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Evolution in Public Health Systems and their Contributions to Population Health

Glen P. Mays, *University of Kentucky*



Available at: https://works.bepress.com/glen_mays/301/

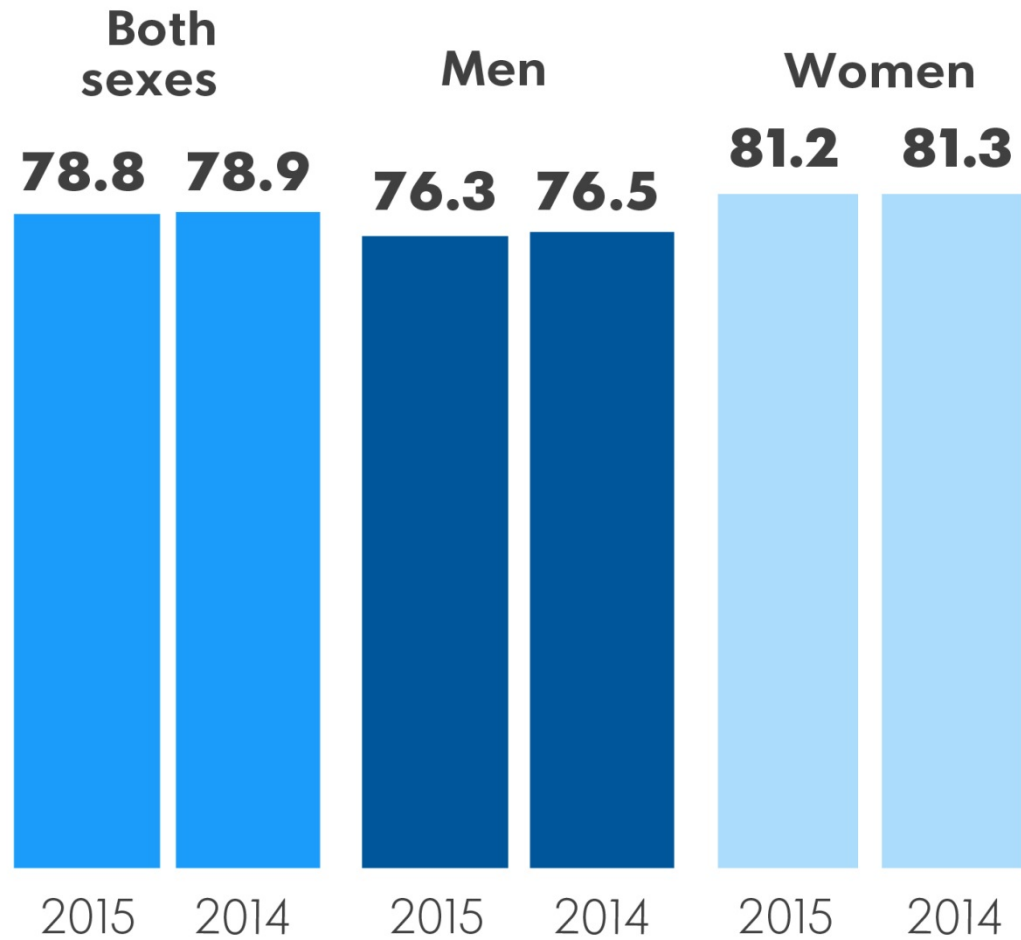
Evolution in Public Health Systems and their Contributions to Population Health

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publichealtheconomics.org

Ripped from the headlines

U.S. LIFE EXPECTANCY FALLS

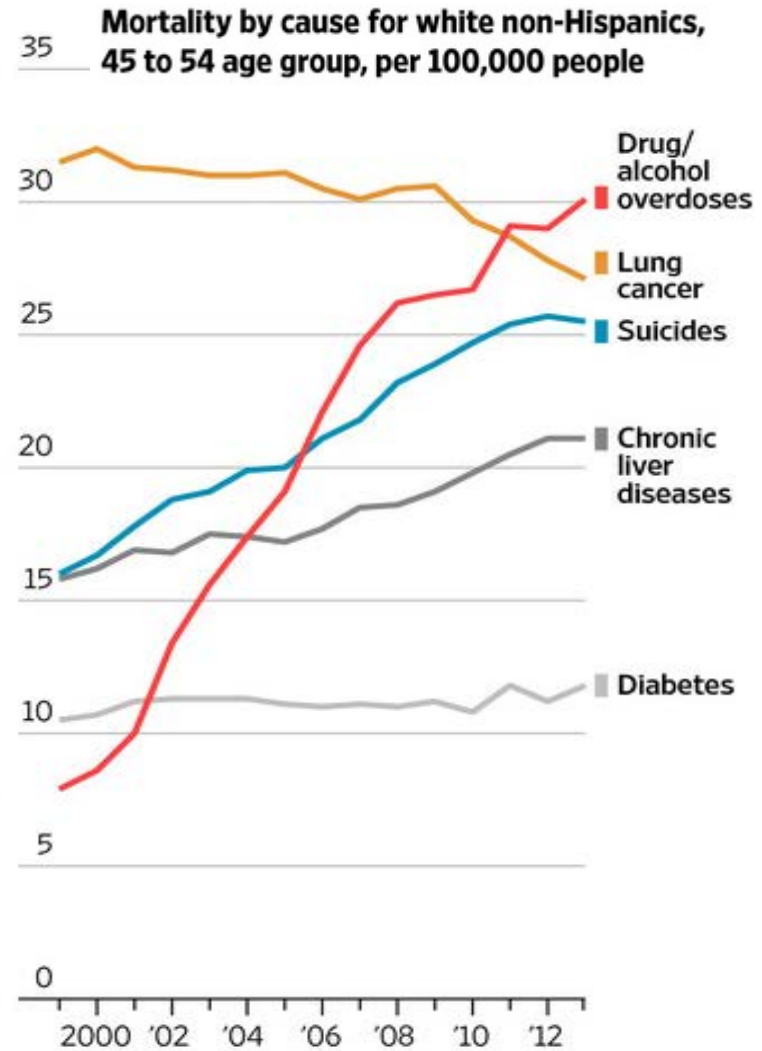
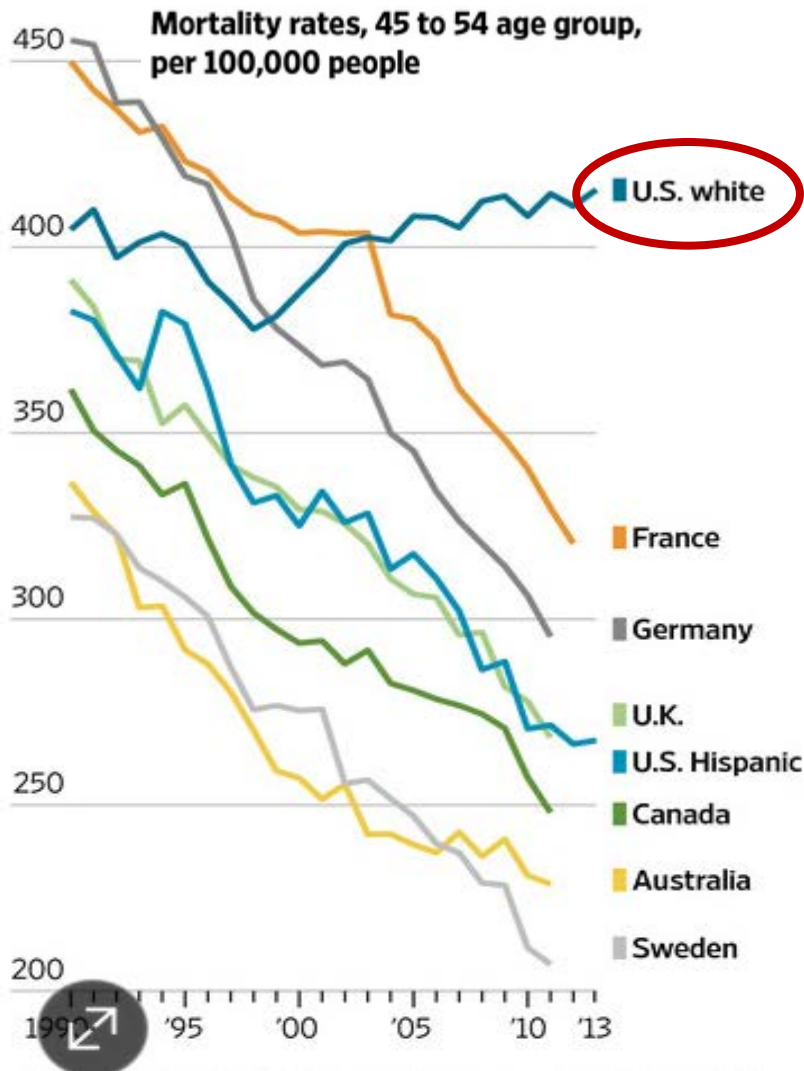


SOURCE CDC

Jim Sergent, USA TODAY



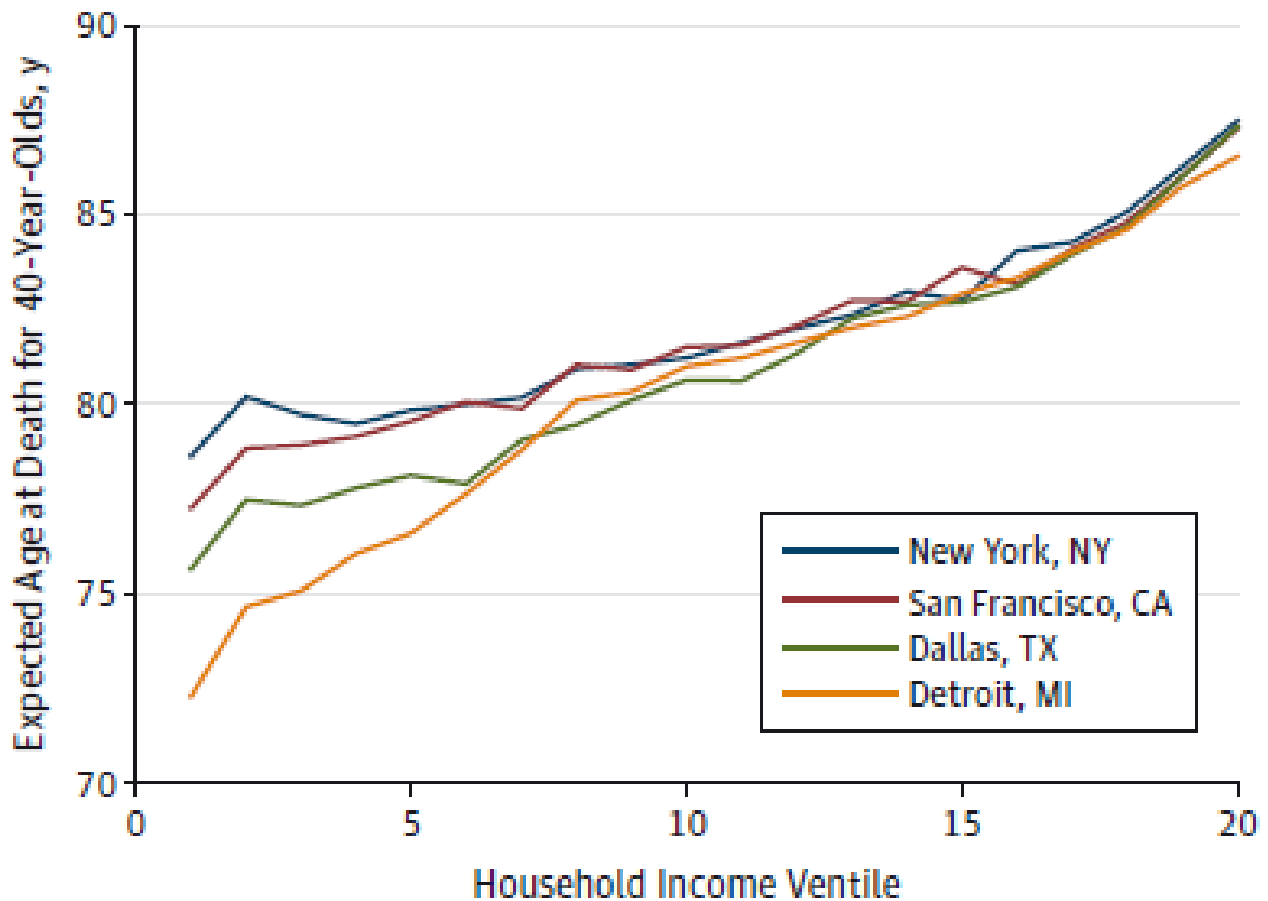
Losing ground in population health



Case A, Deaton A. Proceedings of the National Academy of Sciences 2015

But poor health is not uniformly poor among the poor

Men



Mean household income
in thousands, \$^a

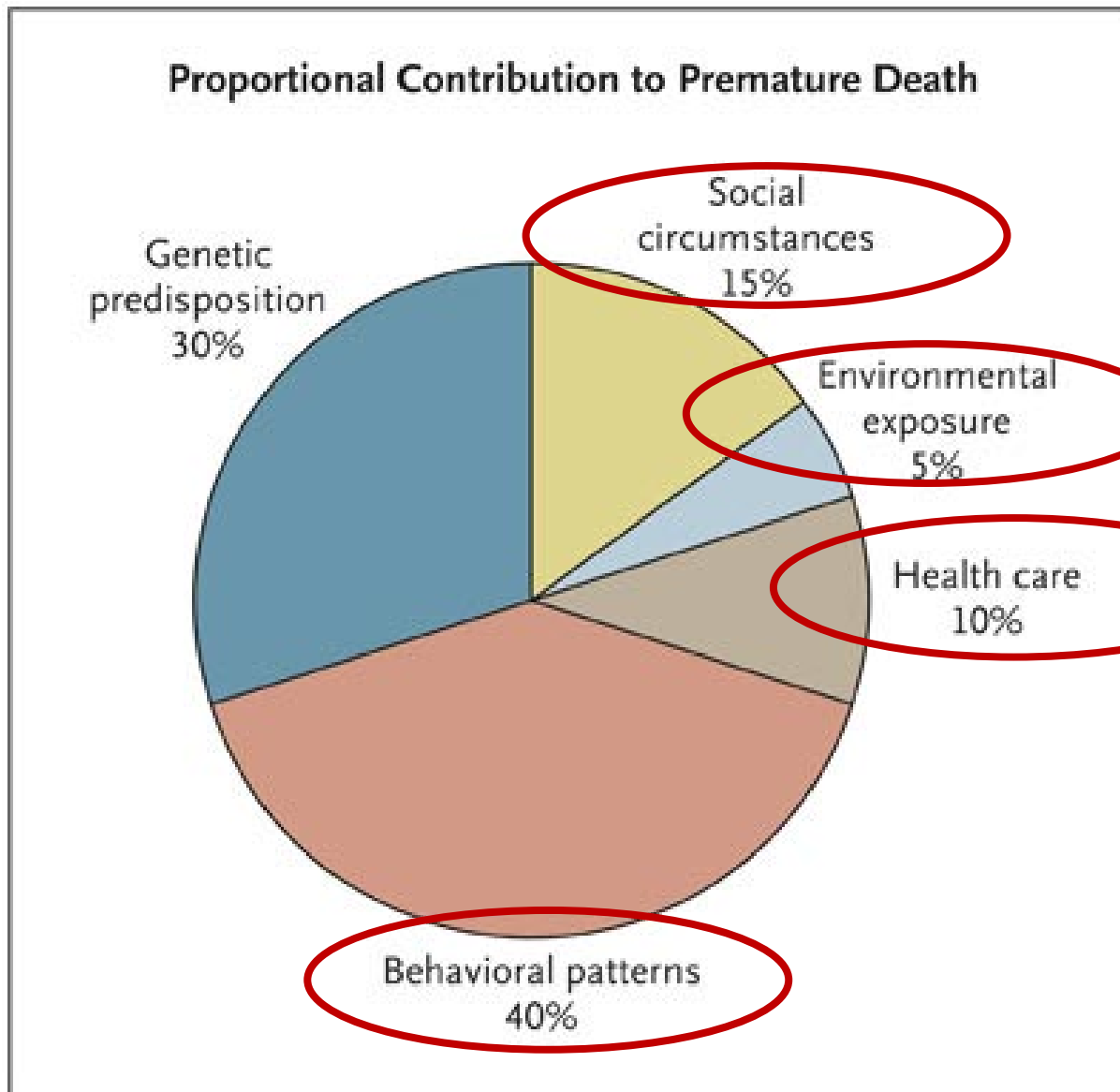
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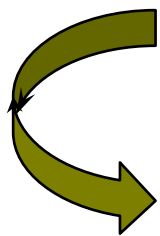
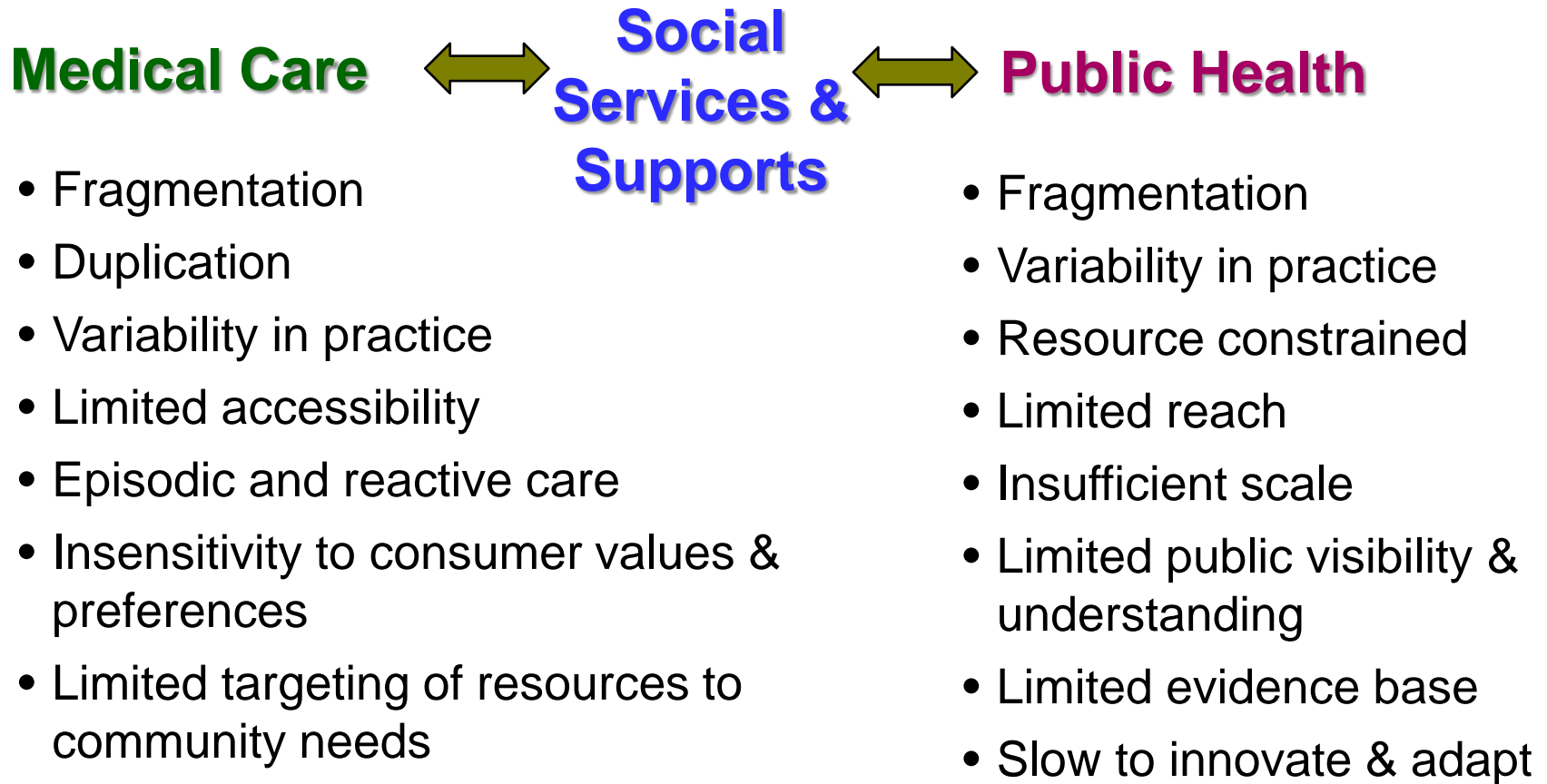
101

683

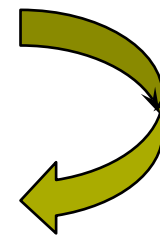
Multiple systems & sectors drive health...



...But existing systems often fail to connect

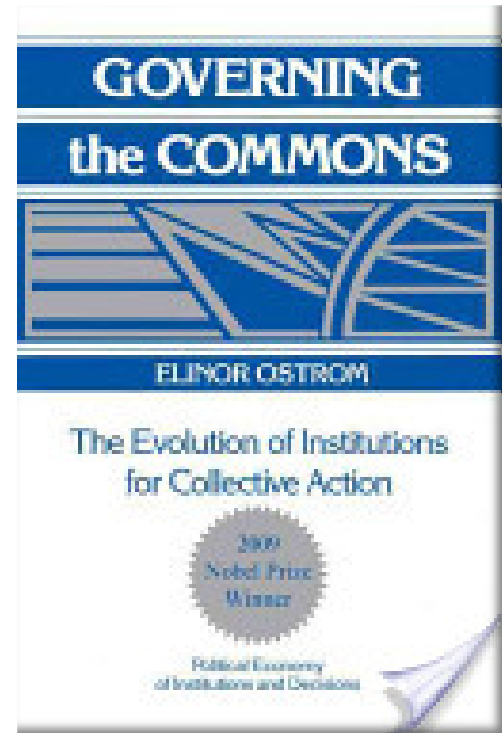


Waste & inefficiency
Inequitable outcomes
Limited population health impact



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

How do we support effective population health improvement strategies?

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

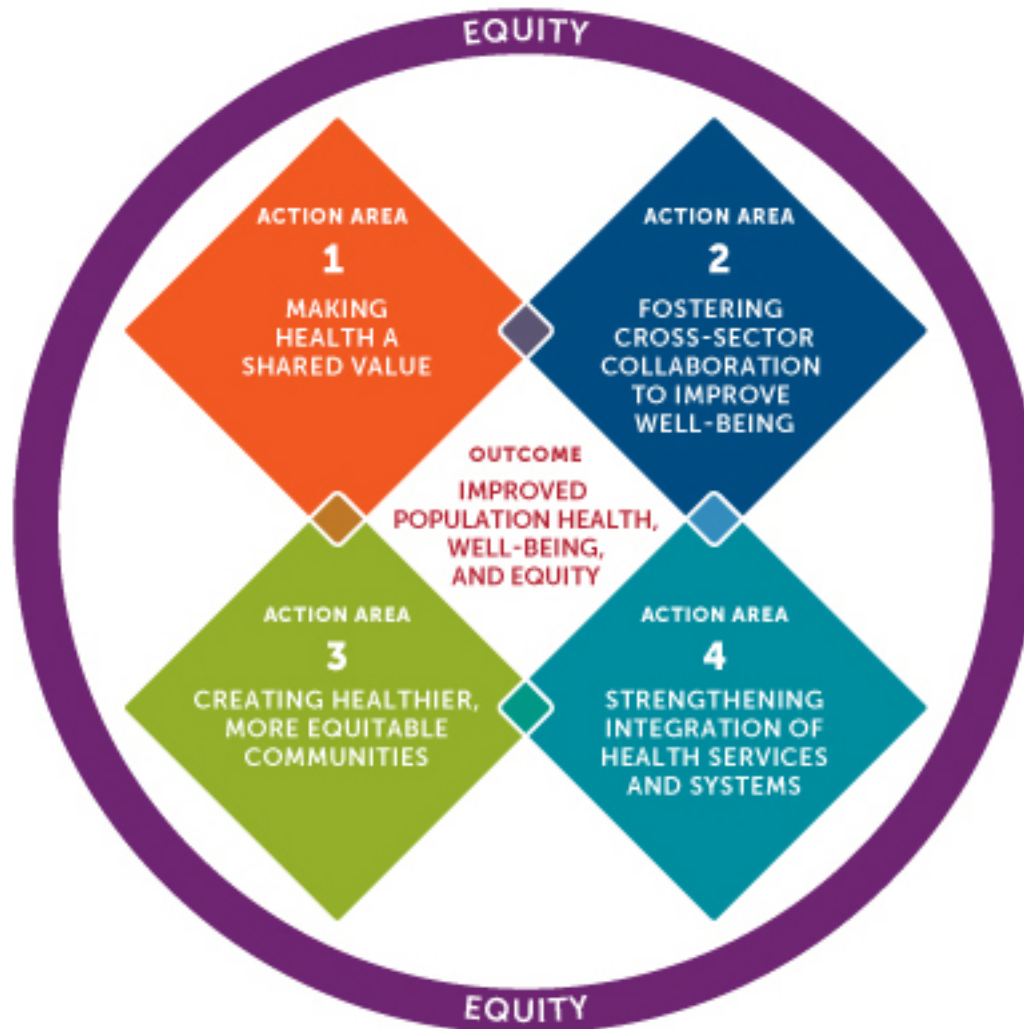
Mays GP. Governmental public health and the economics of adaptation to population health strategies. *National Academy of Medicine Discussion Paper*. 2014.

<http://nam.edu/wp-content/uploads/2015/06/EconomicsOfAdaptation.pdf>

Public health provides the catalytic functions to fuel multi-sector actions in health



Guided by Culture of Health Action Framework



http://www.rwjf.org/en/culture-of-health/2015/11/measuring_what_matter.html

Comprehensive Public Health Systems

One of RWJF's Culture of Health National Metrics

- Implement a ***broad scope*** of population health activities
- Through ***dense networks*** of multi-sector relationships
- Including ***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

What do we know about multi-sector work in population health?

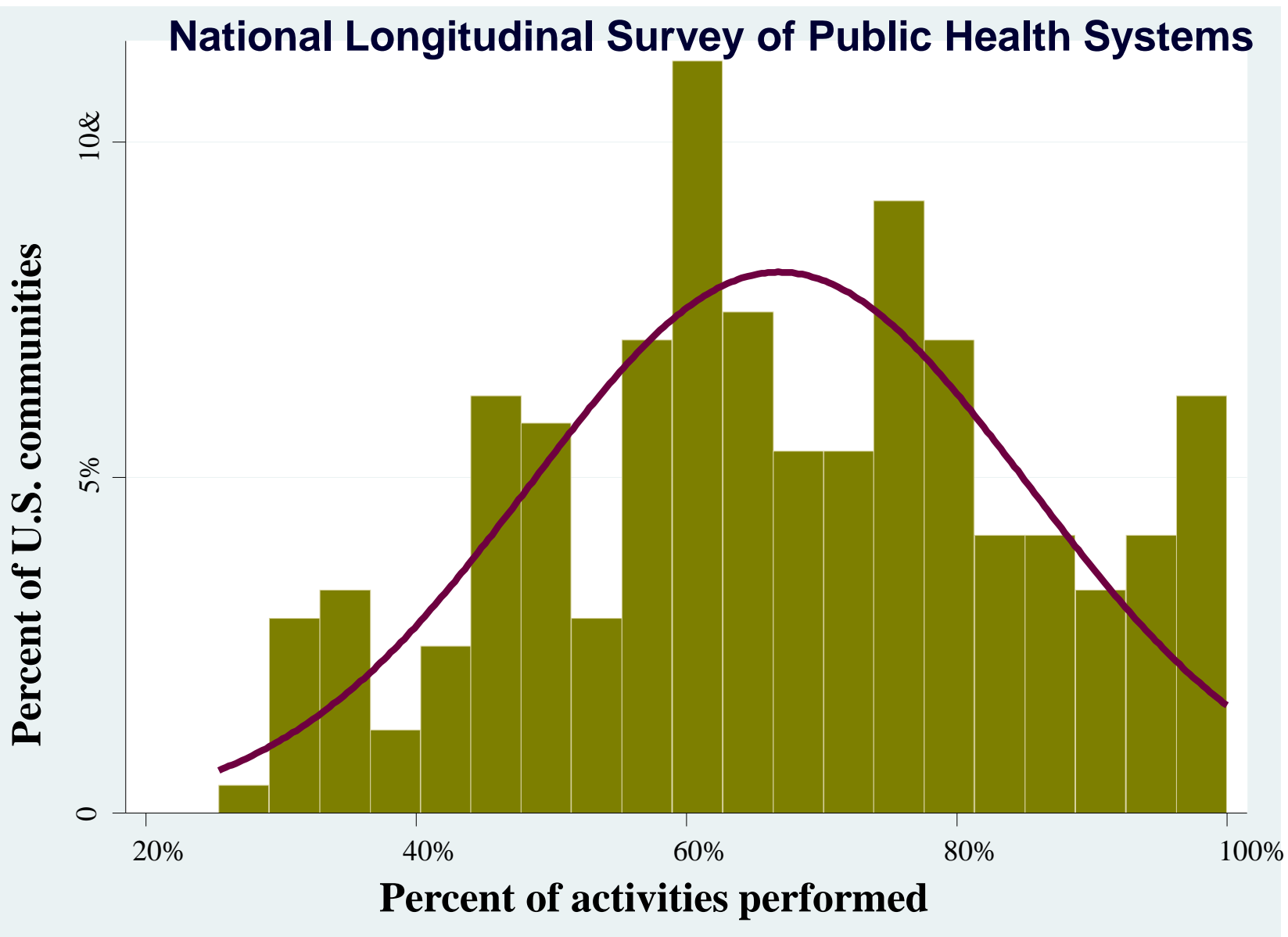
National Longitudinal Survey of Public Health Systems

- 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**: organizations contributing to each activity
 - **Centrality of effort**: contributed by governmental public health agency
 - **Quality**: perceived effectiveness of each activity

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

Variation in implementing foundational public health activities

National Longitudinal Survey of Public Health Systems



Implementation of public health activities, 1998-2014

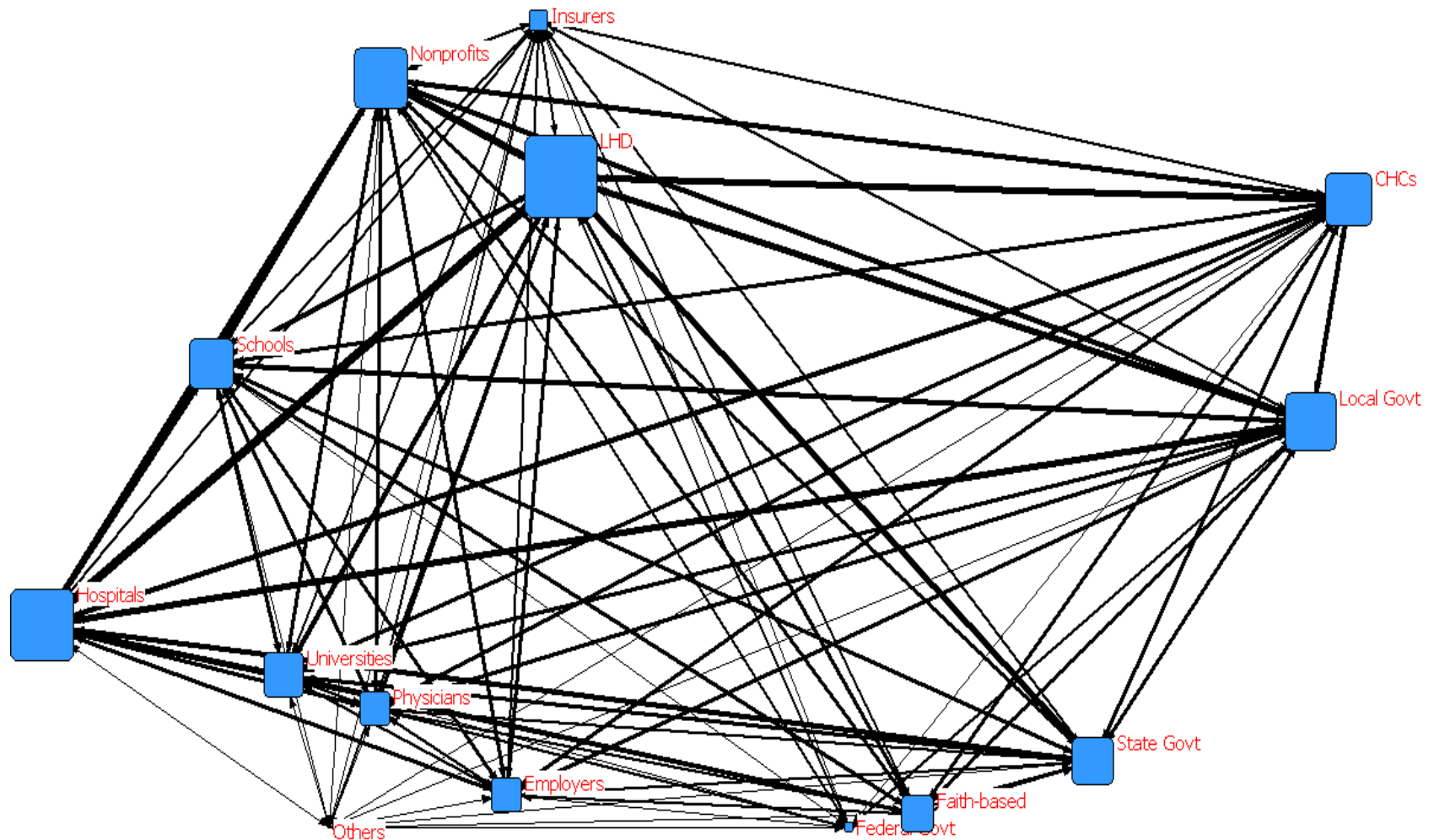
	Activity	1998	2014	% Change
Assessment	1. Conduct periodic assessment of community health status and needs	71.5%	87.1%	21.8%
	2. Survey community for behavioral risk factors	45.8%	71.1%	55.2%
	3. Investigate adverse health events, outbreaks and hazards	98.6%	100.0%	1.4%
	4. Conduct laboratory testing 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. Identify and 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 local 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 public health activities, 1998-2014

% of Recommended Activities Implemented

<u>Type of Organization</u>	<u>1998</u>	<u>2014</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%

Mapping who contributes to public health

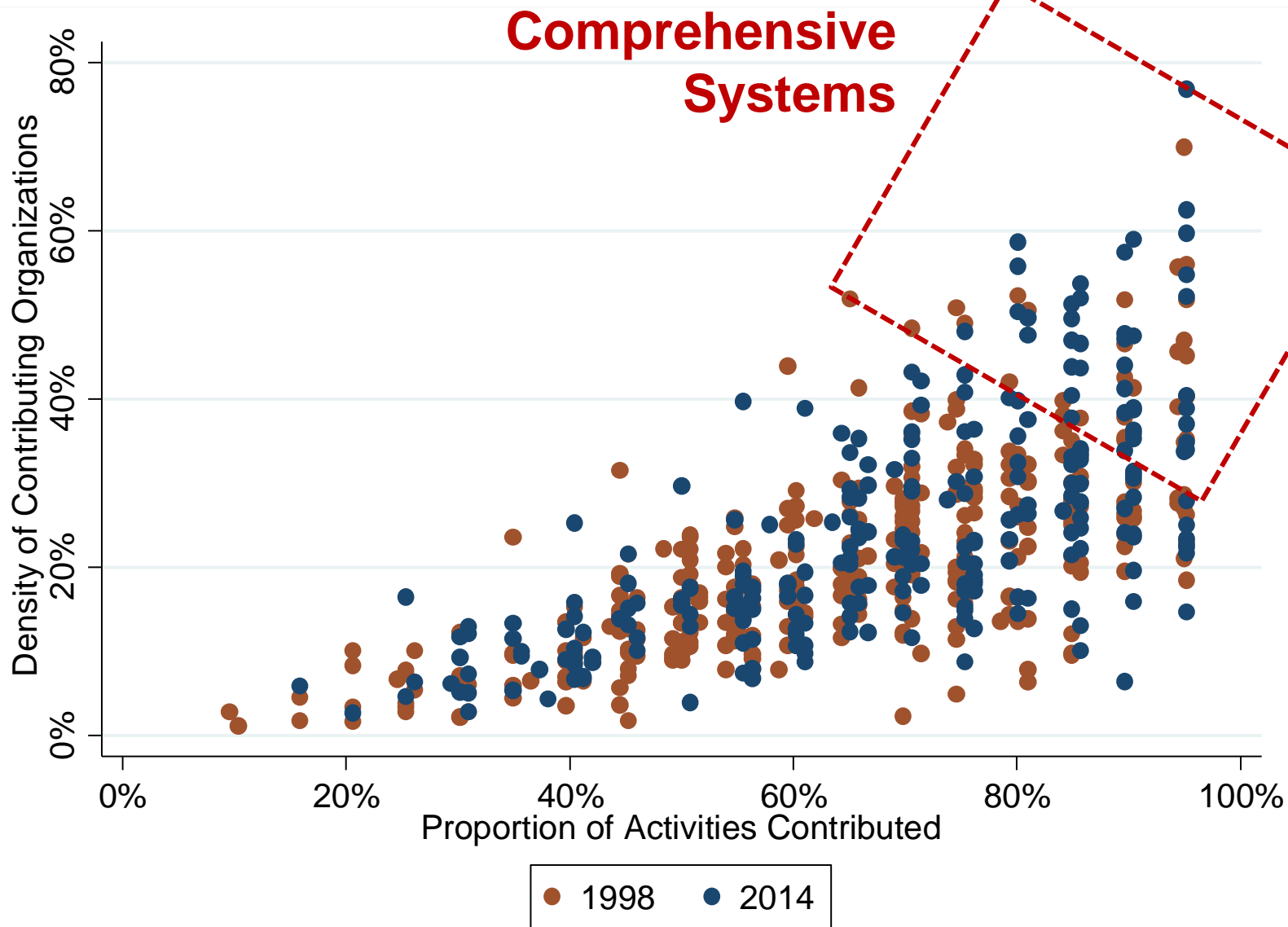


Node size = degree centrality

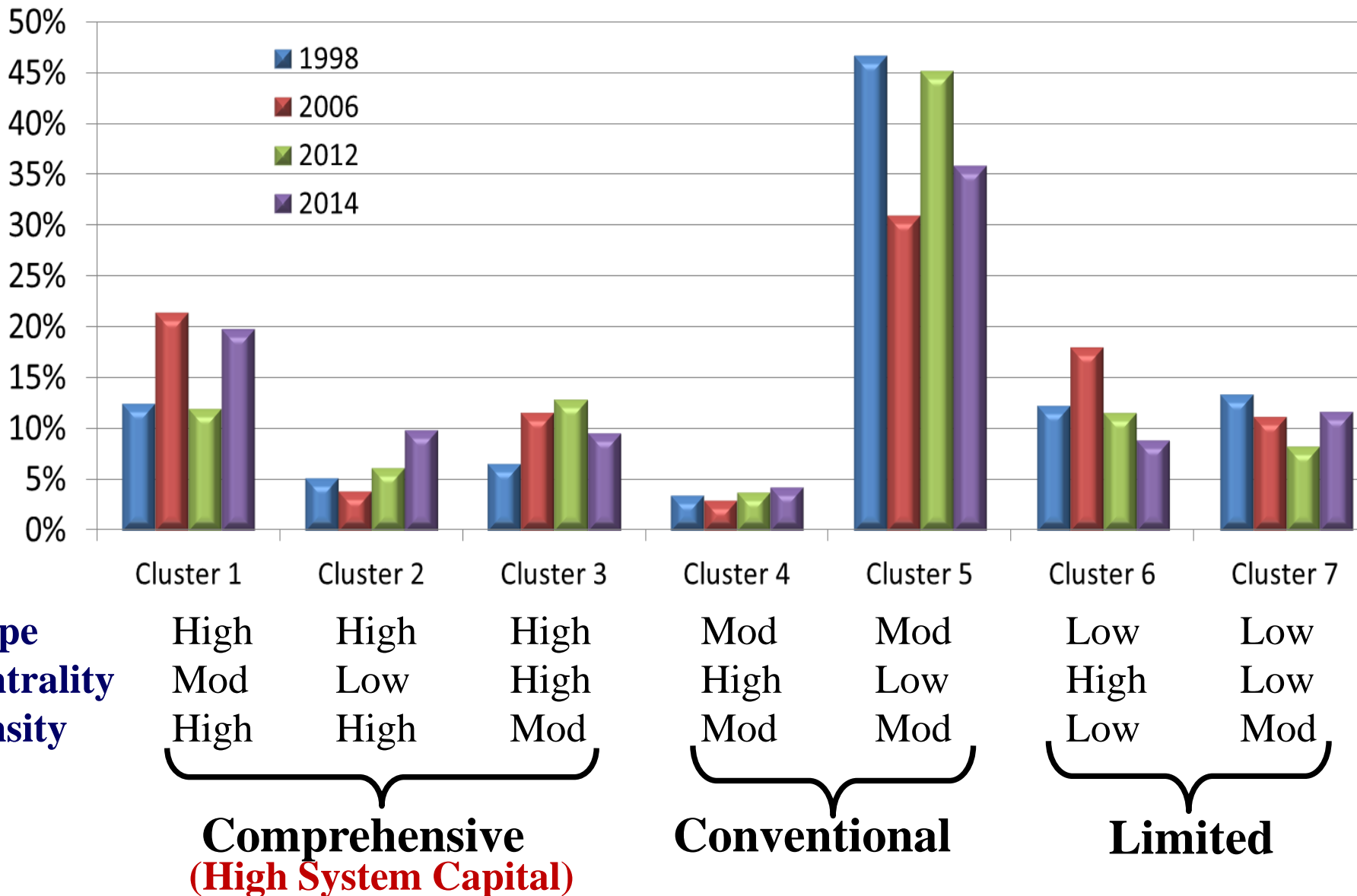
Line size = % activities jointly contributed (tie strength)

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

Network density and scope of activities



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



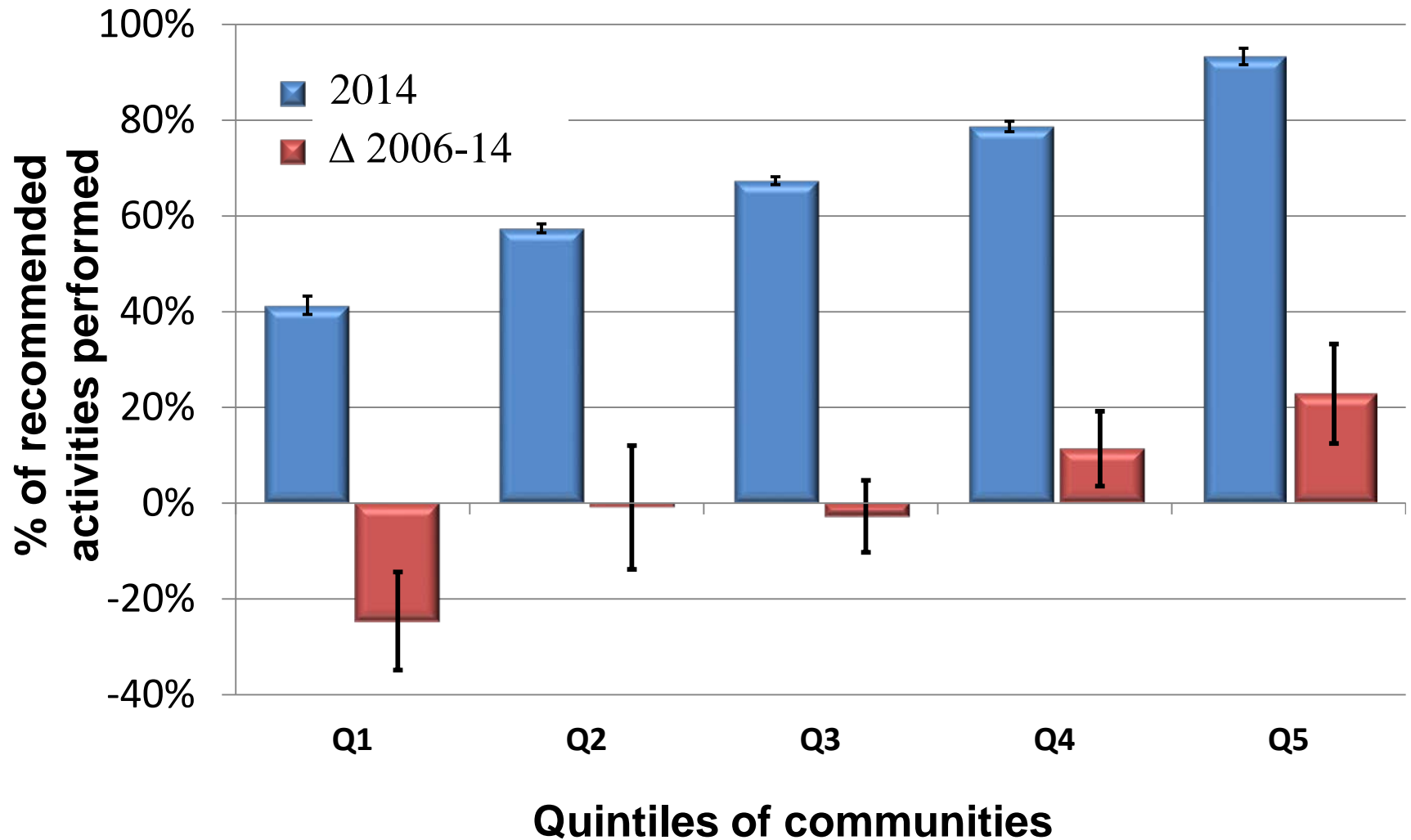
Changes in system prevalence and coverage

System Capital Measures	1998	2006	2012	2014	2014 (<100k)
Comprehensive systems					
% of communities	24.2%	36.9%	31.1%	32.7%	25.7%
% of population	25.0%	50.8%	47.7%	47.2%	36.6%
Conventional systems					
% of communities	50.1%	33.9%	49.0%	40.1%	57.6%
% of population	46.9%	25.8%	36.3%	32.5%	47.3%
Limited systems					
% of communities	25.6%	29.2%	19.9%	20.6%	16.7%
% of population	28.1%	23.4%	16.0%	19.6%	16.1%

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

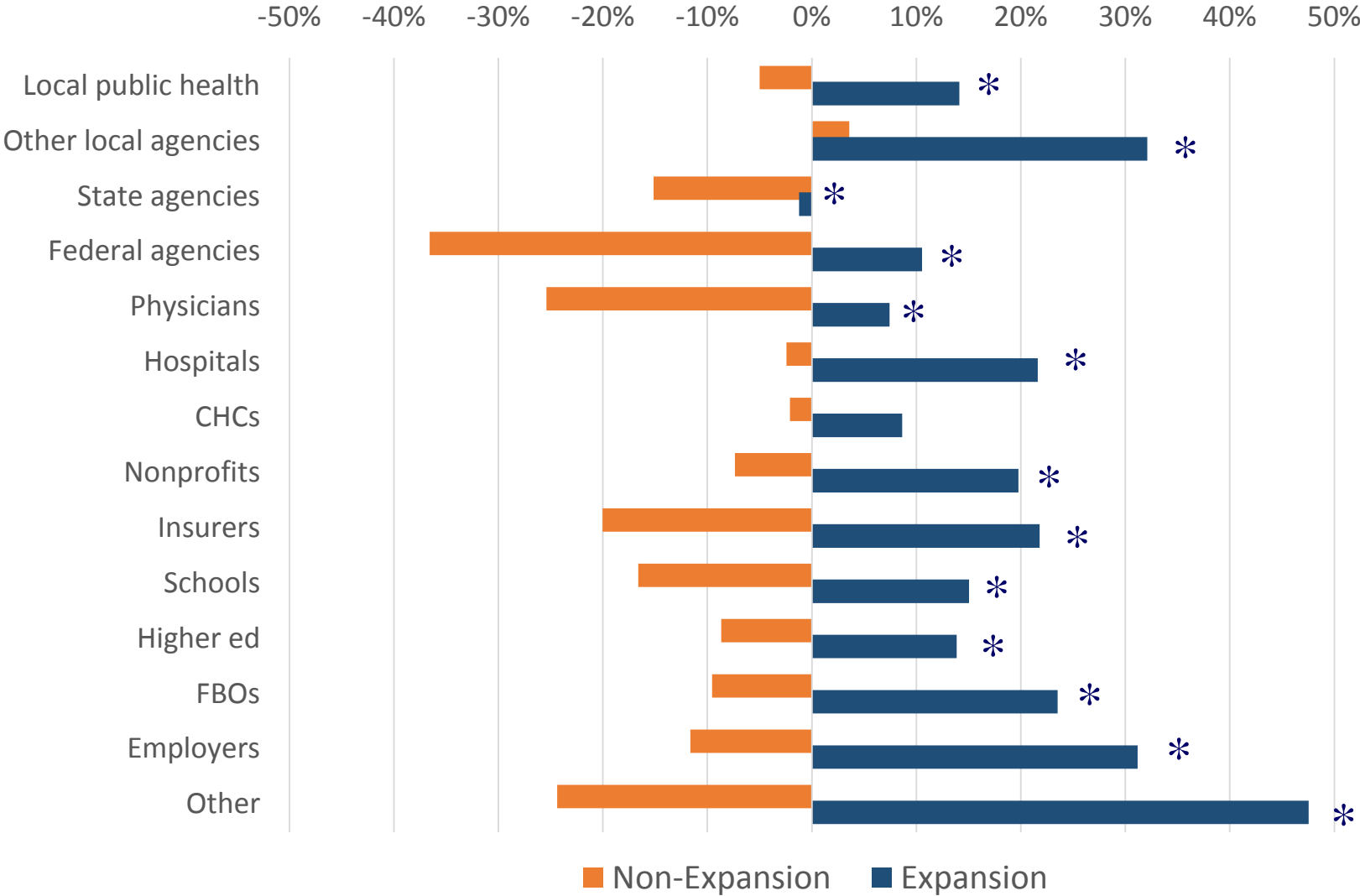
Equity in public health delivery systems

Delivery of recommended 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.

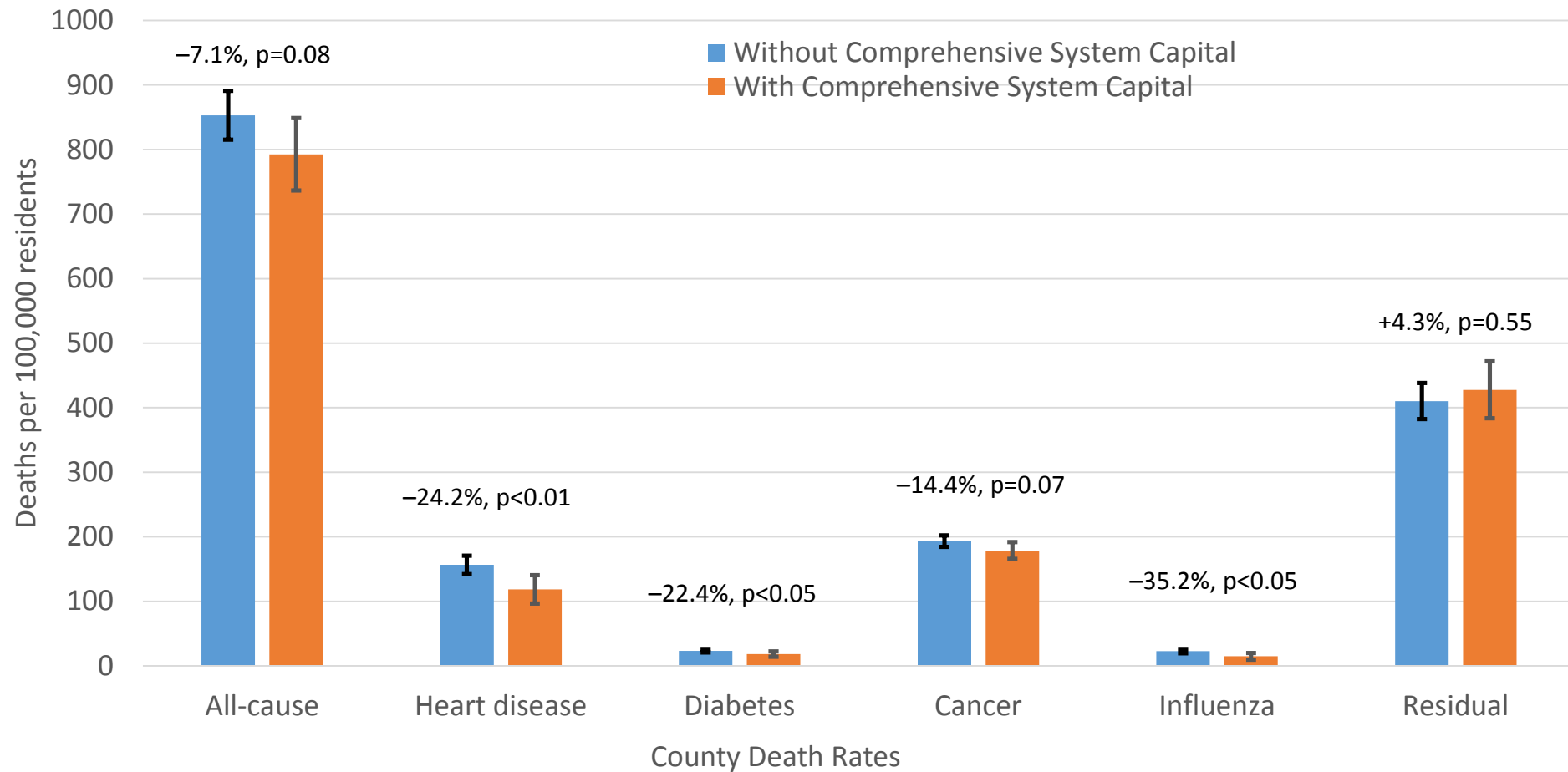
Changes in organizational centrality by ACA Medicaid expansion status, 2012-2014



*p<0.05

Health effects attributable to multi-sector work

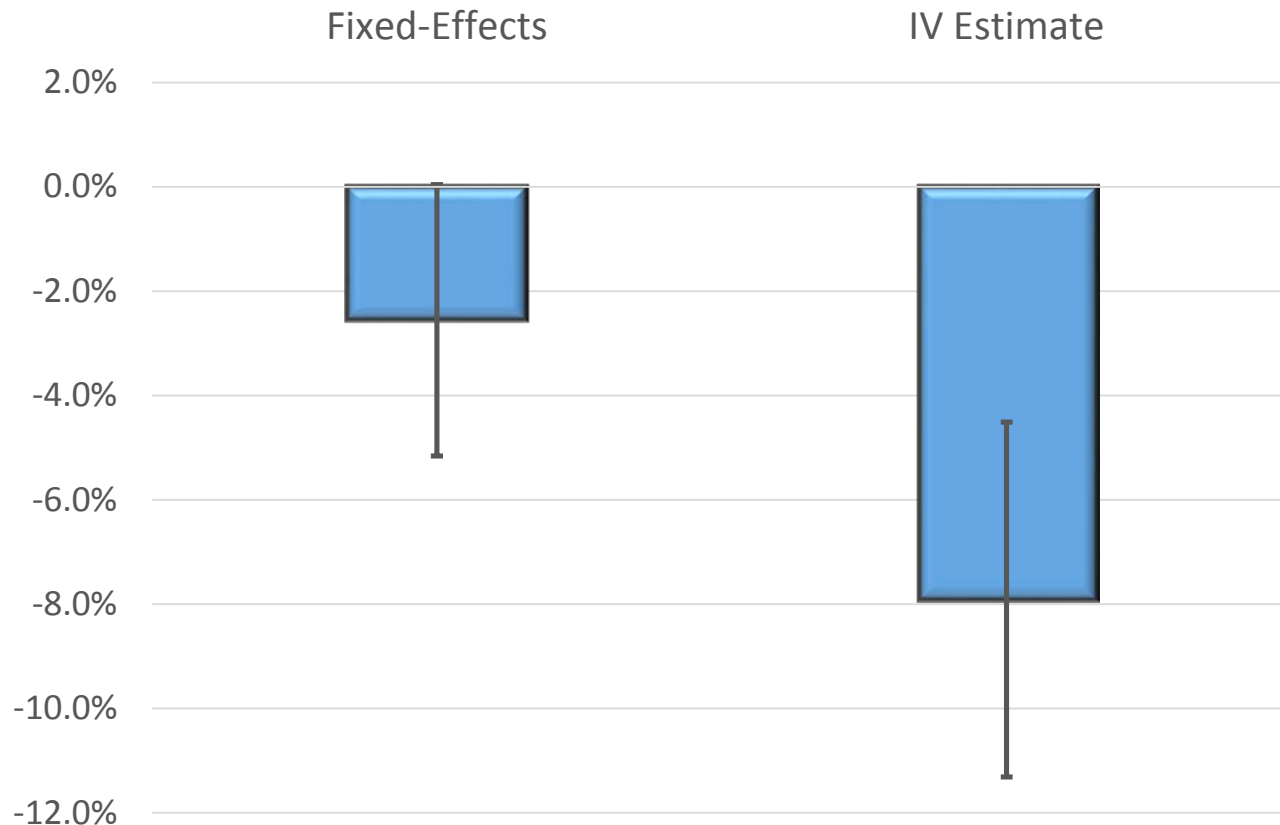
Impact of Comprehensive Systems on **Mortality**, 1998-2014



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 multi-sector work

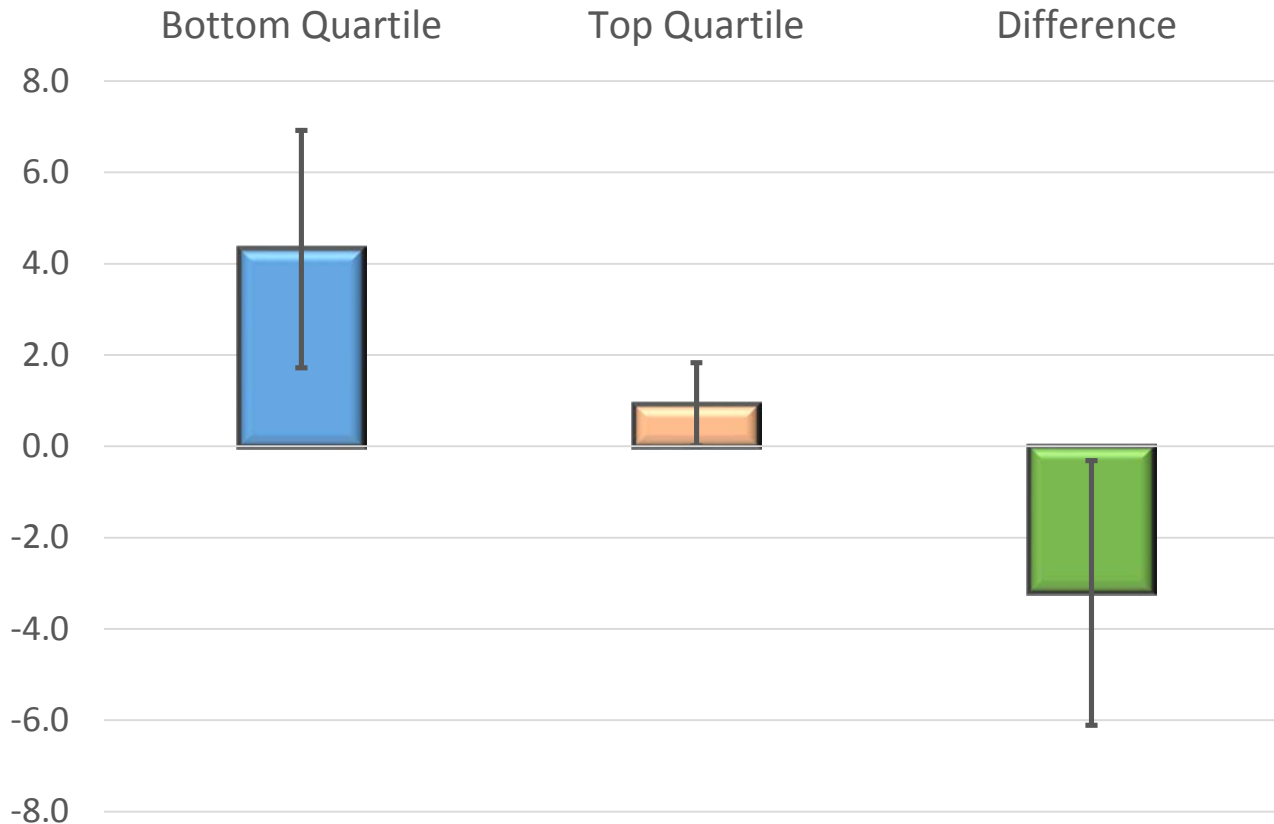
Impact of Comprehensive Systems on **Medical Spending** (Medicare) 1998-2014



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 multi-sector work

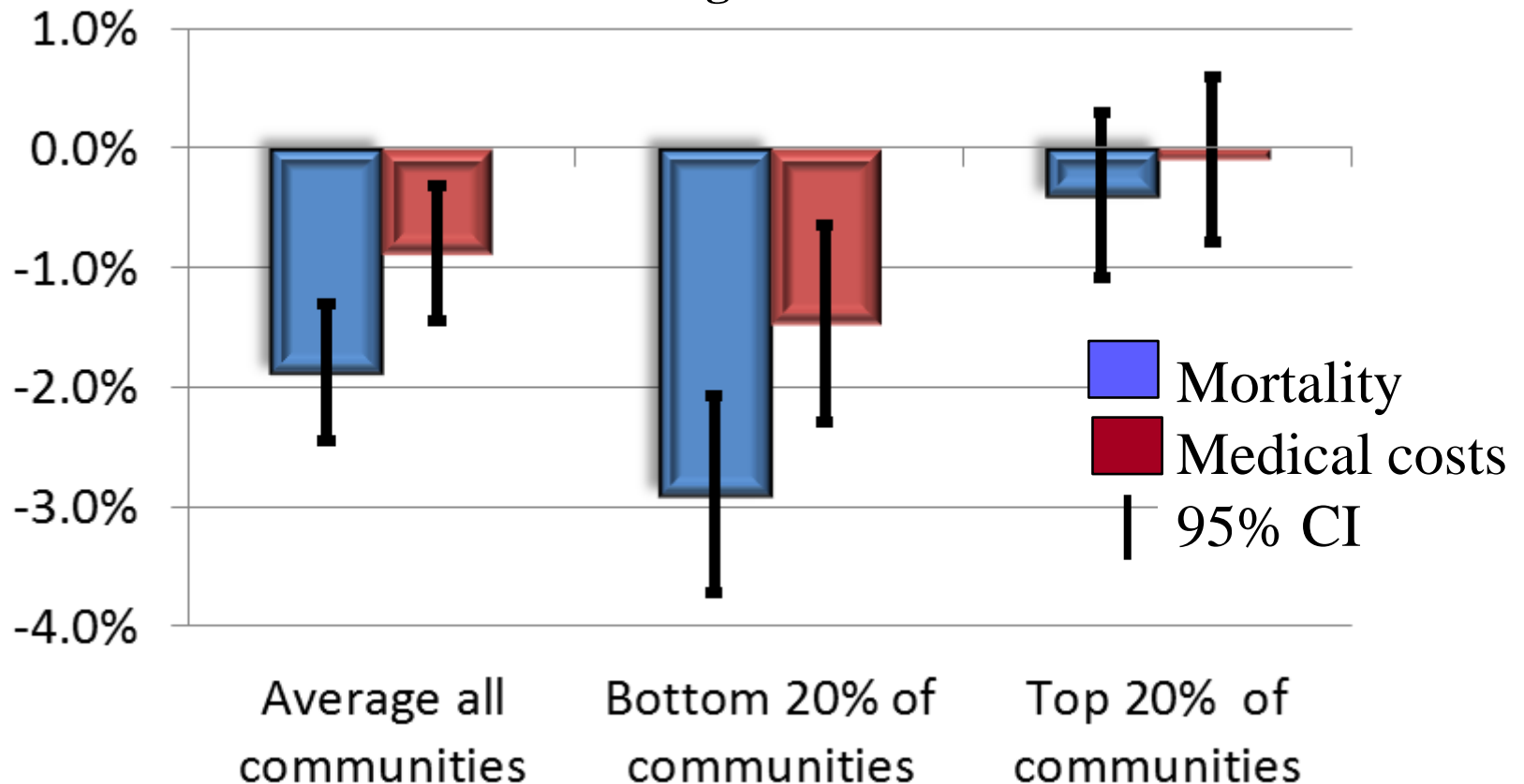
Impact of Comprehensive Systems on **Life Expectancy by Income** (Chetty), 2001-2014



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

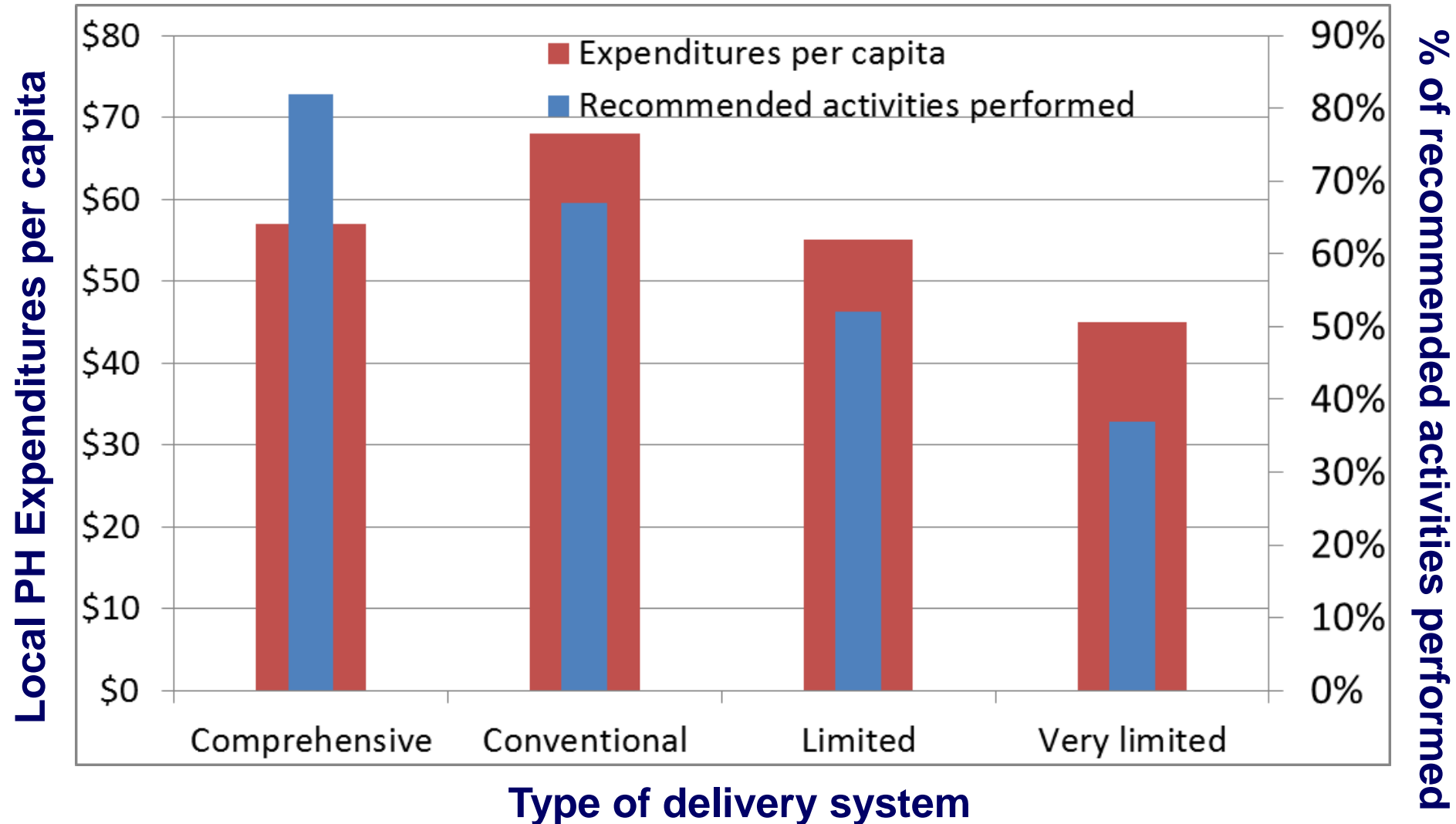
Making the case for equity: larger gains in low-resource communities

Effects of Comprehensive Population Health Systems in Low-Income vs. High-Income Communities



Log IV regression estimates controlling for community-level and state-level characteristics

Comprehensive systems do more with less



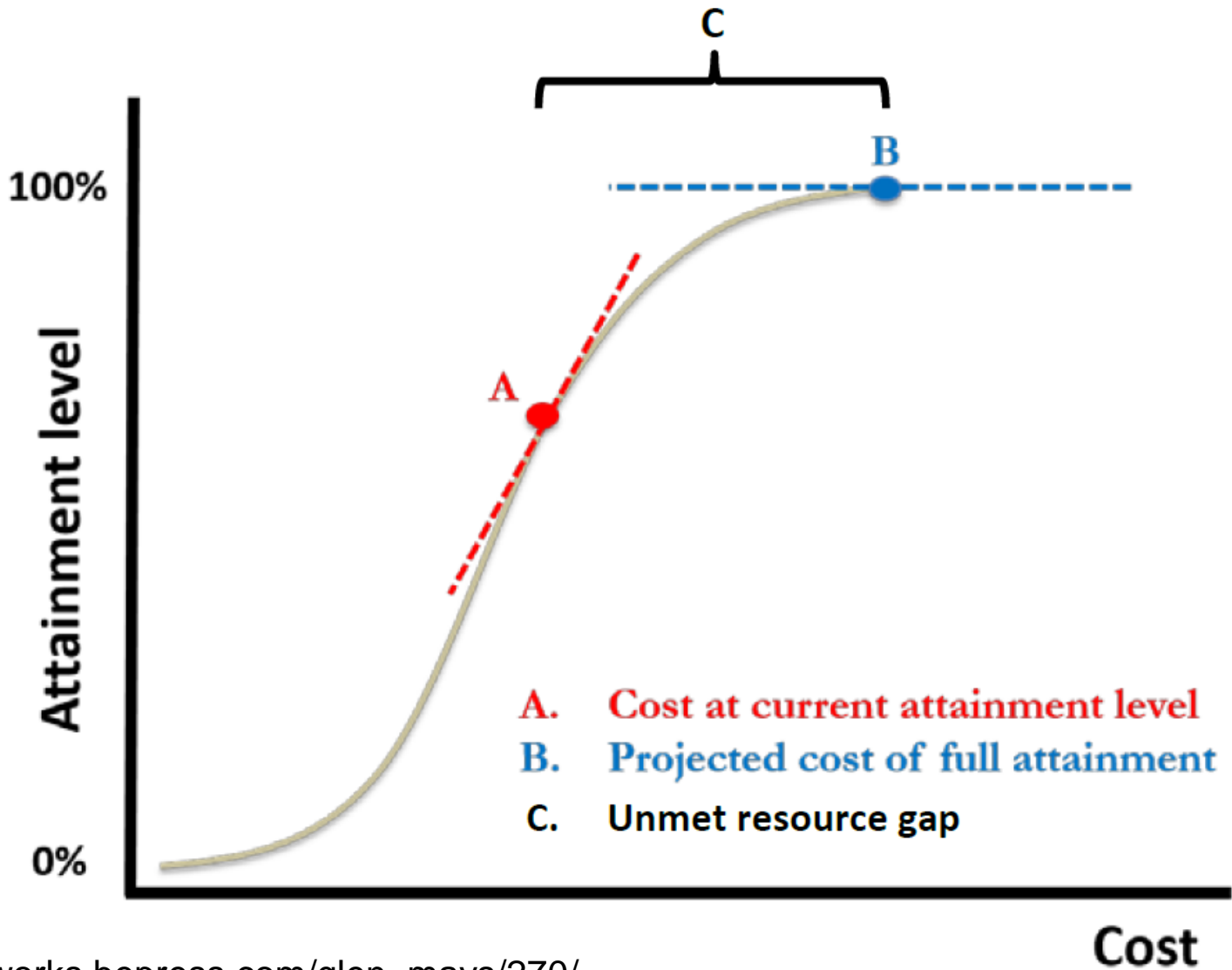
Toward a deeper understanding of implementation costs in public health

2012 Institute of Medicine Recommendations

- Identify the components and **costs of a minimum package** of public health services
 - Foundational capabilities
 - Basic programs
- Implement a **national chart of accounts** for tracking spending and flow of funds
- Expand **research on costs and effects** of public health delivery



How much do foundational capabilities cost?



How much do foundational capabilities cost?

FPHS Domain	Current Resource Use				Expected Costs of Full Attainment			
	Mean	Percentile		Coef. Var.	Mean	Percentile		Coef. Var.
		5th	95th			5th	95th	
<i>Foundational Capabilities</i>								
Assessment	1.70	0.45	3.18	48.8%	3.40	0.79	3.18	53.2%
Emergency Preparedness	2.57	0.66	4.91	50.6%	5.46	1.12	11.31	57.5%
Communication	0.63	0.02	0.22	50.8%	0.98	0.28	1.80	46.7%
Policy Development	1.52	0.35	3.00	53.3%	3.21	0.83	6.31	52.6%
Community Partnerships	2.22	0.52	4.37	53.2%	3.85	0.98	7.42	51.2%
Org. Competencies	9.82	4.38	15.39	34.1%	14.91	4.68	27.17	46.1%
Total Foundational Capabilities	18.46	11.99	25.20	21.7%	31.82	19.18	45.94	25.8%
<i>Foundational Areas</i>								
Communicable Disease	3.40	1.11	5.94	43.2%	5.53	1.81	9.59	42.9%
Chronic Disease/Injury Prevention	3.30	0.85	6.26	50.0%	6.72	1.70	13.02	51.6%
Environmental/Occupational Health	7.49	2.92	13.34	42.7%	10.85	4.42	17.92	37.9%
Maternal Child Health	10.93	3.03	20.16	47.8%	19.08	4.15	38.27	54.9%
Access/Linkage to Clinical Care	4.56	1.10	8.82	51.8%	8.42	1.71	17.26	56.8%
Total Foundational Areas	29.68	18.84	41.37	23.2%	50.60	30.84	73.56	25.6%
TOTAL FPHS	48.14	35.32	61.50	16.4%	82.43	58.54	108.62	18.6%

Estimating ROI

Establishing strong PH systems across the U.S.:

- Produce 1.5M additional life-years
- Require \$10.9B in additional spending
- Cost \$7335 per life-year gained
- Offset by reductions in medical care spending
 - 1.6 percentage point reduction in hospital uncompensated care costs = \$2B in offsets

Getting to sustainable financing

Structural element	Function
1. Strong multi-sector governance model	Do I have a seat at the table?
2. Clear goals, activities, division of responsibility	What are we buying?
3. Clarity on implementation costs	What is the investment?
4. Credible estimates of health & economic outcomes	What are the returns?
5. Robust evaluation and monitoring systems	How will we know success?



Willingness to Pay

Financing sources & models

- Dedicated state and local government allocations
- Medicaid administrative match/claiming
- Hospital community benefit allocations
- AHC/ACO shared savings models
- Community health trusts
- Public/private joint ventures

Conclusions: What we know and still need to learn

- Large potential benefits of system integration
- Inequities in integration are real & problematic
- Integration requires support
 - Infrastructure
 - Institutions
 - 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 the public

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>

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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