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From the Selected Works of Glen Mays

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The Strength of Multi-Sector Delivery Systems for Population Health

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Available at: https://works.bepress.com/glen_mays/306/

The Strength of Multi-Sector Networks for Population Health

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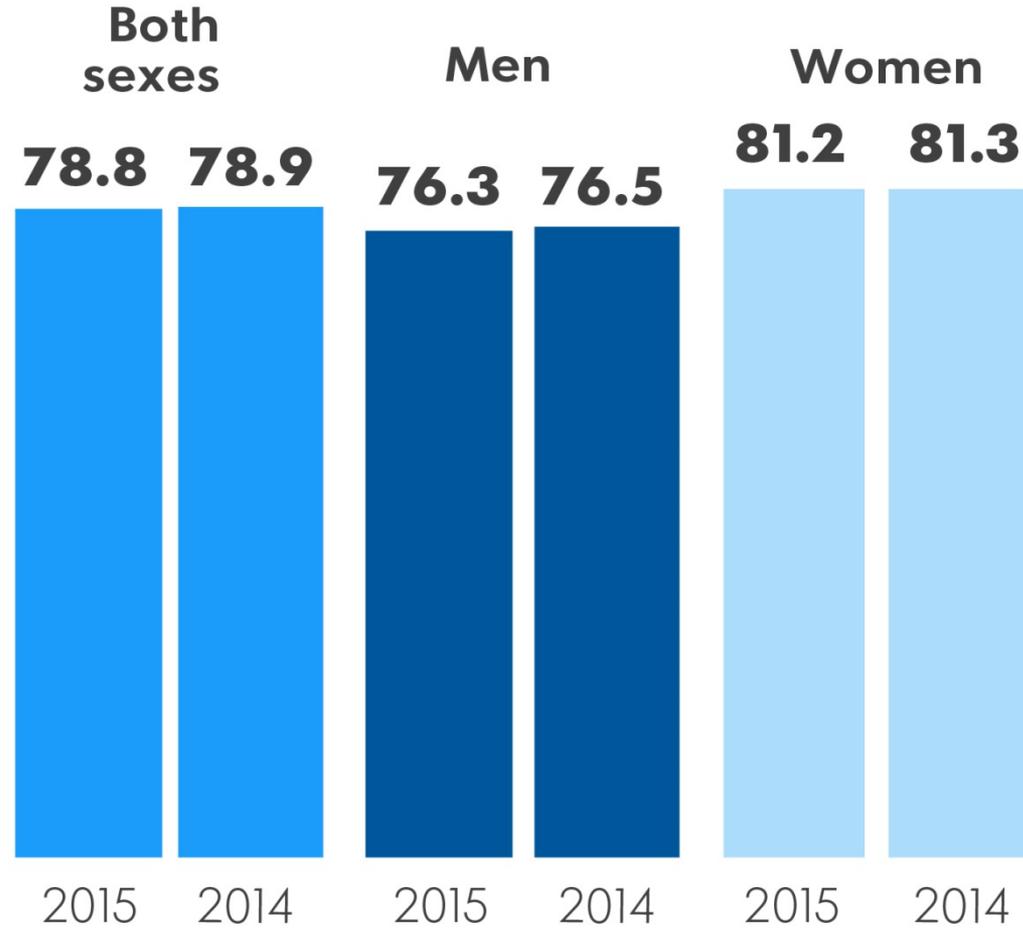
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Losing ground in population health

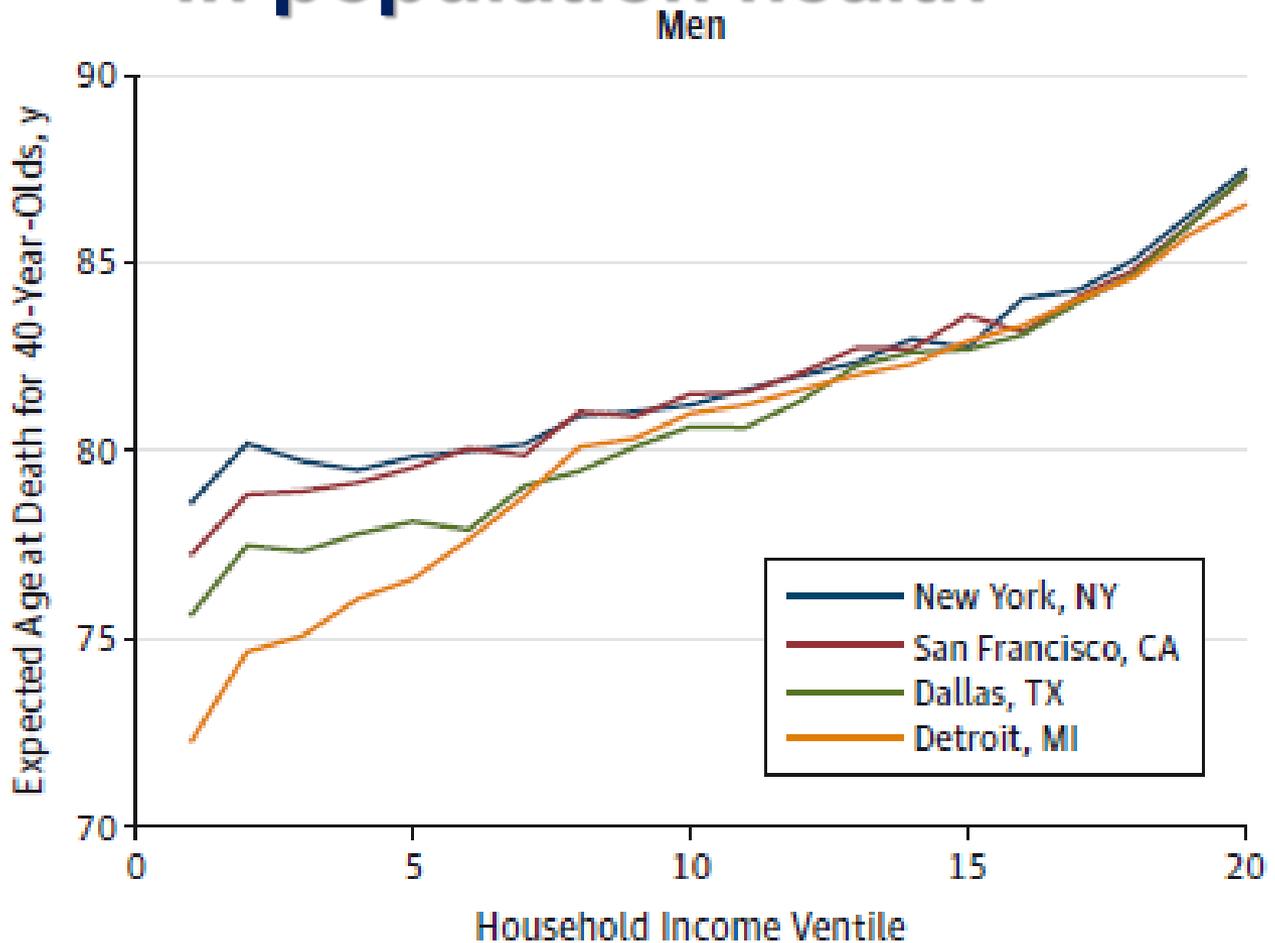
U.S. LIFE EXPECTANCY FALLS



SOURCE CDC
Jim Sergent, USA TODAY



Geographic & socioeconomic inequities in population health



Mean household income
in thousands, \$^a

30

60

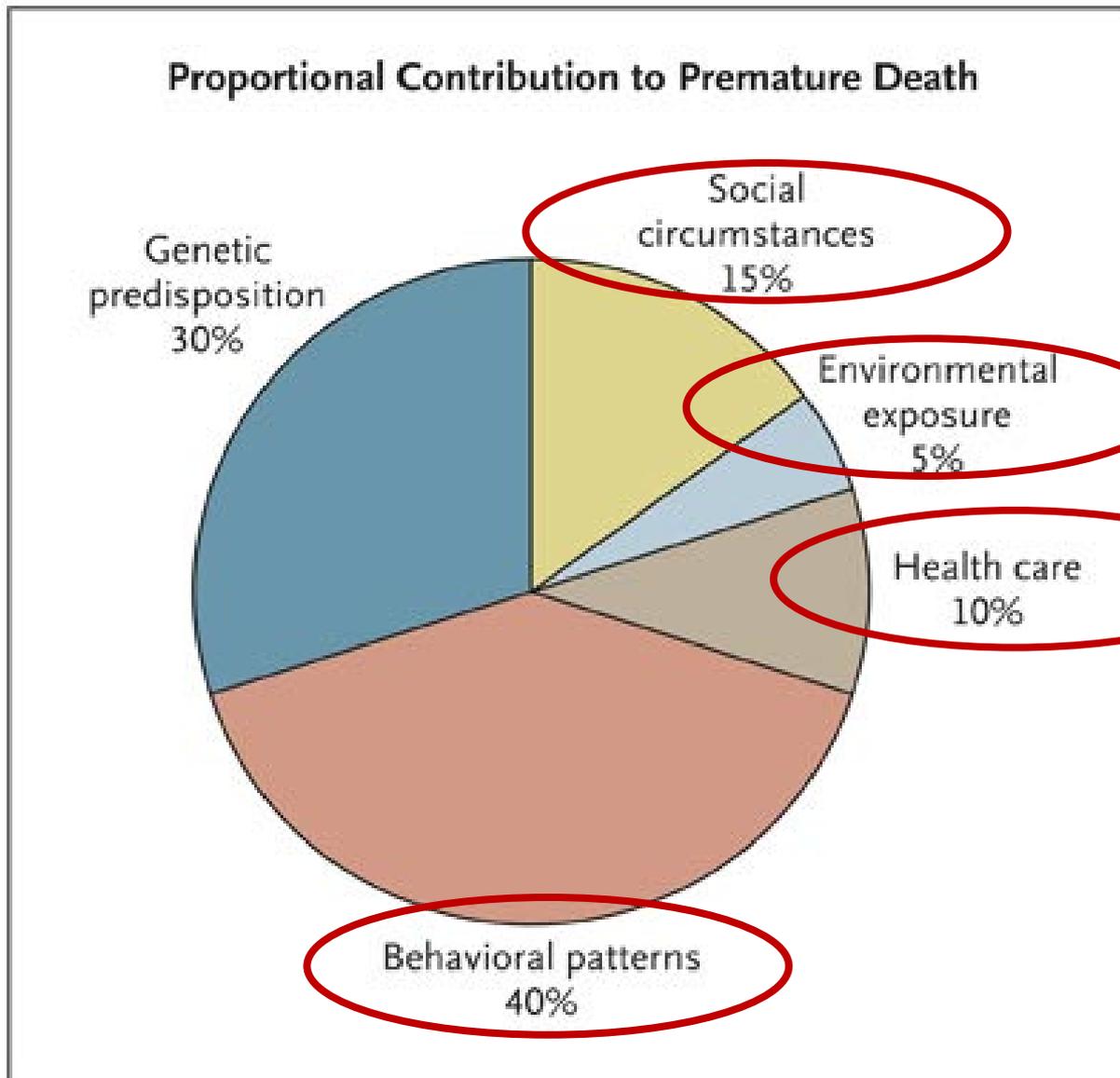
101

683

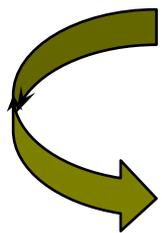
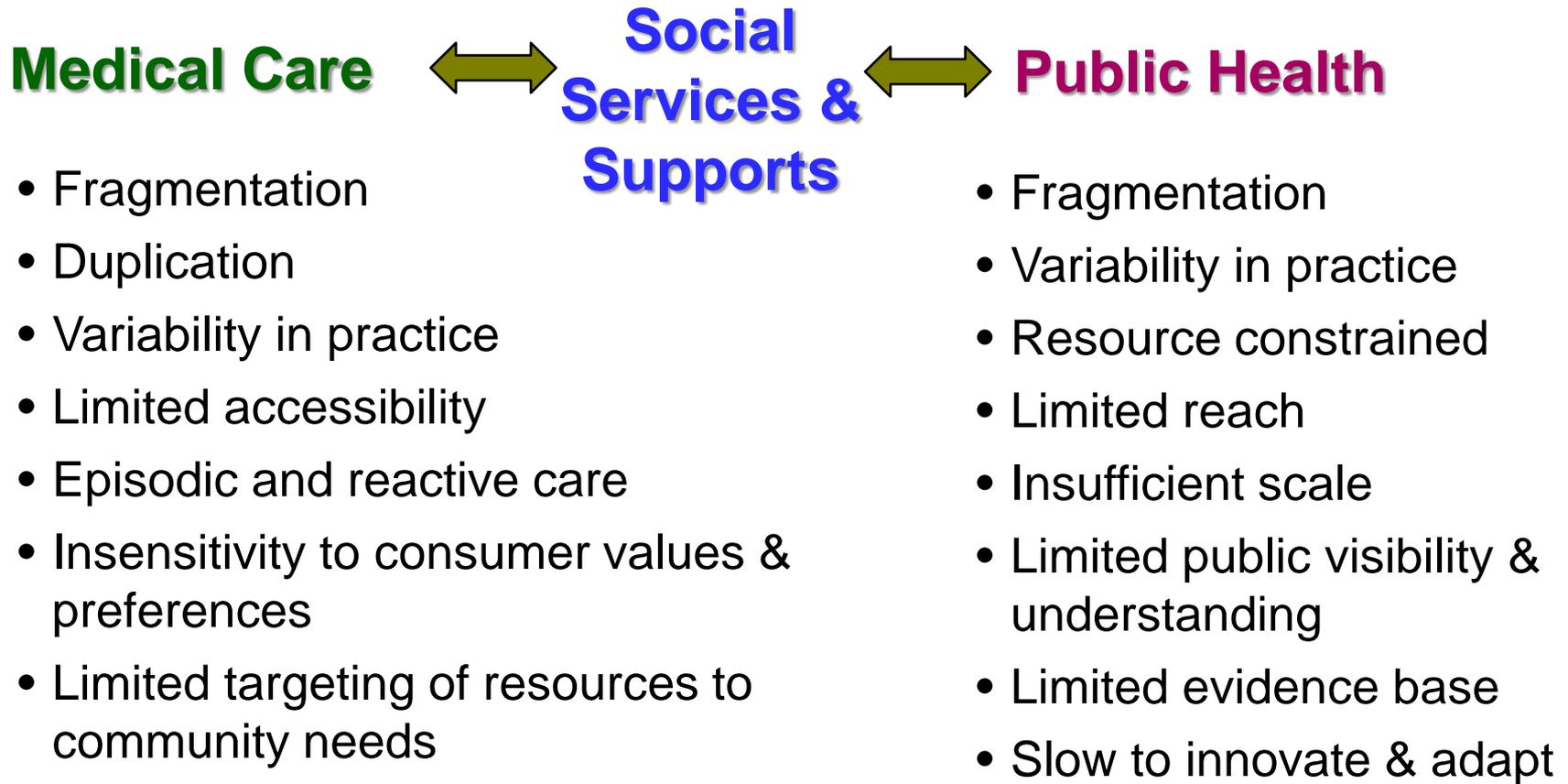
How do we support effective population health improvement strategies?

- Designed to achieve **large-scale** health improvement: neighborhood, city/county, region
- Improve the mean and reduce the variance (**equity**)
- Target **fundamental** and often **multiple** determinants of health
- Mobilize the **collective actions** of multiple stakeholders in government & private sector
 - Infrastructure
 - Information
 - Incentives

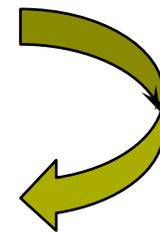
Multiple systems & sectors drive health...



...But existing systems often fail to connect

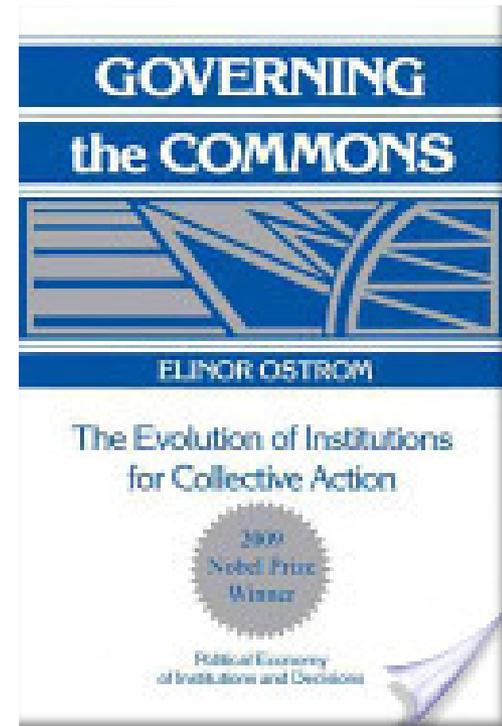


Waste & inefficiency
Inequitable outcomes
Limited population health impact



Challenge: overcoming collective action problems across systems & sectors

- Incentive compatibility → public goods
- Concentrated costs & diffuse benefits
- Time lags: costs vs. improvements
- Uncertainties about what works
- Asymmetry in information
- Difficulties measuring progress
- Weak and variable institutions & infrastructure
- Imbalance: resources vs. needs
- Stability & sustainability of funding



Ostrom E. 1994

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



Questions of interest

- How strong are the delivery systems that support foundational capabilities for population health?
- How do these delivery systems change over time?
Recession | Recovery | ACA implementation
- How do these delivery systems influence health and economic outcomes?

A useful lens for studying multi-sector work

National Longitudinal Survey of Public Health Systems

- Cohort of 360 communities with at least 100,000 residents
- Followed over time: 1998, 2006, 2012, 2014**, 2016
- 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

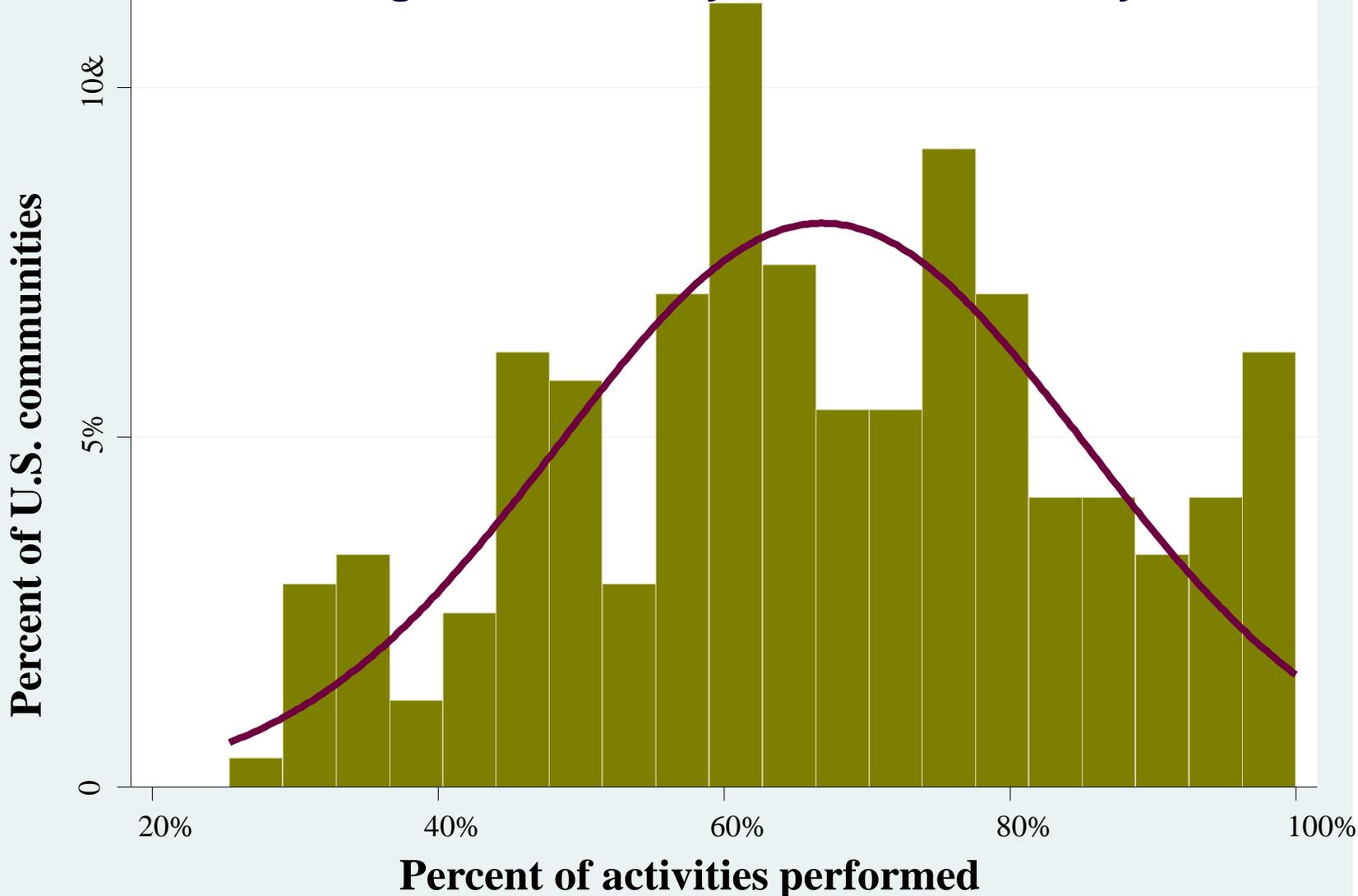
** Expanded sample of 500 communities < 100,000 added in 2014 wave

Data linkages expand analytic possibilities

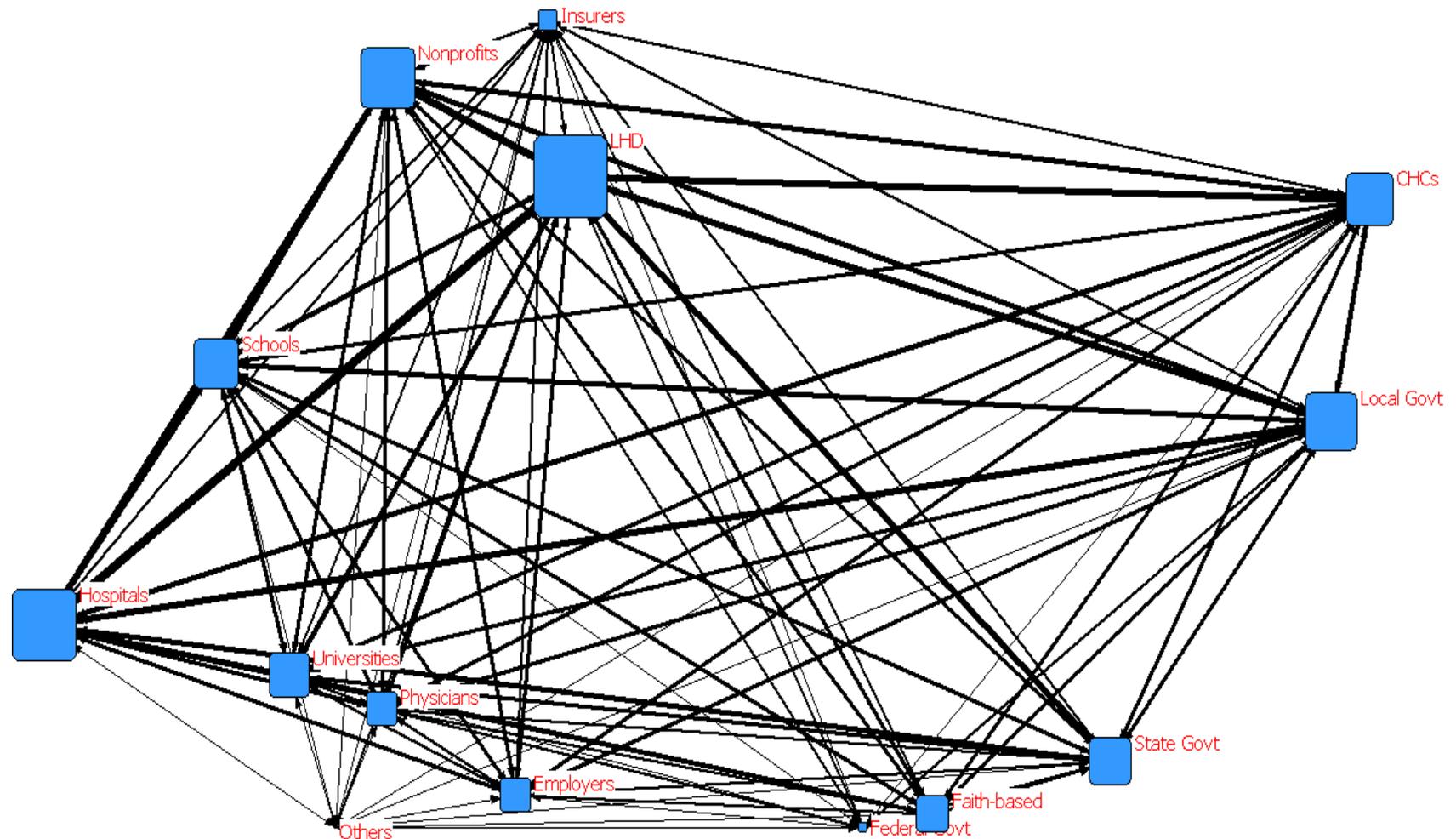
- **Area Health Resource File:** health resources, demographics, socioeconomic status, insurance coverage
- **NACCHO Profile data:** public health agency institutional and financial characteristics
- **CMS Impact File & Cost Report:** hospital ownership, market share, uncompensated care
- **Dartmouth 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

Variation in implementing foundational population health activities

National Longitudinal Survey of Public Health Systems 2016



Mapping who contributes to population health

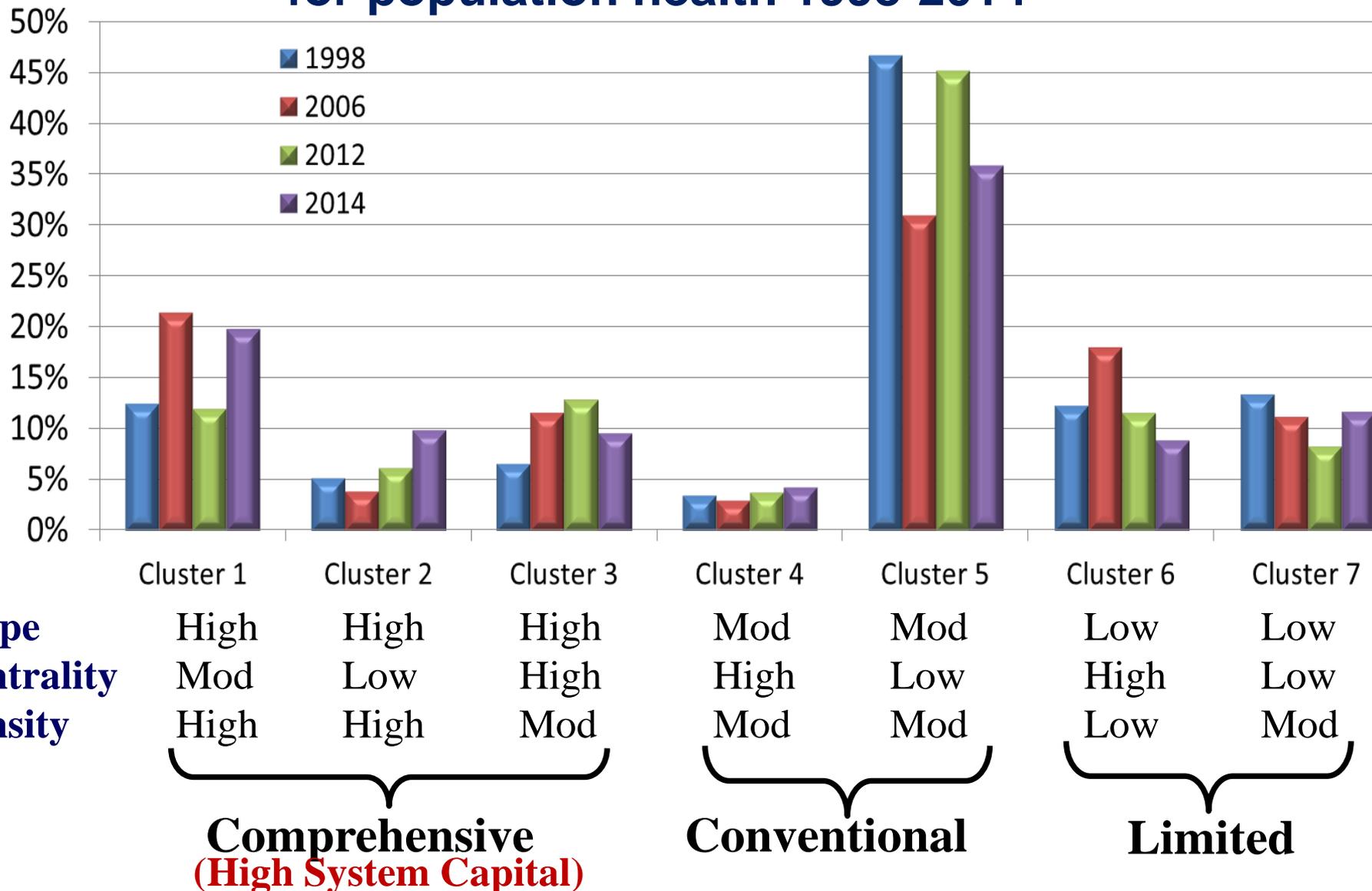


Node size = degree centrality

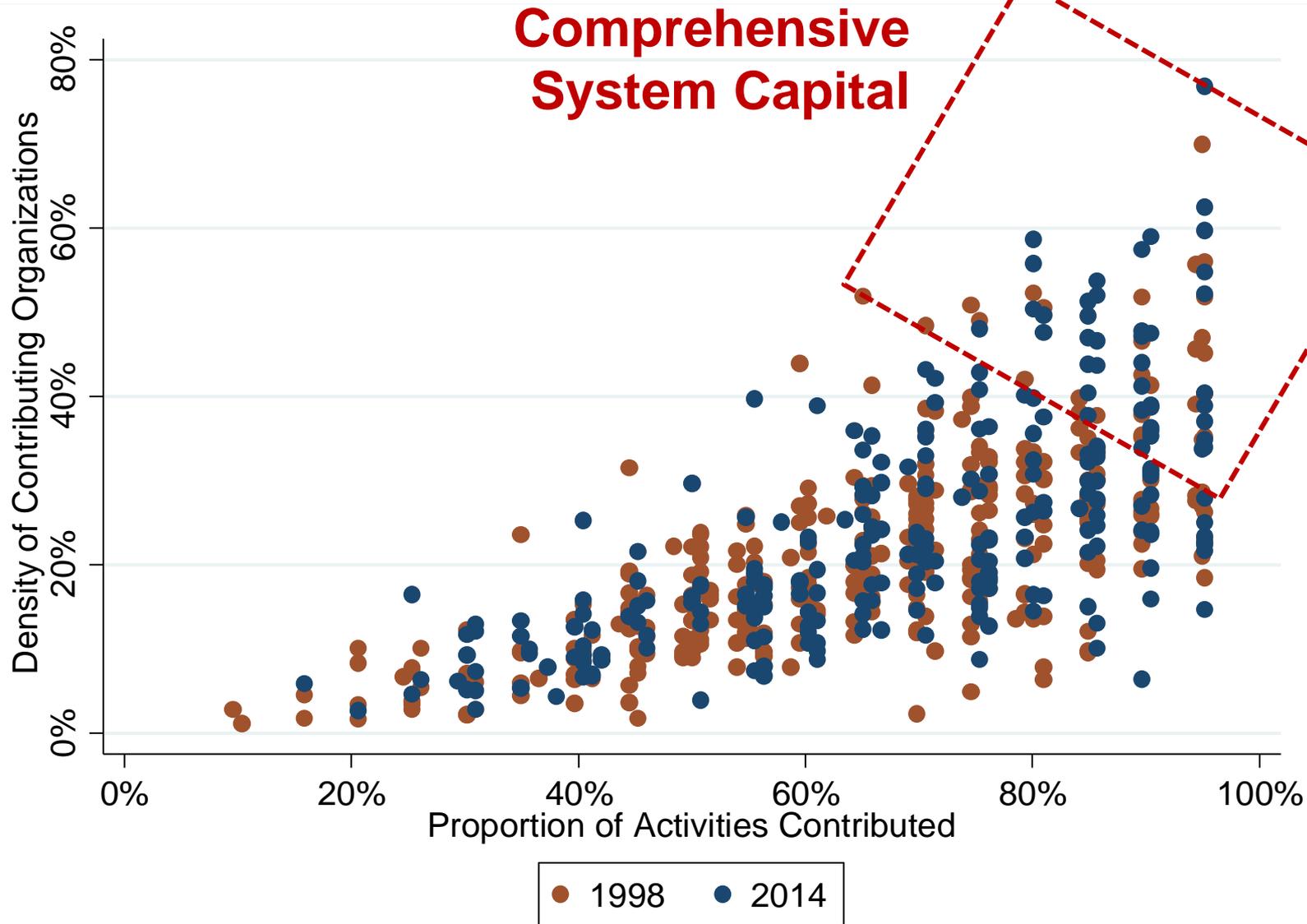
Line size = % activities jointly contributed (tie strength)

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

Classifying multi-sector delivery systems for population health 1998-2014



Network density and scope of activities



Comprehensive System Capital

One of RWJF's Culture of Health National Metrics

- **Broad scope** of population health activities
- **Dense network** of multi-sector relationships
- **Central actors** to coordinate actions

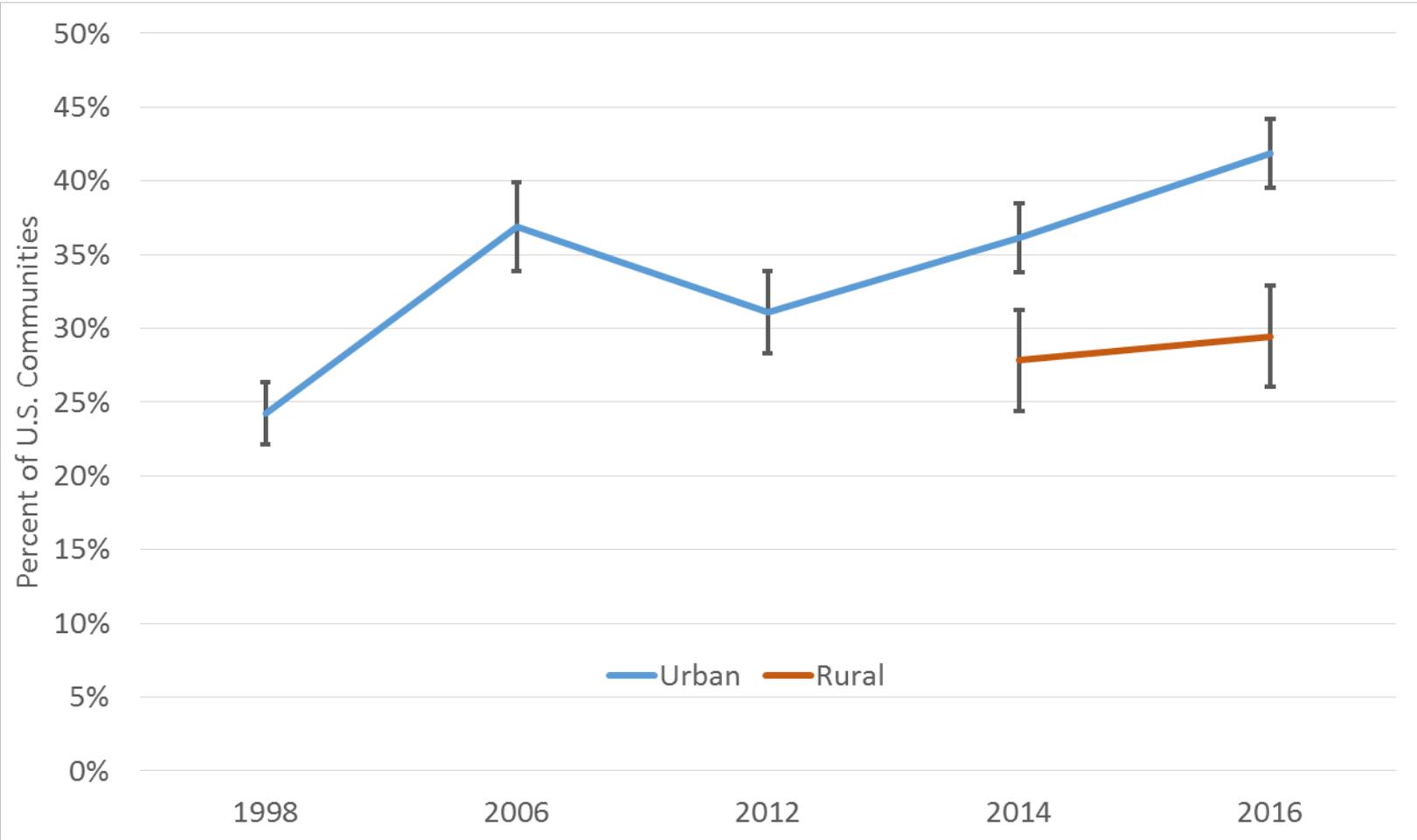
Access to public health

Overall, 47.2 percent of the population is covered by a comprehensive public health system. Individuals are more likely to have access if they are non-White (51.5 percent vs. 45.5 percent White) or live in a metropolitan area (48.7 percent vs. 34.1 percent in nonmetropolitan areas).

47.2%

of population served by a
comprehensive public
health system

Variation and change in comprehensive system capital



Implementation of foundational activities, 1998-2016

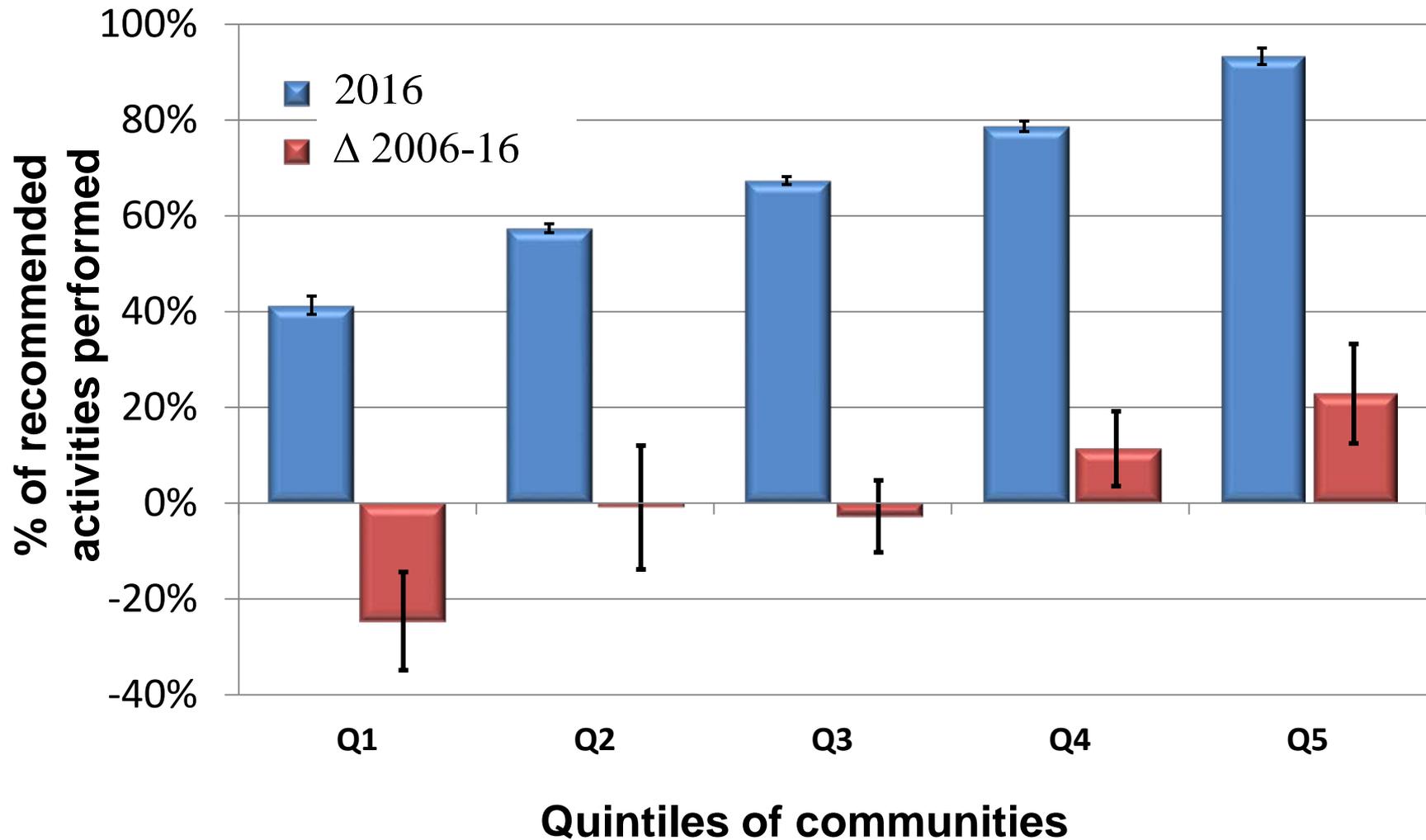
	Activity	1998	2016	% Change	
Assessment	1. Conduct periodic assessment of community health status and needs	71.5%	87.1%	21.8%	
	2. Survey community for behavioral risk factors	45.8%	71.1%	55.2%	
	3. Investigate adverse health events, outbreaks and hazards	98.6%	100.0%	1.4%	
	4. Conduct laboratory testing to identify health hazards and risks	96.3%	96.1%	-0.2%	
	5. Analyze data on community health status and health determinants	61.3%	72.7%	18.6%	
	6. Analyze data on preventive services use	28.4%	39.0%	37.3%	
Policy/Planning	7. Routinely provide community health information to elected officials	80.9%	84.0%	3.8%	
	8. Routinely provide community health information to the public	75.4%	82.3%	9.1%	
	9. Routinely provide community health information to the media	75.2%	89.0%	18.3%	
	10. Prioritize community health needs	66.1%	83.6%	26.5%	
	11. Engage community stakeholders in health improvement planning	41.5%	68.8%	65.7%	
	12. Develop a community-wide health improvement plan	81.9%	87.9%	7.3%	
	13. Allocate resources based on community health plan	26.2%	41.9%	59.9%	
	14. Develop policies to address priorities in community health plan	48.6%	56.8%	16.9%	
	15. Maintain a communication network among health-related organizations	78.8%	85.3%	8.2%	
Assurance	16. Link people to needed health and social services	75.6%	50.0%	-33.8%	
	17. Implement legally mandated public health activities	91.4%	92.4%	1.1%	
	18. Evaluate health programs and services in the community	34.7%	37.9%	9.4%	
	19. Evaluate public health agency capacity and performance	56.3%	56.1%	-0.3%	
	20. Monitor and improve implementation of health programs and policies	47.3%	46.4%	-1.9%	
	Mean performance of assessment activities (#1-6)	67.0%	77.7%	15.9%	
	Mean performance of policy and planning activities (#7-15)	63.9%	75.5%	18.3%	
	Mean performance of implementation and assurance activities (#16-20)	61.1%	56.6%	-7.3%	
	Mean performance of all activities	63.8%	67.6%	6.0%	

Organizational contributions to foundational activities, 1998-2016

% of Recommended Activities Contributed

<u>Type of Organization</u>	<u>1998</u>	<u>2016</u>	<u>Percent Change</u>
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%

Inequities in the implementation of population health activities



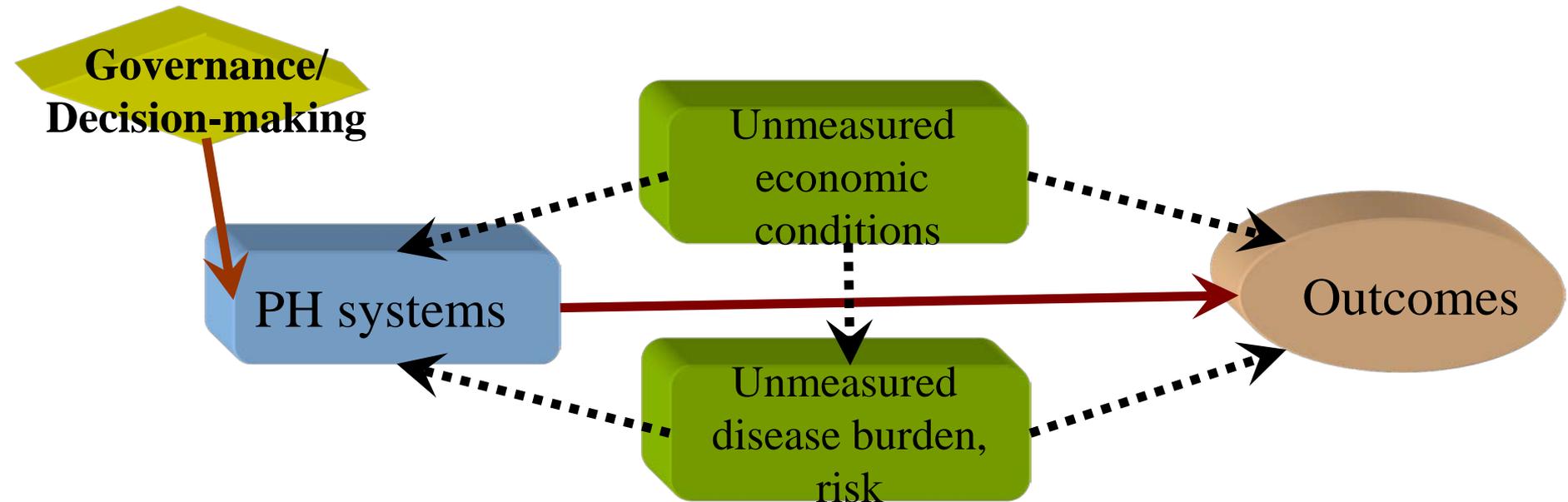
Mays GP, Hogg RA. Economic shocks and public health protections in US metropolitan areas. *Am J Public Health*. 2015;105 Suppl 2:S280-7.

Estimating outcomes attributable to system capital: instrumental variables

- IVs influence treatment choices/exposures but are independent of factors that determine outcomes
- IVs serve as natural randomizers: they approximate RCTs with observational studies
- IVs can be used to estimate causal treatment effects while accounting for both observed and hidden confounding and selection bias

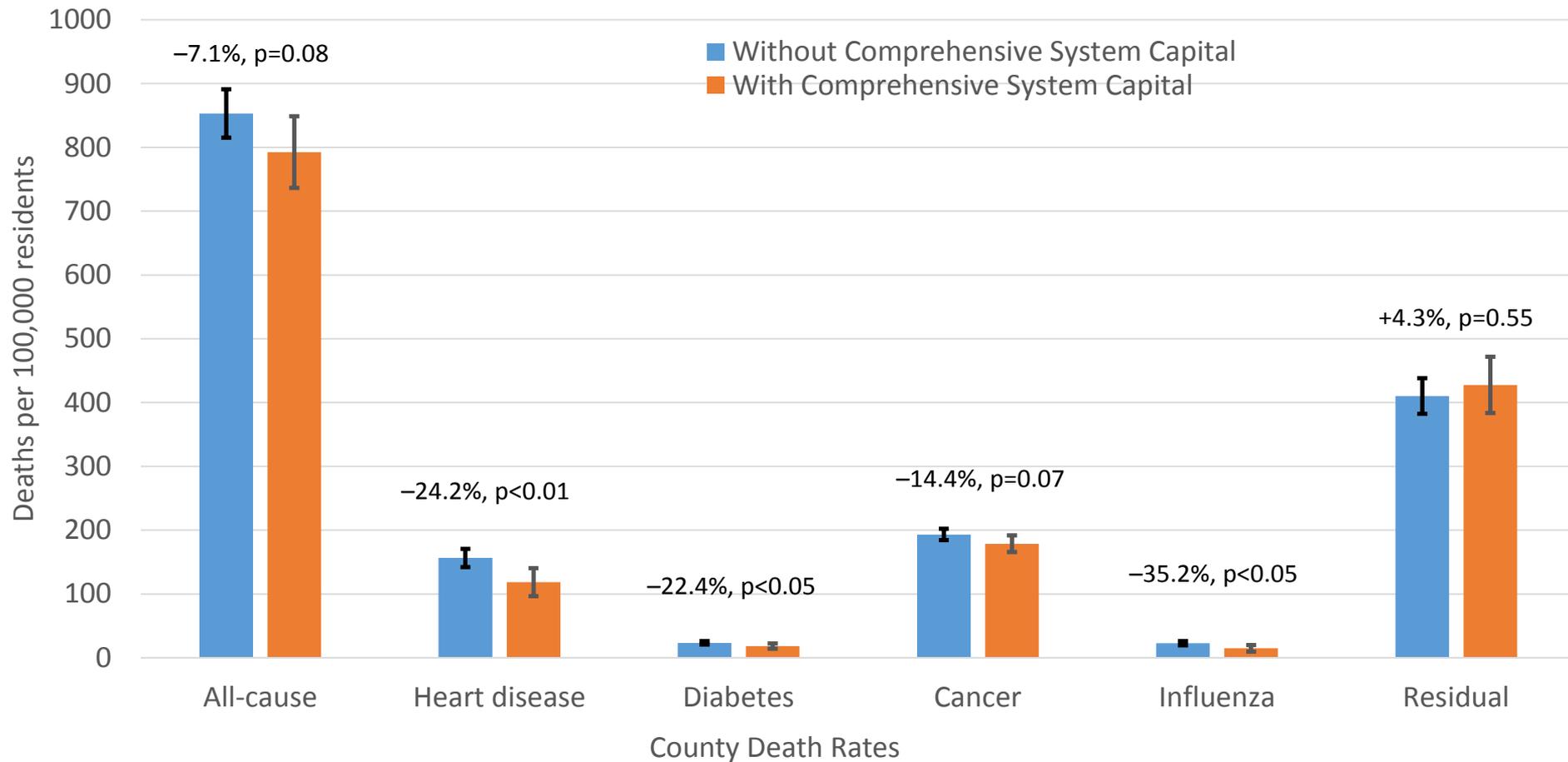
Analytical approach: IV estimation

- ◆ Identify exogenous sources of variation in system strength that are unrelated to outcomes
 - Governance structures: local boards of health
 - Decision-making authority: agency, board, local, state
- ◆ Controls for unmeasured factors that jointly influence systems and outcomes



Health effects attributable to system capital

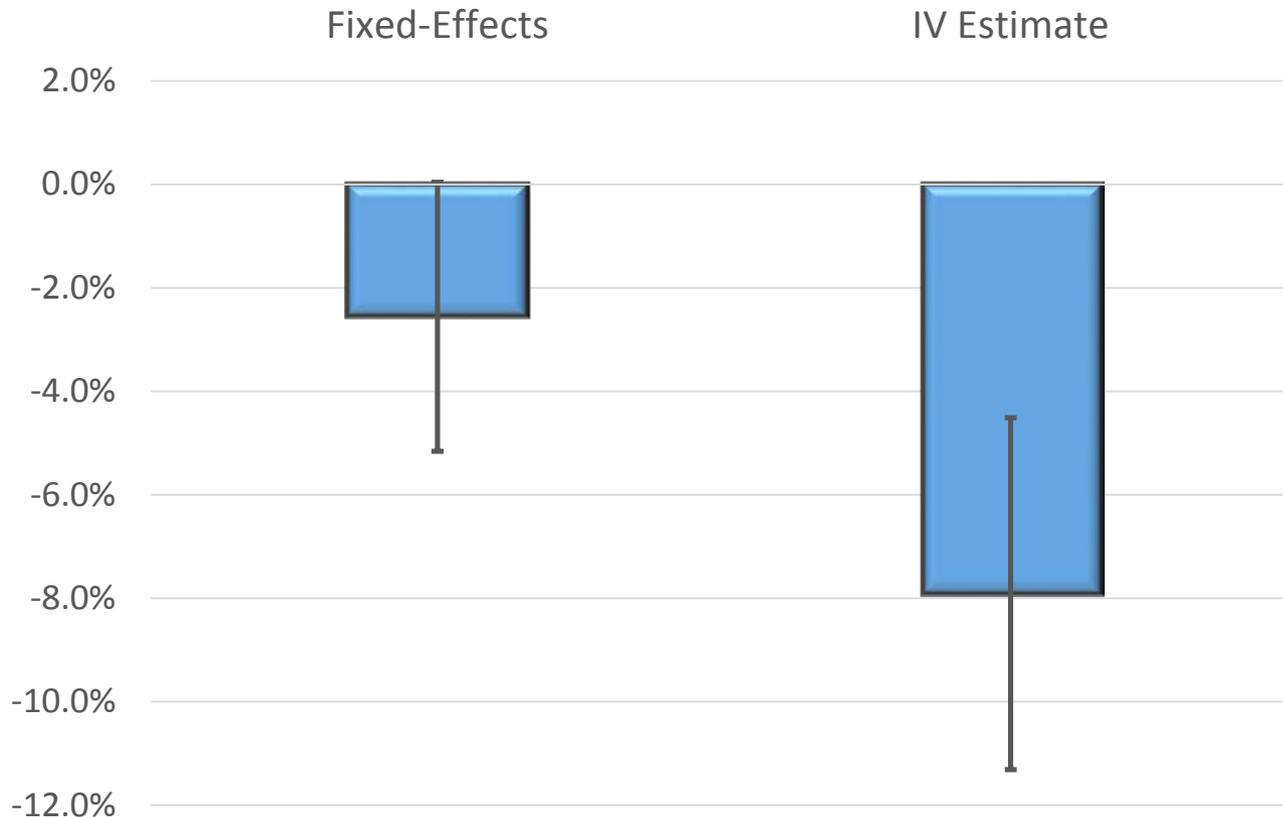
Impact of Comprehensive Systems on **Mortality**, 1998-2014



Fixed-effects instrumental variables estimates controlling for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. N=1019 community-years

Economic effects attributable to system capital

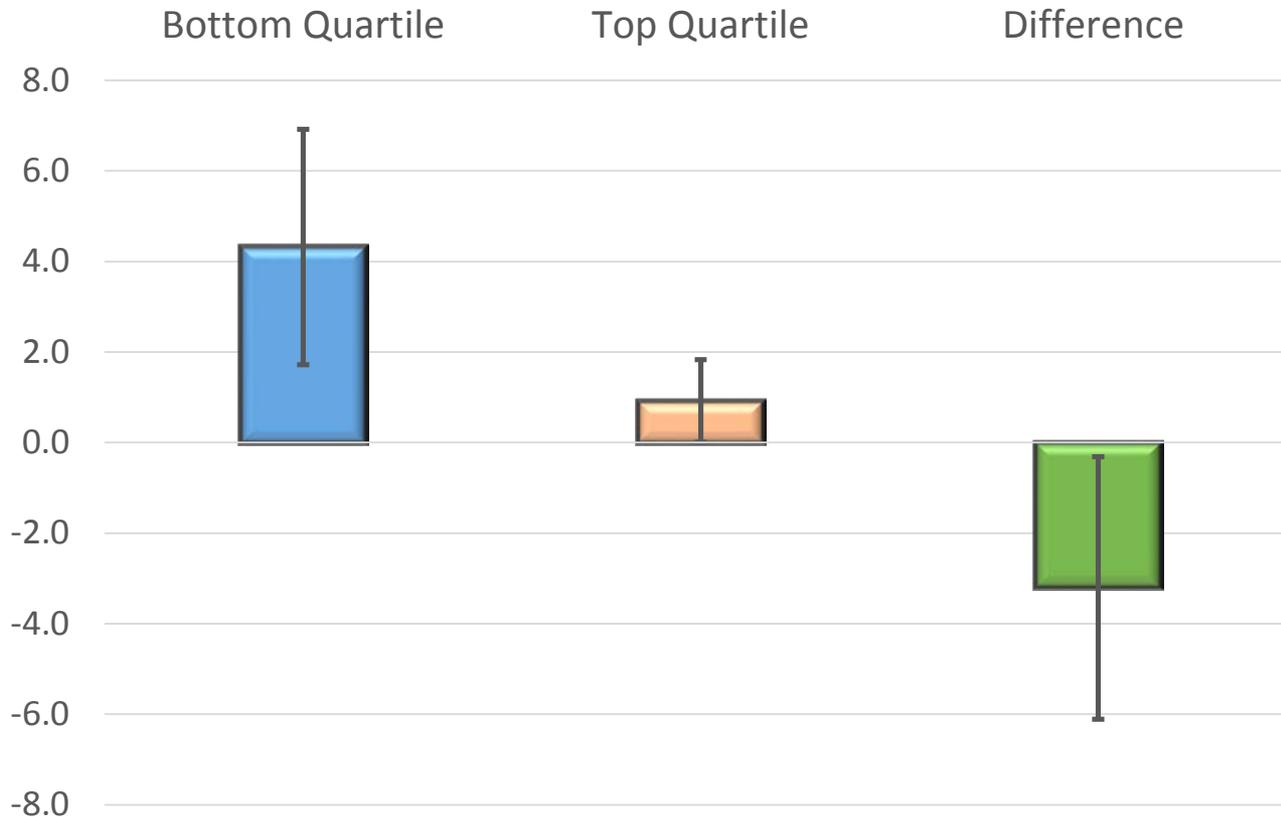
Impact of Comprehensive Systems on **Medical Spending** (Medicare) 1998-2014



Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. N=1019 community-years. Vertical lines are 95% confidence intervals

Economic effects attributable to system capital

Impact of Comprehensive Systems 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. N=1019 community-years. Vertical lines are 95% confidence intervals

Conclusions and implications

- Large health gains in places with strong system capital
- Larger gains for low-income populations & communities
- Comprehensive systems do more than just plan: prioritize, invest, evaluate, repeat (crowd-sourcing)
- Equity and opportunity: two-thirds of communities currently lack comprehensive system capital
- ACA incentives and resources may help:
 - Hospital community benefit
 - Value-based health care payments
 - Insurer and employer incentives
- Sustainability and resiliency are not automatic

Finding the connections



- Act on aligned incentives
- Exploit the disruptive policy environment
- Innovate, prototype, study – then scale
- Pay careful attention to shared governance, decision-making, and financing structures
- Demonstrate value and accountability to communities

New research program focuses on delivery and financing system alignment

A Robert Wood Johnson Foundation program

Systems for Action

Systems and Services Research to Build a Culture of Health



Research Agenda

*Delivery and Financing System Innovations
for a Culture of Health*

September 2015

<http://www.systemsforaction.org>

Systems for Action

Systems and Services Research to Build a Culture of Health

Collaborating Research Centers

- ***University of Chicago:*** Randomized trial of a Comprehensive Care, Community and Culture program
- ***Arizona State University:*** Analysis of medical, mental health, and criminal justice system interactions for persons with behavioral health disorders
- ***IUPUI:*** Evaluating integration and decision support strategies for a community-based safety net health care and public health system
- ***University of Kentucky:*** Measuring multi-sector contributions to public health services and population health outcomes.

Systems for Action

Systems and Services Research to Build a Culture of Health

Individual Research Projects

- ***Michigan State University:*** Randomized trial of community complex care response teams to improve geriatric public health outcomes
- ***Los Angeles Department of Health:*** Housing for Health: estimating cross-sector impacts of providing permanent supportive housing to homeless high utilizers of health care services
- ***University of Delaware:*** Randomized trial of a multi-agency health and human services team for Delaware's Probation Population
- ***Drexel University:*** Impact of Integrating Behavioral Health with Temporary Assistance for Needy Families to Build a Culture of Health across Two-Generations

For More Information

Systems for Action

National Coordinating Center

Systems and Services Research to Build a Culture of Health

Supported by The Robert Wood Johnson Foundation

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