinants of health
- Mobilize the collective actions of multiple sectors and stakeholders in government & private sector
  - Infrastructure
  - Information
  - Incentives

Mays GP. Governmental public health and the economics of adaptation to population health strategies. ***National Academy of Medicine Discussion Paper.*** 2014. http://nam.edu/wp-content/uploads/2015/06/EconomicsOfAdaptation.pdf

Questions of interest

- How strong are the community networks that support public health improvement activities?
- How do these networks change over time?

  - Hospital roles as anchor institutions

- How do these networks influence health and economic outcomes?

Questions of interest – Hospital roles

- Do uncompensated care obligations influence hospital contributions to community health networks?
  - Substitution between 2 forms of community benefit
- How have hospital contributions changed in response to reduced demand for charity care under ACA?

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Economics of hospital decisions regarding community health networks

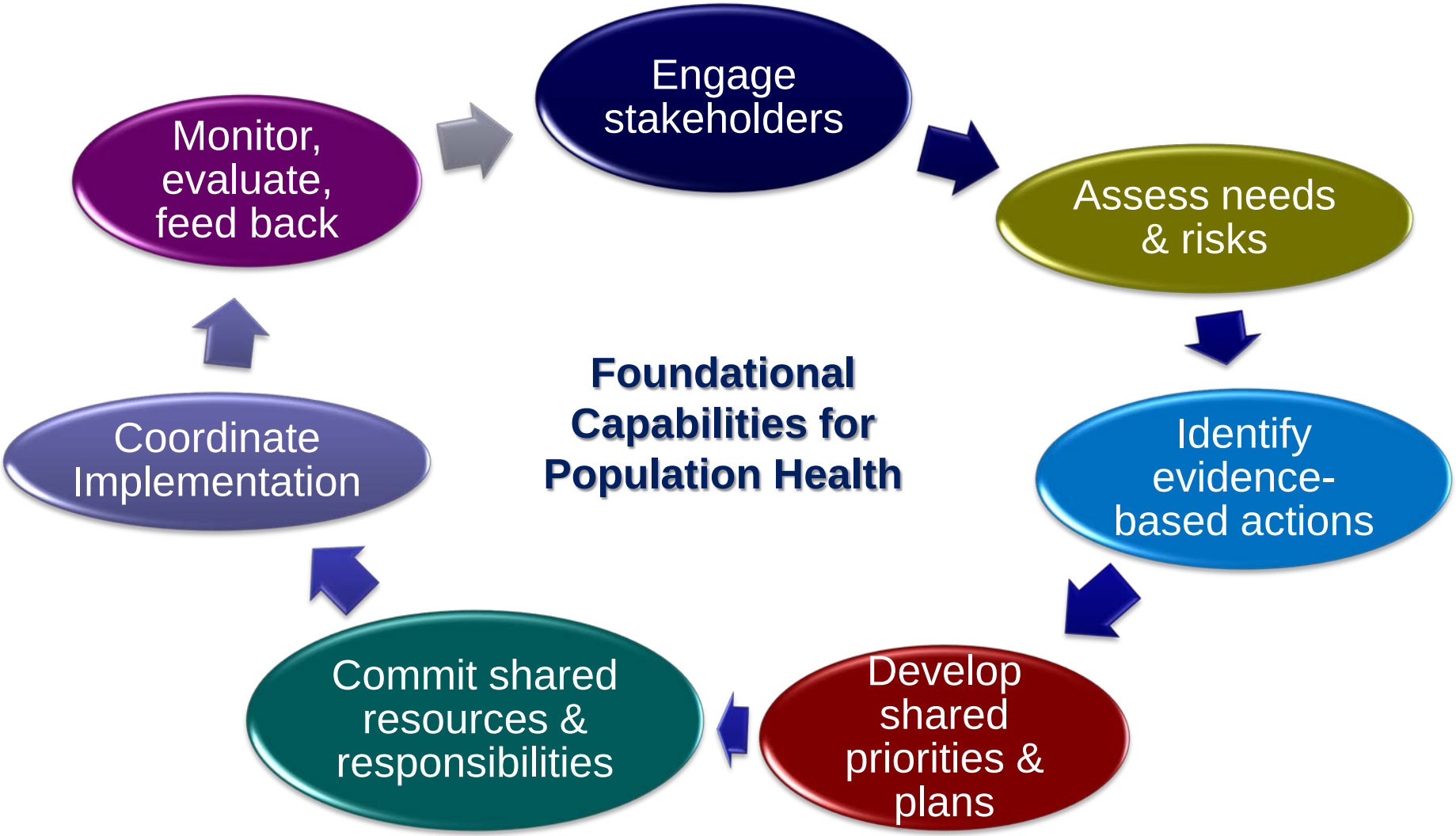
- **Mission**: charitable vs. investor-owned
- **Policy**: EMPTALA, tax exemption, community benefit regs, payment incentives
  → crowding in?
- **Market**: public vs. private goods
  → crowding out?

A useful lens for studying multi-sector work

National Longitudinal Survey of Public Health Systems

- Nationally representative cohort of 600 U.S. communities
- Followed over time: 1998-2018
- Local public health officials report:
  - ***Scope***: availability of 20 recommended population health activities
  - ***Network density***: organizations contributing to each activity
  - ***Network centrality***: strongest central actor
  - ***Quality***: perceived effectiveness of each activity

Widely recommended activities to support multi-sector initiatives in population health



National Academy of Medicine: ***For the Public's Health: Investing in a Healthier Future.*** Washington, DC: National Academies Press; 2012.

Data linkages expand analytic possibilities

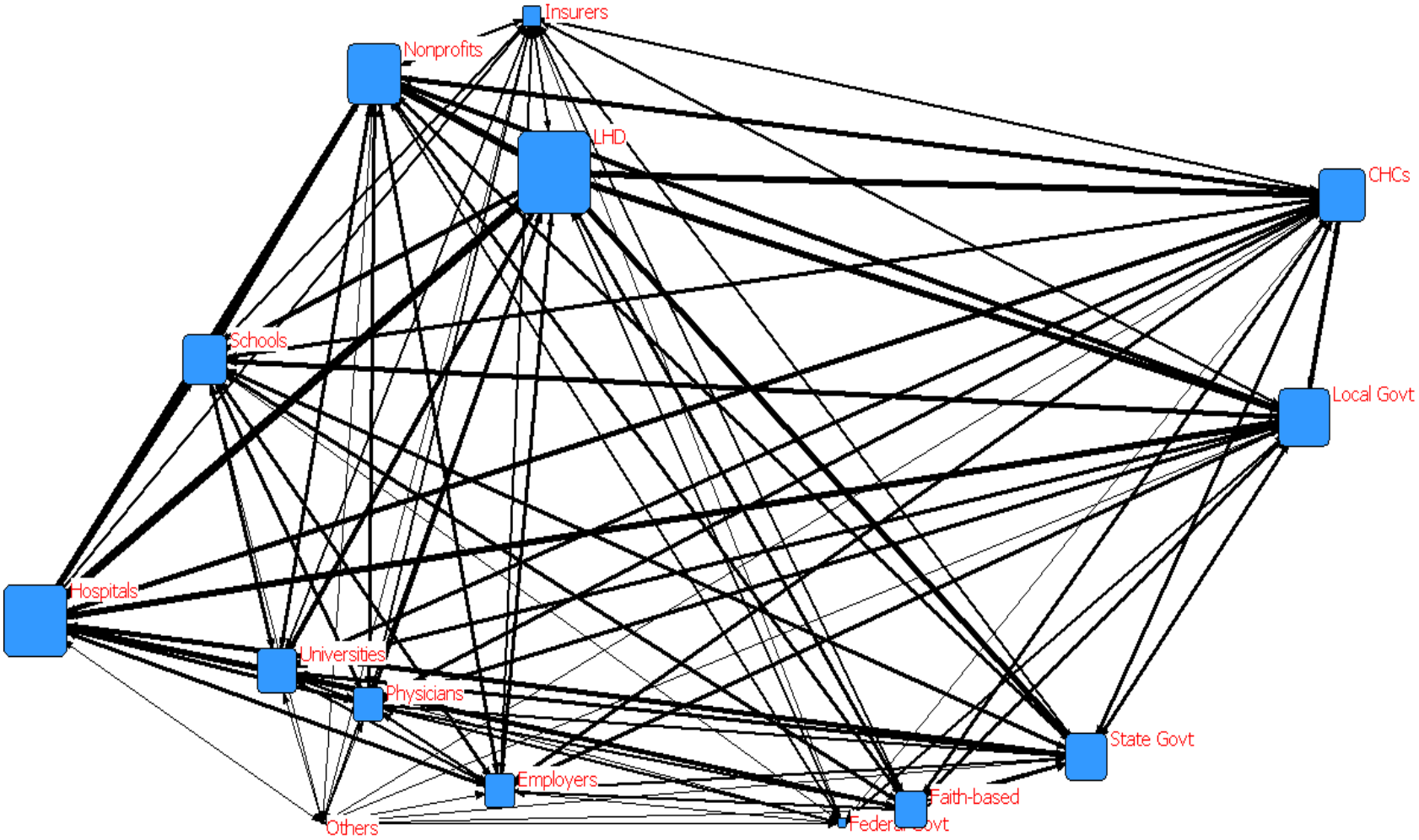
- **Area Health Resource File**: health resources, demographics, socioeconomic status, insurance coverage
- **Association data**: public health agency institutional and financial characteristics
- **CMS Impact File & Cost Report**: hospital ownership, market share, uncompensated care
- **Dartmouth Atlas**: Area-level medical spending (Medicare)
- **CDC Compressed Mortality File**: Cause-specific death rates by county
- **Equality of Opportunity Project (Chetty)**: local estimates of life expectancy by income
- **National Health Interview Survey**: individual-level health
- **HCUP**: area-level hospital and ED use, readmissions

Measuring network structure

- Two-mode networks (organization types X activities) transformed to one-mode networks with tie strength indicated by number of activities jointly produced

Organization Type/Sector	Activities							
	1	2	3	4	5	6	7	...20
Local public health agency	X	X		X		X		
State public health agency		X	X		X			X
Hospitals		X	X	X			X	
Physician practices					X		X	
CHCs	X		X		X			
Insurers					X	X		X
Employers								
Social service organizations		X		X			X	
Schools			X		X	X		
.....								

Mapping community health networks

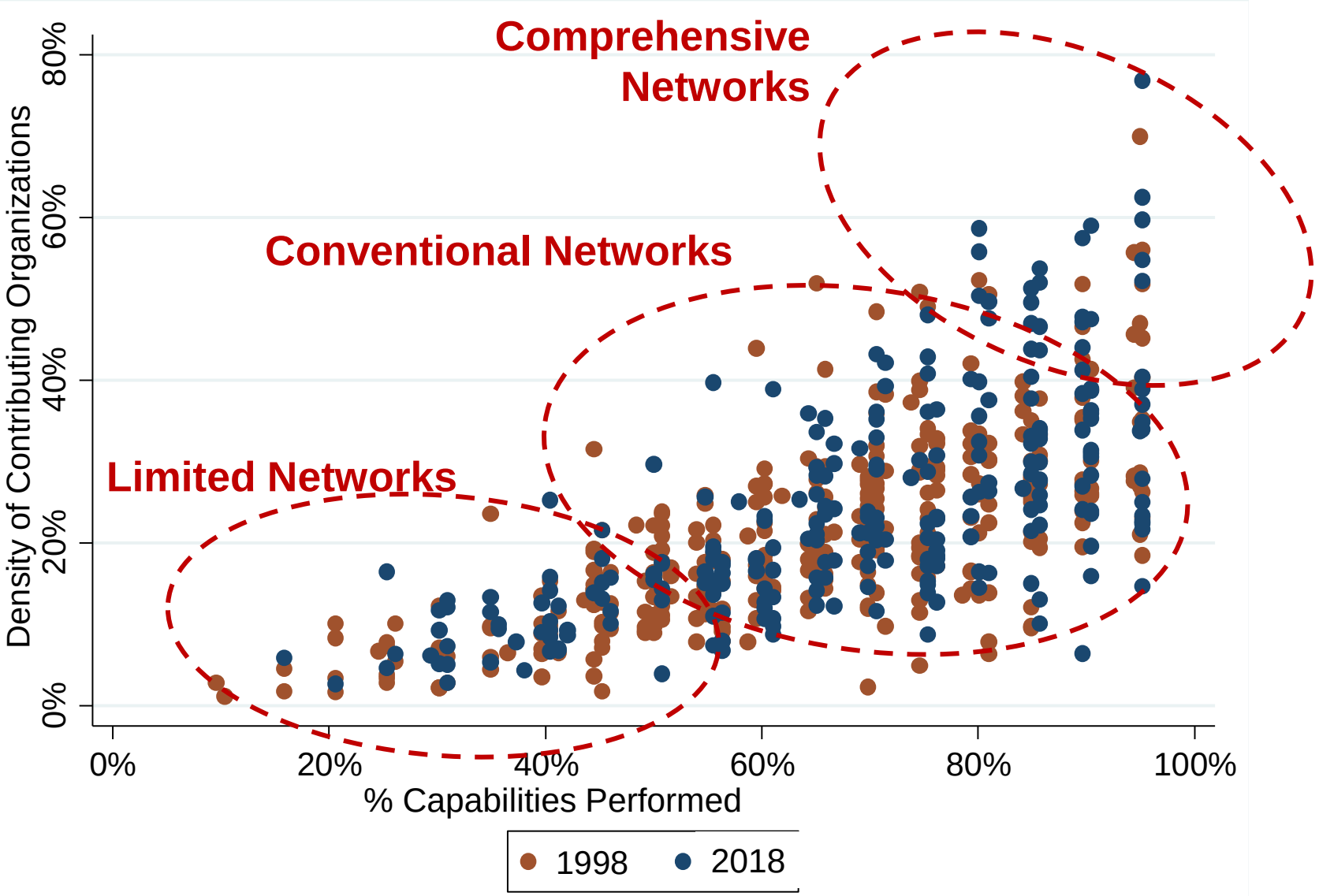


Node size = degree centrality

Line size = % activities jointly contributed (tie strength)

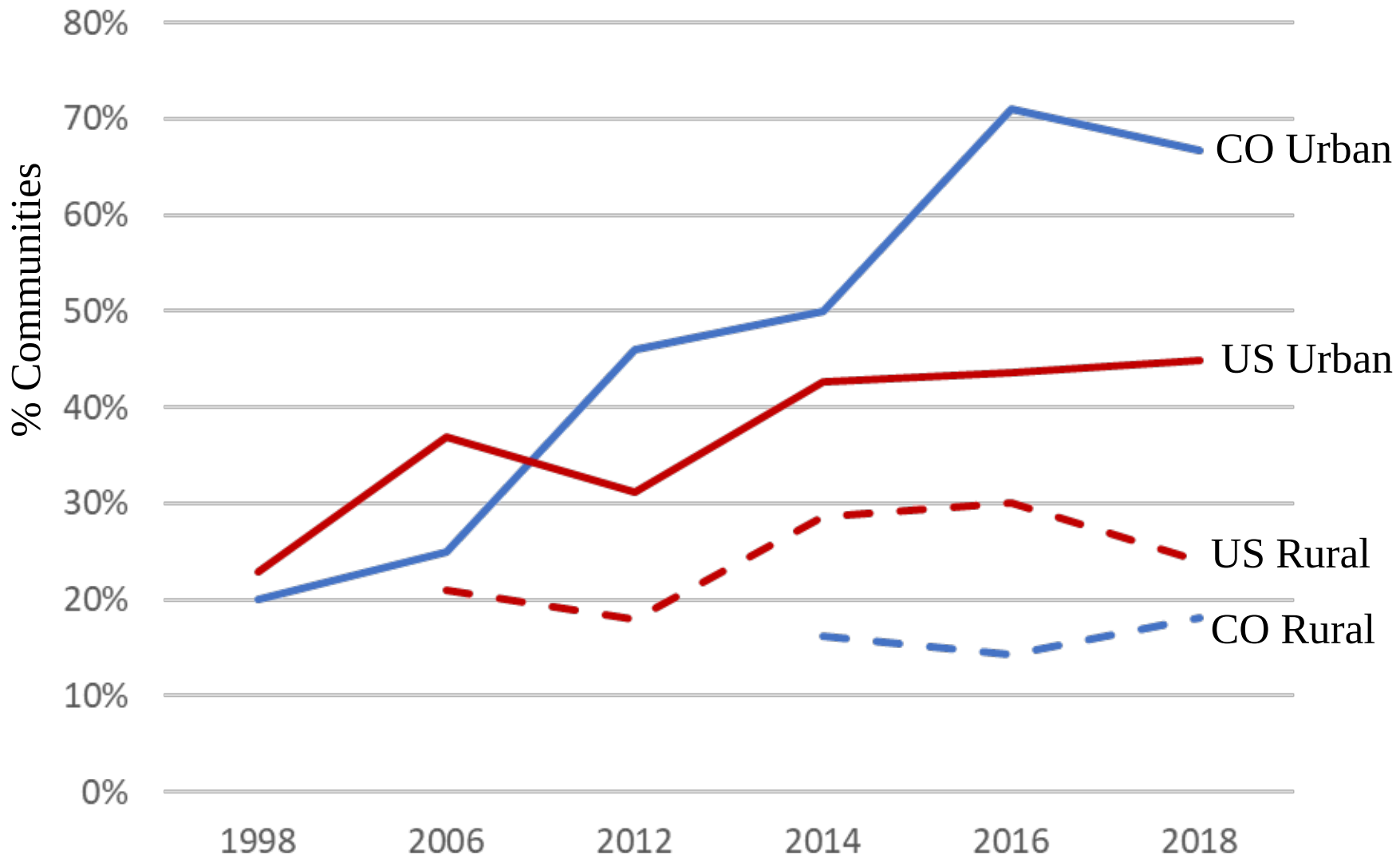
Mays GP et al. Understanding the organization of public health delivery systems: an empirical typology. *Milbank Q.* 2010;88(1):81–111.

Classifying network structure



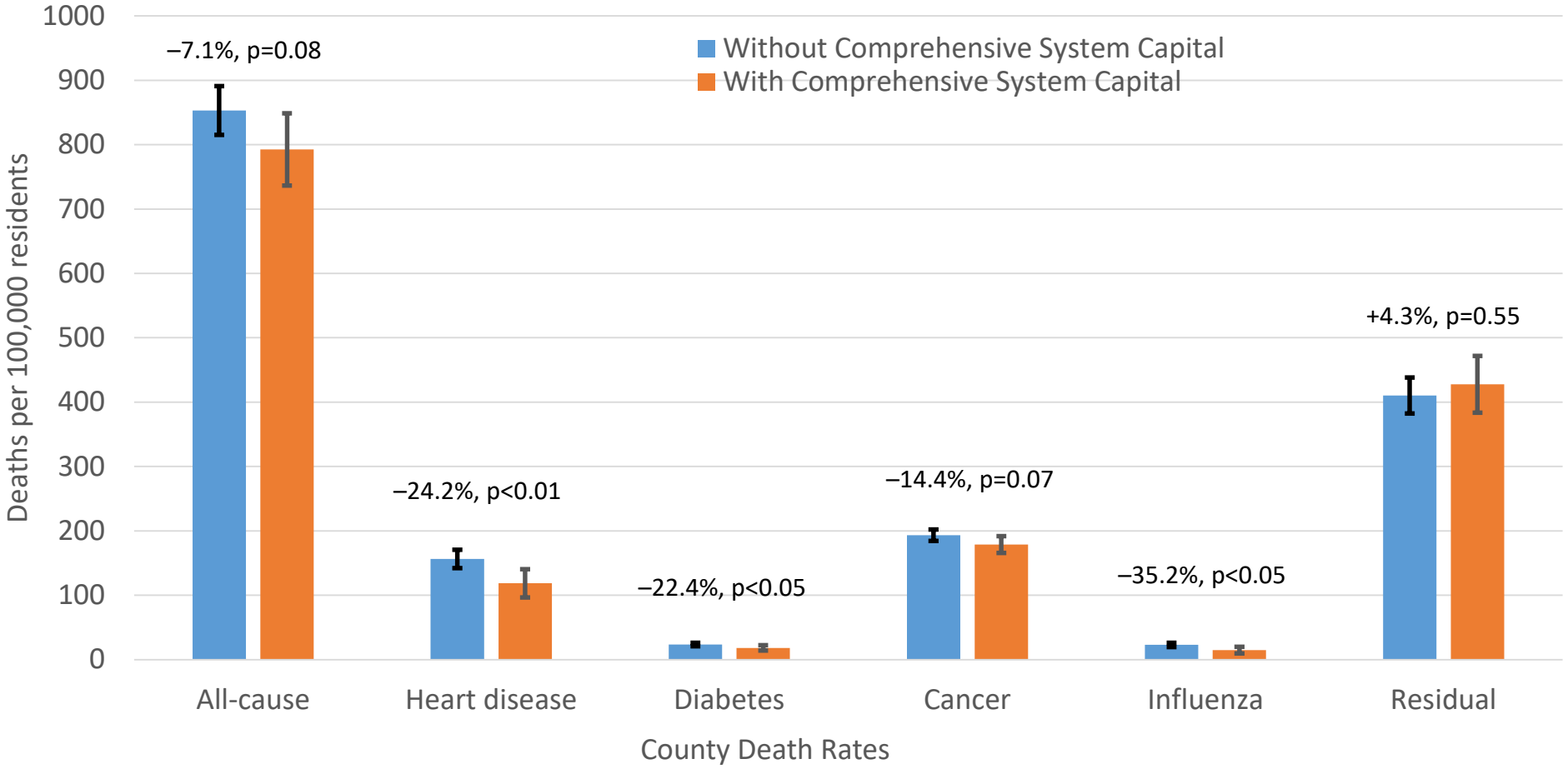
Mays GP et al. Understanding the organization of public health delivery systems: an empirical typology. *Milbank Q.* 2010;88(1):81–111.

Prevalence of Comprehensive Networks: Urban-Rural Differences



Health effects attributable to network structure

Impact of Comprehensive Networks on Mortality, 1998-2014

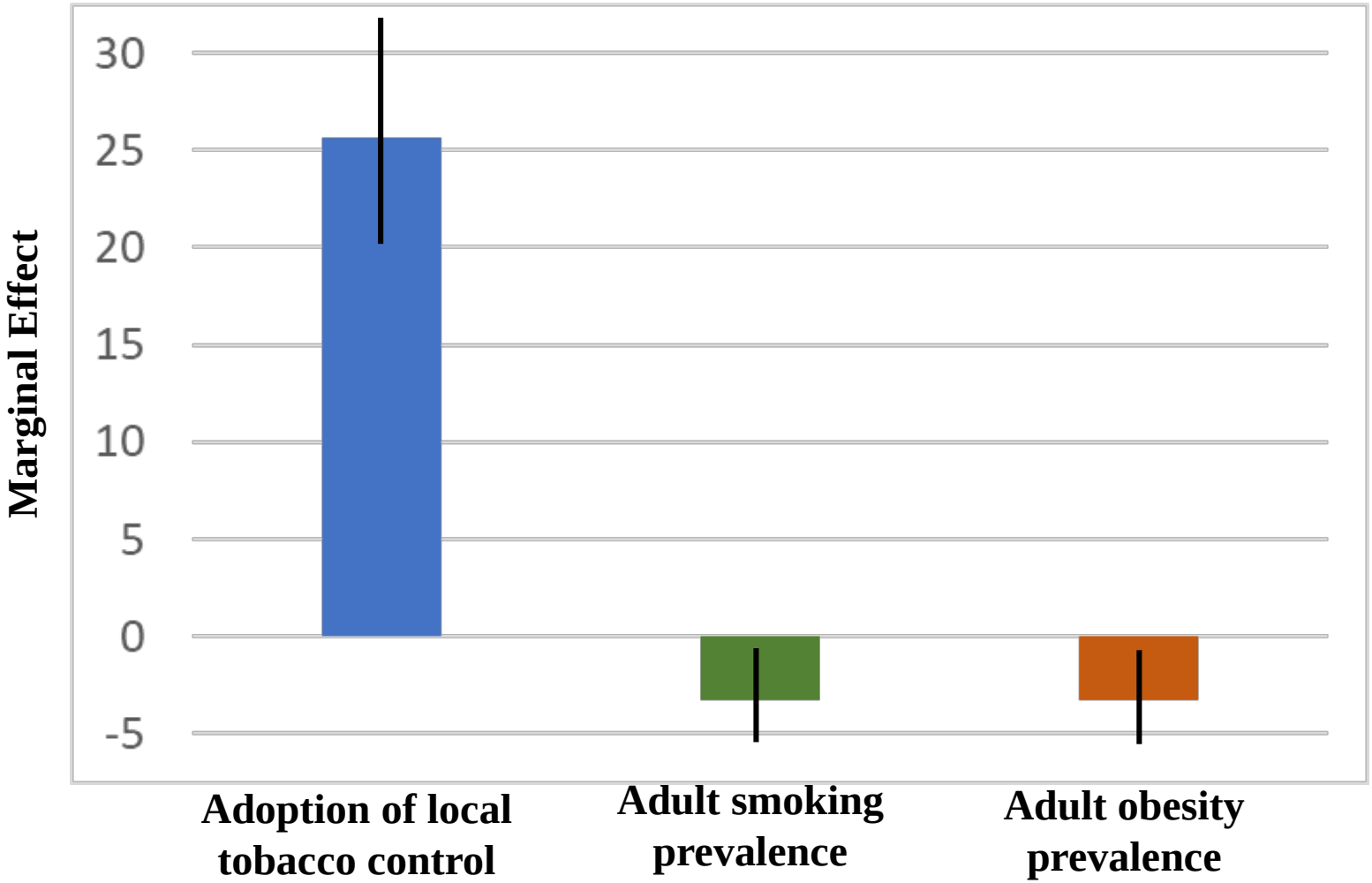


Fixed-effects instrumental variables estimates controlling for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects.

Mays GP et al. *Health Affairs* 2016

Health effects attributable to network structure

Impact of Comprehensive Networks on Policy & Behavior

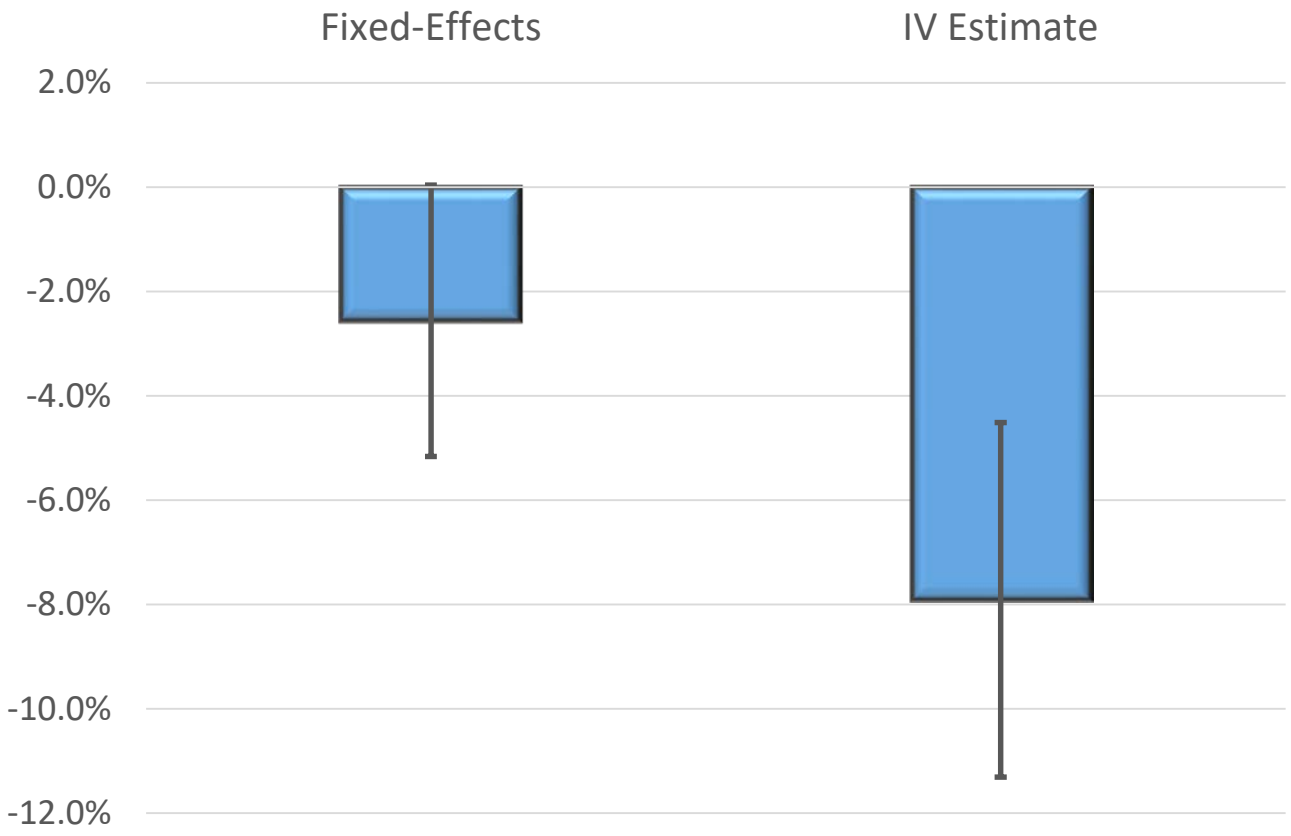


Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. Vertical lines are 95% confidence intervals

Mays GP et al. *Health Affairs* 2016

Economic effects attributable to network structure

Impact of Comprehensive Networks on Medical Spending (Medicare) 1998-2014

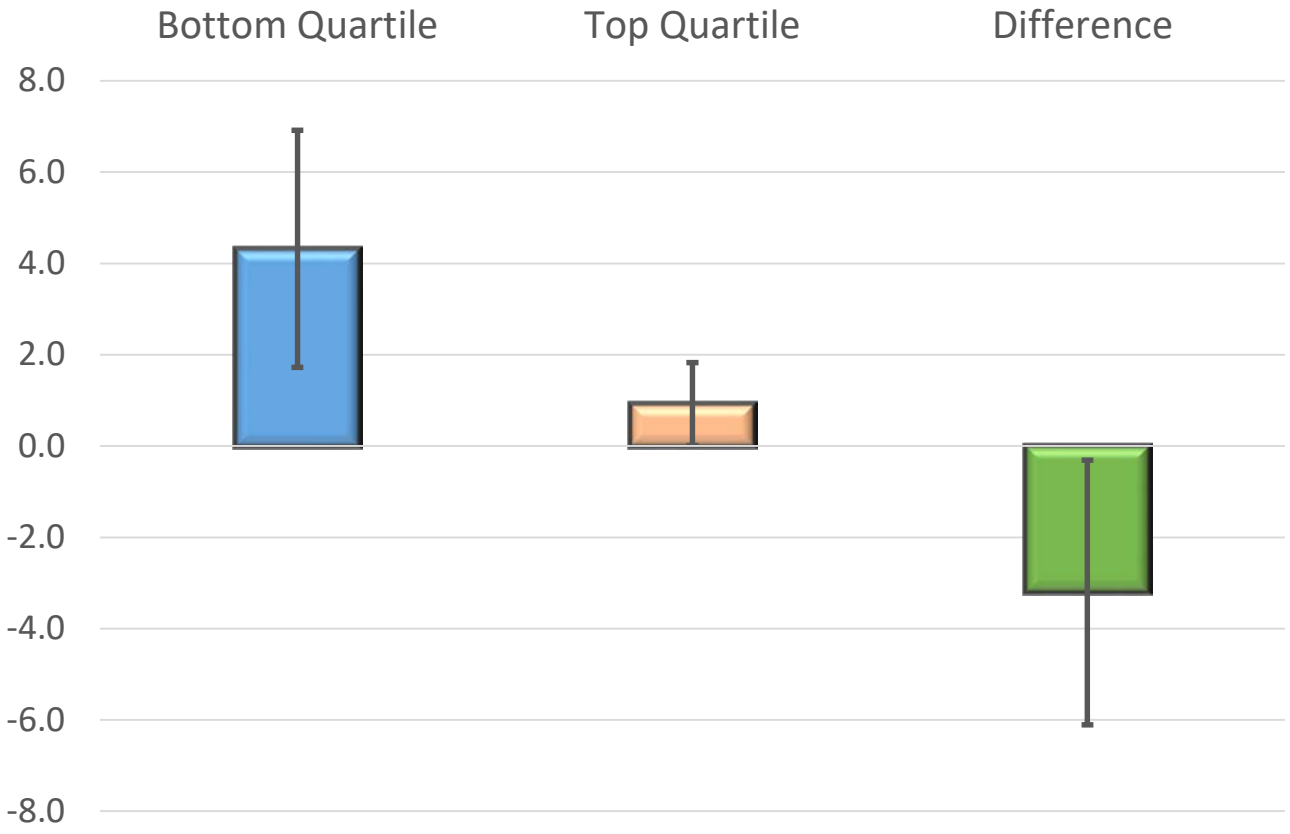


Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. Vertical lines are 95% confidence intervals

Mays GP et al. *Health Services Research* 2018

Equity effects attributable to network structure

Impact of Comprehensive Networks on Life Expectancy by Income (Chetty), 2001-2014



Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. Vertical lines are 95% confidence intervals

Mays GP et al. *forthcoming* 2019

Hospital Contributions and Uncompensated Care: Analytic Approach

- Follow cohort of 600 communities over 12 years: 2006-2018
- Measure hospital contributions as degree centrality
- Measure uncompensated care using CMS Cost Report, aggregated to HSA level
- Panel regression estimation with fixed and random effects to account for repeated measures and clustering of communities within states
- Two-stage IV model to estimate effect of network changes on community outcomes (mortality, medical spending, life expectancy by income)

$$\text{Ln}(\text{UCC}_{ijt}) = f\,(\text{Uninsured, Medicaid Expansion, Market, Community})_{ijt} + \text{State}_j + \text{Year}_t$$

$$\text{Ln}(\text{HspCentrality}_{ijt}) = f\,(\widehat{\ln(\text{UCC})}, \text{Market, Community})_{ijt} + \text{State}_j + \text{Year}_t + \varepsilon_{ijt}$$

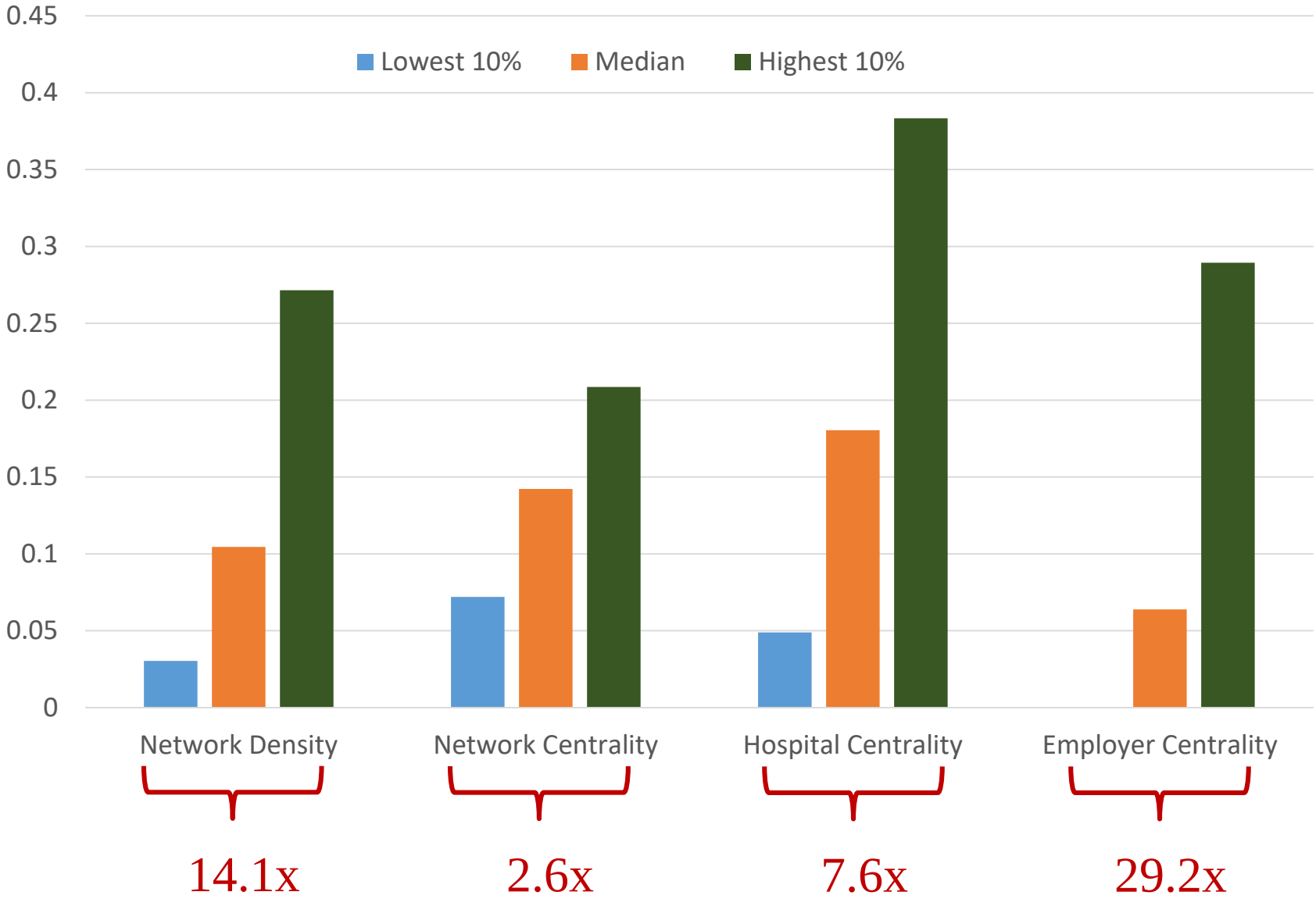
All models control for type of jurisdiction, population size and density, metropolitan area designation, income per capita, unemployment, poverty rate, racial composition, age distribution, physician and hospital availability, insurance coverage, and state and year fixed effects.

Organizational contributions to public health activities

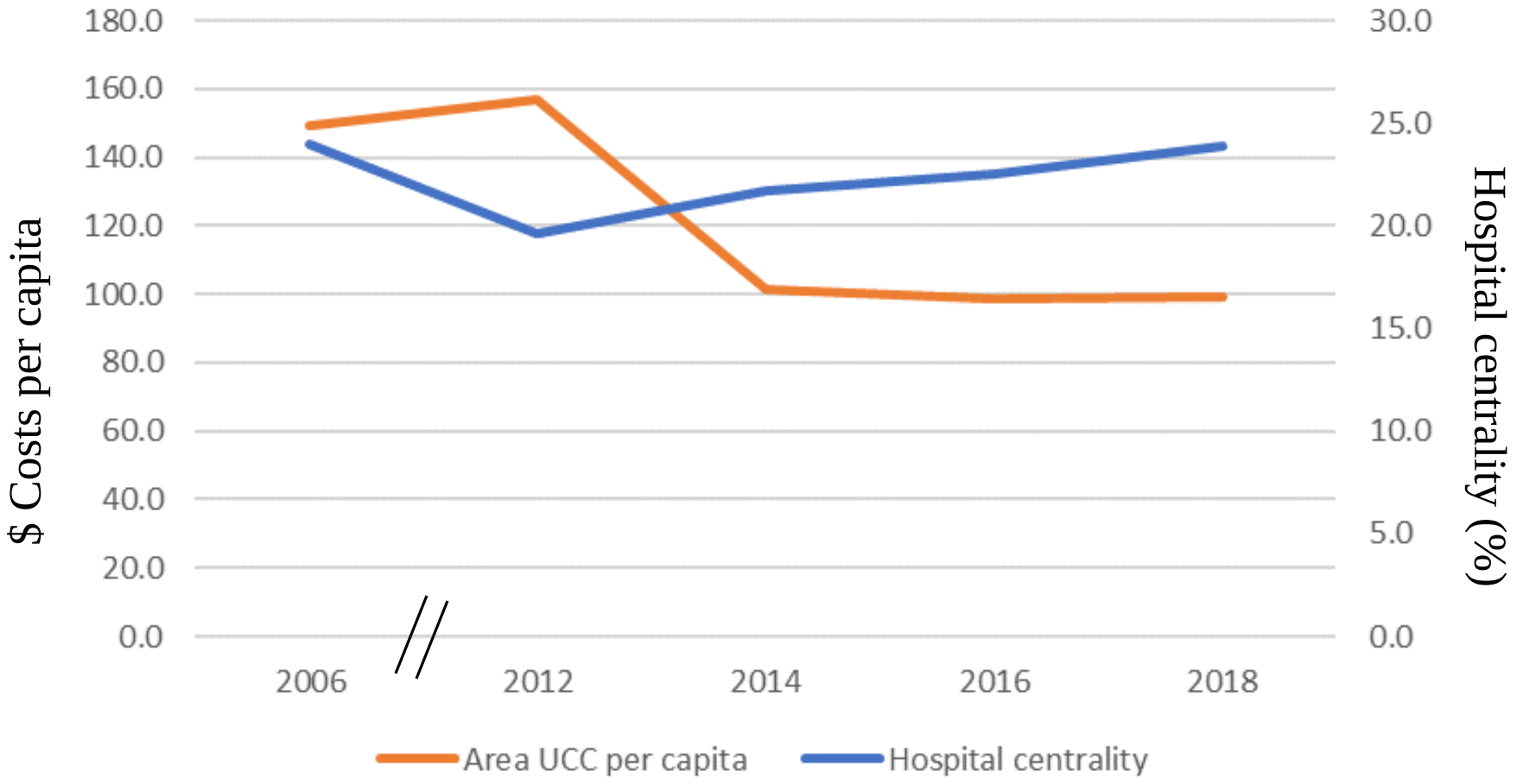
% of recommended activities contributed

Type of Organization	1998	2018	Percent Change
Local public health agencies	60.7%	67.5%	11.1%
Other local government agencies	31.8%	33.2%	4.4%
State public health agencies	46.0%	34.3%	-25.4%
Other state government agencies	17.2%	12.3%	-28.8%
Federal government agencies	7.0%	7.2%	3.7%
Hospitals	37.3%	46.6%	24.7%
Physician practices	20.2%	18.0%	-10.6%
Community health centers	12.4%	29.0%	134.6%
Health insurers	8.6%	10.6%	23.0%
Employers/businesses	16.9%	15.3%	-9.6%
Schools	30.7%	25.2%	-17.9%
Universities/colleges	15.6%	22.6%	44.7%
Faith-based organizations	19.2%	17.5%	-9.1%
Other nonprofit organizations	31.9%	32.5%	2.0%
Other	8.5%	5.2%	-38.4%

Variation in network structure

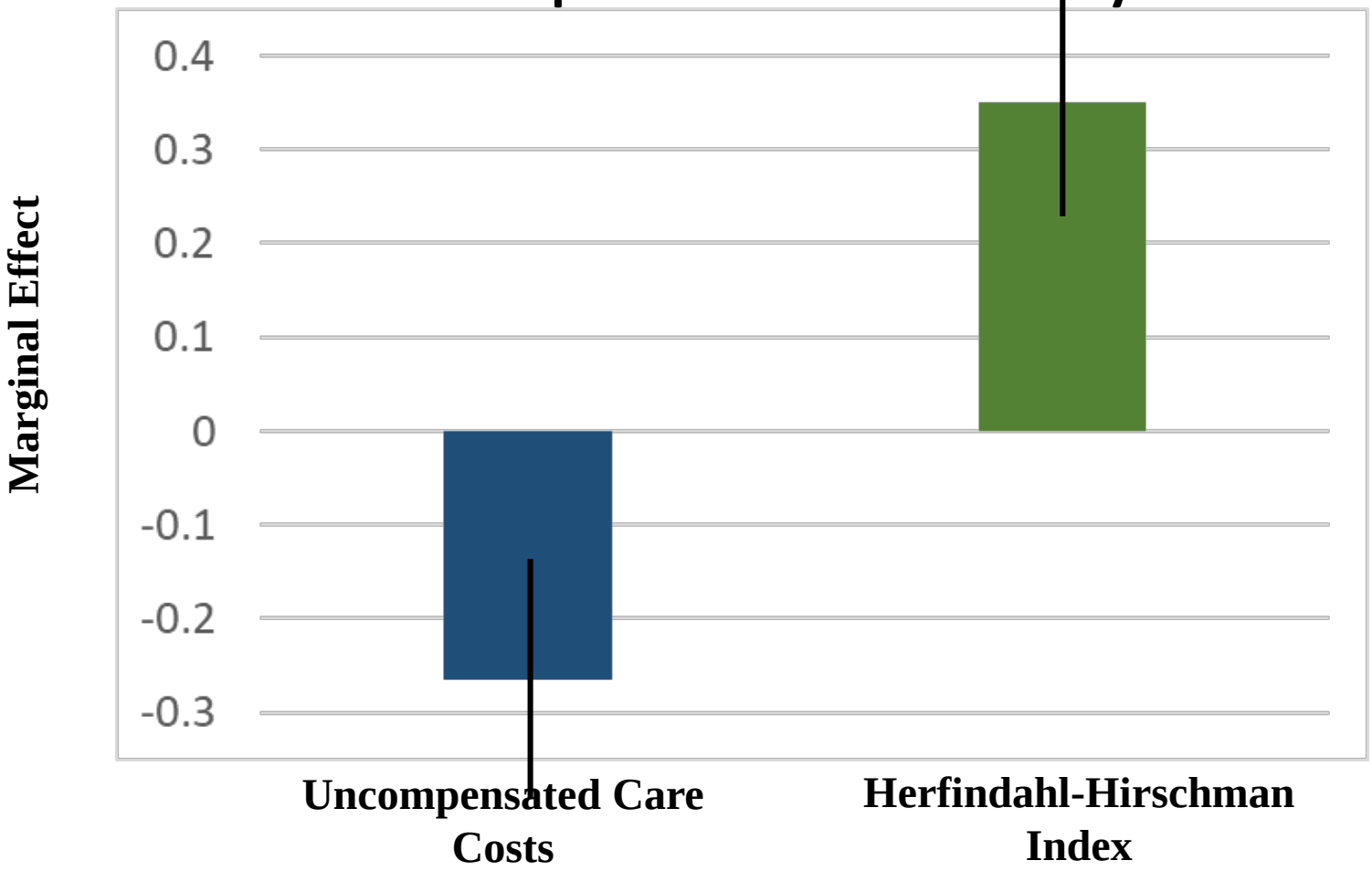


Changes in hospital contributions and uncompensated care (means)



Model Estimates

Impact of Uncompensated Care Costs and Market Concentration on Hospital Network Centrality



Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. Vertical lines are 95% confidence intervals

Preliminary conclusions and implications

- Hospitals are the largest nongovernmental contributors to community health networks in most communities
- Hospital contributions have increased significantly over time, particularly post-ACA
- Reductions in uncompensated care burden are associated with increases in hospital contributions to networks
- Hospital contributions are significantly larger in more concentrated markets

Implications for policy, practice & research

- Community benefit standards
- Hospital consolidation
- Hospital closures
- Alternative payment models
- Accountable Health Community approaches

For More Information

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