

The Health & Economic Returns of Strong Public Health Systems

Paul Halverson, DrPH, MSHA

Richard M. Fairbanks School of Public Health
Indiana University - Purdue University Indianapolis
pkhalver@iu.edu

Glen Mays, PhD, MPH

Department of Health Systems, Management & Policy
Colorado School of Public Health
glen.mays@CUAnschutz.edu



RICHARD M. FAIRBANKS
SCHOOL OF PUBLIC HEALTH
Indianapolis

colorado school of
public health

UNIVERSITY OF COLORADO
COLORADO STATE UNIVERSITY
UNIVERSITY OF NORTHERN COLORADO

Overview

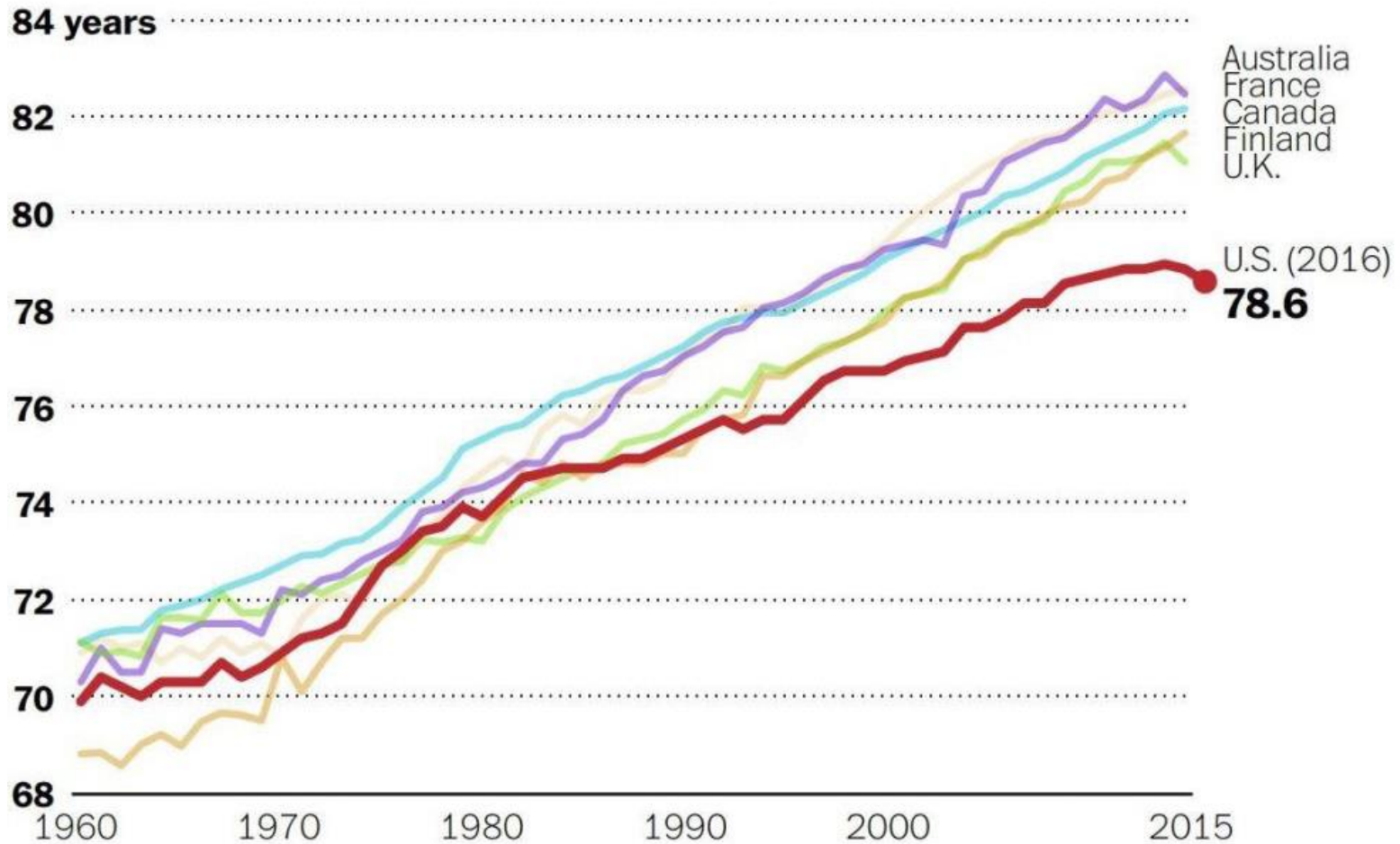
- What is public health and why focus on it now?
- What impact does public health work have on health & economic outcomes?
- Where should new investments be directed to achieve the largest health & economic gains?



1. What is public health and why focus on it now?

Losing ground in population health

Life expectancy at birth, selected OECD countries



Source: OECD, U.S. Census Bureau

Widening gaps in U.S. life expectancy

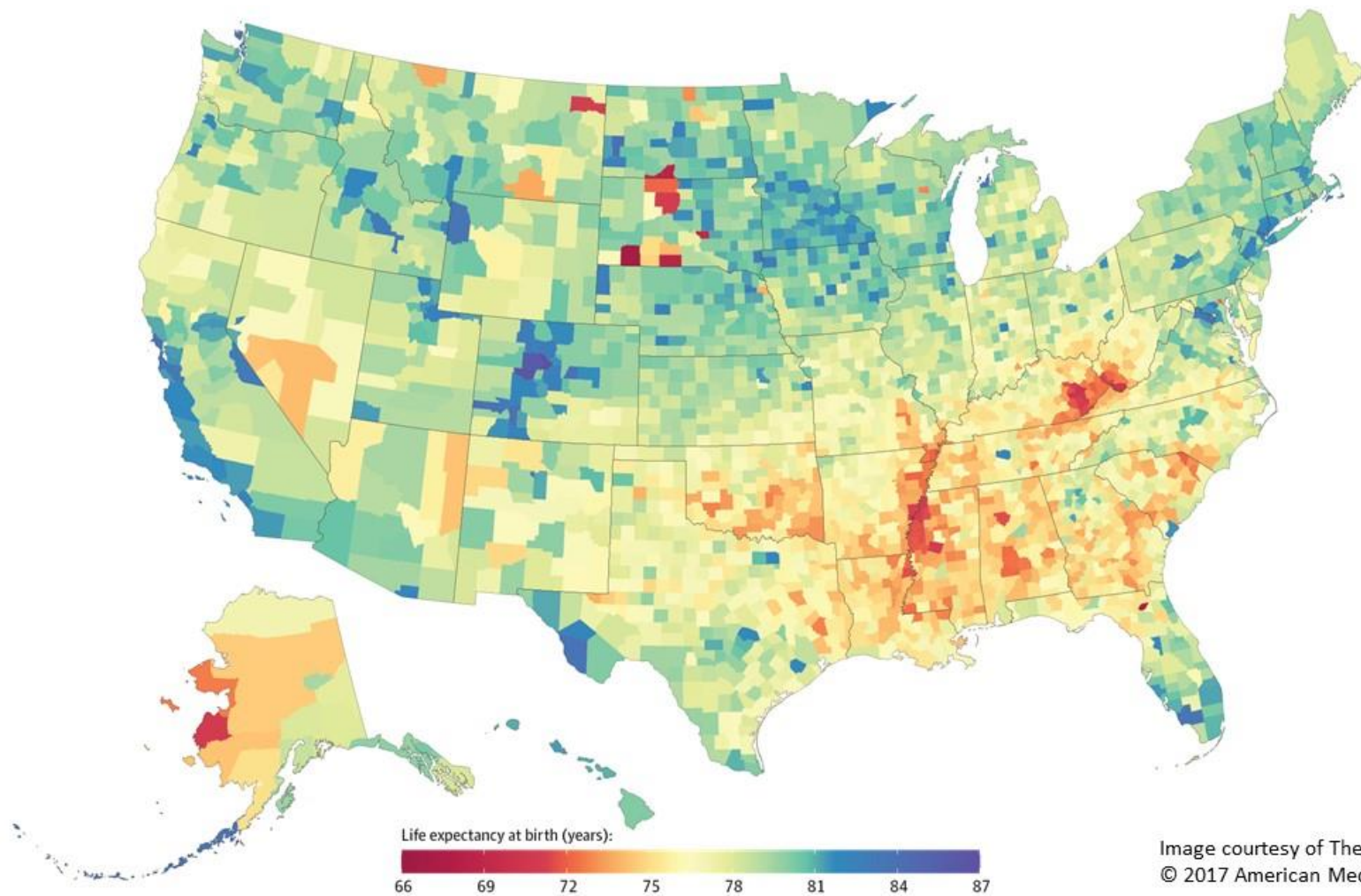
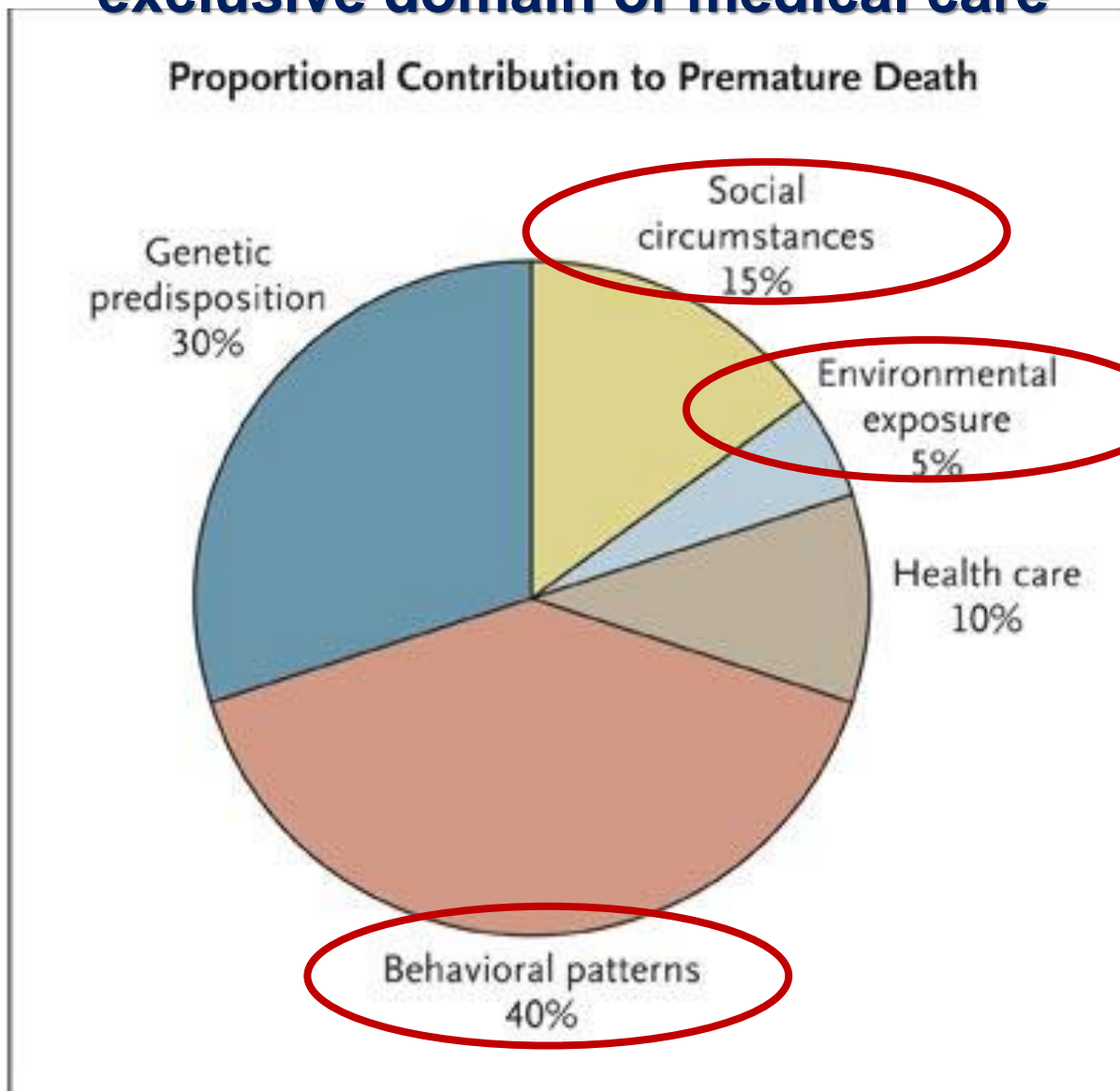


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Health determinants lie beyond the exclusive domain of medical care



Why the U.S. is losing ground in health

>75% of US health spending is attributable to conditions that are largely preventable

- Cardiovascular disease
- Diabetes
- Lung diseases
- Cancer
- Injuries
- Vaccine-preventable diseases and sexually transmitted infections

<5% of US health spending is allocated to prevention and public health

What is public health?

1. Winslow, 1920, “public health is the science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private communities, and individuals.”
2. IOM, 1988, “Public health is what we as a society do collectively to assure conditions in which people can be healthy.”
3. WHO, 1998, “public health is a dynamic state of complete physical, mental, spiritual, and social well-being and not merely the absence of disease or infirmity.”



10 GREAT PUBLIC HEALTH ACHIEVEMENTS



**Control of
Infectious Diseases**



**Family
Planning**



**Healthier Mothers
and Babies**



**Motor Vehicle
Safety**



**Tobacco as a
Health Hazard**



**Declines in deaths from
heart disease and stroke**



**Fluoridation of
Drinking Water**



Immunizations



**Safer and
Healthier Foods**



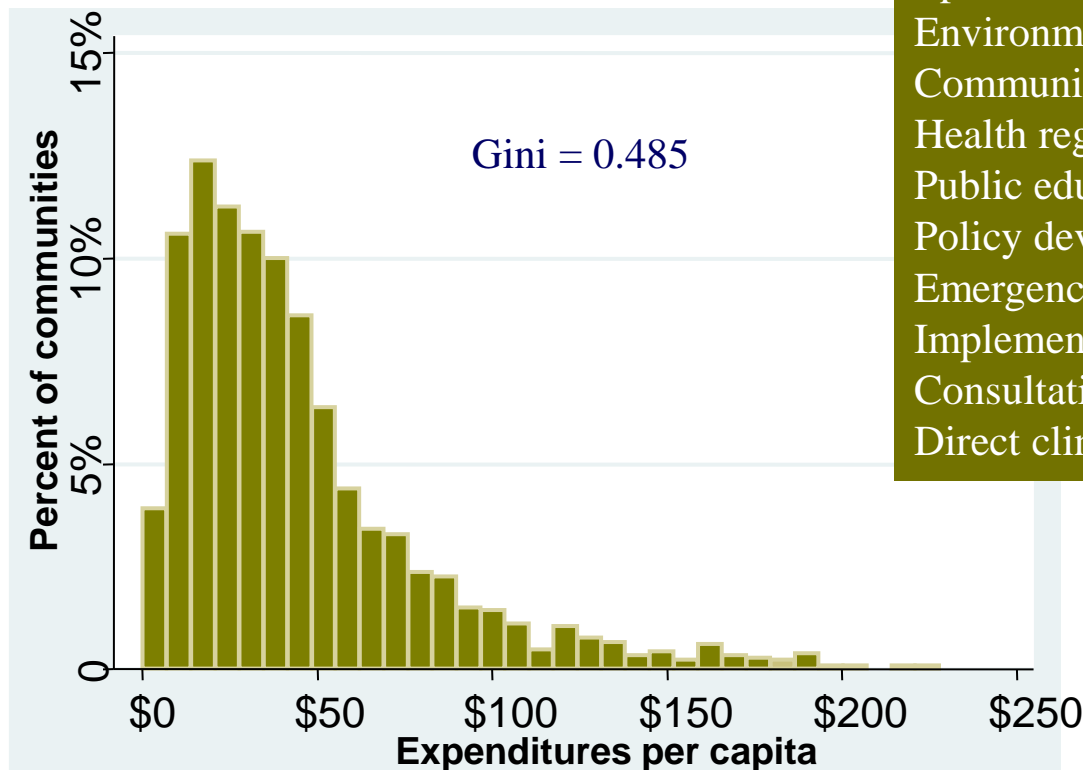
**Workplace
Safety**

During the 20th century, the US gained an additional 30 years in life expectancy. Twenty-five of those 30 years are attributed to public health efforts, including the 10 great public health achievements.



The U.S. public health sector

- Federation of 3000 local agencies, 50 states + federal agencies
- Broad scope of activity
- Decentralized authority
- Highly variable capacity



Community health assessment
Health surveillance
Epidemiologic investigation
Environmental health monitoring
Community health planning & priority-setting
Health regulation enforcement
Public education & risk communication
Policy development & assessment
Emergency preparedness & response
Implementation of prevention programs
Consultation for school & worksite health
Direct clinical service delivery

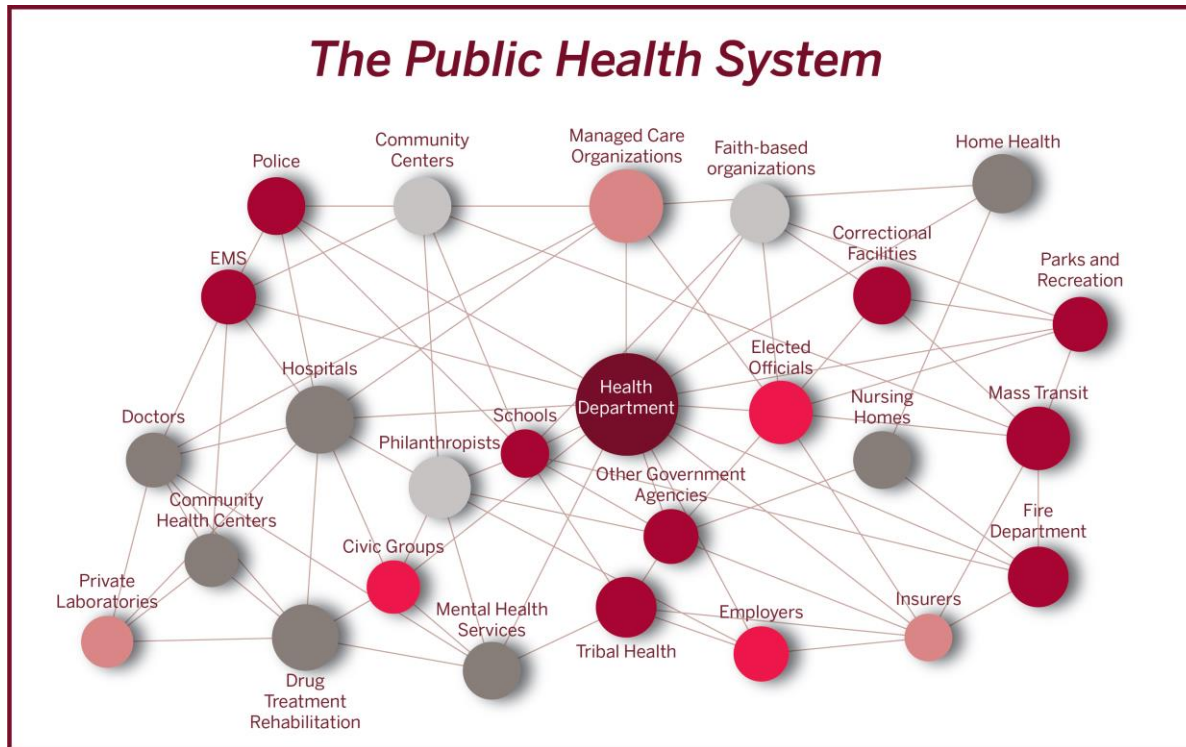
Core Public Health Infrastructure



- **Specialized workforce:** Epidemiologists, disease investigators, data analysts, health educators, planners, intervention specialists, community health workers
- **Data systems:** collection, linkage, analysis, exchange, dissemination
- **Laboratory systems:** connected across federal, state, local, clinical labs
- **Communication systems:** clinical, inter-governmental, and public-facing
- **Legal & regulatory systems:** Food, air, water, healthcare facilities, occupations



What are public health systems?



Public health agencies connect and lead other community partners in the effort to promote and protect public health and specifically address social determinants of health.



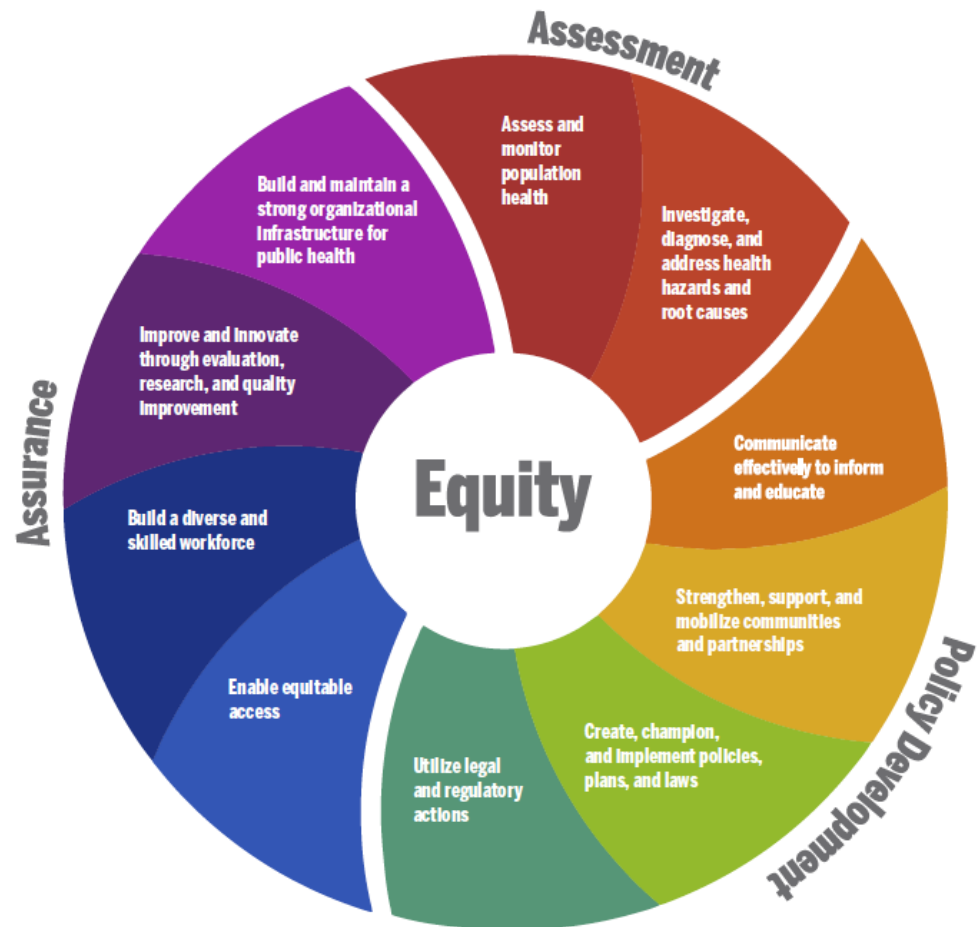
Expectations of a functioning public health system

The 10 Essential Public Health Services

Some activities are conducted primarily at the state level and or are state level components that provide the infrastructure - such as the reporting system - that locals will use to conduct their work.

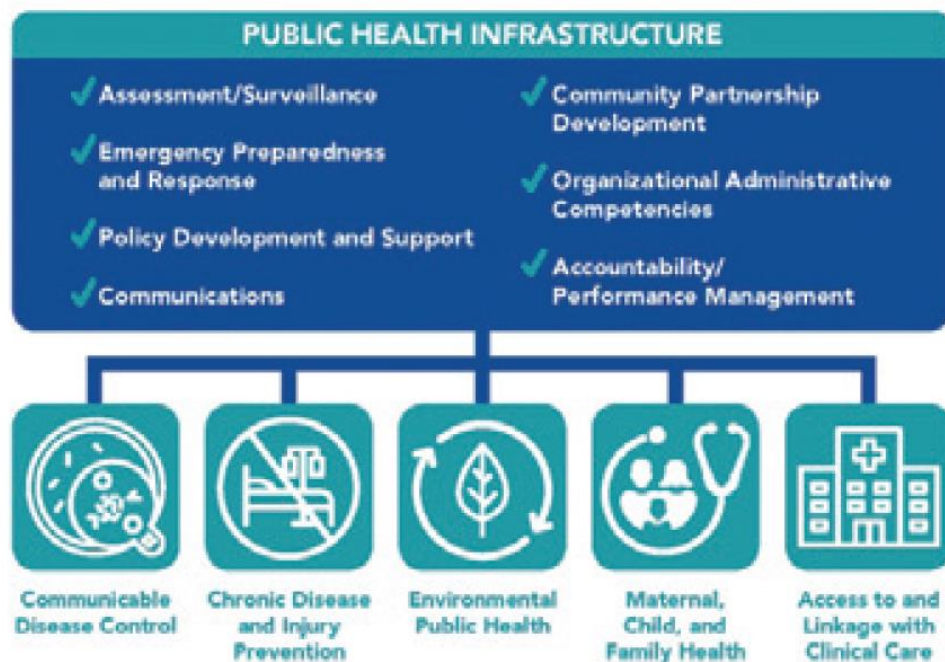
Some of these system activities are conducted in collaboration with system partners.

The 10 Essential Services are system-wide and all-encompassing.



Expectations of a functioning public health system

The Foundational Public Health Services

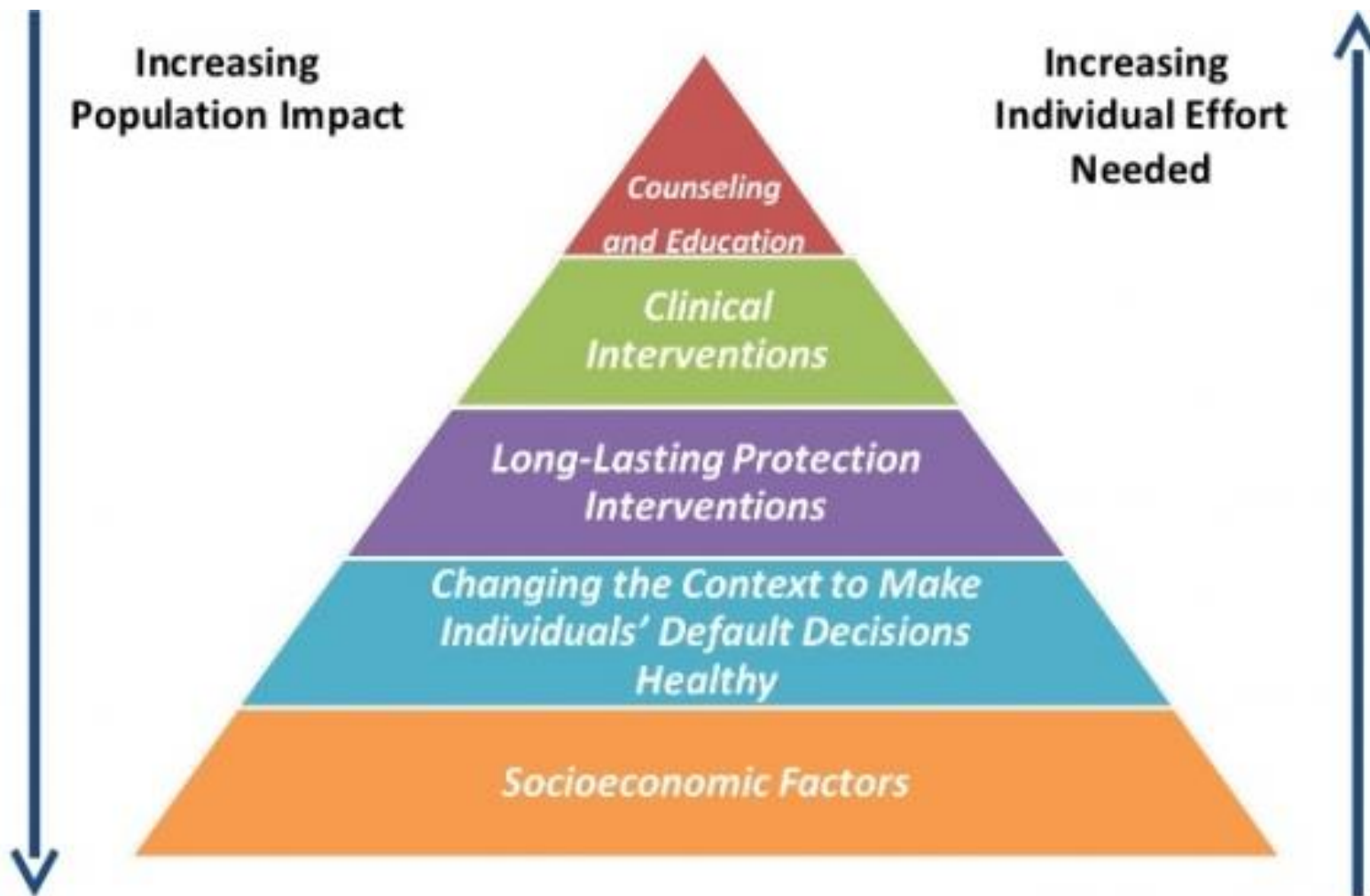


The Foundational Public Health Services are those services that have been nationally recommended to be provided at the local level.

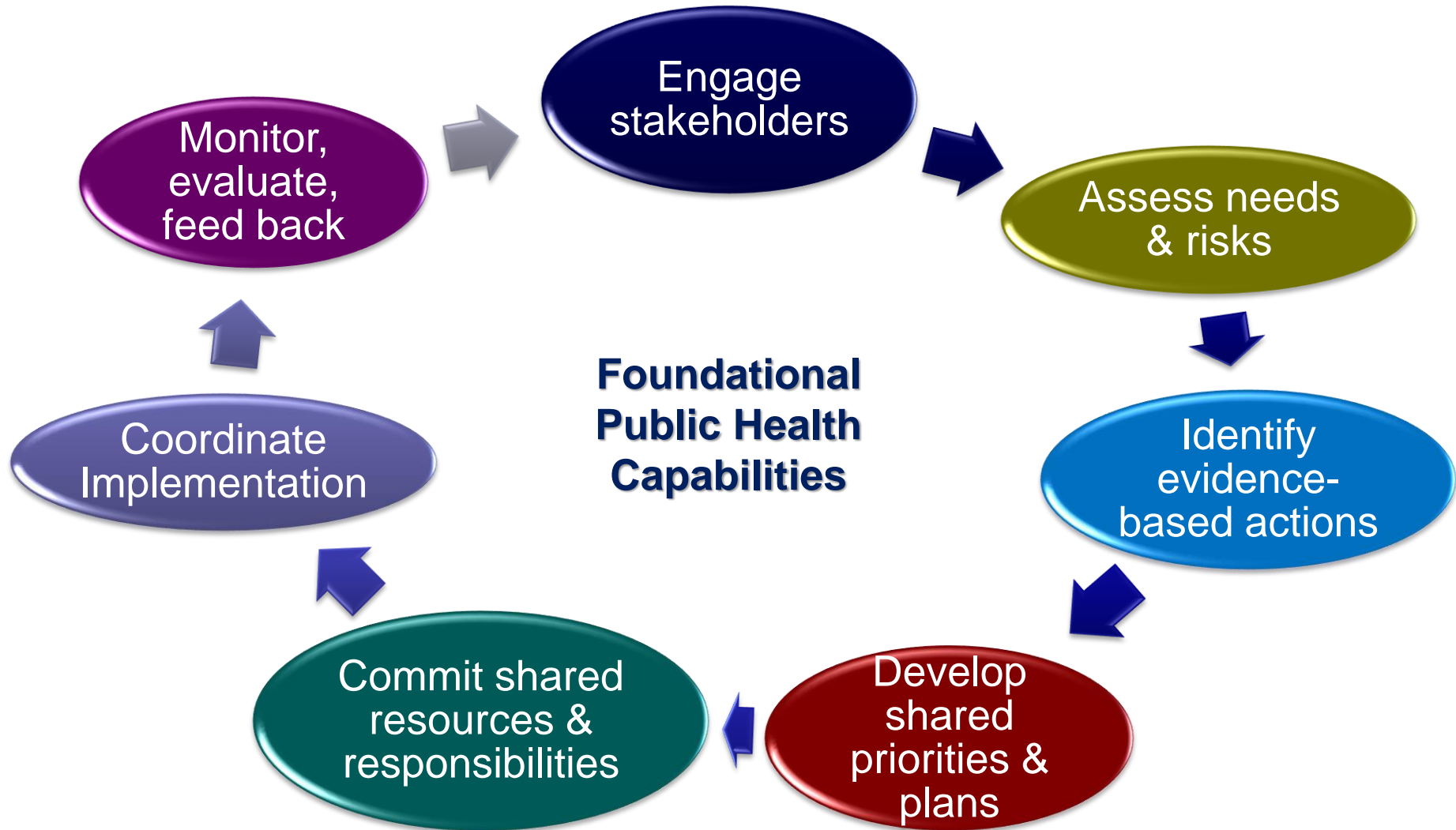
These are particularly important because the local level is where direct services are most commonly provided to communities.



High value public health interventions

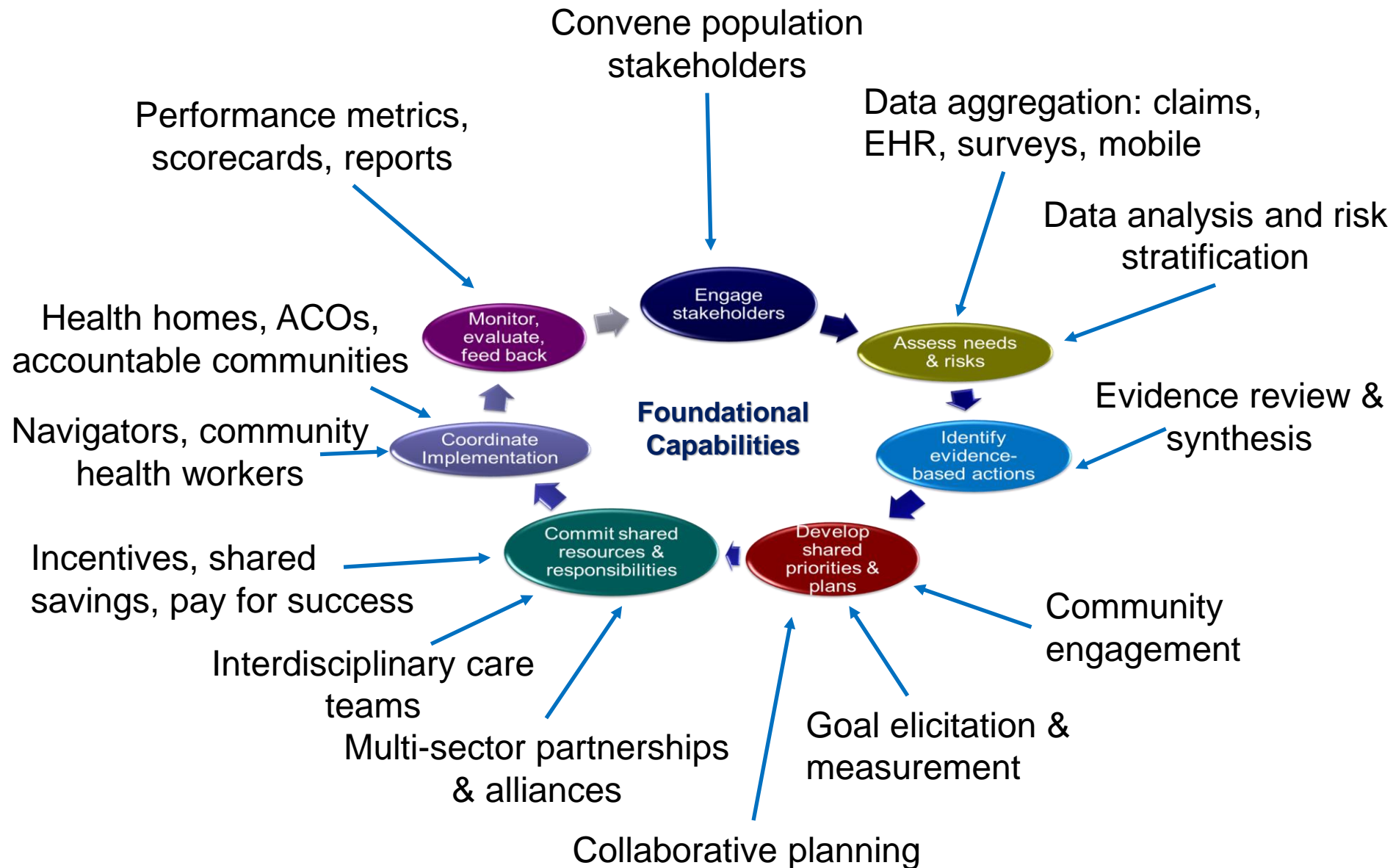


Cross-cutting capabilities are required to deliver public health interventions



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

Public Health Foundational Capabilities



2. What impact does public health work have on health & economic outcomes?

Widening gaps in U.S. life expectancy

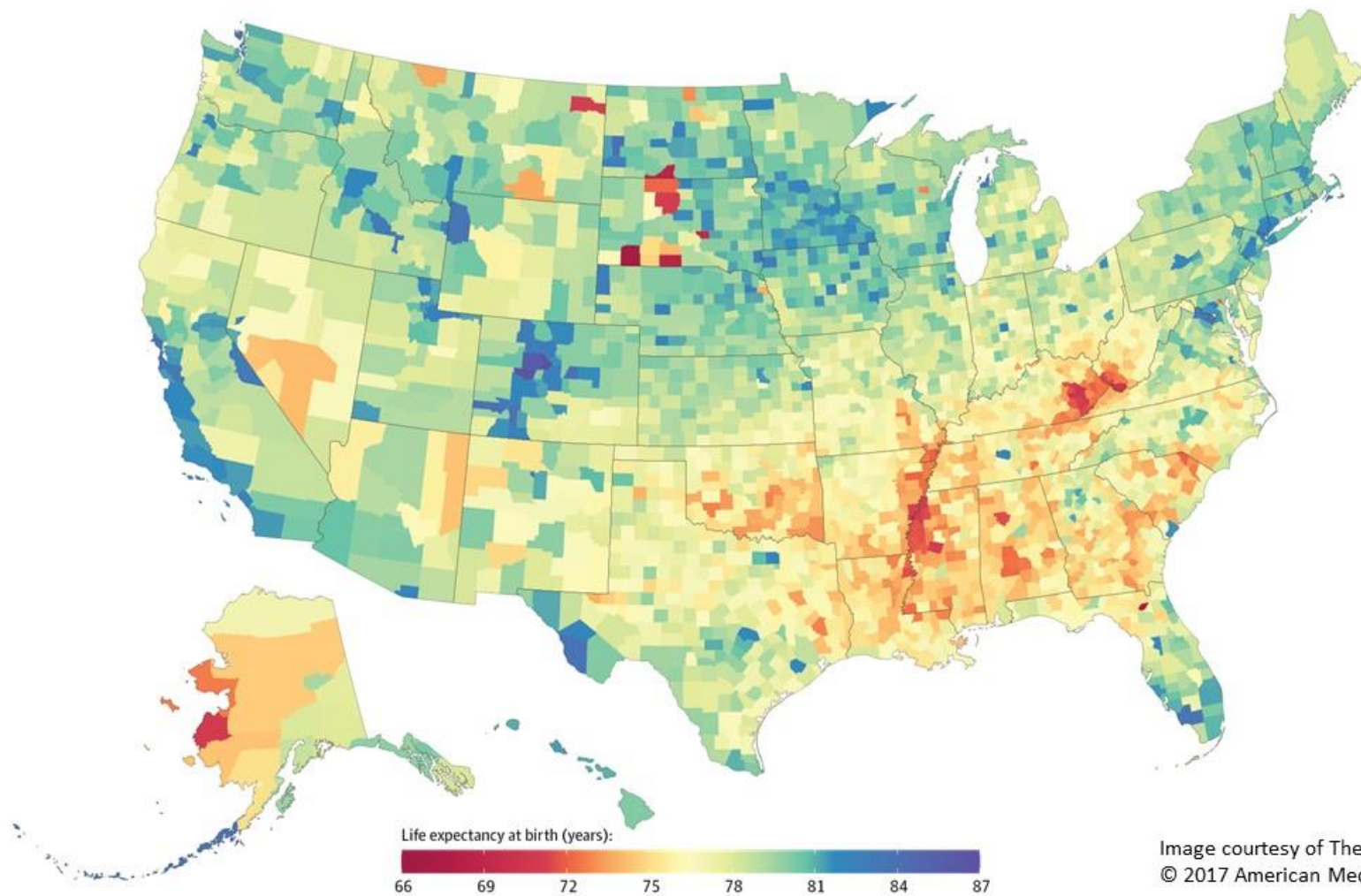
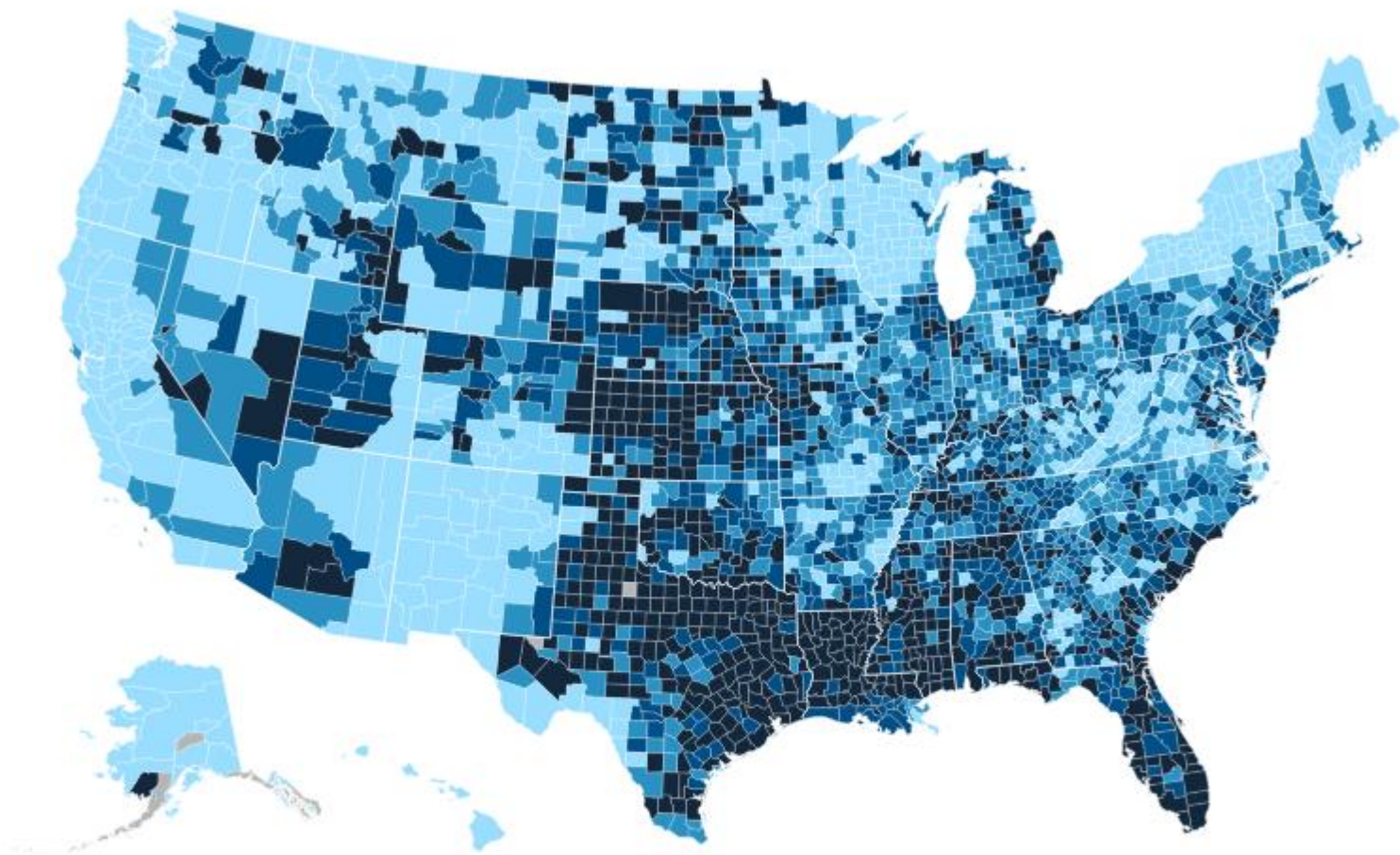
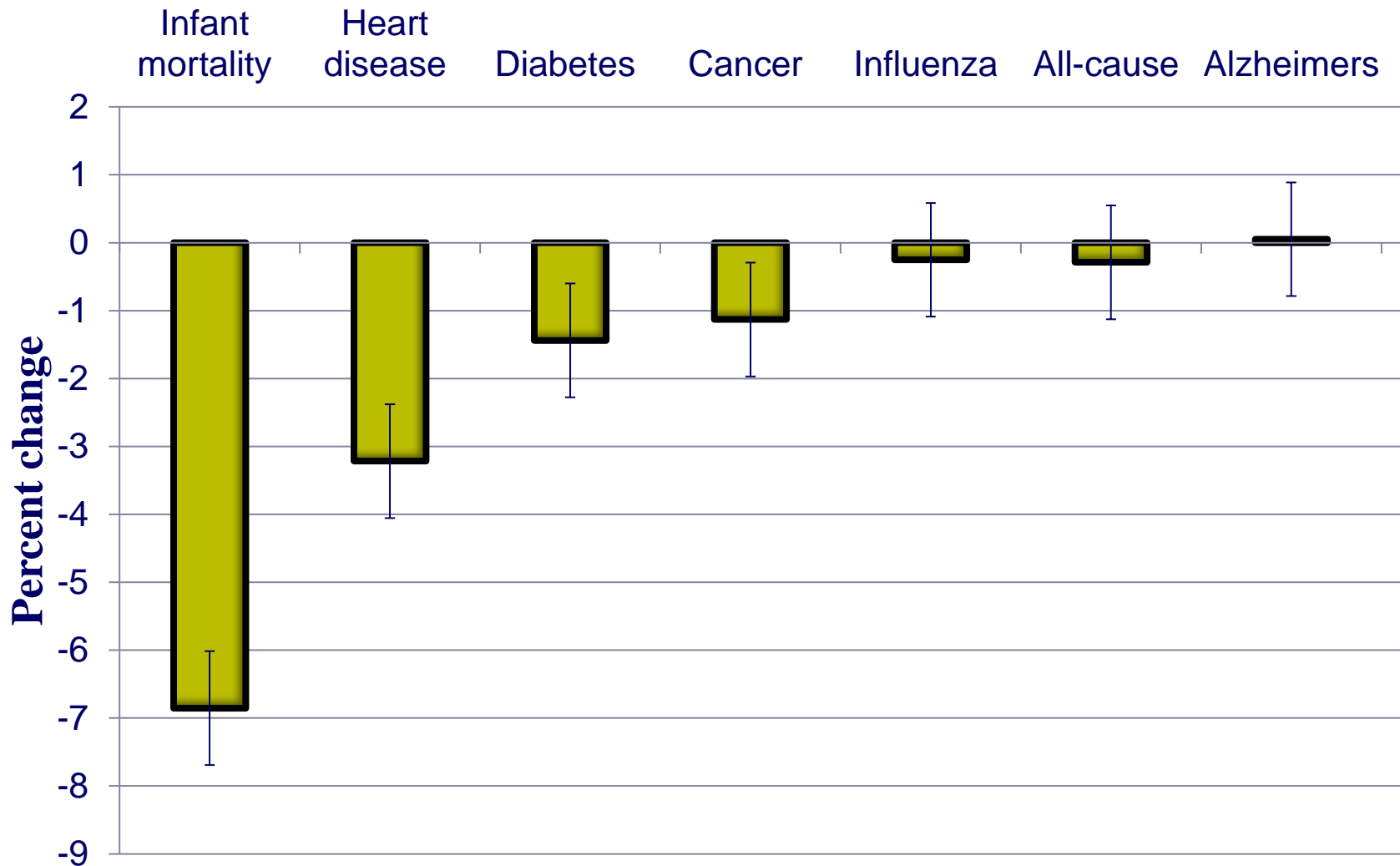


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Geographic variation in Medical Spending



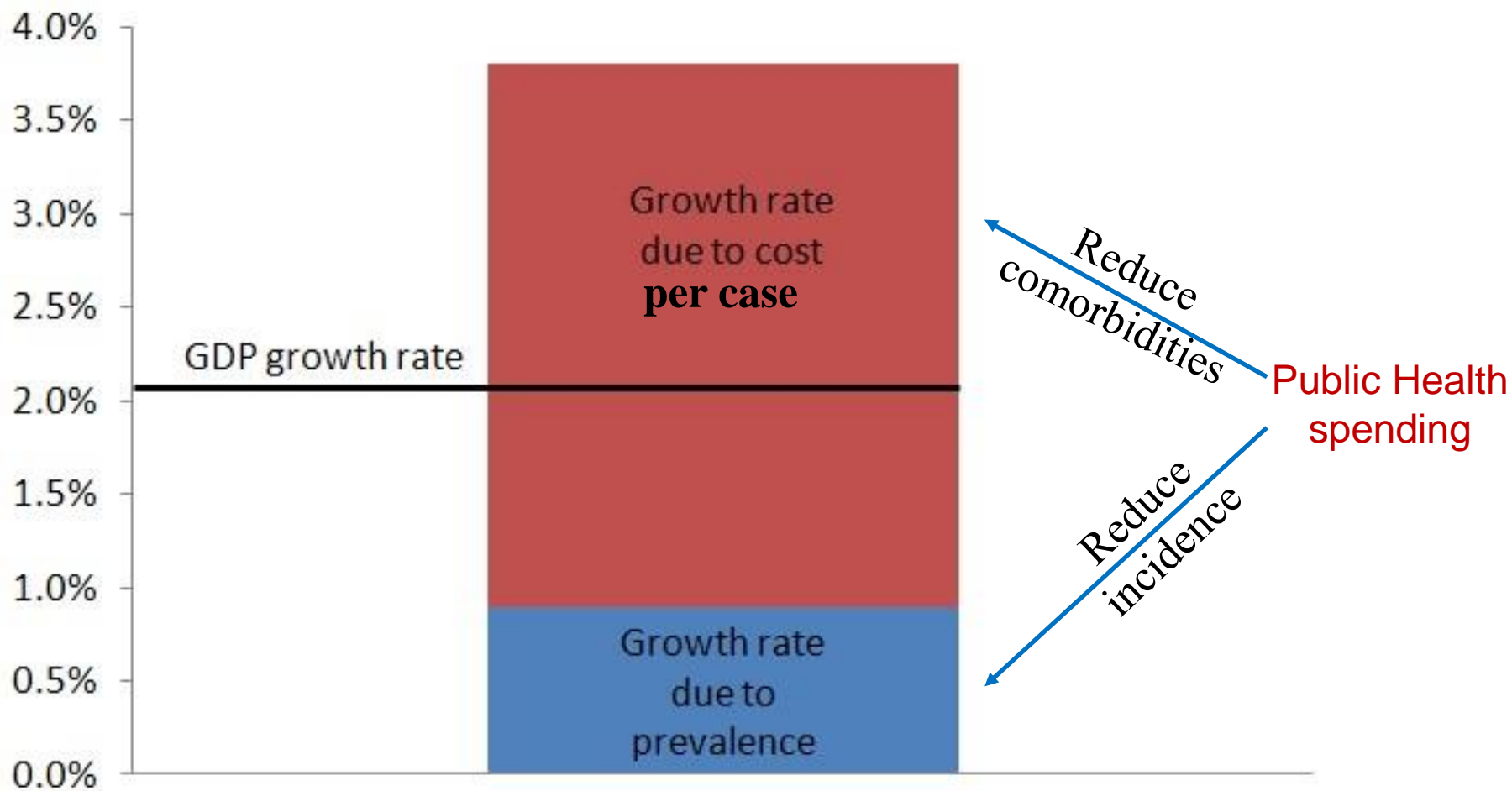
Mortality reductions attributable to local public health spending



Hierarchical regression estimates with instrumental variables to correct for selection and unmeasured confounding

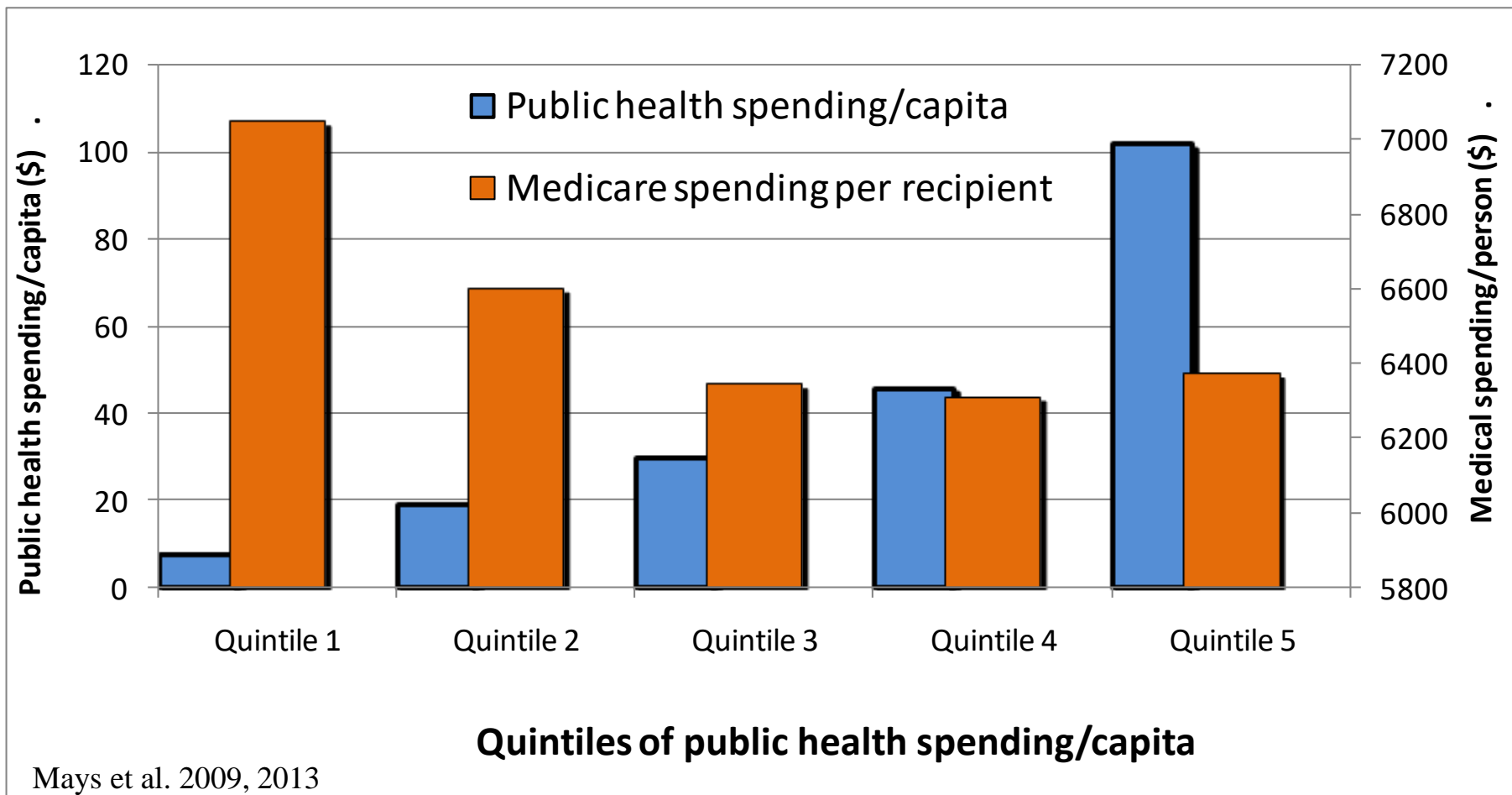
Factors driving growth in medical spending

Health spending growth rate



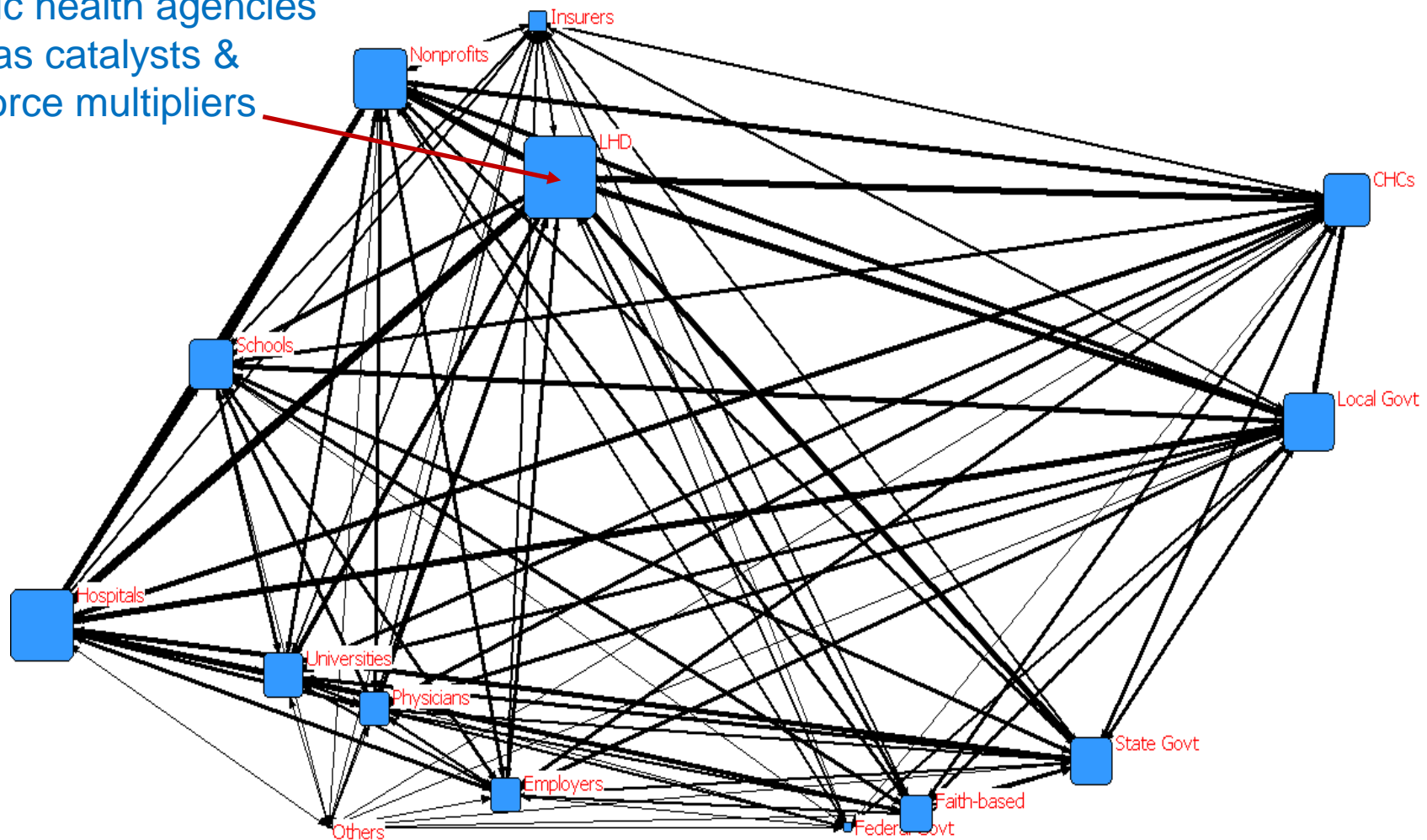
Medical cost offsets attributable to public health spending

For every \$10 of public health spending, ≈\$9 are recovered in lower Medicare spending over 10 years



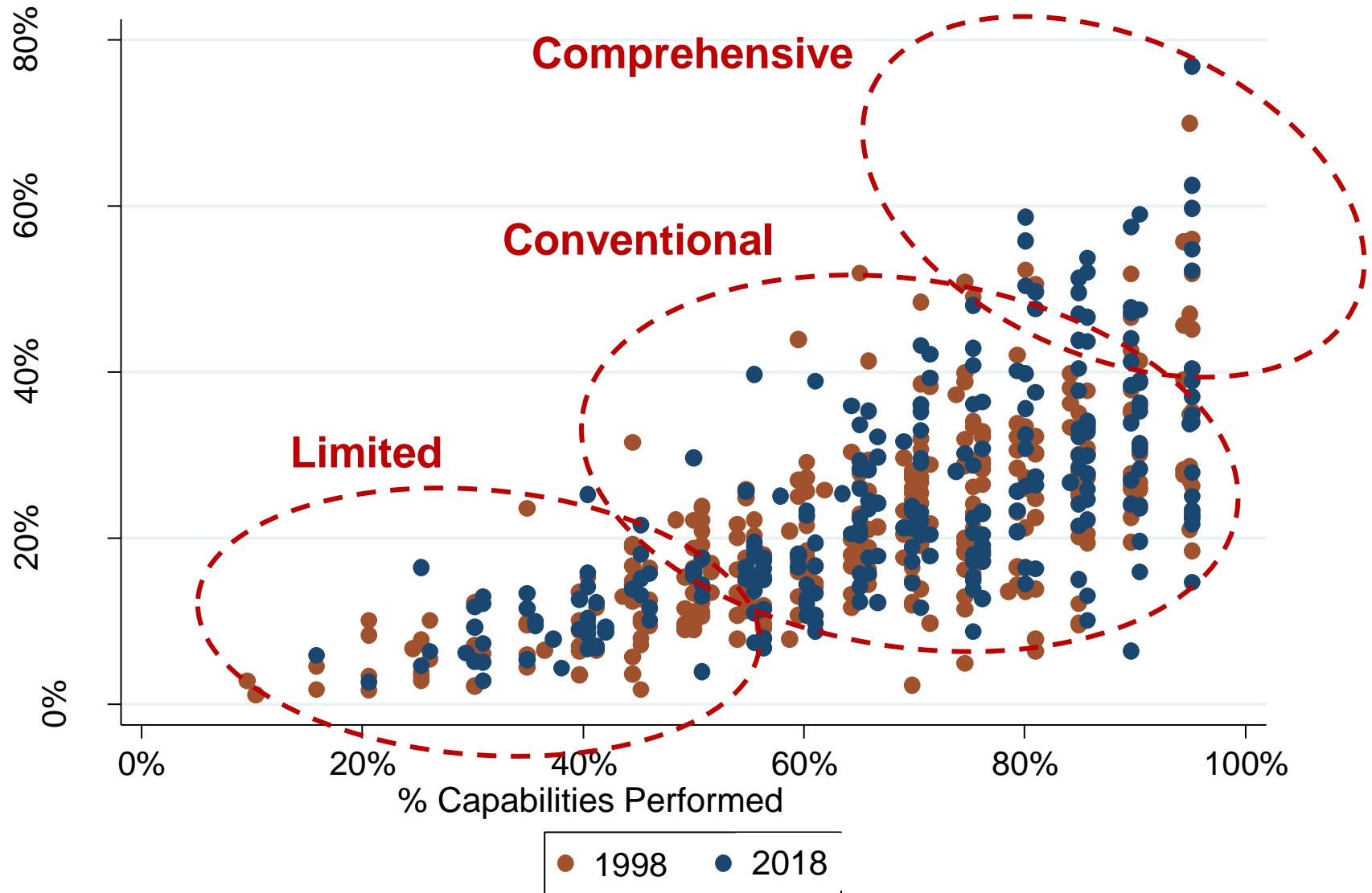
Strong public health systems are networks, not just government agencies

Public health agencies
as catalysts &
force multipliers



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

Classifying public health system strength



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

Public Health System Strength

One of RWJF's Culture of Health National Metrics

- Implement a ***broad scope*** of public health activities
- Through ***dense networks*** of multi-sector relationships
- Including ***central actors*** to coordinate actions

Access to Population Health

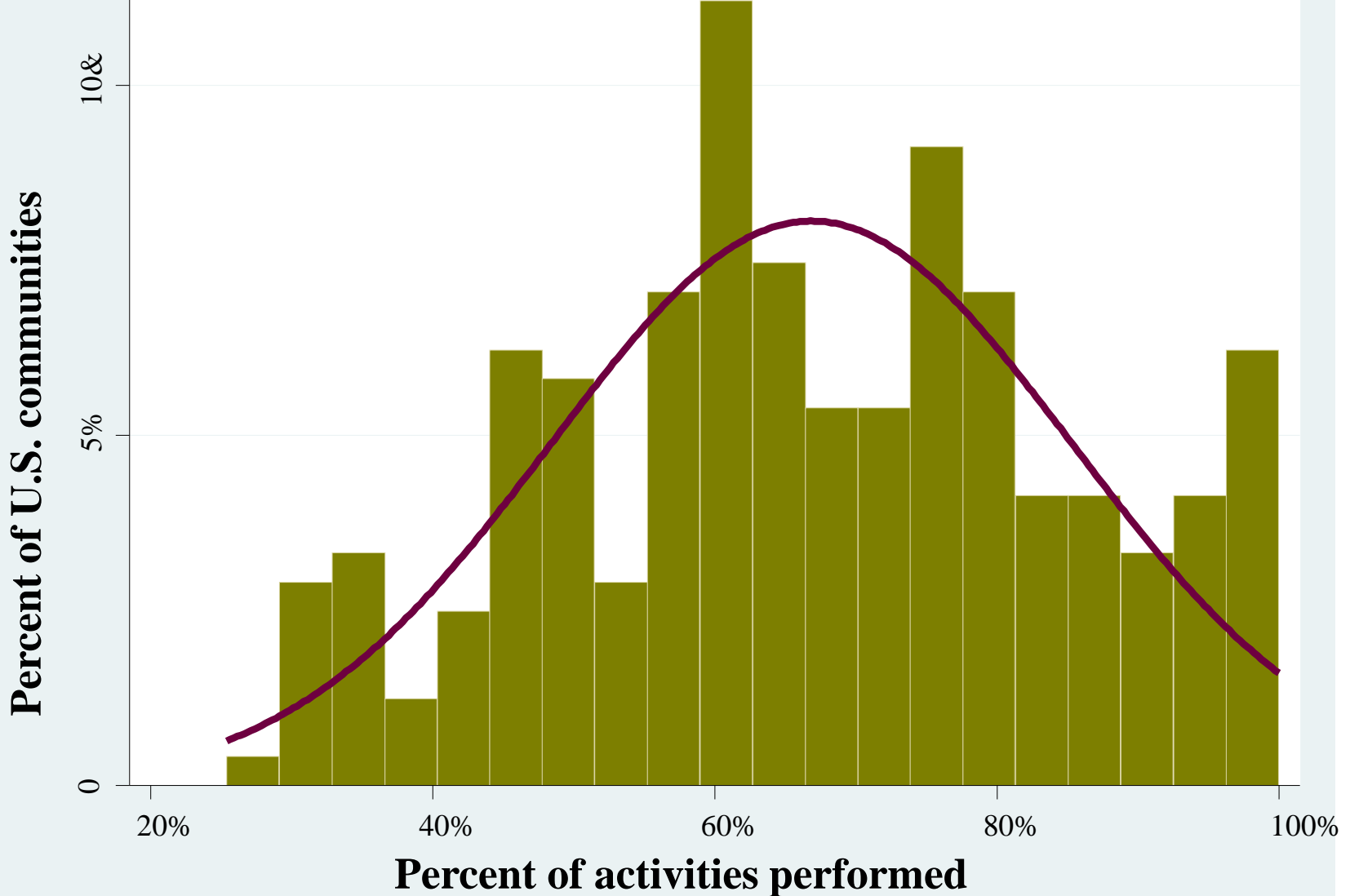
Overall, 47.2 percent of the population is covered by a comprehensive public health system. Individuals are more likely to have access if they are non-White (51.5 percent vs. 45.5 percent White) or live in a metropolitan area (48.7 percent vs. 34.1 percent in nonmetropolitan areas).

47.2%

of population served by a
comprehensive public
health system

Variation in implementing public health activities

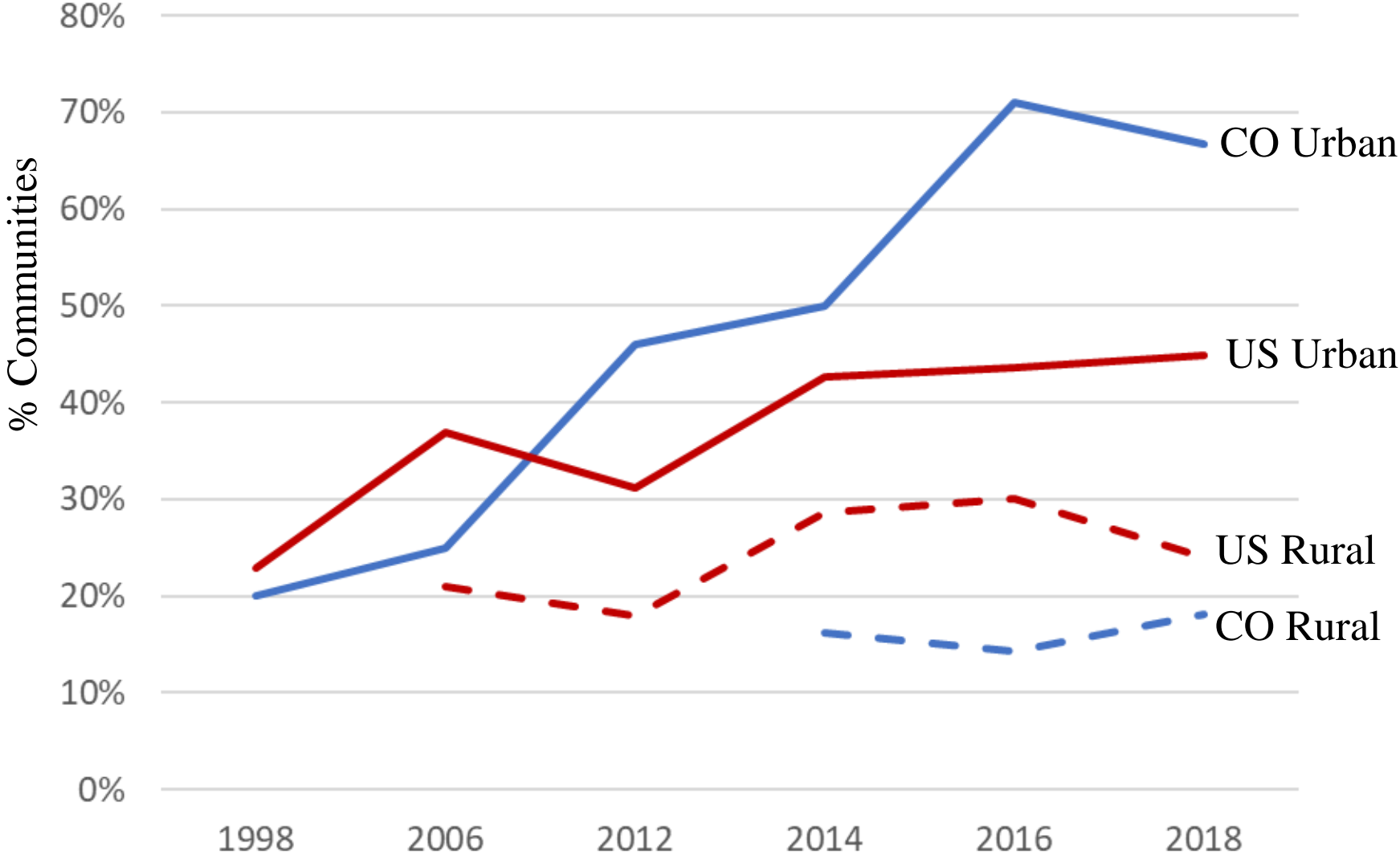
National Longitudinal Survey of Public Health Systems 2018



Organizational contributions to public health activities

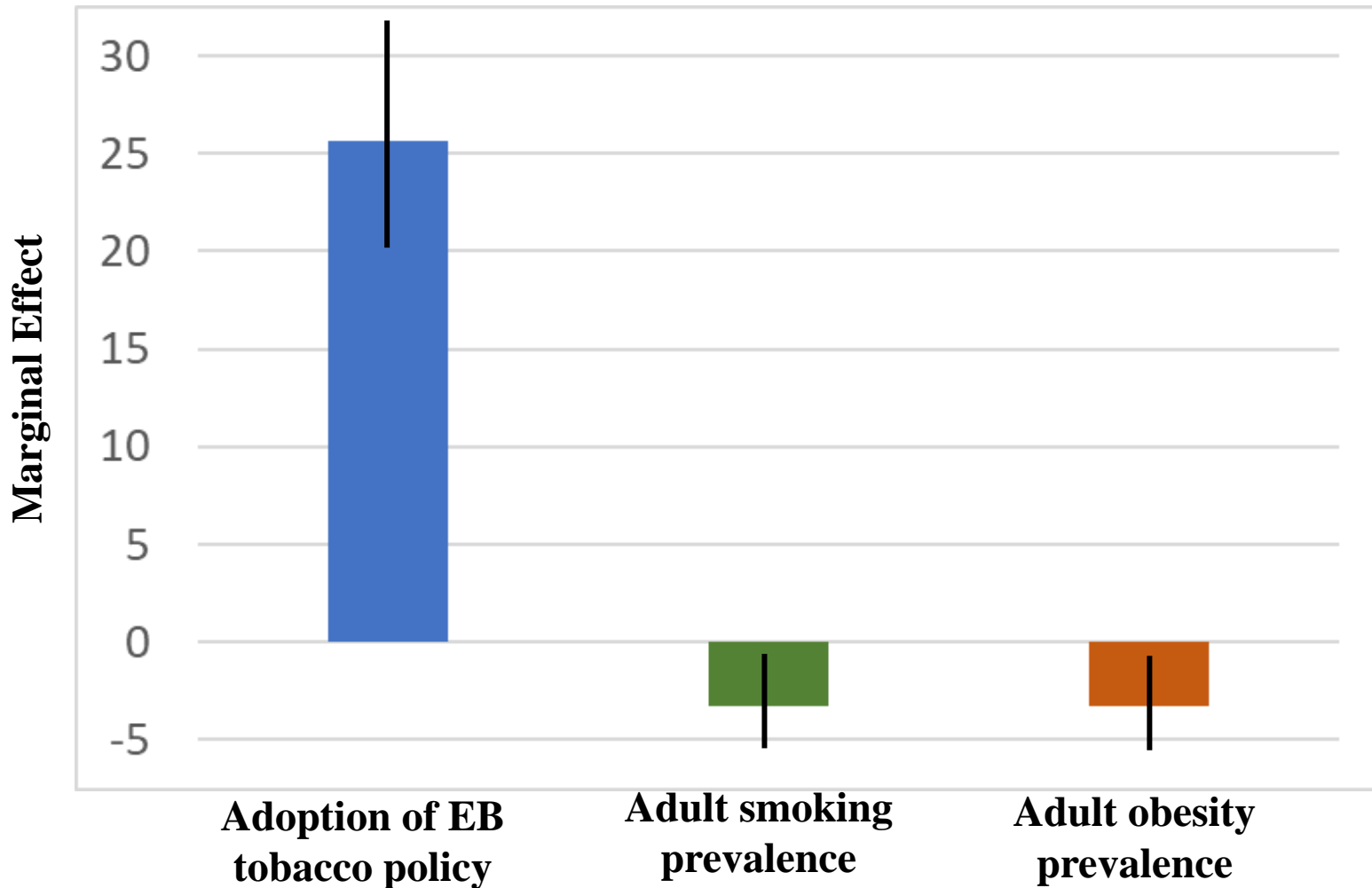
	% of recommended activities contributed			
	Type of Organization	1998	2018	Percent Change
	Local public health agencies	60.7%	67.5%	11.1%
	Other local government agencies	31.8%	33.2%	4.4%
	State public health agencies	46.0%	34.3%	-25.4%
	Other state government agencies	17.2%	12.3%	-28.8%
	Federal government 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%

Prevalence of Comprehensive Systems: Urban-Rural Differences



Health effects attributable to system strength

Impact of Comprehensive Systems on Policy & Behavior

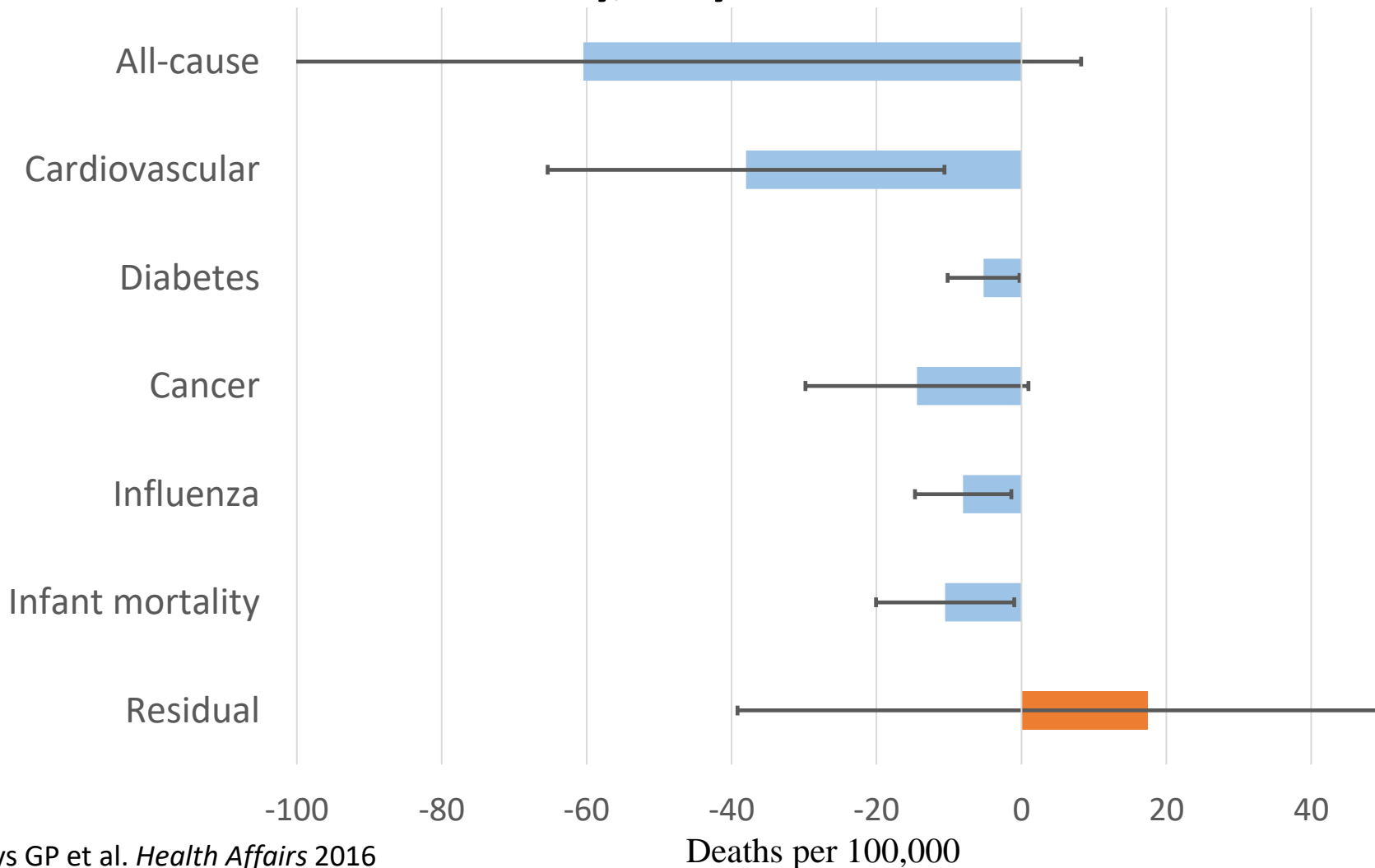


Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. Vertical lines are 95% confidence intervals

Mays GP et al. *Health Affairs* 2016

Mortality effects attributable to comprehensive public health systems

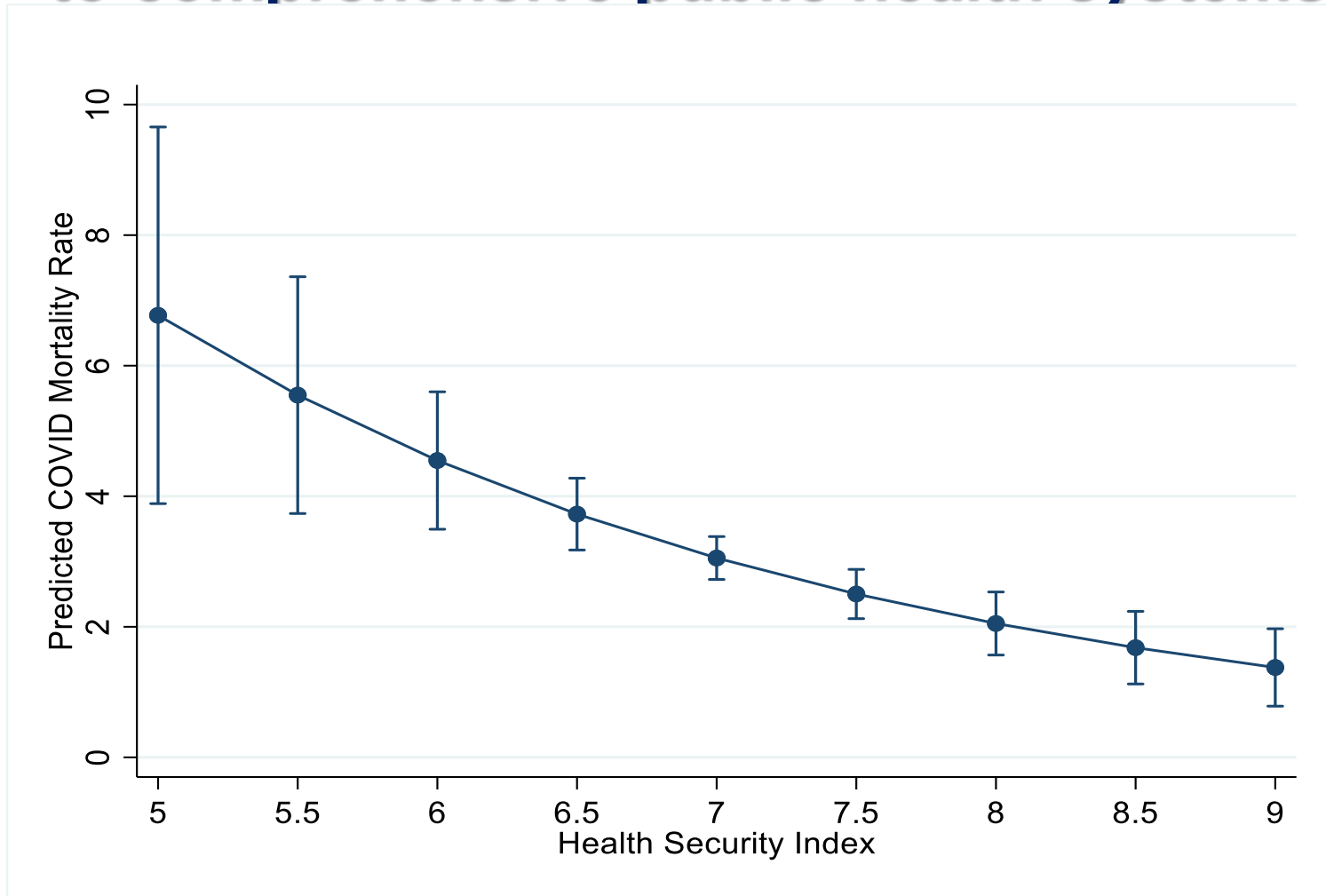
Mortality, 10-year estimates



Mays GP et al. *Health Affairs* 2016

Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. N=1019 community-years

COVID-19 Mortality effects attributable to comprehensive public health systems

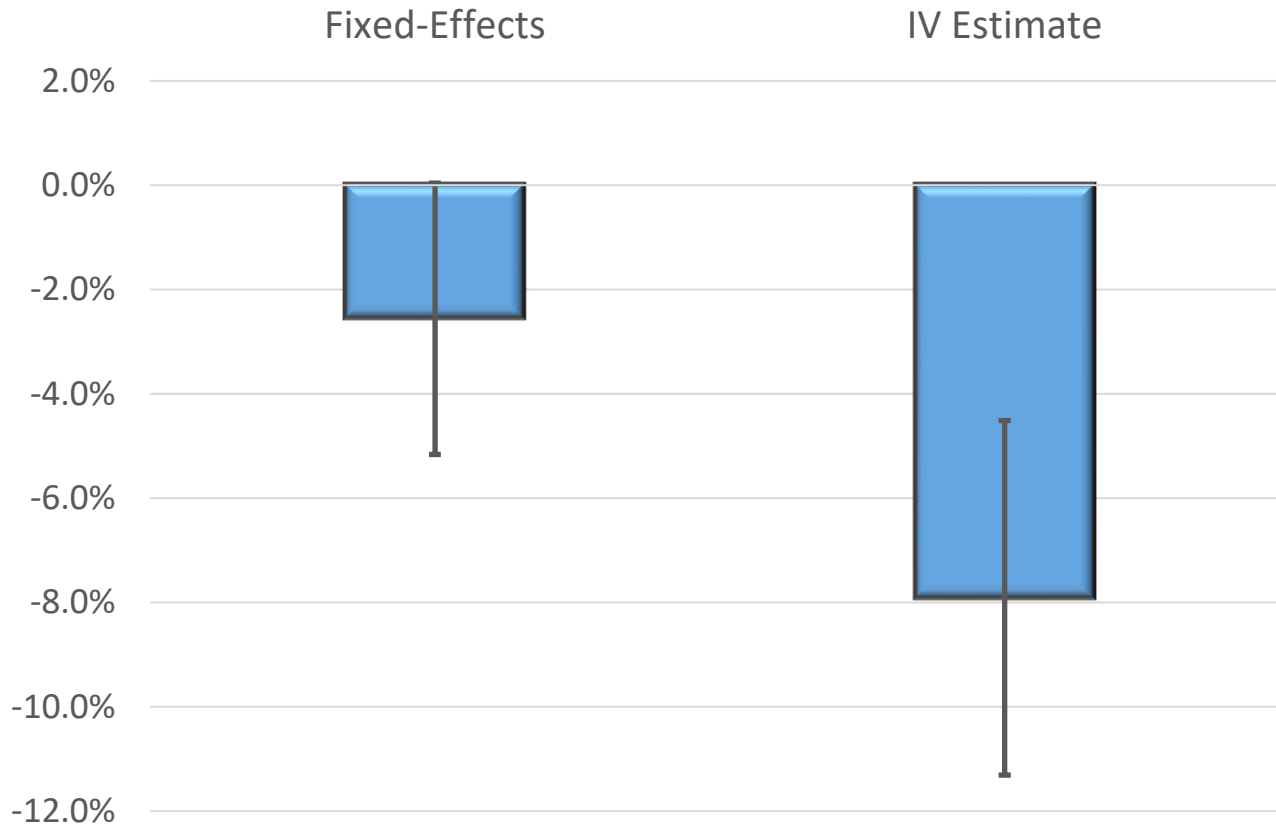


www.nhspl.org

Models controlled for COVID-19 risk factors including county population size, population density, percent aged 65 years or older, percent Black, percent Hispanic, percent below poverty level, percent under age 65 without health insurance, number of nursing home residents per capita, and social vulnerability rates measured in the Community Resiliency Index.¹⁴ Models were adjusted for clustering of counties within states.

Economic effects attributable to system strength

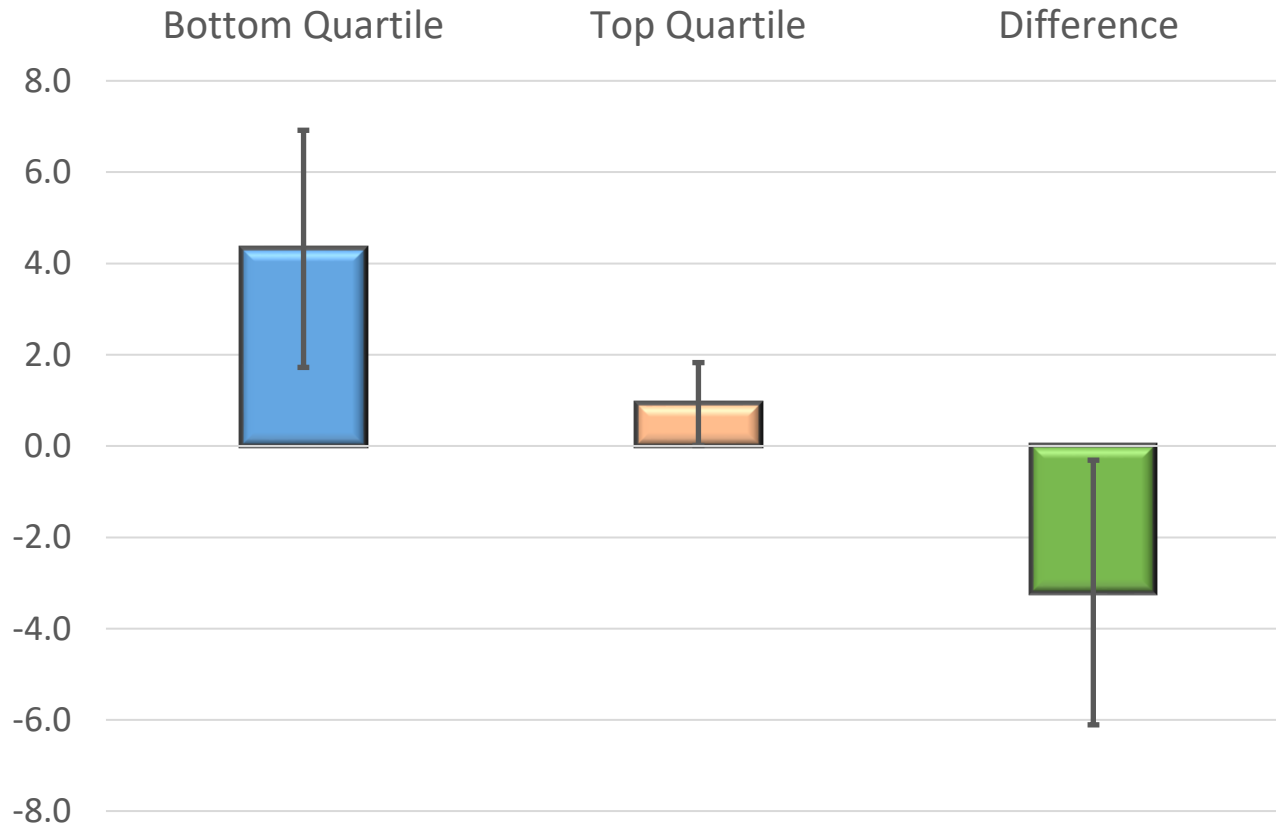
Impact of Comprehensive Systems on **Medical Spending** (Medicare 10-year estimates)



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

Equity effects attributable to system strength

Impact of Comprehensive Systems on **Life Expectancy by Income** (10-year estimates)



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

3. Where should new investments be directed to achieve the largest health & economic gains?

The answer: it depends

Future gains =

- Current capability levels of public health system

X

- Unmet health and social needs/risks in population

X

- Ability to target & tailor new resources to unmet needs

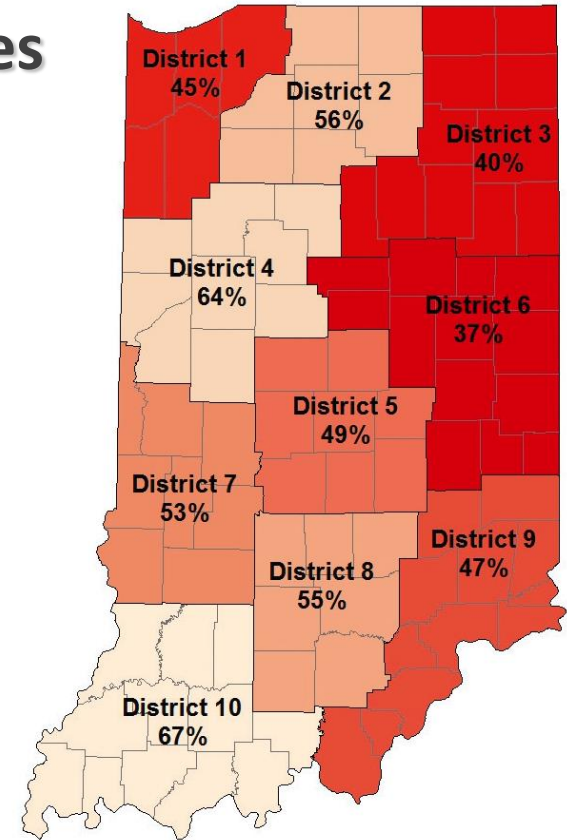
High value public health activities: targeting & tailoring

	<u>Activity</u>	<u>Mortality Effect</u>	<u>Cost Effect</u>	
Assessment	1. Conduct periodic assessment of community health status and needs	0.8%	0.6%	
	2. Survey community for behavioral risk factors	0.6%	0.3%	
	3. Investigate adverse health events, outbreaks and hazards	0.3%	0.1%	
	4. Conduct laboratory testing to identify health hazards and risks	0.1%	0.2%	
	5. Analyze data on community health status and health determinants	1.2%	2.4%	
	6. Analyze data on preventive services use	0.1%	2.1%	
Policy/Planning	7. Routinely provide community health information to elected officials	1.3%	2.2%	
	8. Routinely provide community health information to the public	1.8%	0.7%	
	9. Routinely provide community health information to the media	2.3%	1.1%	
	10. Prioritize community health needs	4.5%	5.3%	←
	11. Engage community stakeholders in health improvement planning	3.7%	4.6%	←
	12. Develop a community-wide health improvement plan	1.3%	1.4%	
	13. Identify and allocate resources based on community health plan	8.9%	7.9%	←
	14. Develop policies to address priorities in community health plan	4.2%	3.7%	←
15. Maintain a communication network among health-related orgs.	0.7%	1.1%		
Assurance	16. Link people to needed health and social services	7.3%	8.4%	←
	17. Implement legally mandated public health activities	0.2%	0.4%	
	18. Evaluate health programs and services in the community	1.4%	1.2%	
	19. Evaluate local public health agency capacity and performance	0.3%	0.5%	
	20. Monitor and improve implementation of health programs and policies	3.9%	2.7%	←

Case Study: Indiana's Public Health System Strength

Evidence shows that when communities invest more in public health, they spend less on health care and live longer.

However, Indiana communities are less likely to be implementing nationally recommended public health activities compared to other states – those Foundational Public Health Services, in particular.



Map shows average proportion of activities completed by LHDs (weighted by population)



Case Study: Indiana vs. U.S. Public Health System Strength

<u>Network Measures</u>	<u>IN</u>	<u>US</u>	<u>Difference</u>
Network participation (%)			
Local public health agency	19.4%	35.6%	-83.2% **
State public health agency	18.4%	28.2%	-53.2% **
Other state agencies	7.0%	11.9%	-70.4% **
Other local agencies	14.3%	30.1%	-109.8% **
Federal agencies	4.7%	6.5%	-37.0%
Physician organizations	14.3%	18.0%	-25.2%
Hospitals	26.2%	38.9%	-48.3% **
Community health centers	14.1%	22.9%	-62.7% **
Faith-based organizations	10.3%	15.0%	-45.6%
Other nonprofits	15.0%	28.1%	-87.9% **
Health insurers	4.3%	9.7%	-127.3% **
Employers/businesses	9.1%	12.4%	-36.2%
Schools	11.4%	22.2%	-95.6% **
Higher education institutions	7.6%	15.4%	-102.5% **
Other organizations	1.3%	3.8%	-181.3% **
Composite Network Strength (%)			
Comprehensive	10.6%	32.7%	-208.20% **
Conventional	7.6%	13.5%	-78.40% **
Limited	81.8%	53.8%	34.30% **

***p<0.001 **p<0.05

Case Study of Indiana: Estimated Health & Economic Effects of System Improvement

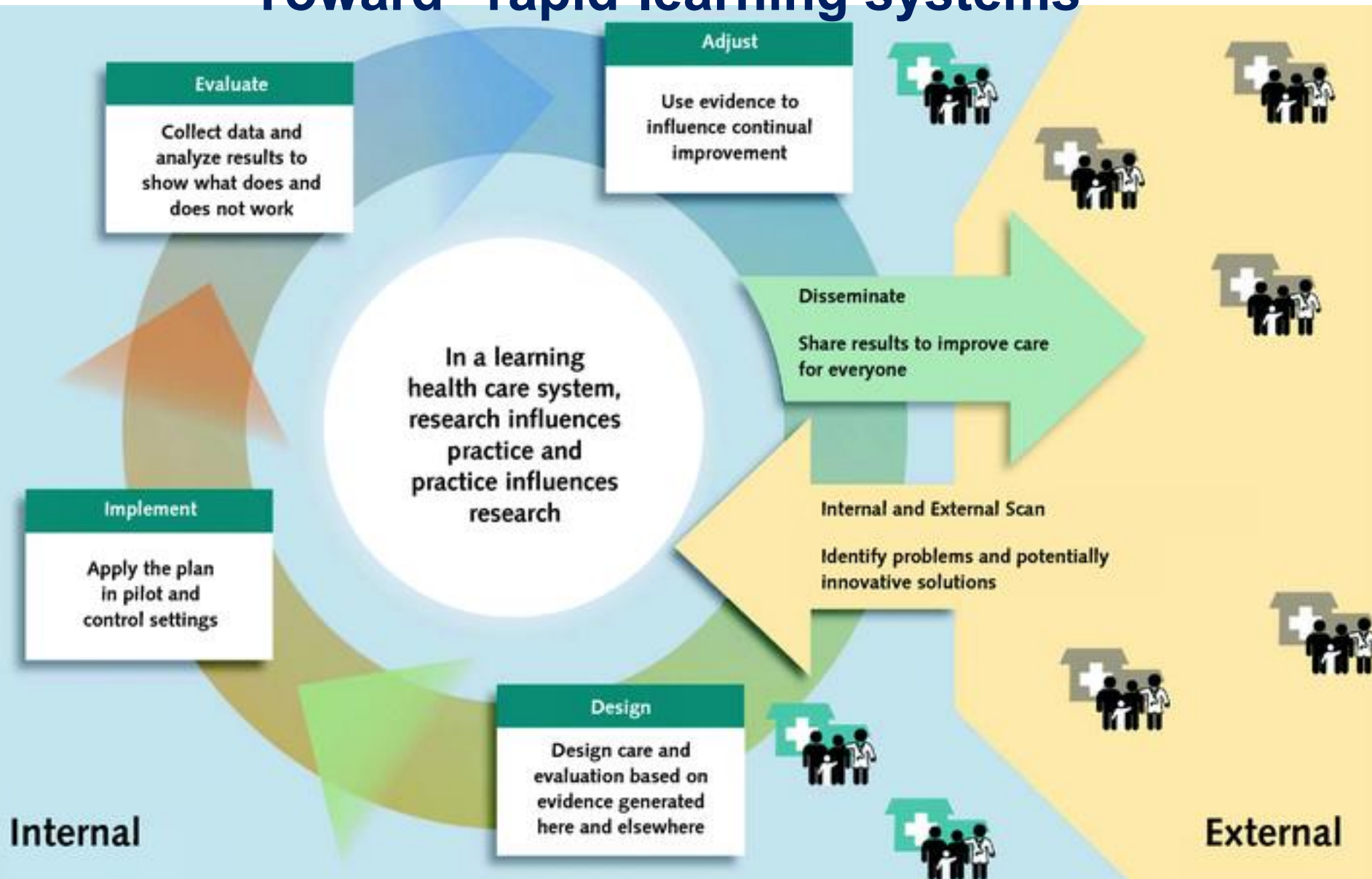
Outcome	Estimated Values Attributable to System Improvement				
	Current Value	Improve to U.S. Level		Improve to 100% Capability	
		Estimate	Std. Error	Estimate	Std. Error
Age-adjusted mortality rate					
All-cause	848.6	835.2	6.7	794.5	27.2
Heart disease	183.2	174.8	3.1	149.2	12.5
Diabetes	26.6	25.4	0.6	21.9	2.3
Cancer	170	166.8	1.6	157.1	6.4
Influenza	13.8	12.0	0.7	6.6	3.0
Infant mortality	7.3	7.1	0.1	6.4	0.4
Number of deaths averted per year	--	890.2	447.6	3604.0	1811.9
Life Expectancy					
Bottom 25% of family income	78.0	78.9	0.2	81.7	1.0
Top 25% of family income	87.6	87.8	0.1	88.4	0.3
Difference	9.5	8.8	0.2	6.7	0.8
Average gain in years of life					
Bottom 25% of family income	--	0.9	0.2	3.7	1.0
Top 25% of family income	--	0.2	0.1	0.8	0.3
Change in annual medical spending					
Medicare	\$13.4B	-\$66.5M	\$31.5M	-\$269.3M	\$127.4M
Medicaid	\$8.9B	-\$43.8M	\$20.7M	-\$177.5M	\$84.0M
Private	\$16.9B	-\$83.8M	\$39.7M	-\$339.4M	\$160.6M
Total	\$39.3B	-\$194.2M	\$91.9M	-786.2M	\$372.0M

Case Study of Indiana: Estimated Net Benefit of System Improvement

<u>Estimate</u>	<u>Level of Public Health System Improvement</u>	
	<u>Improve to U.S. Level</u>	<u>Improve to 100% Capability</u>
Additional public health spending required per year (\$M) ¹	81.18	328.45
Medical spending reductions per year, discounted (\$M)	-167.52	-678.18
Net cost savings (\$M)	-86.34	-349.73

1. Estimate based on Mamaril and Mays (2018)

Harvesting the power of public health systems: Toward “rapid-learning systems”



Conclusions and implications

- Large health & economic gains attributable to strong public health systems
- Larger gains for low-income populations & communities
- Comprehensive systems do more than just plan: prioritize, invest, implement, evaluate
- Opportunity: most communities currently lack strong PH systems, especially in rural areas
- Policy incentives and resources can help:
 - Public health accreditation
 - Hospital community benefit
 - Value-based health care payments
 - Insurer and employer incentives
- Sustainability and resiliency are not automatic

Implications for policy, practice & research

- Leveraging federal funding
- State & local contributions
- Private sector contributions
 - Shared savings
 - Impact investing

Systems for Action

National Coordinating Center

Systems and Services Research to Build a Culture of Health

<http://www.systemsforaction.org>