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Creating Learning Systems: Lessons from Public Health Practice-Based Research Networks

Glen P Mays, *University of Kentucky*



Available at: https://works.bepress.com/glen_mays/155/

Creating Learning Systems: Lessons from Public Health Practice-Based Research Networks

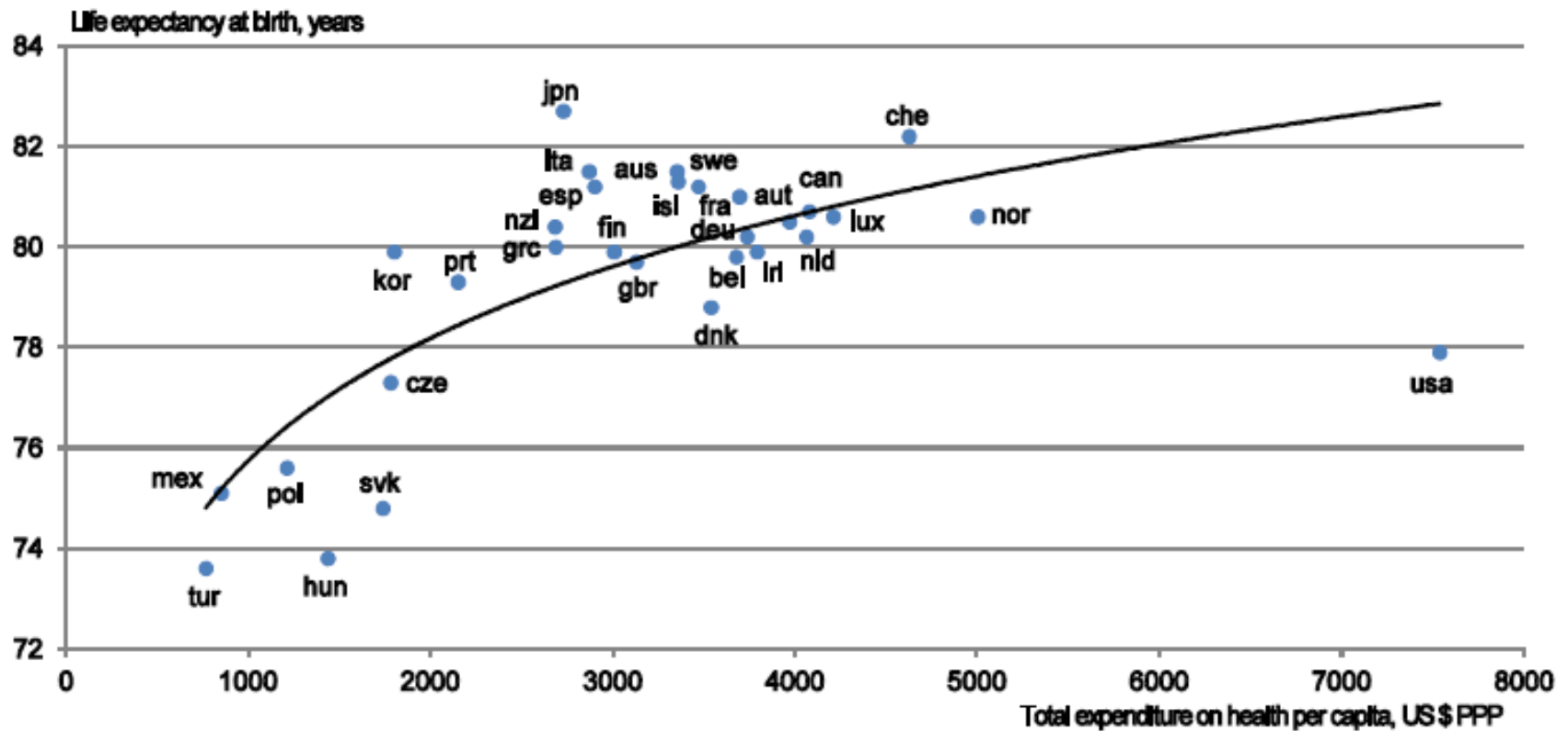
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SPOR Strengthening Workshop • Toronto CA • 7 April 2014

Failures in health production

Figure 1. There are large differences in life expectancy and health care spending across OECD countries 2008¹

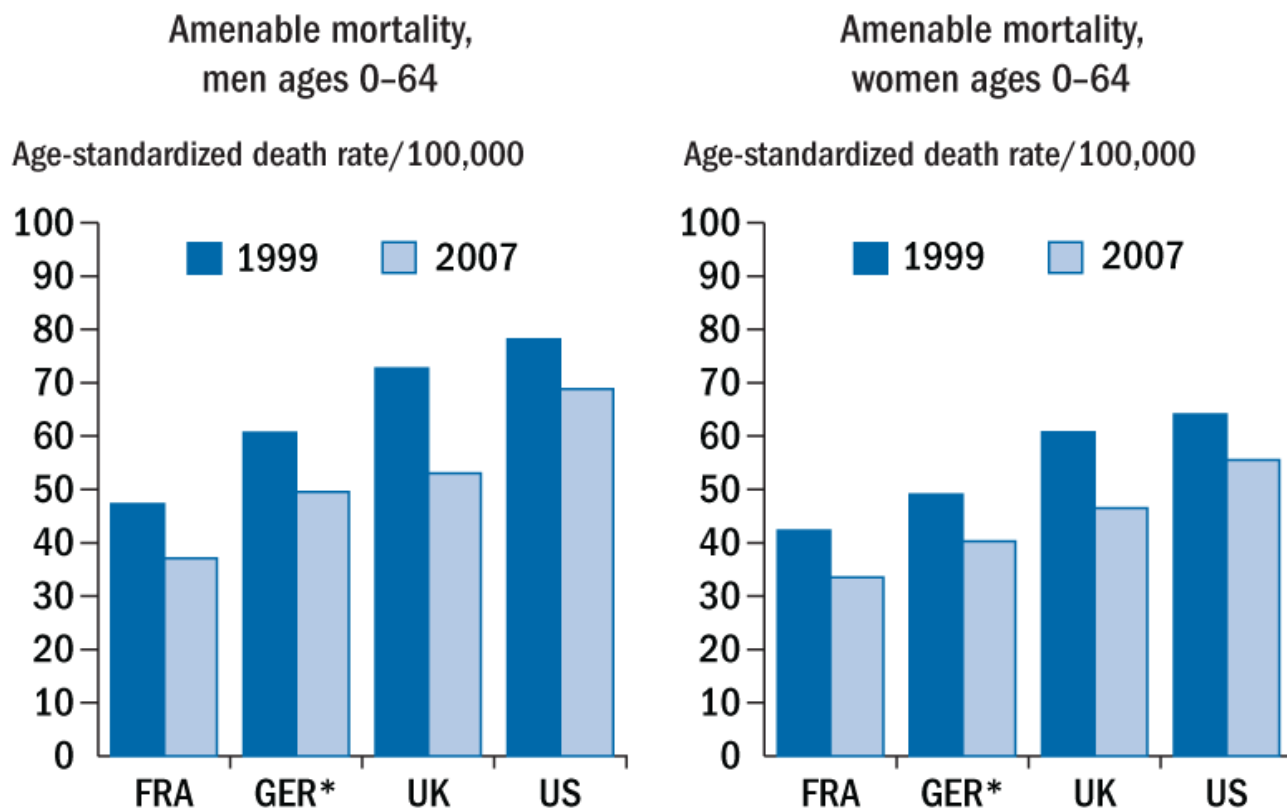


1. Or latest year available.

Source: OECD Health Data 2010.

Failures in health production

U.S. Men and Women Under Age 65 Have Higher Rates of Potentially Preventable Deaths Slowest Rate of Improvement, 1999–2007



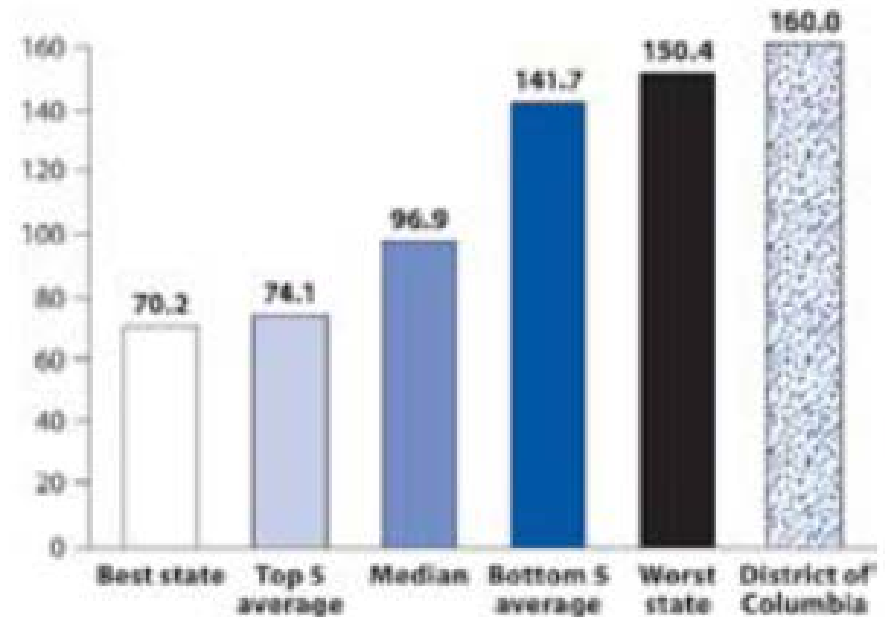
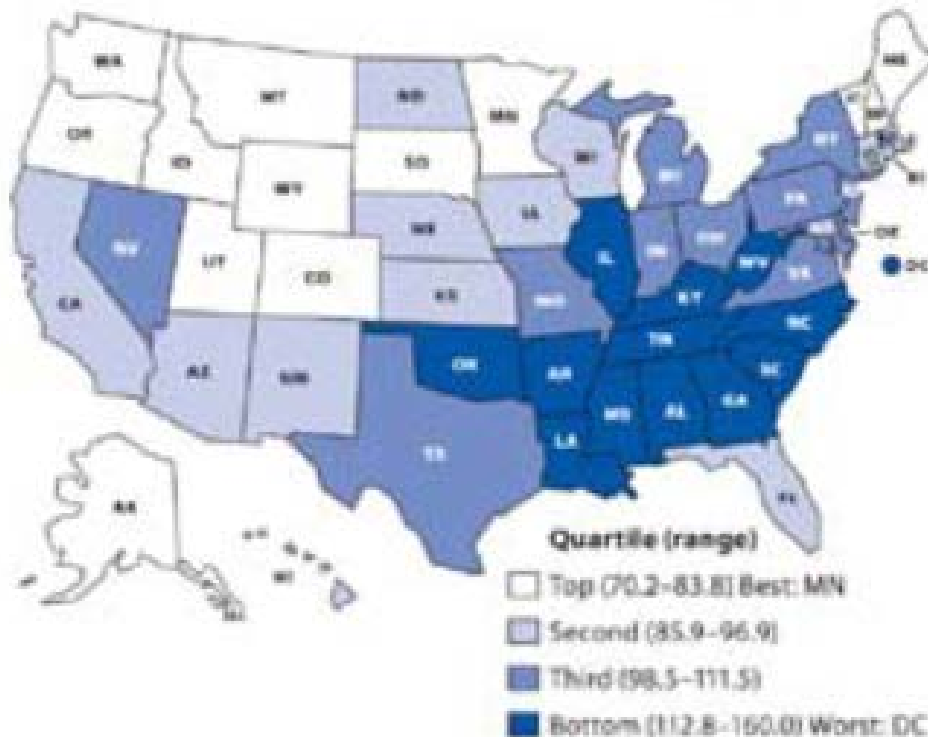
* Data for Germany are 1999 and 2006.

Source: Adapted from E. Nolte and C. M. McKee, "In Amenable Mortality—Deaths Avoidable Through Health Care—Progress in the US Lags That of Three European Countries," *Health Affairs*, published online Aug. 29, 2012.

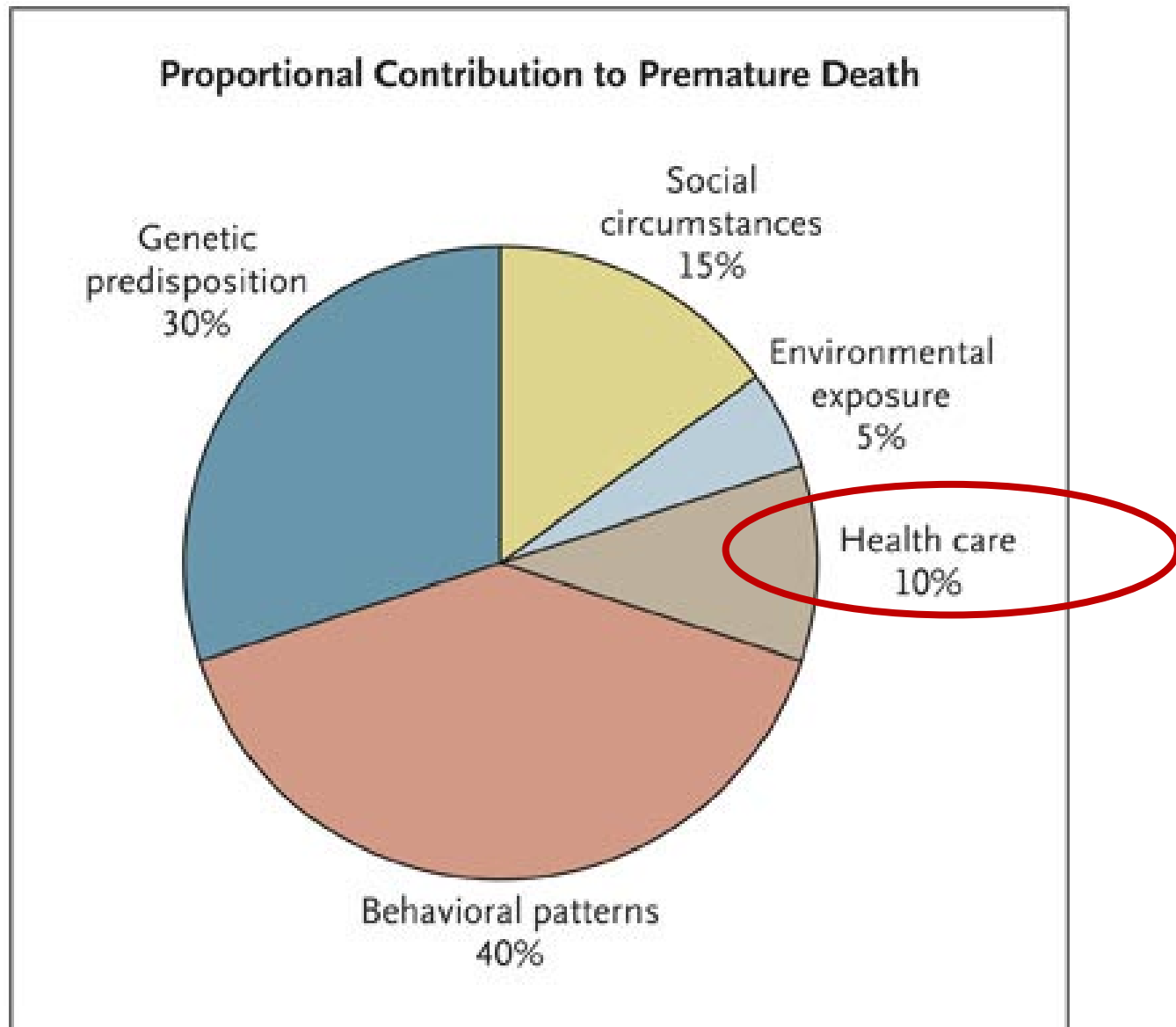
Failures in health production

Premature Deaths per 100,000 Residents

U. S. Average = 103 Deaths per 100,000



Drivers of population health failures



Preventable disease burden and national health spending

>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

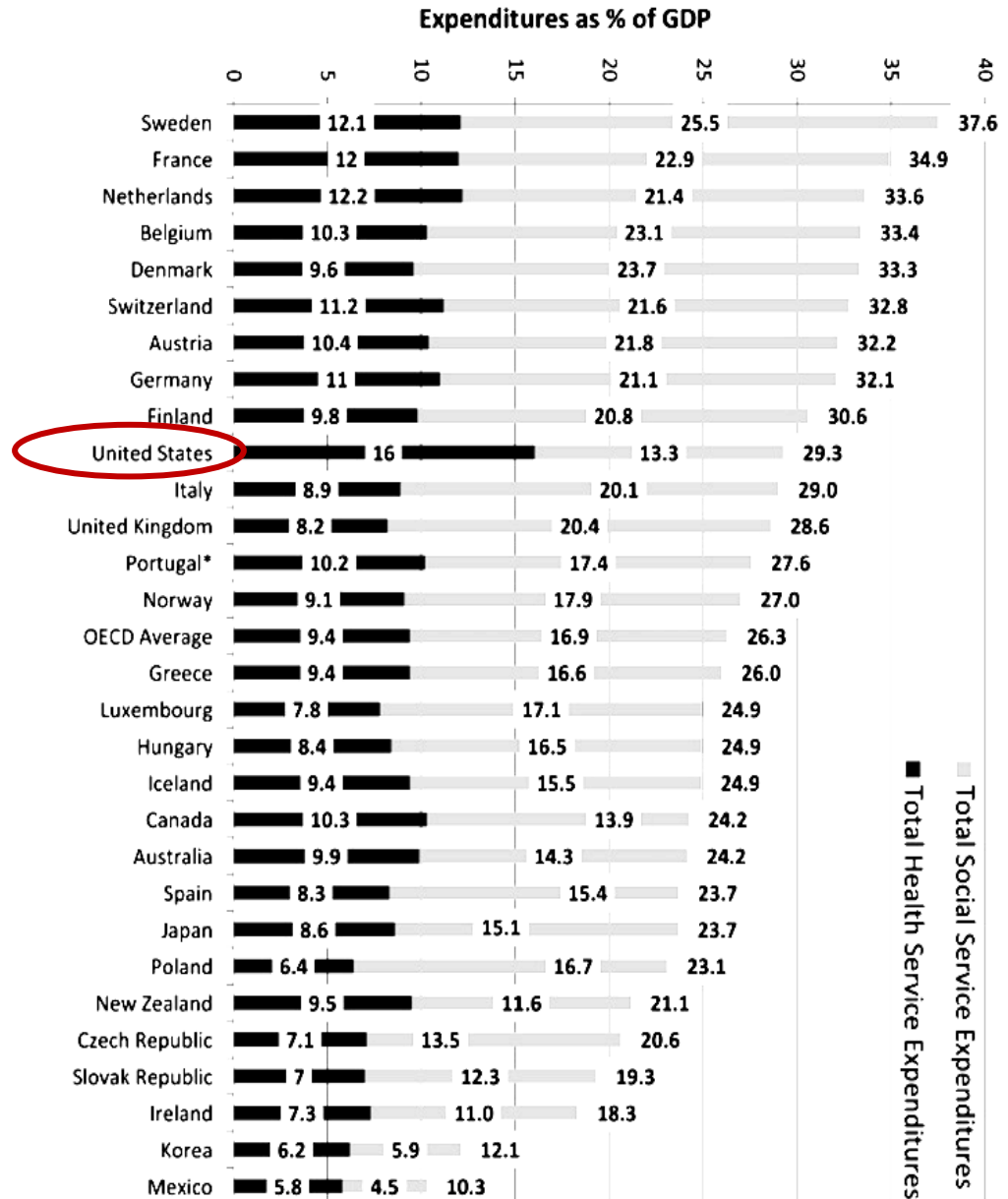
<5% of US health spending is allocated to prevention and public health

Social Investments and Health

Ratio of non-health care social spending to health care social spending:

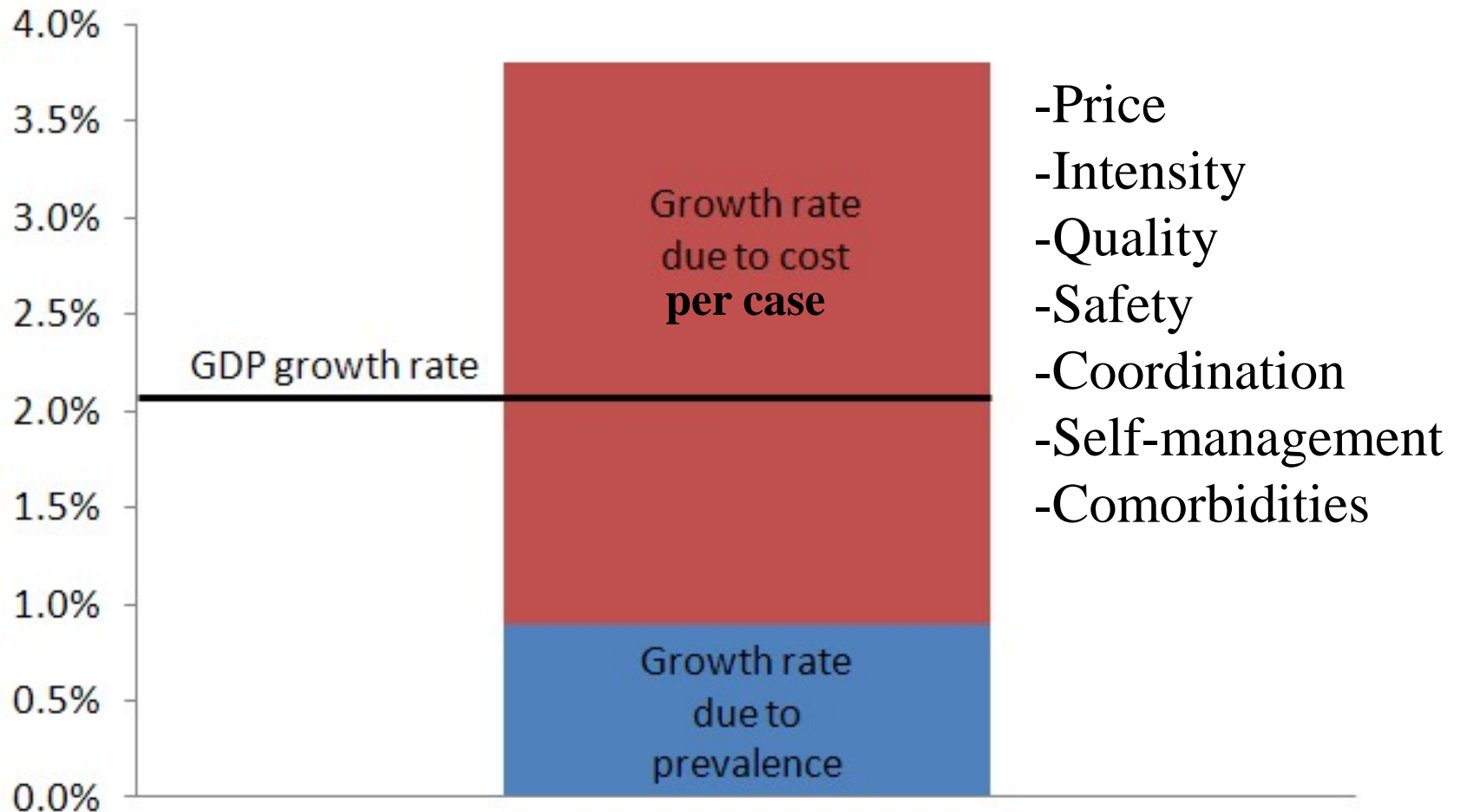
- 2.0 in the OECD countries
- 0.83 in the United States

Source: Bradley et al., 2011:3 (BMJ)

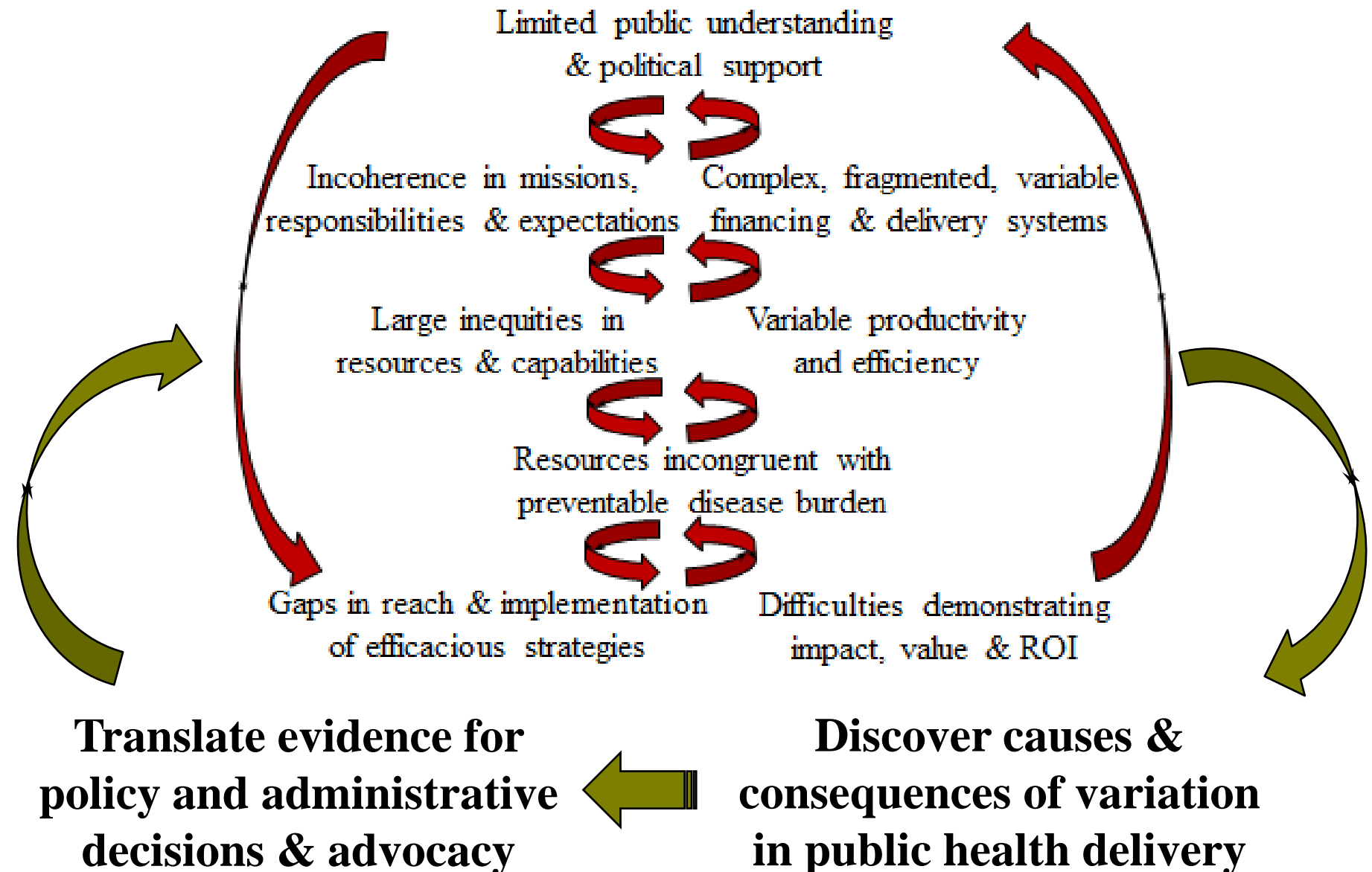


Bending the medical cost curve

Health spending growth rate 1996-2006



Vicious cycles to learning systems

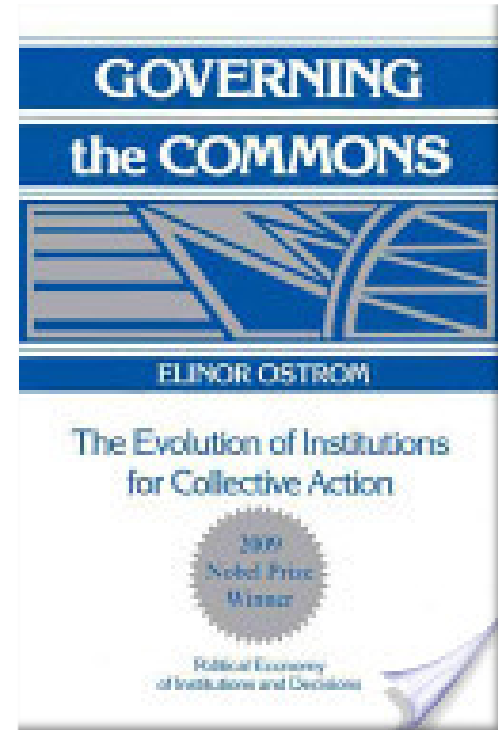


What are Population Health Strategies?

- 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
 - Public health authorities
 - Health care providers
 - Social & community-based organizations
 - Business, finance, economic development

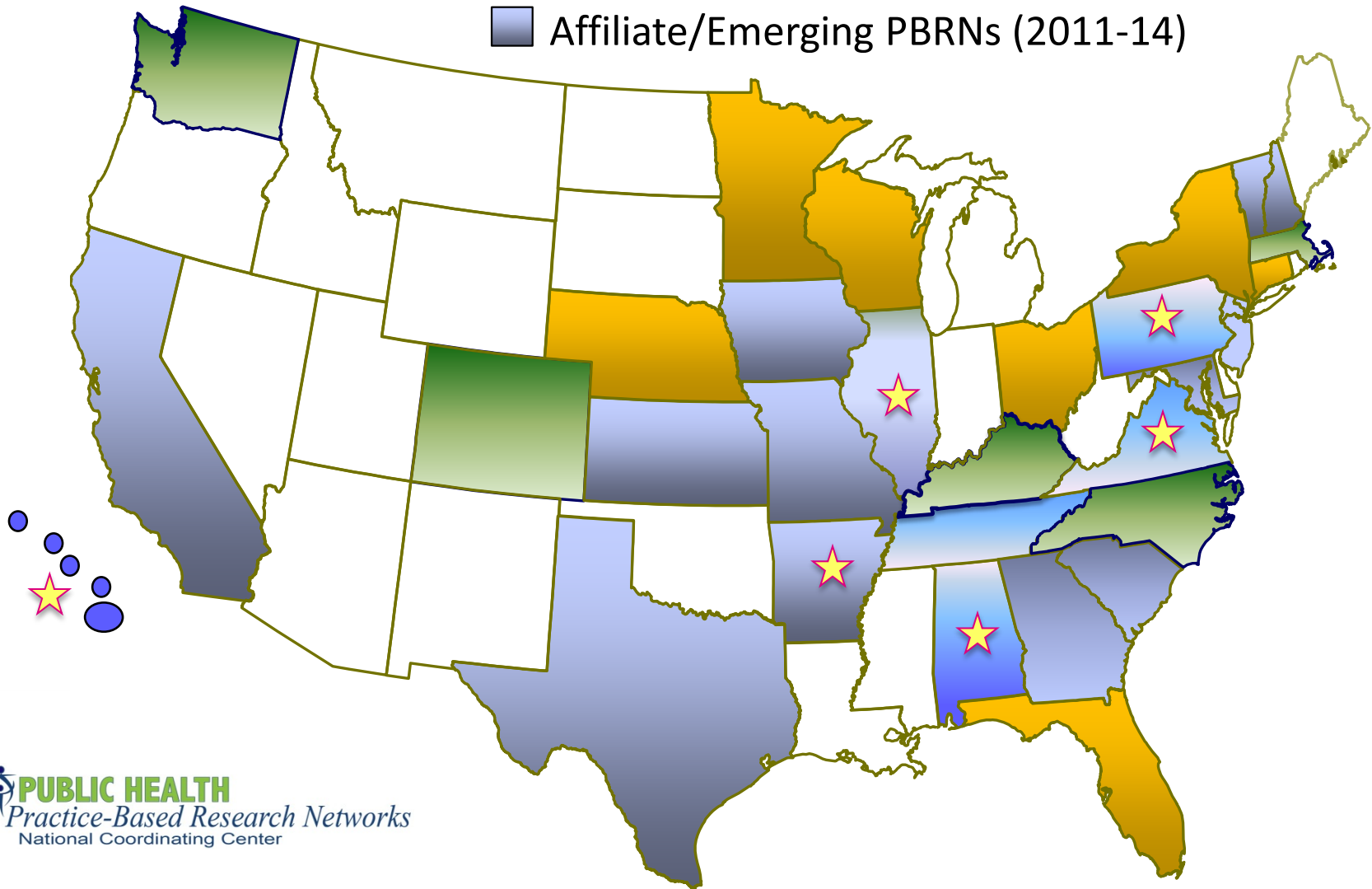
What Makes Population Health Strategies So Hard?

- 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

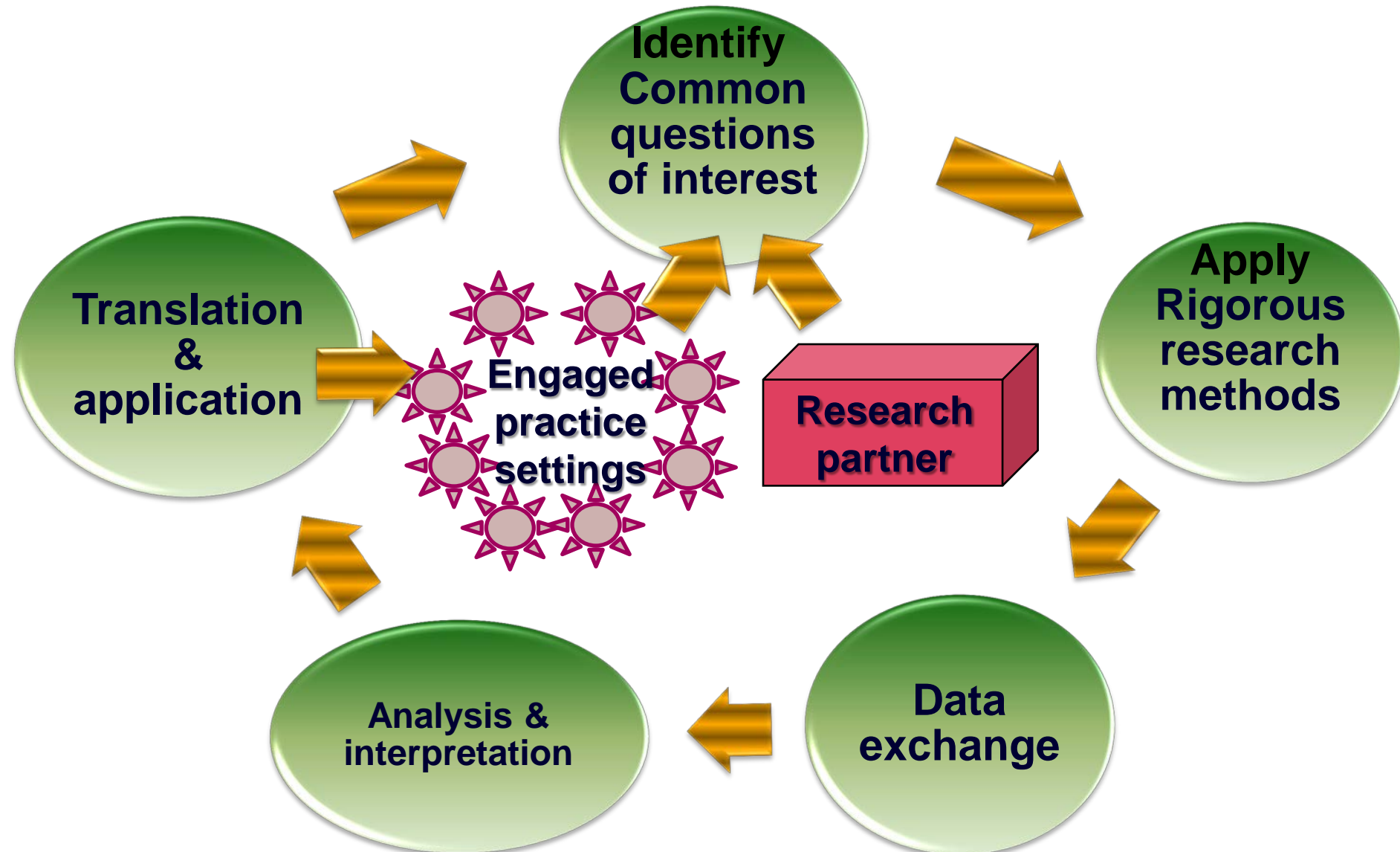


Diffusion of Public Health PBRNs

- First cohort (December 2008 start-up)
- Second cohort (January 2010 start-up)
- Affiliate/Emerging PBRNs (2011-14)



The Logic of Public Health PBRNs



What is Practice-Based Research in Public Health?

- Research that tests effectiveness & impact of public health practices in real-world ***public health settings***
- Research designed to address uncertainties and information needs of real-world public health ***decision-makers***
- Research that evaluates the implementation and impact of ***innovations in practice***
- Research that uses ***observations generated through public health practice*** to produce new knowledge

PBRN Reach

- 1593 local health agencies
- 35 state health agencies
- 52 academic research units
- 58 professional & community organizations

Research Progression

Delivery System Organization and Structure



Practice Variation



Volume, Intensity, and Quality of Delivery



Cost of Delivery



Value of Delivery

Productivity & Dissemination

- 60 competitively awarded research projects
- 81 articles in peer-reviewed journals
- 221 presentations and conferences & meetings
- 51 reports & tools in the grey literature
- Earned media in elite venues: *Modern Healthcare*, *Forbes*, *Kaiser Health News*, *Men's Health*
- >15,000 downloads of *Frontiers in PHSSR* articles
- >8,000 downloads from Research Archive
- >2,000 page views on PublicHealthEconomics blog

- Extramural research programs
 - Quick Strike studies
 - Natural Experiments in Public Health Delivery
 - Predoctoral and Postdoctoral Awards
 - Mentored Research Scientist Awards
- Intramural research activities
 - **Public Health Value**: Cost estimation & economic evaluation
 - **Public Health Reform**: Effects of ACA on public health delivery

■ Data Development

- Periodic census surveys of local and state agencies
- National Longitudinal Survey of Public Health Systems
- Tracking PH expenditures: US Census of Governments, Uniform Public Health Chart of Accounts
- Public Health Activities and Services Tracking (PHAST): compiling existing administrative data across states

■ Dissemination & Translation


- Weekly Work in Progress Webinars
- Open-access journal: ***Frontiers in PHSSR***
- Newsletters, Podcasts, Blogs
- Briefings with policy stakeholders

PBRNs and Practice Engagement

Local Health Departments Engaged in Research Implementation & Translation Activities During Past 12 months

	PBRN Agencies		National Sample		
<u>Activity</u>	<u>Percent/Mean</u>		<u>Percent/Mean</u>		
Identifying research topics	94.1%		27.5%		***
Planning/designing studies	81.6%		15.8%		***
Recruitment, data collection & analysis	79.6%		50.3%		**
Disseminating study results	84.5%		36.6%		**
Applying findings in own organization	87.4%		32.1%		**
Helping others apply findings	76.5%		18.0%		***
Research implementation composite	84.04	(27.38)	30.20	(31.38)	**
N	209		505		

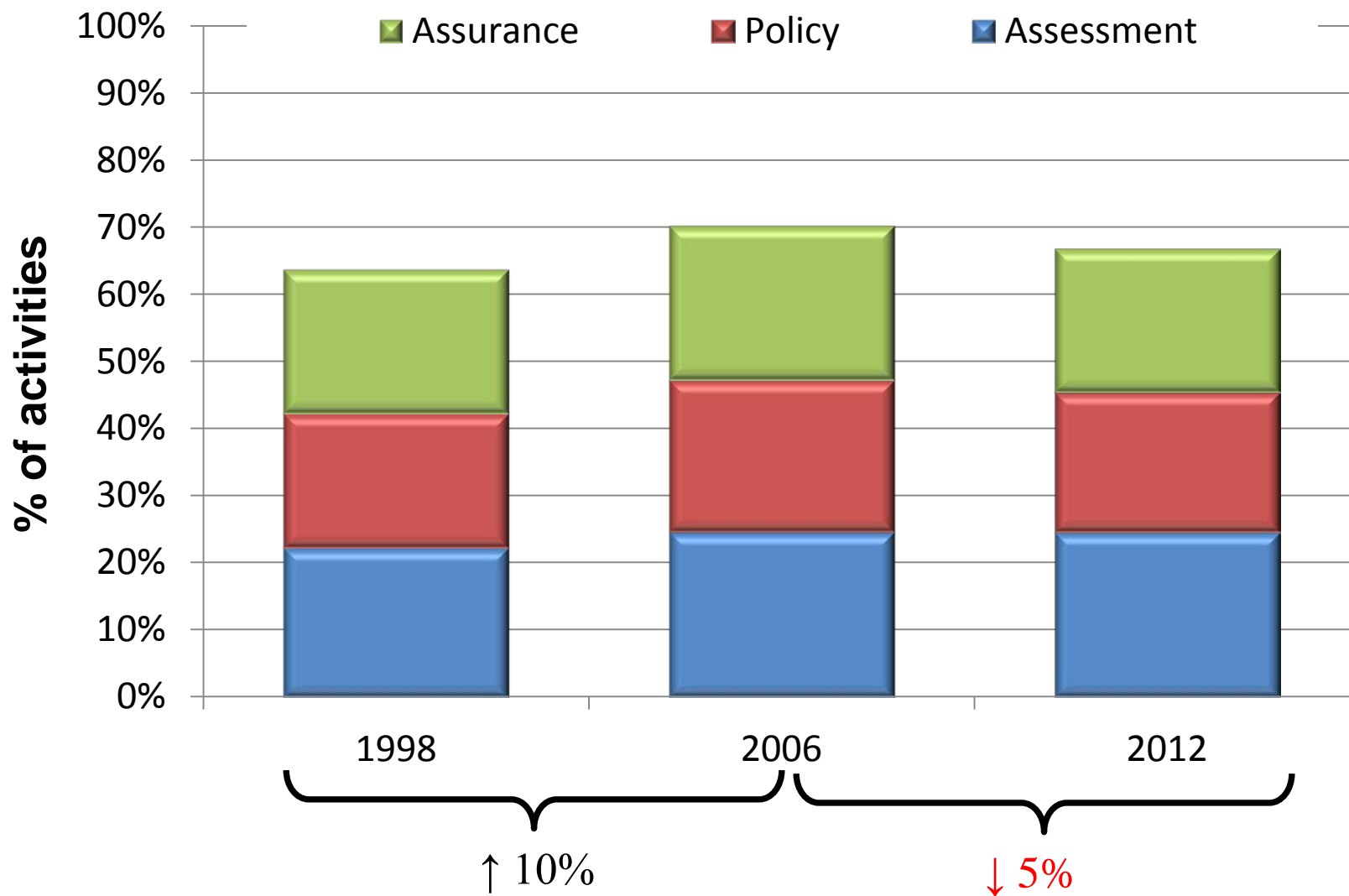
Mays et al. American Journal of Preventive Medicine 2013.



Research examples: organization and structure

- Who contributes to public health delivery?
- How are roles and responsibilities divided?
- How and why do delivery systems vary and change over time?
- How do system structures affect public health delivery and outcomes?

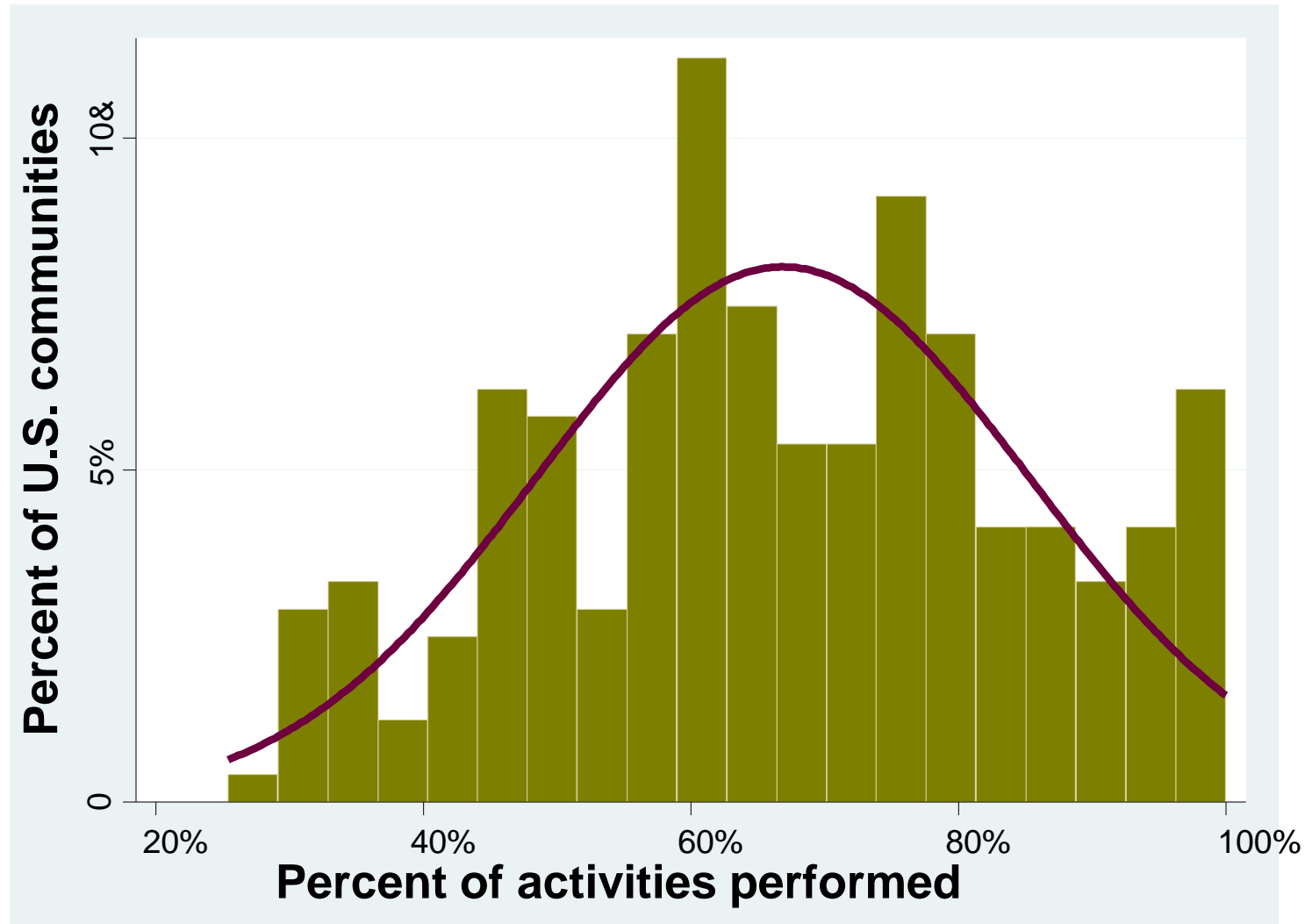
Delivery of recommended public health activities



National Longitudinal Survey of Public Health Systems, 2012

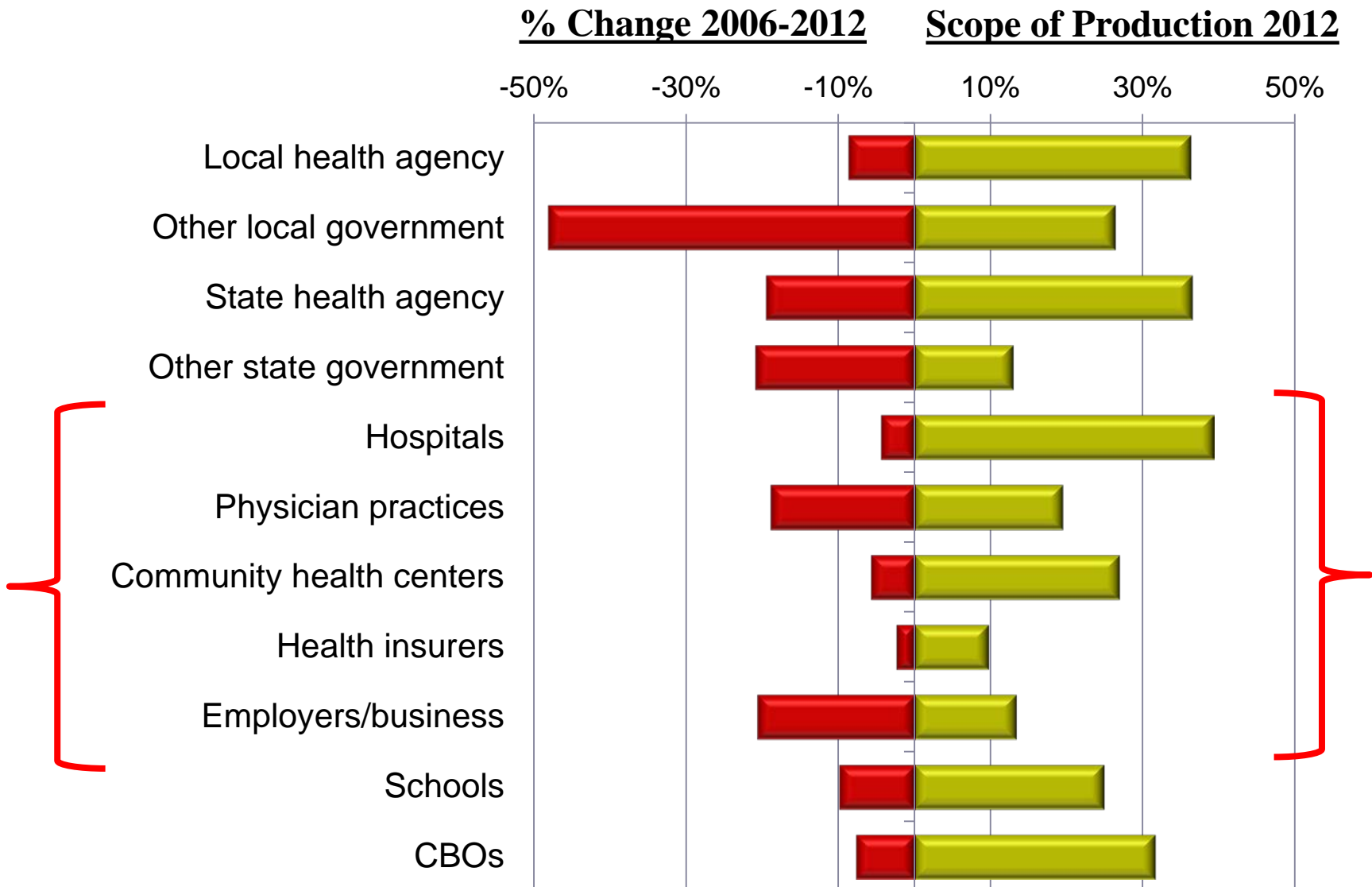
Variation in Scope of Public Health Delivery

Delivery of recommended public health activities, 2012



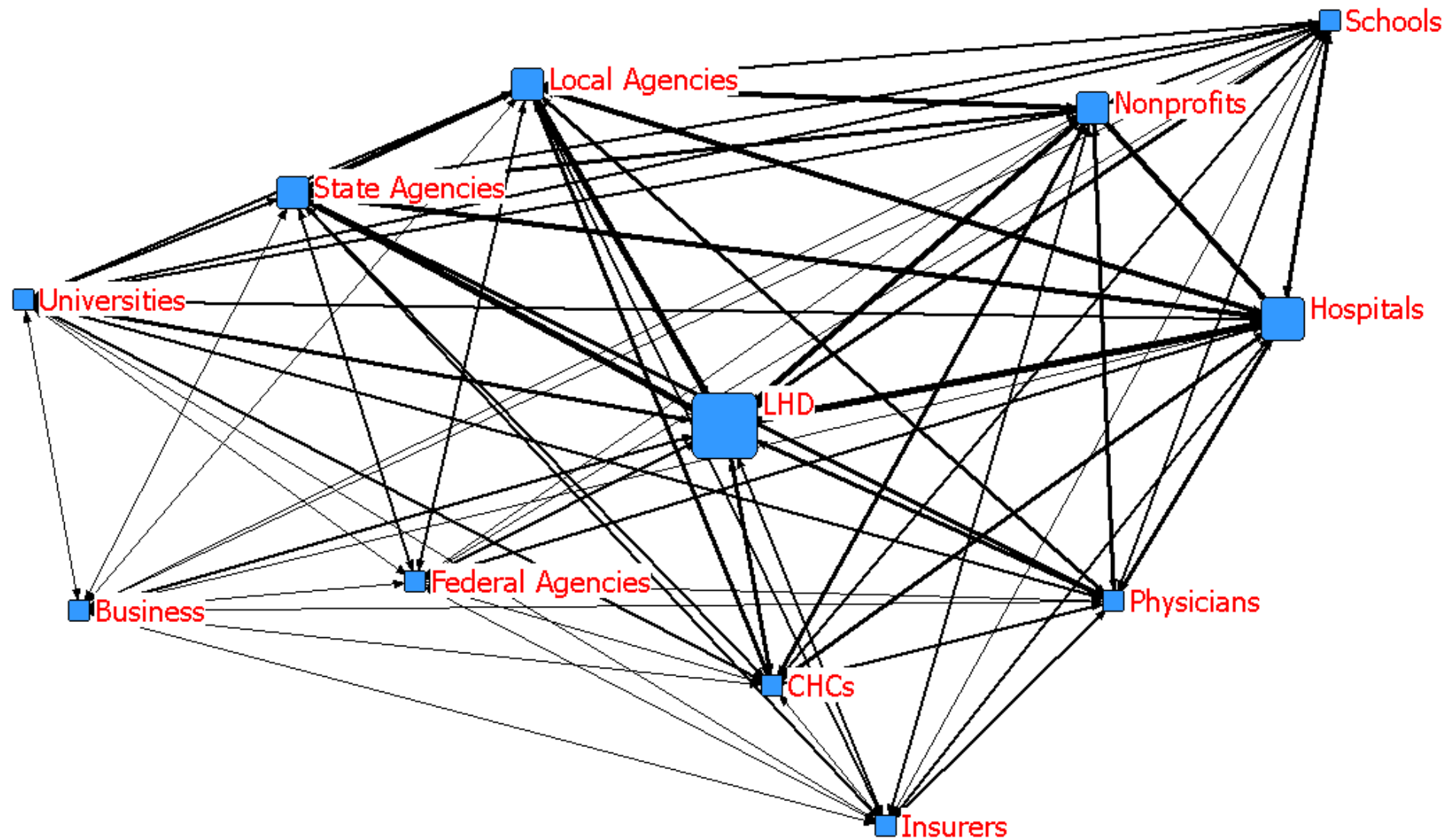
National Longitudinal Survey of Public Health Systems, 2012

Organizations contributing to local public health production



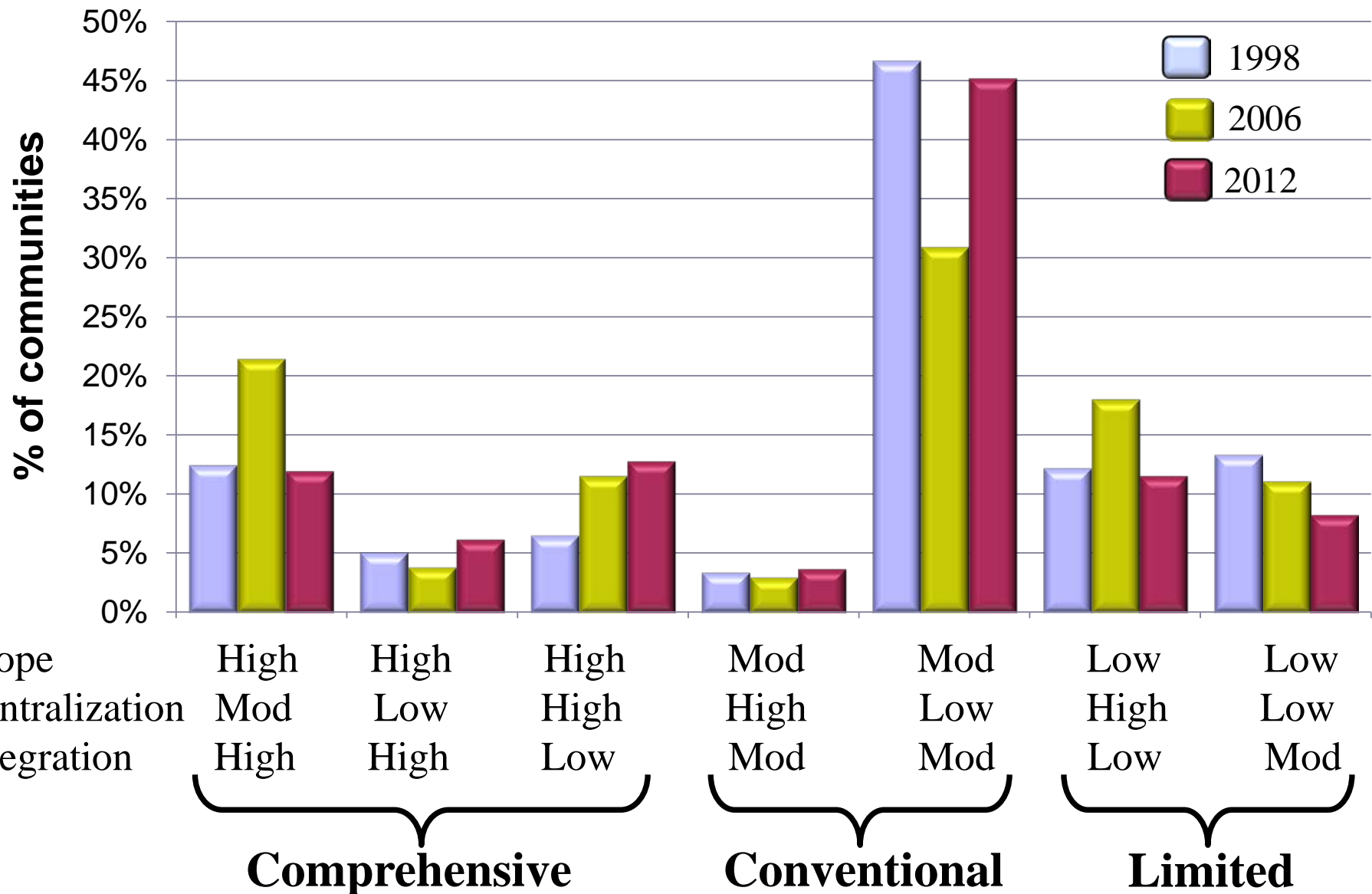
National Longitudinal Survey of Public Health Systems, 2012

Inter-organizational relationships in public health delivery systems



National Longitudinal Survey of Public Health Systems, 2012

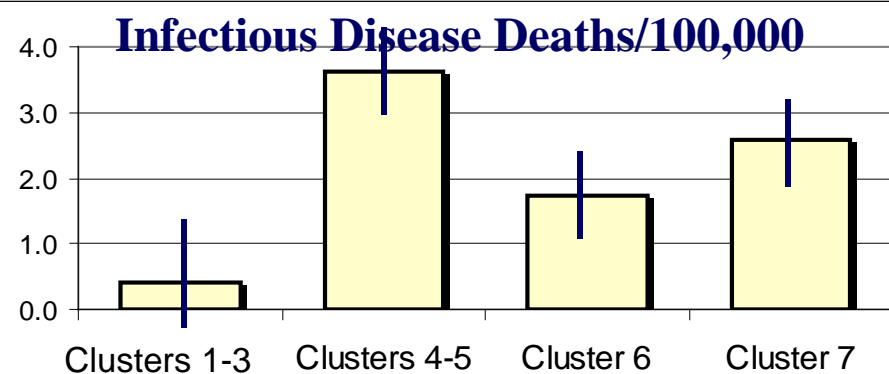
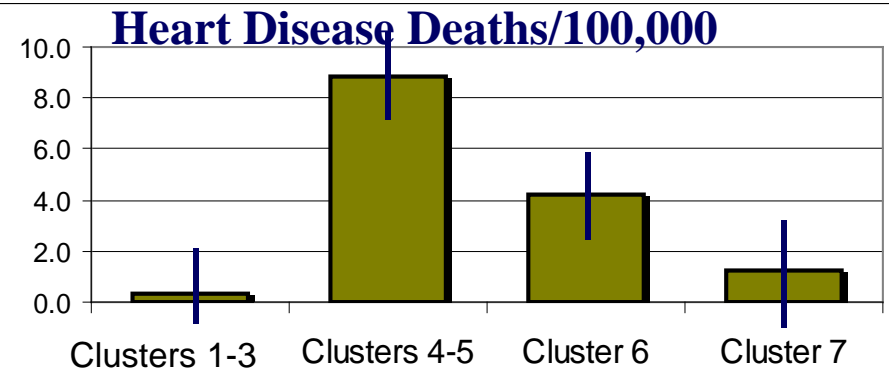
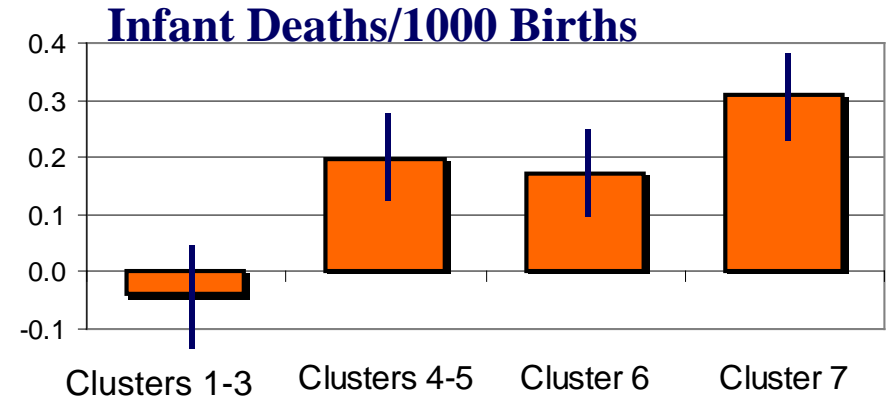
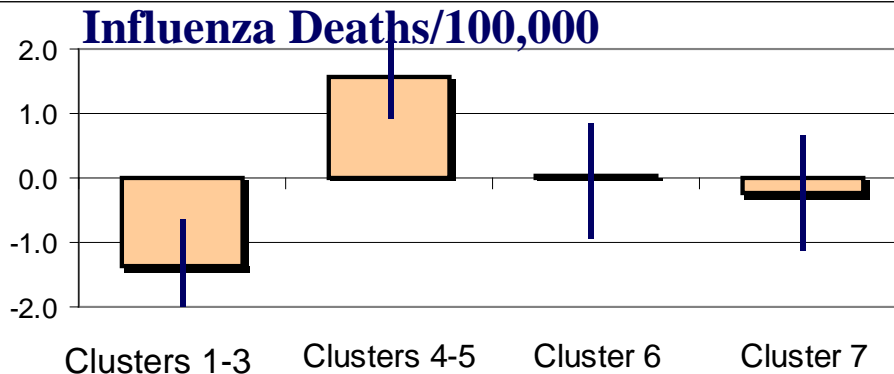
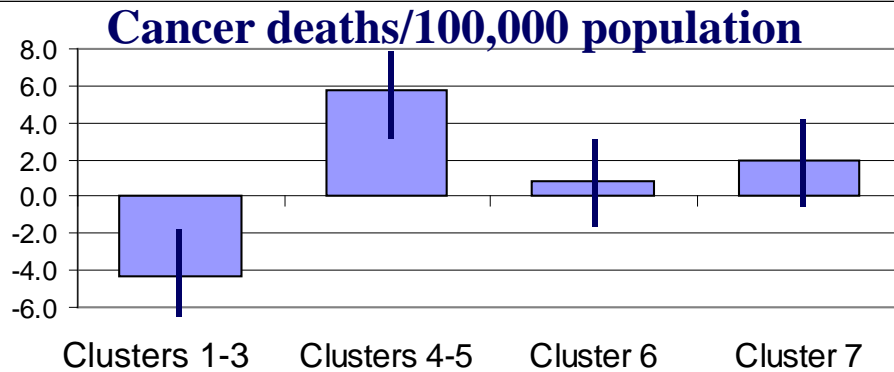
A typology of public health delivery systems



Source: Mays et al. 2010; 2012

Changes in health associated with delivery system

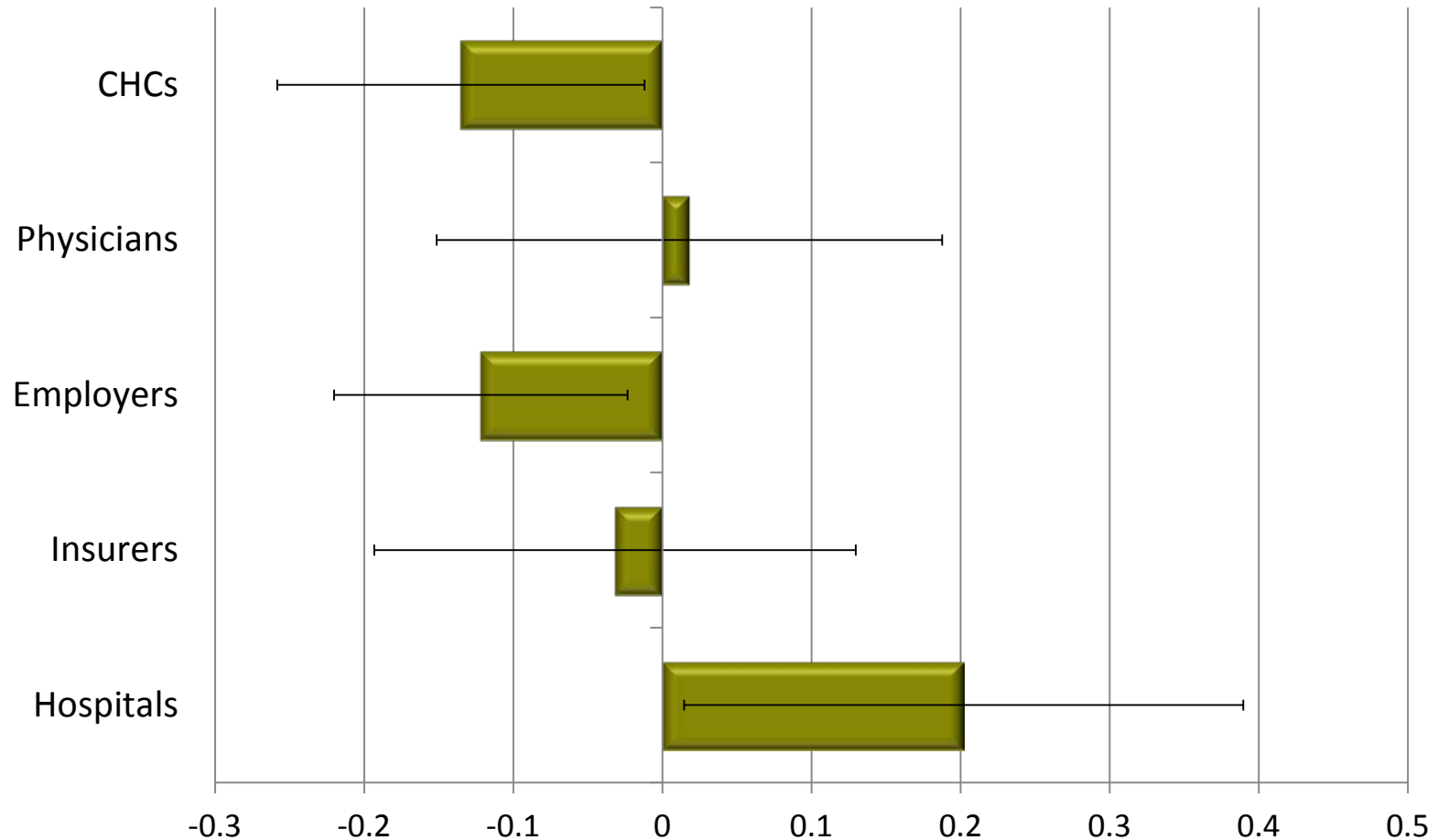
Percent Changes in Preventable Mortality Rates by System Typology (cluster)



Fixed-effects models control for population size, density, age composition, poverty status, racial composition, and physician supply

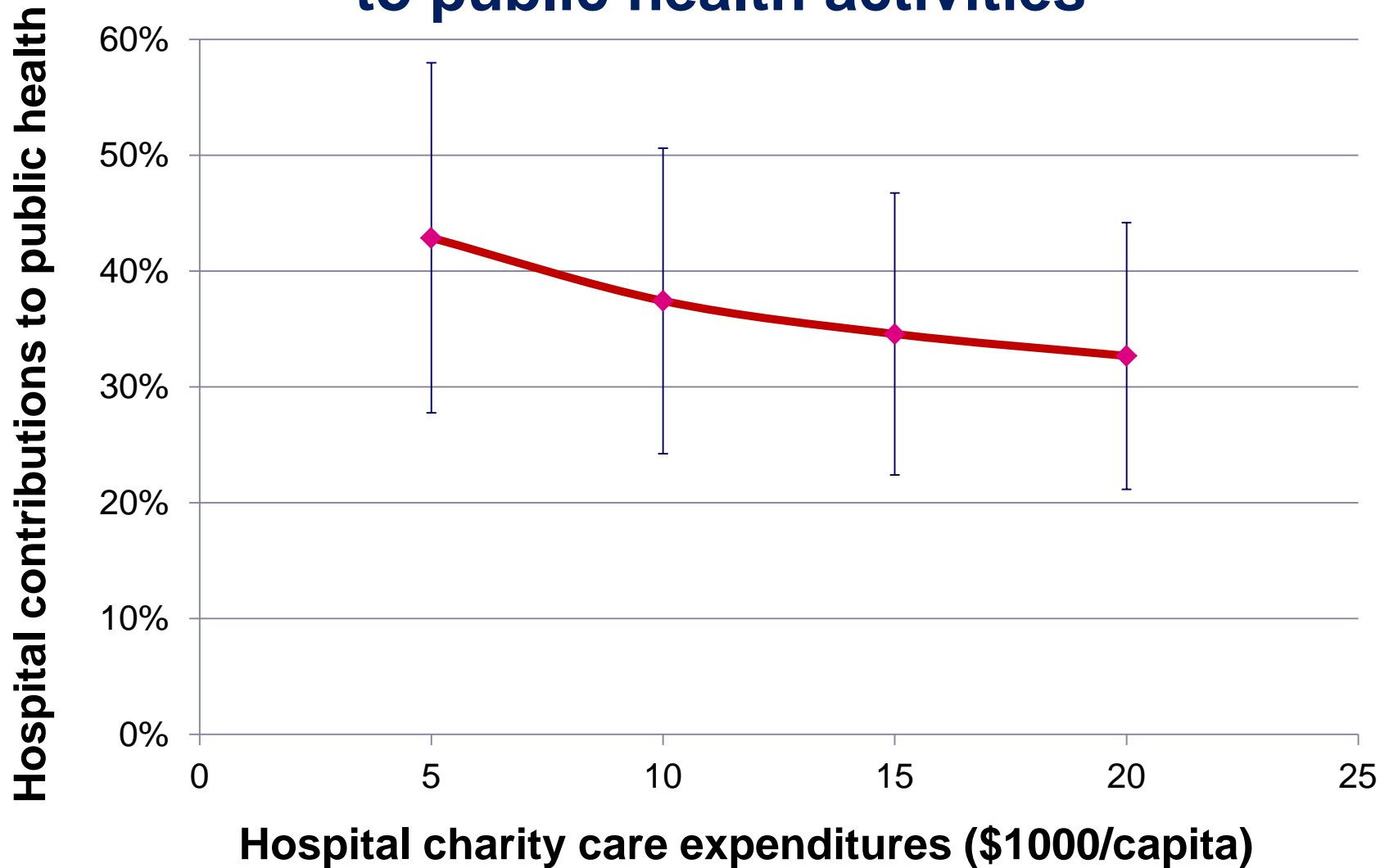
Do other organizations complement or substitute for local public health agency effort?

Results from Multivariate GLLAMM Models



Note: GLLAMM estimates, holding all other variables constant in the model

Estimated crowd-out in hospital contributions to public health activities

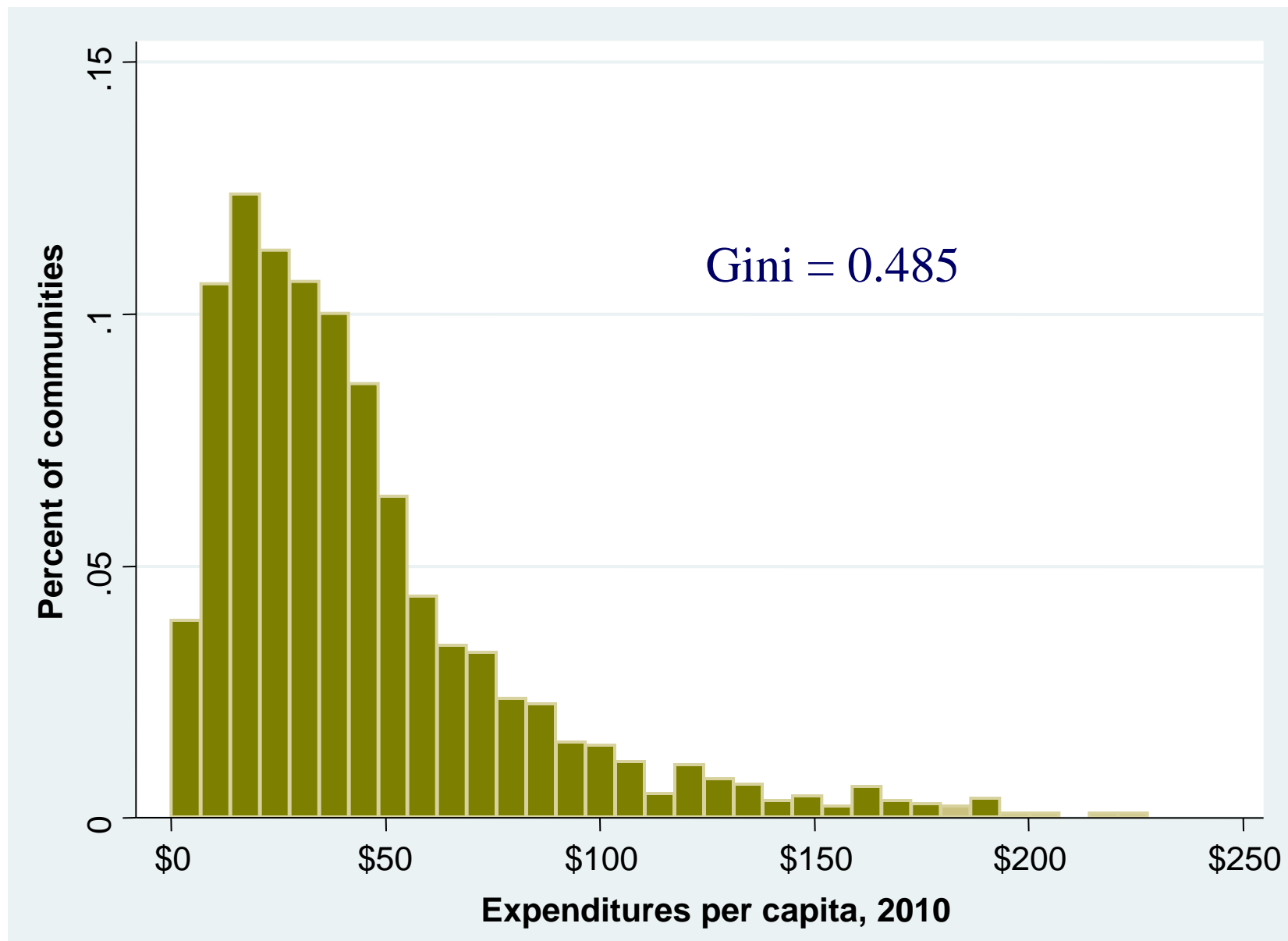


Note: GLLAMM estimates, holding all other variables constant in the model

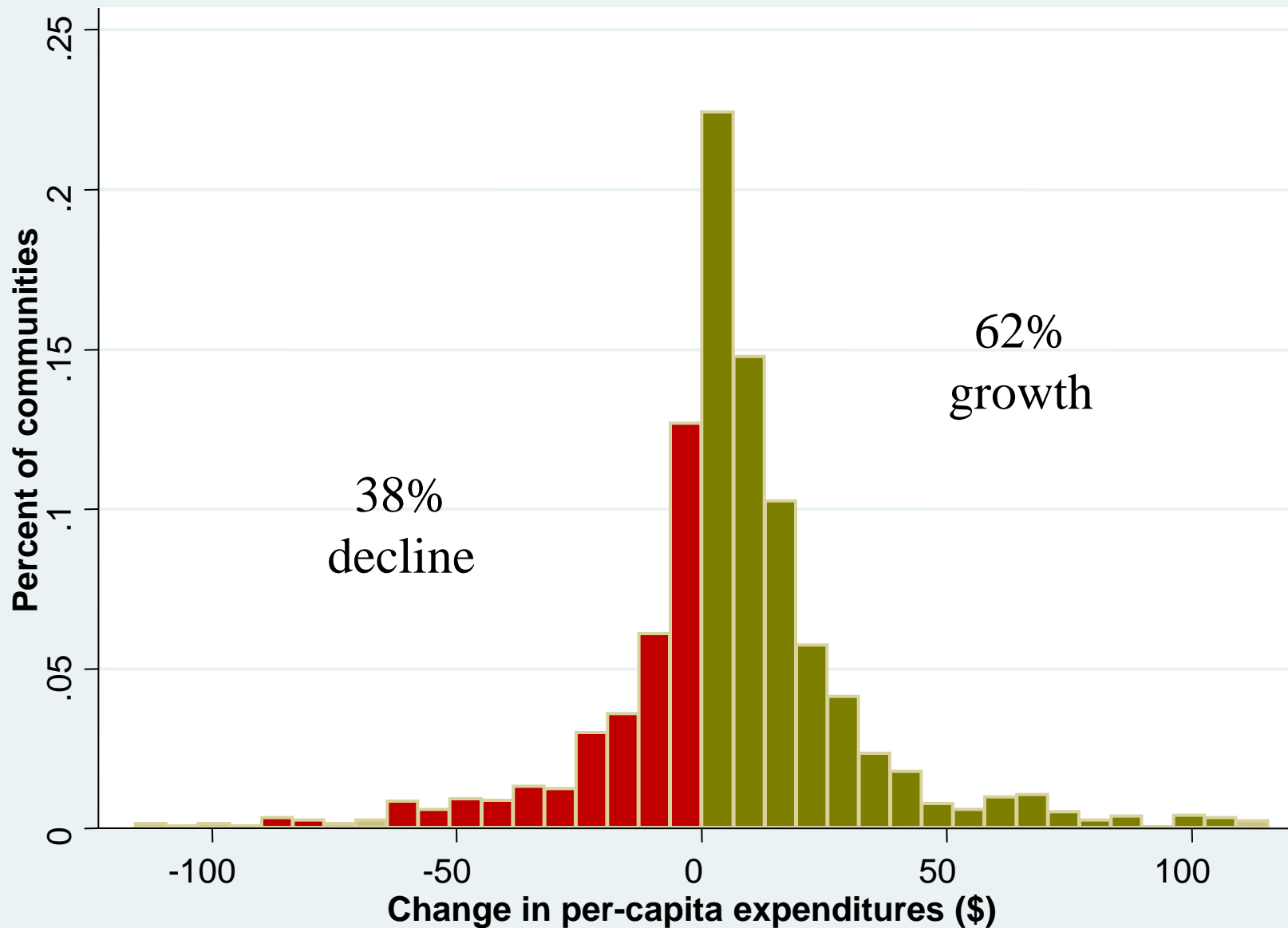
Research examples: financing, costs and economics

- How do ***public health*** investments vary across communities and change over time?
- What are the health effects attributable to changes in public health spending?
- What are the medical cost effects attributable to changes in public health spending?
- What are the opportunities for improving efficiency in public health delivery?

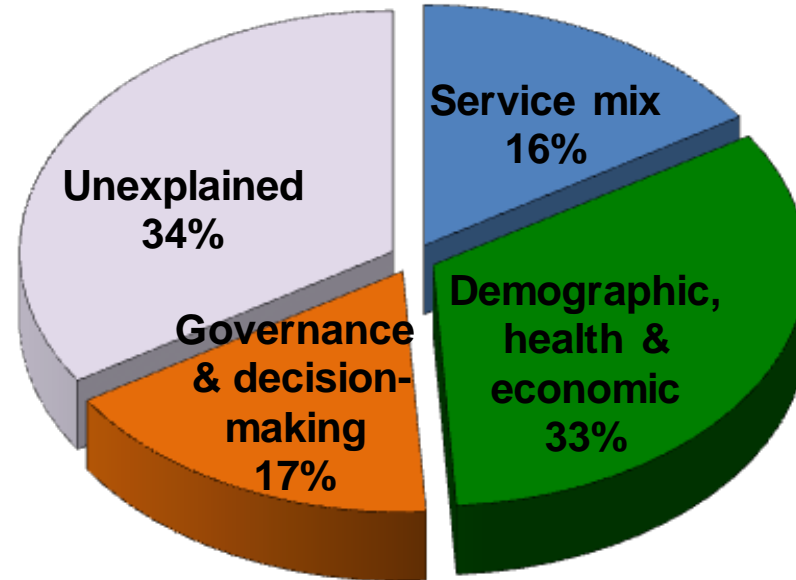
Variation in Local Public Health Spending



Changes in Local Public Health Spending 1993-2010

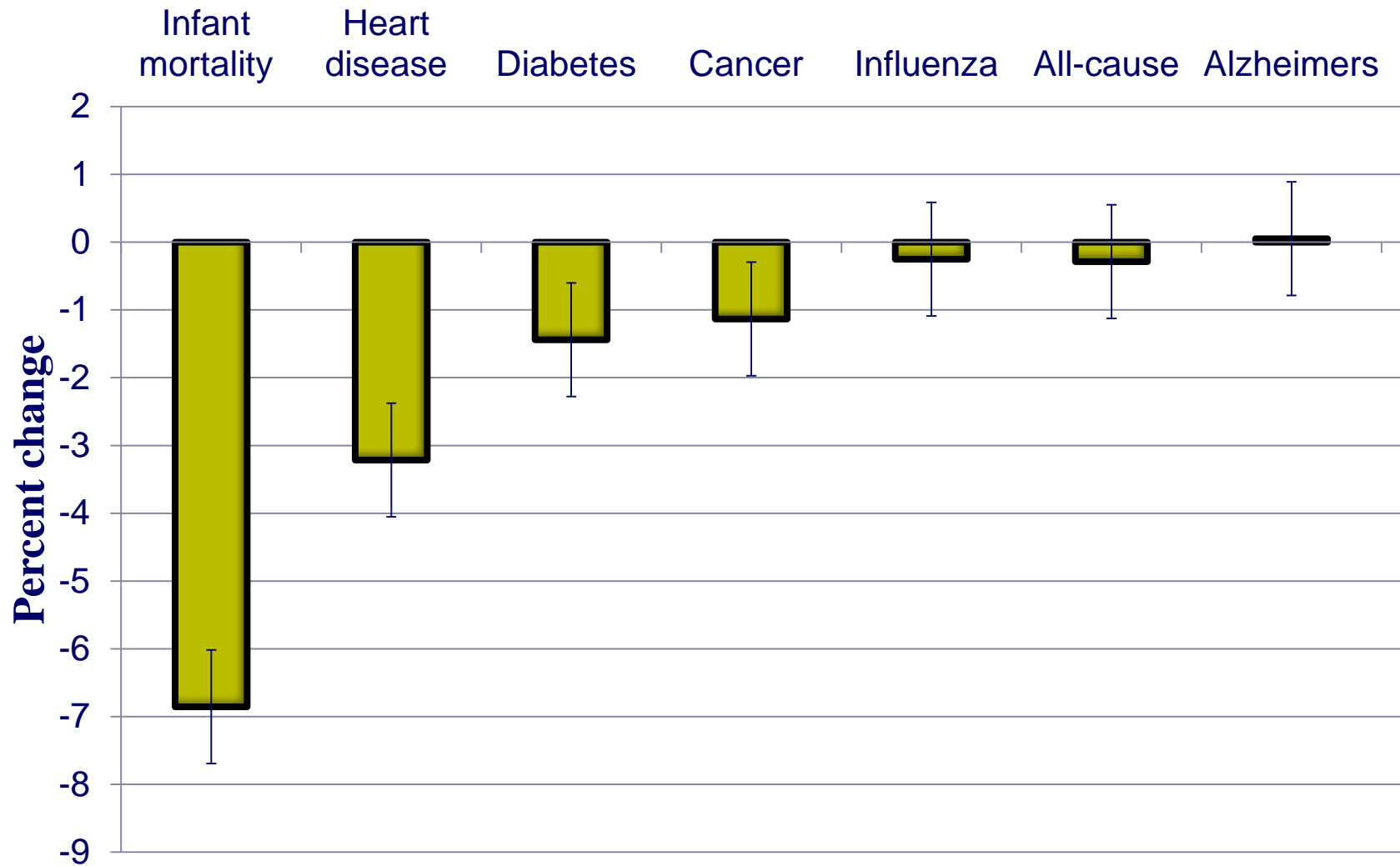


Determinants of Local Public Health Spending Levels



- Delivery system size & structure
- Service mix
- Population needs and risks
- Efficiency & uncertainty

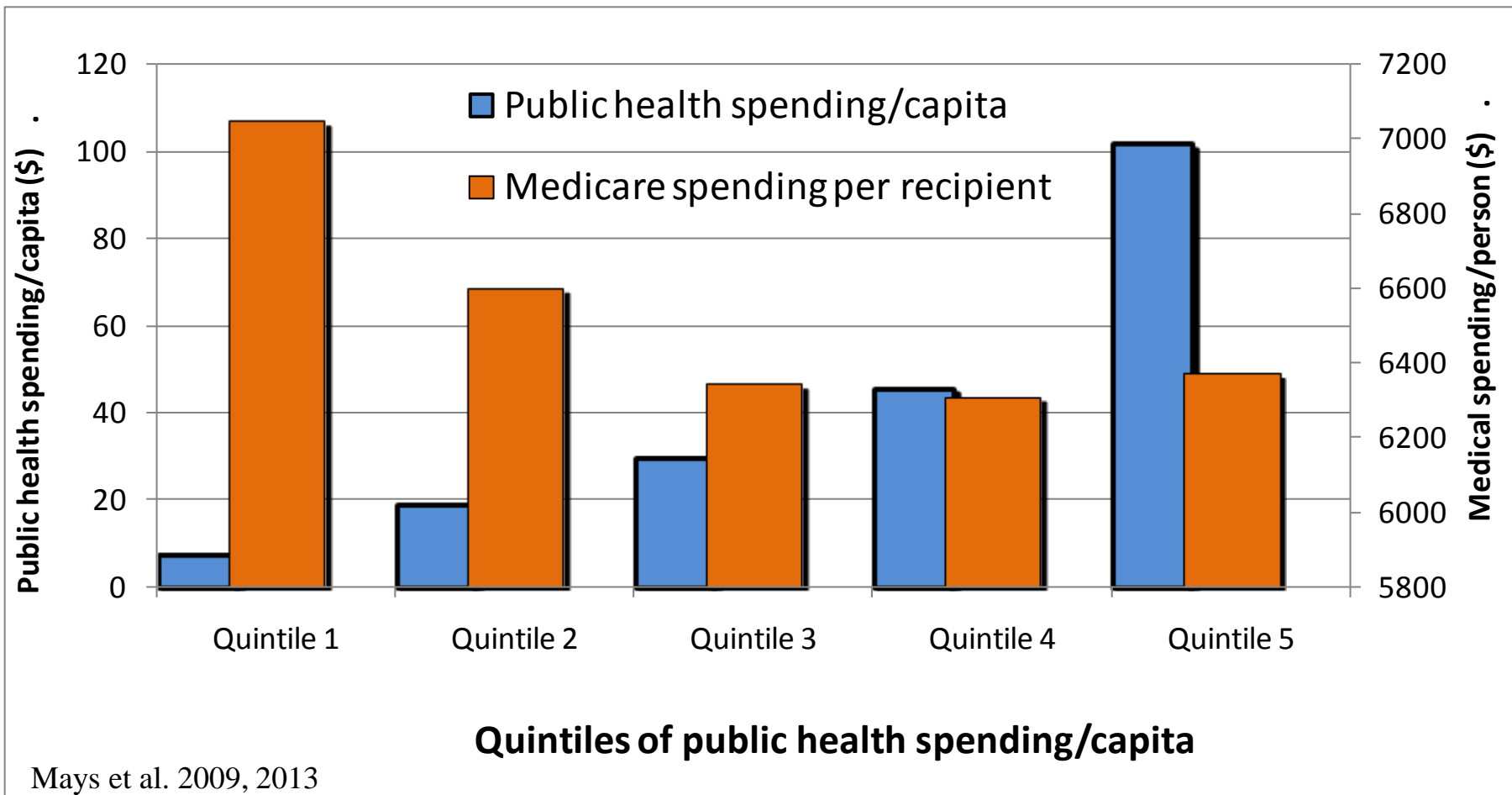
Mortality reductions attributable to local public health spending, 1993-2008



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

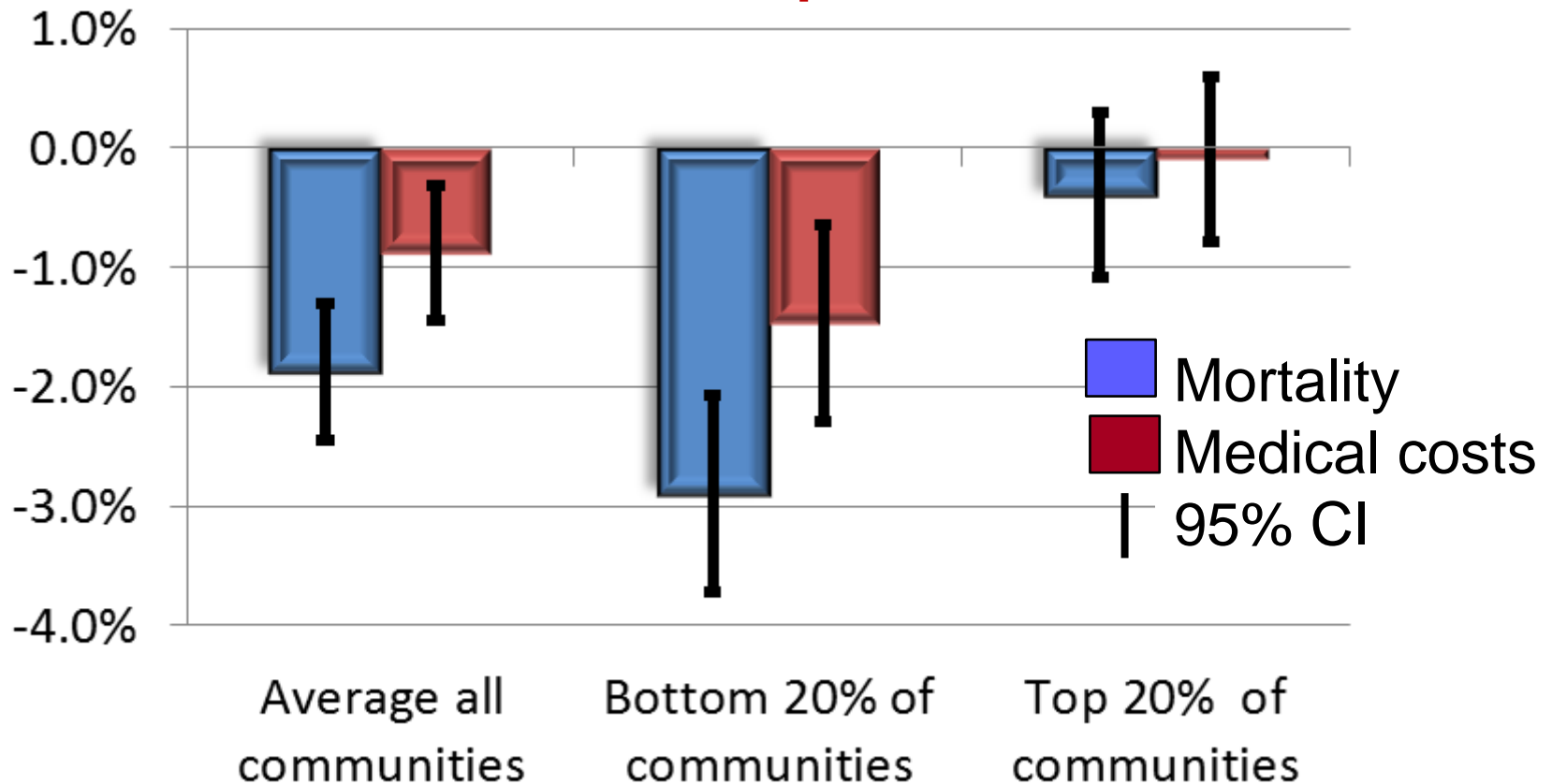
Medical cost offsets attributable to investments in public health delivery, 1993-2008

For every \$10 of public health spending, ≈\$9 are recovered in lower medical care spending over 15 years



Community-specific estimates of public health spending on heart disease mortality

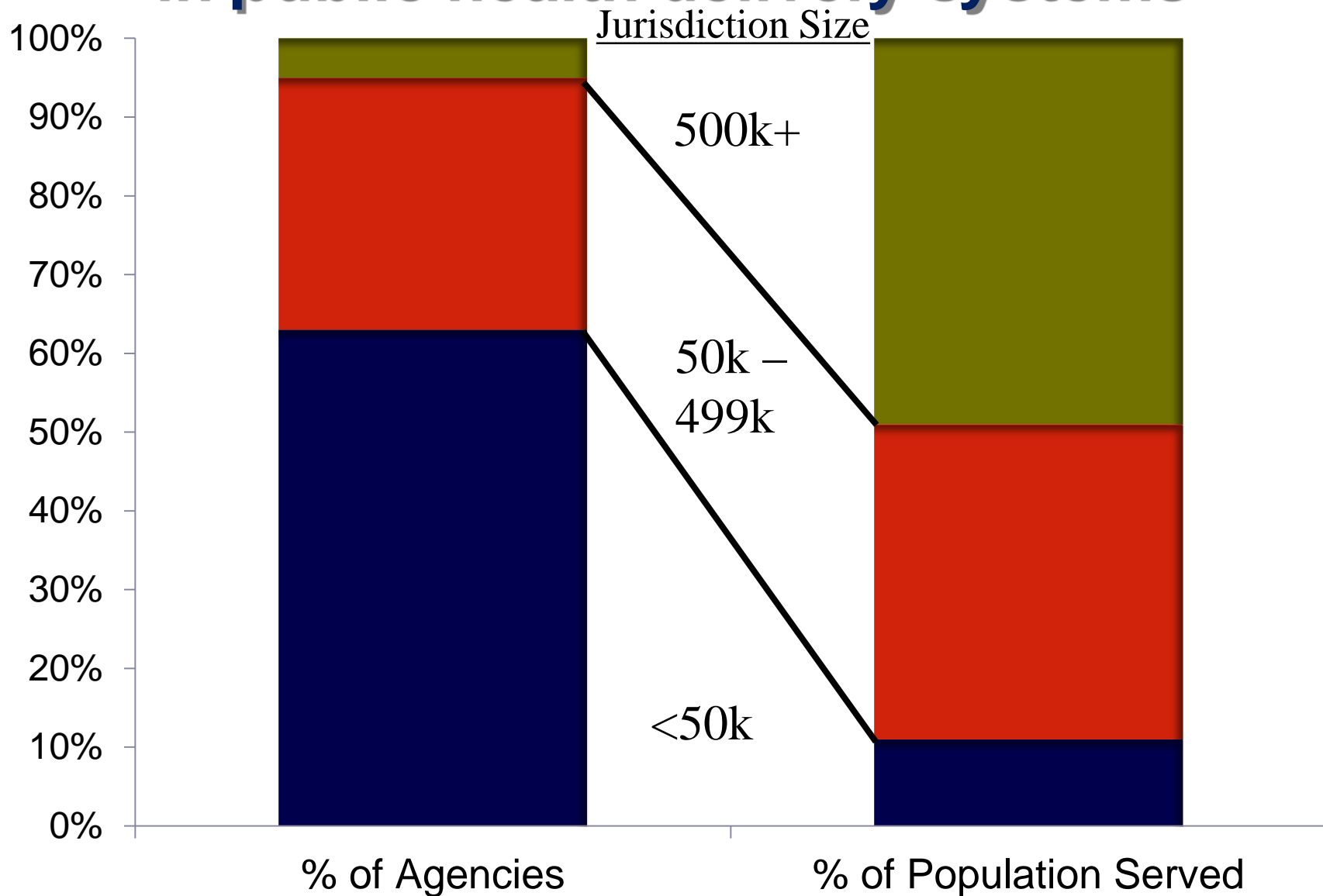
Impact of 10% Increase in Public Health Spending/Capita
Based on Income Per Capita in Communities



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

Mays et al. forthcoming

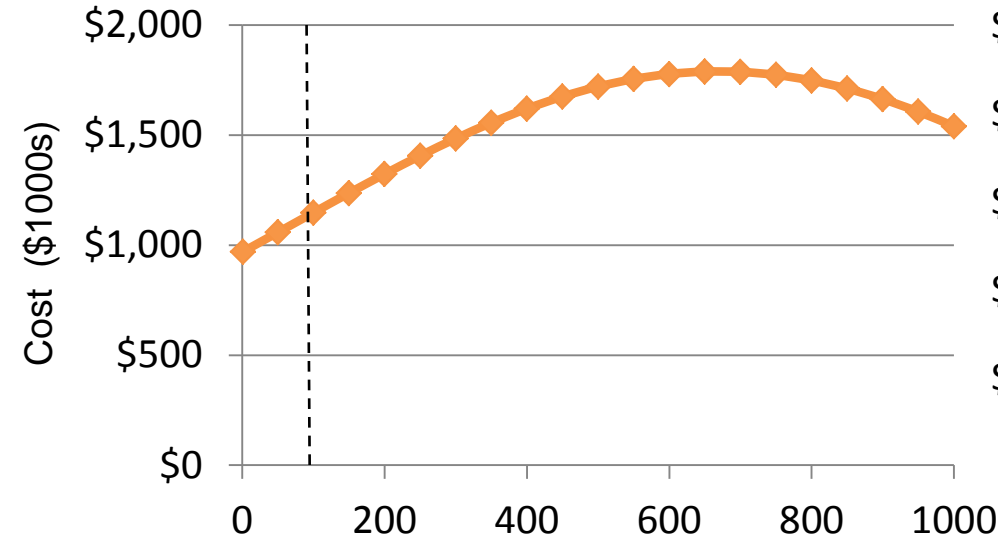
Economies of scale and scope in public health delivery systems



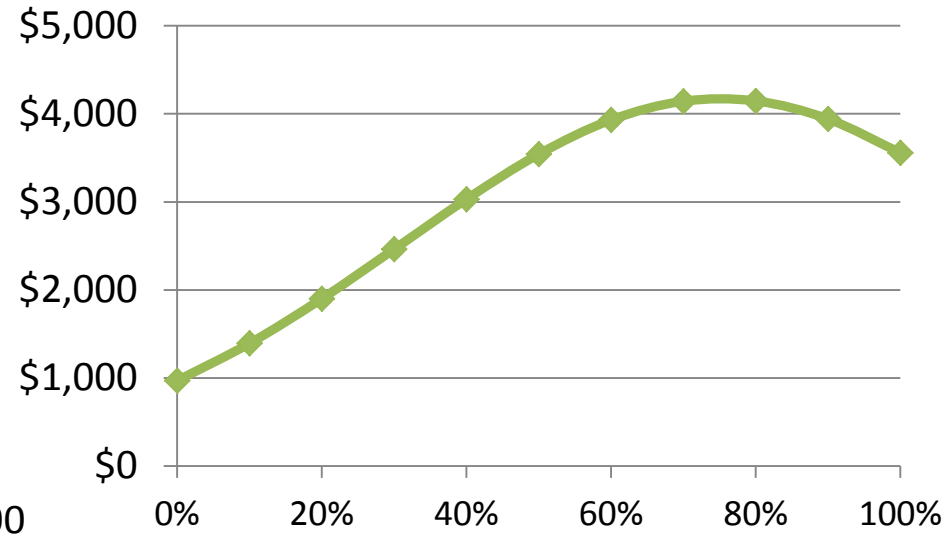
Source: 2010 NACCHO National Profile of Local Health Departments Survey

Economies of scale and scope in public health delivery

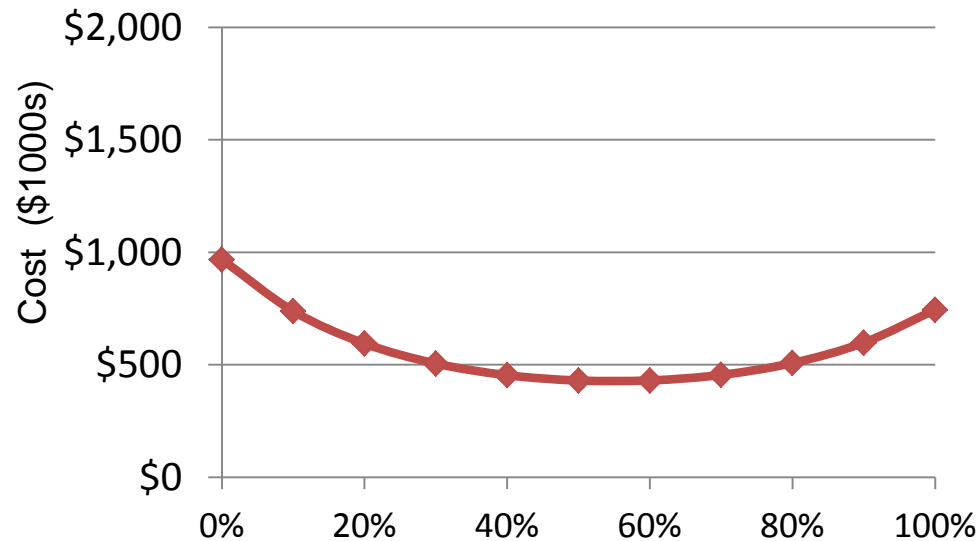
Scale (Population in 1000s)



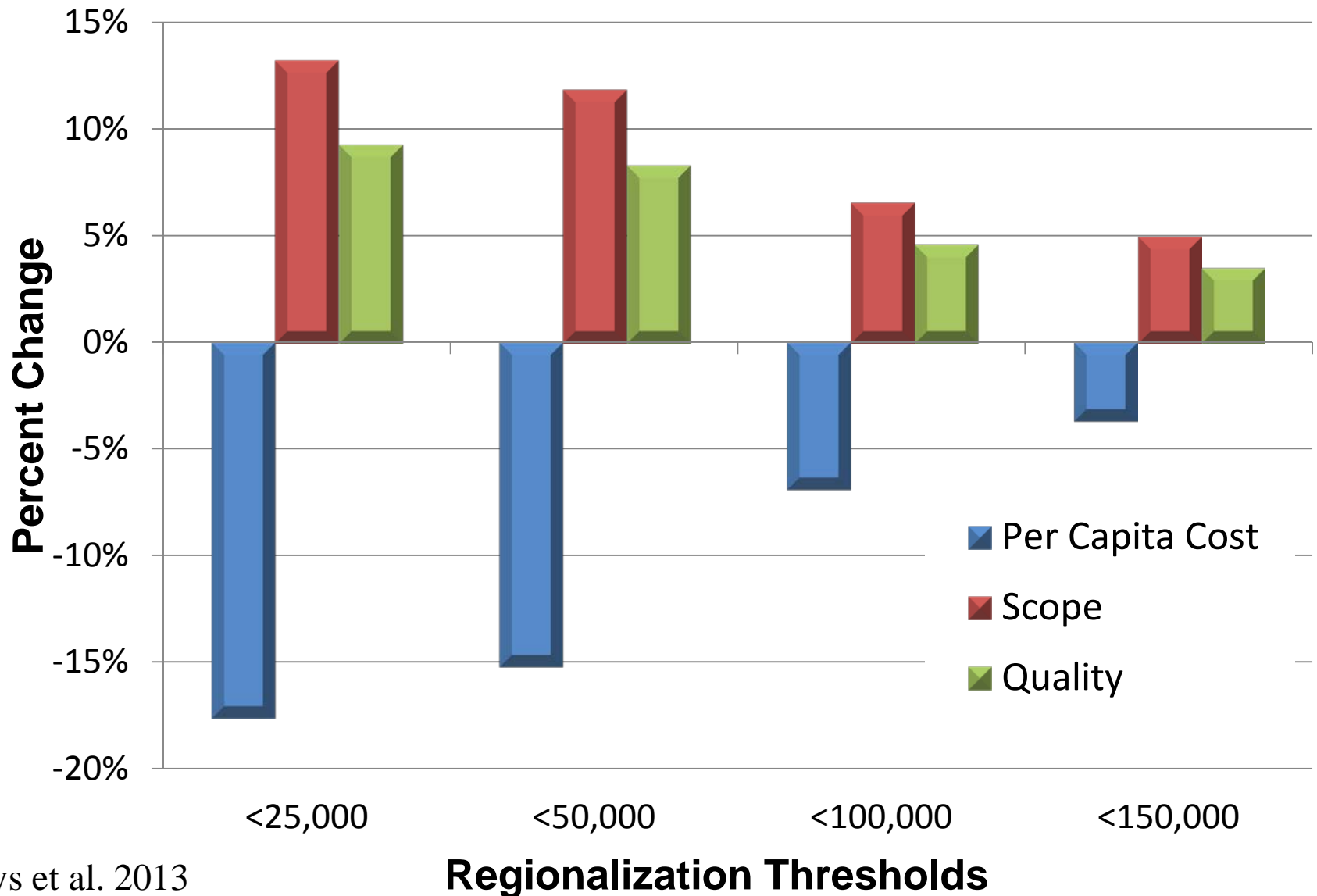
Scope (% of Activities)



Quality (Perceived Effectiveness)



Gains from regionalizing public health delivery



New frontiers through PBRN research

- **MPROVE**: Measuring geographic variation in the implementation of a core set of population health strategies
- **DACS**: Effects of public health delivery system characteristics on costs of delivering evidence-based programs and policies
 - Chronic disease prevention
 - Communicable disease control
 - Environmental health protection



Studying innovations in alignment

Hennepin Health ACO

- Partnership of county health department, community hospital, and FQHC
- Accepts full risk payment for all medical care, public health, and social service needs for Medicaid enrollees
- Fully integrated electronic health information exchange
- Heavy investment in care coordinators and community health workers
- Savings from avoided medical care reinvested in public health initiatives
 - Nutrition/food environment
 - Physical activity



Studying innovations in alignment

Massachusetts Prevention & Wellness Trust Fund

- \$60 million invested from nonprofit insurers and hospital systems
- Funds community coalitions of health systems, municipalities, businesses and schools
- Invests in community-wide, evidence-based prevention strategies with a focus on reducing health disparities
- Savings from avoided medical care are expected to be reinvested in the Trust Fund activities



Studying innovations in alignment

Arkansas Community Connector Program

- Use community health workers & public health infrastructure to identify people with unmet social support needs
- Connect people to home and community-based services & supports
- Link to hospitals and nursing homes for transition planning
- Use Medicaid and SIM financing, savings reinvestment
- ROI \$2.92



Source: Felix, Mays et al. *Health Affairs* 2011

www.visionproject.org

Conclusions: getting inside the box

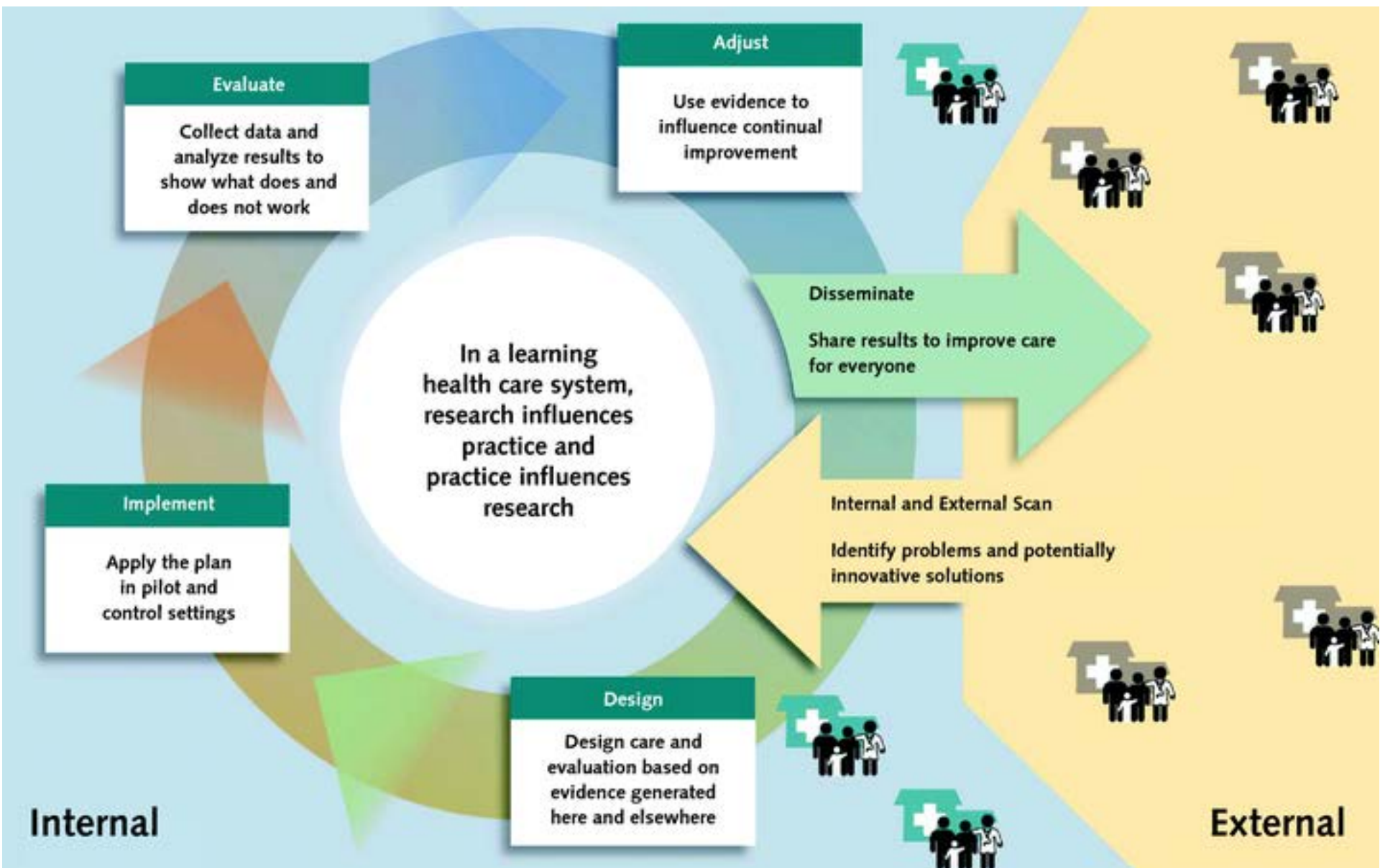
- Engagement of practice and research partners
- Sensitive and specific measures
- Research designs in real-world settings



- What works best in which settings and why
- Informed public health decisions
- Smarter investments and greater value



Toward a “rapid-learning system” in public health



For More Information



Supported by The Robert Wood Johnson Foundation

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