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From the Selected Works of Glen Mays

Spring April 3, 2013

Public Health ROI: Evidence, Experience, and Remaining Questions

Glen Mays, *University of Kentucky*



Available at: http://works.bepress.com/glen_mays/85/

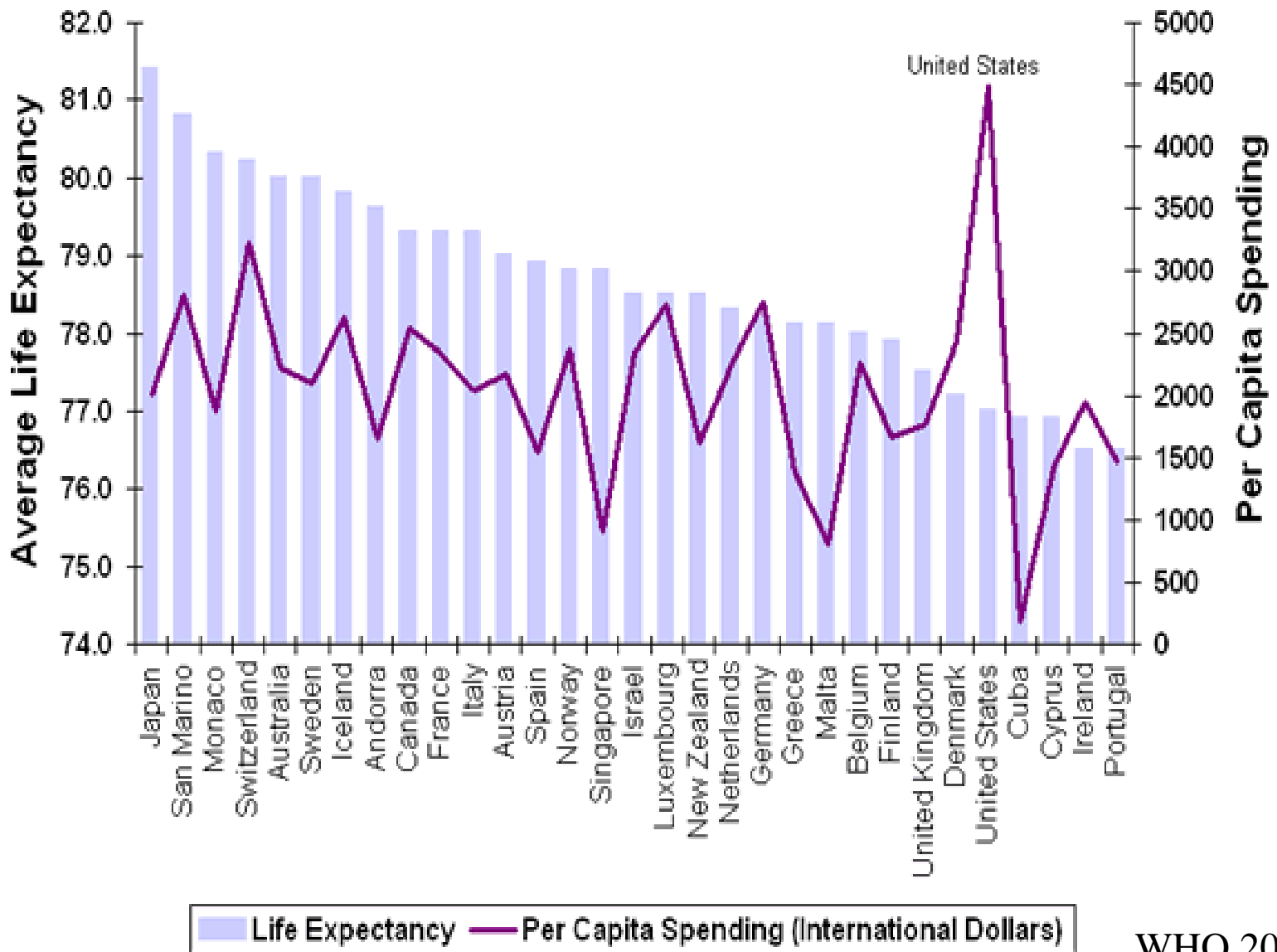
Public Health ROI: Evidence, Experience and Remaining Questions

Glen Mays, PhD, MPH
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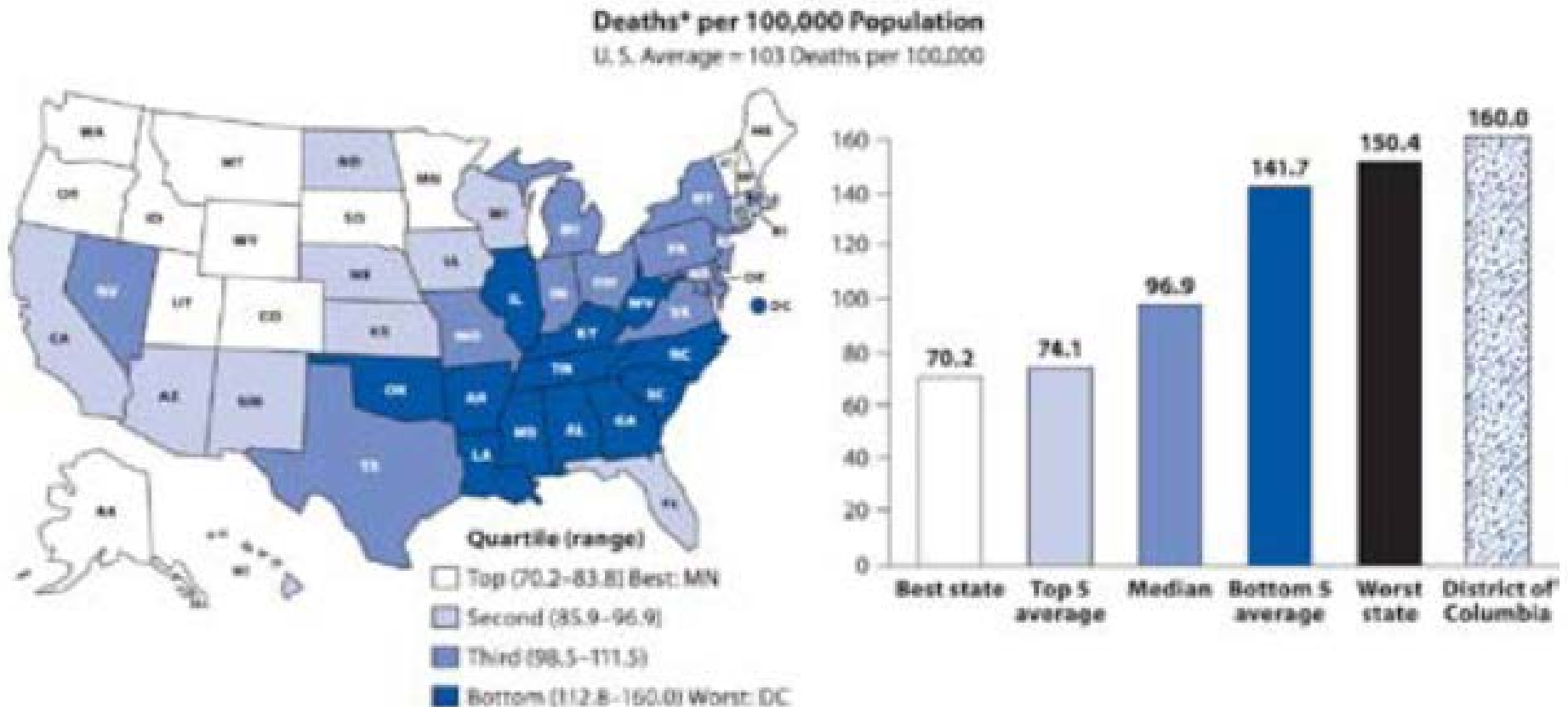
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UTMB Public Health Symposium • Galveston, TX • 3 April 2013

Value in the U.S. health system



Equity in population health



Preventable disease burden and national health spending

>75% of national 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 national health spending is allocated to public health and prevention

Public health activities

Organized programs, policies, and laws to prevent disease and injury and promote health on a population-wide basis

- Epidemiologic surveillance & investigation
- Community health assessment & planning
- Communicable disease control
- Chronic disease and injury prevention
- Health education and communication
- Environmental health monitoring and assessment
- Enforcement of health laws and regulations
- Inspection and licensing
- Inform, advise, and assist school-based, worksite-based, and community-based health programming
- ...and roles in assuring access to medical care



Public Health
Prevent. Promote. Protect.

Public health's share of national health spending

USDHHS National Health Expenditure Accounts

\$Billions

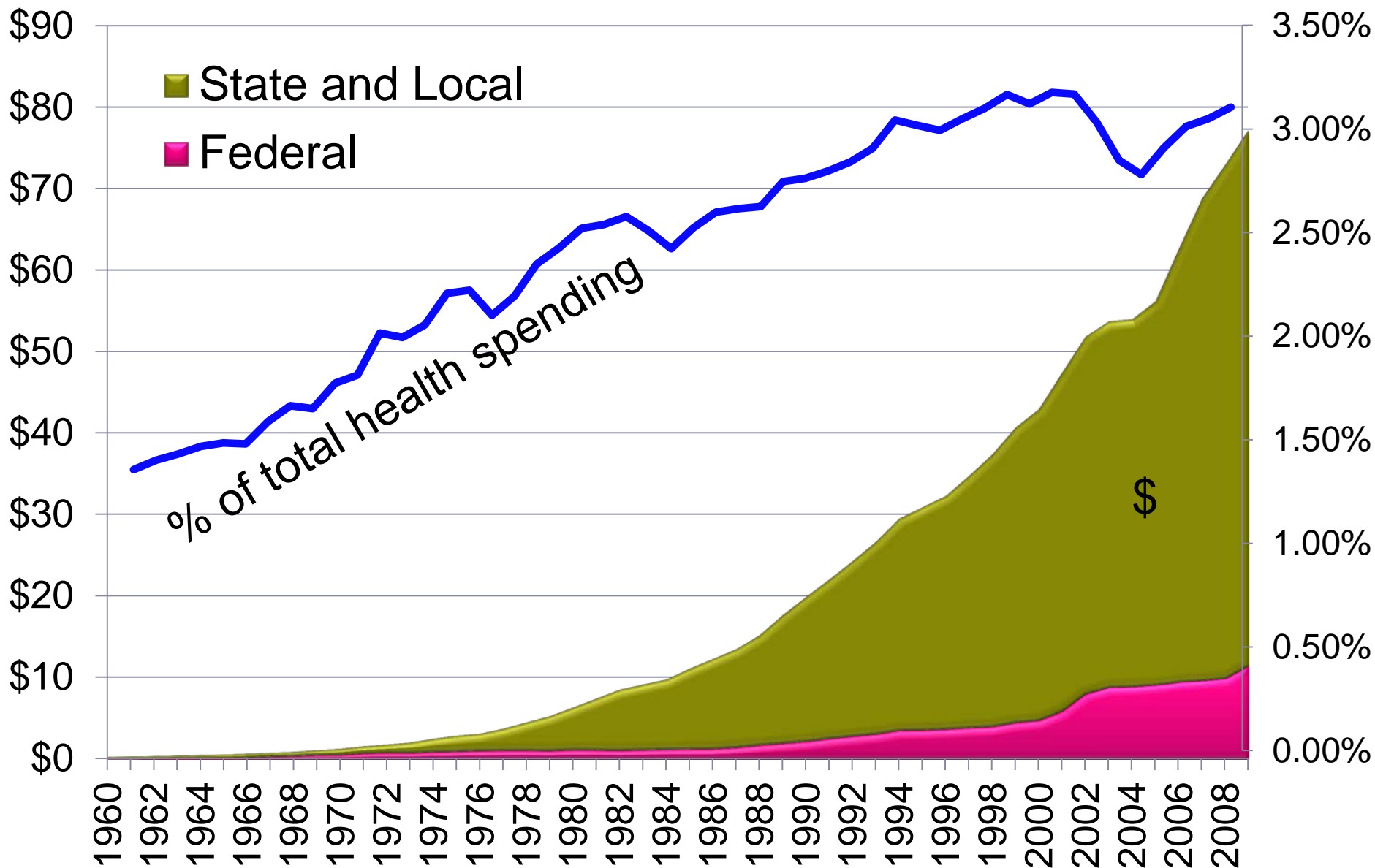
%NHE

■ State and Local

■ Federal

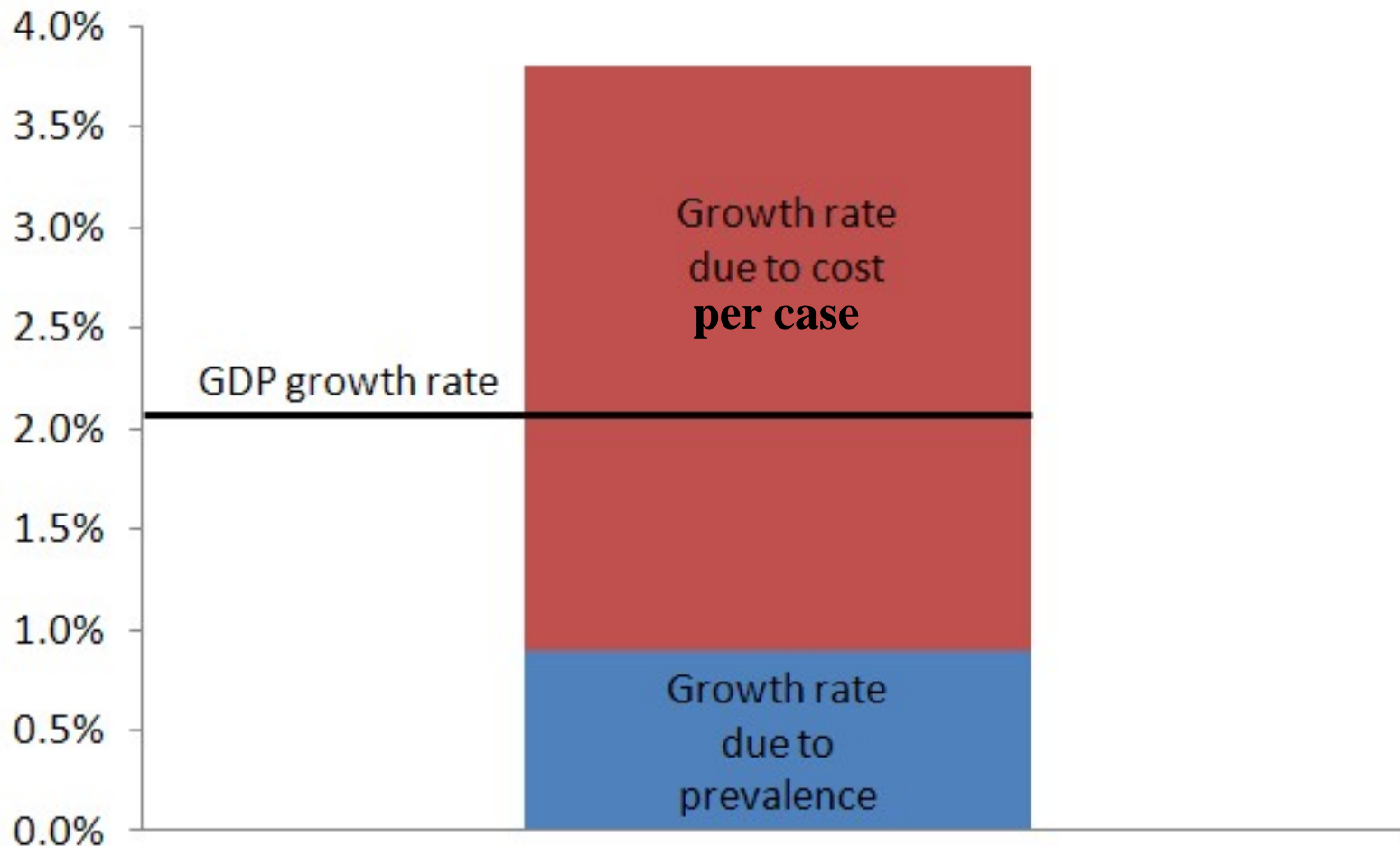
% of total health spending

\$



Factors driving growth in medical spending

Health spending growth rate 1996-2006



Key questions about value

- ✦ Do outcomes achieved by public health strategies justify their costs?
- ✦ Where should new investments be directed to achieve their greatest impact?
- ✦ How much **health** can we produce through public health investments?
- ✦ Can public health investments help “bend the curve” to contain **medical costs**?

Key questions about value

- What level of resources are required to deliver a given bundle of public health activities for a given population?
- How do delivery costs vary across communities and population groups?
- Where are the opportunities to realize efficiencies in delivery?

ROI Uncertainty and Controversy

THE WALL STREET JOURNAL.

WSJ.com

JUNE 12, 2009

Prevention Efforts Provide No Panacea on Health Costs

By JANET ADAMY

Preventing Chronic Disease: An Important Investment, But Don't Count On Cost Savings

An overwhelming percentage of preventive interventions add more to medical costs than they save.

by Louise B. Russell

HEALTH AFFAIRS - Volume 28, Number 1

Prevention for a Healthier America:

INVESTMENTS IN DISEASE PREVENTION
YIELD SIGNIFICANT SAVINGS,
STRONGER COMMUNITIES



Challenges in demonstrating ROI in public health

- ✦ **Time lag** between costs and benefits
- ✦ **Distribution** of costs and benefits: *concentrated* costs but *diffuse* benefits
- ✦ **Measurement** of costs and benefits requires good information systems
- ✦ **Attribution** of benefits: the counterfactual

ROI Key Ingredients

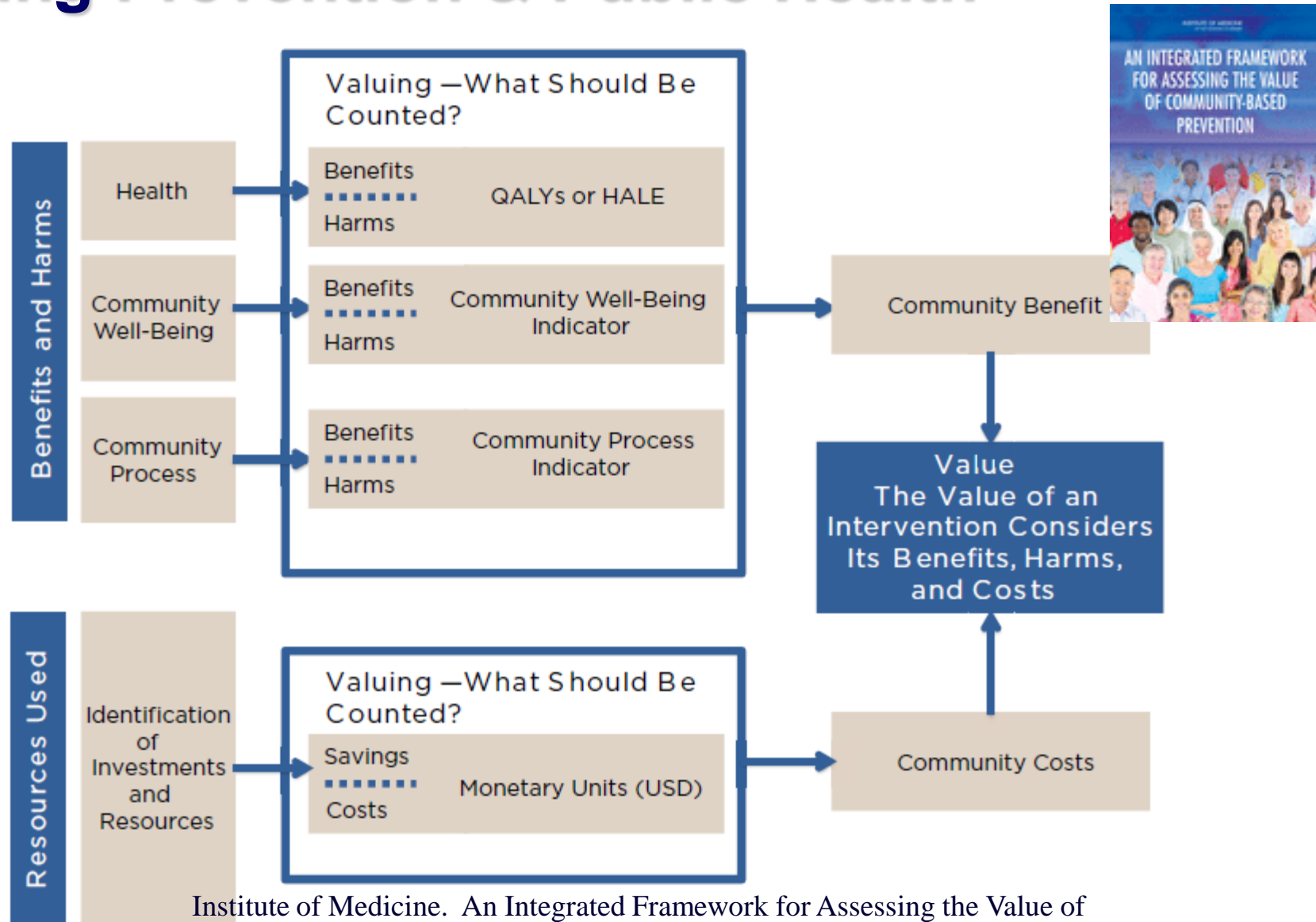
Investments

- ✦ Costs of implementing public health strategies
- ✦ Who's investments?

Returns

- ✦ Valuation of the outputs and outcomes **attributable** to public health strategies
- ✦ Who realizes returns?
- ✦ Over what time frames?
- ✦ Compared to what?

Valuing Prevention & Public Health



Institute of Medicine. An Integrated Framework for Assessing the Value of Community-Based Prevention. Washington, DC; 2012.

Managing ROI Expectations

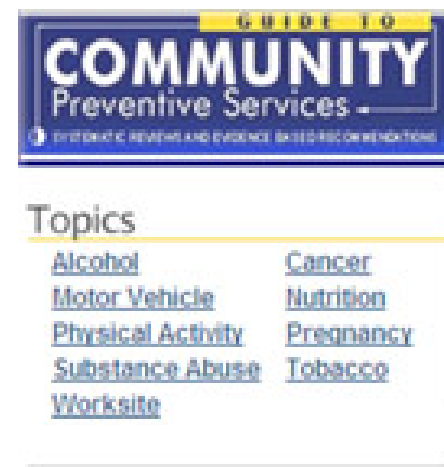
- ✦ **Cost savings** – a high bar
 - ✦ **Cost effectiveness** – value for dollars spent
 - Compared to status quo
 - Compared to other possible investments
 - Compared to doing nothing
- ...Key concept: opportunity costs

Achieving ROI in public health: Key Considerations

- ✦ **Economies of scale:** many public health activities can be delivered more efficiently across larger populations
- ✦ **Economies of scope:** efficiencies can be realized by using the same infrastructure to deliver an array of related programs and services

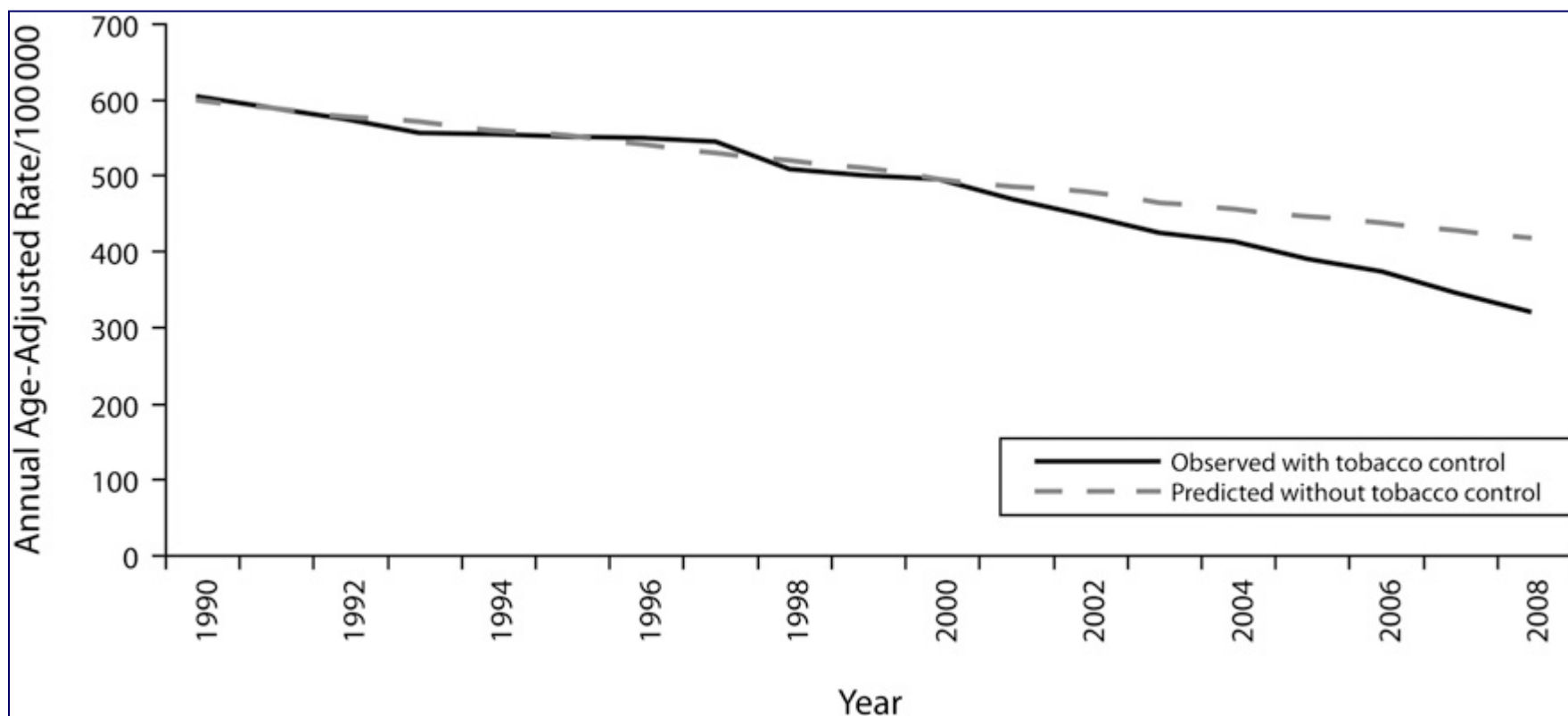
Estimating ROI in public health: Discrete interventions

- ◆ Smoking cessation interventions cost an estimated \$2,587 for each life-year gained
- ◆ \$1 spent on STD and pregnancy prevention produces \$2.65 in medical cost savings
- ◆ \$1 spent on preconception care for diabetic women produces \$5.19 in medical cost savings
- ◆ \$1 spent on childhood immunization produces \$6.30 in medical cost savings



Estimating ROI in public health: Individual Programs

Washington State Comprehensive Tobacco Prevention and Control Program: \$5 in health care savings per \$1 investment



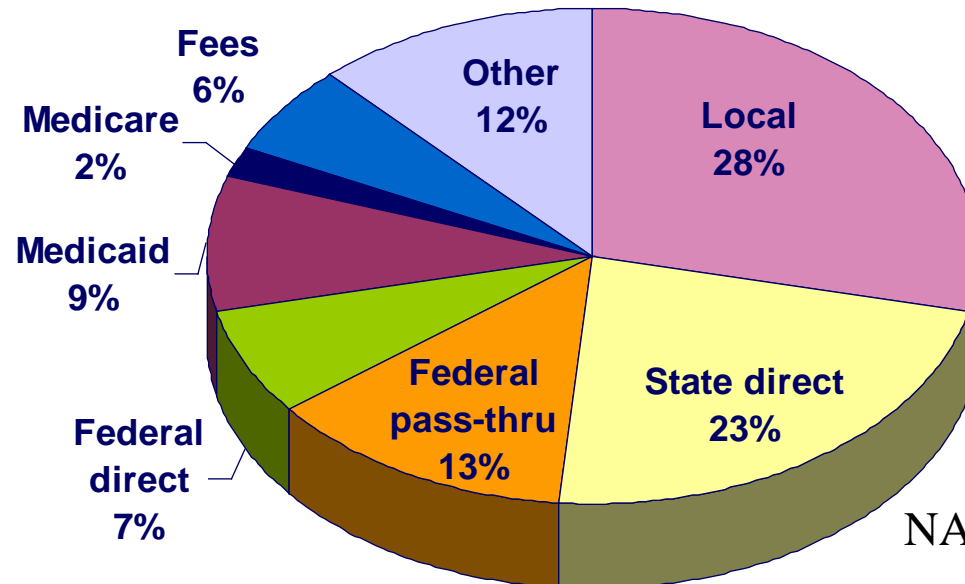
Emerging evidence: what about aggregate public health ROI?

- How does **public health** spending 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?

The problem with public health spending

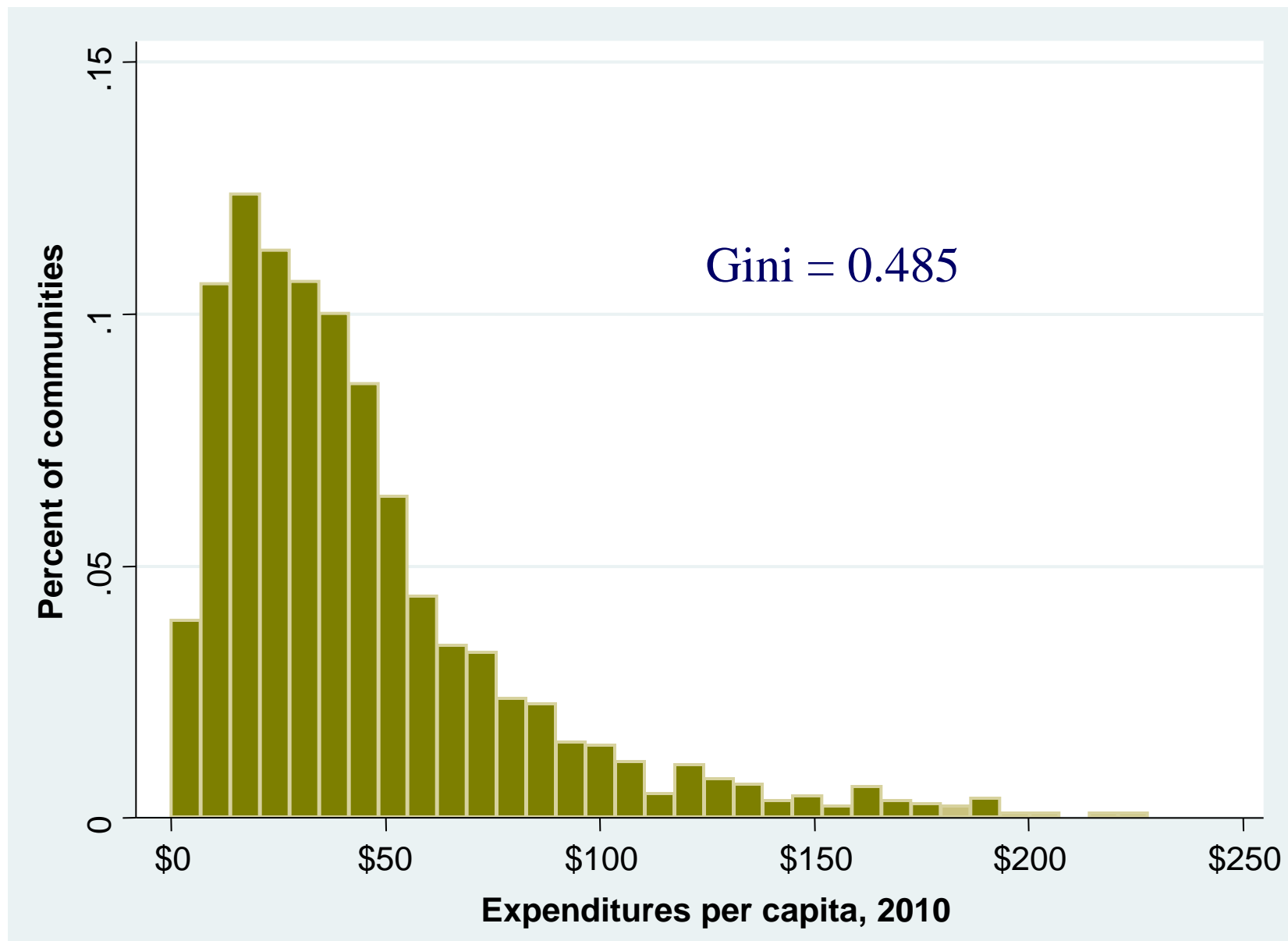
- ◆ Federal & state funding sources often targeted to communities based in part on disease burden, risk, need
- ◆ Local funding sources often dependent on local economic conditions that may also influence health
- ◆ Public health spending may be correlated with other resources that influence health

Sources of Local Public Health Agency Revenue, 2010

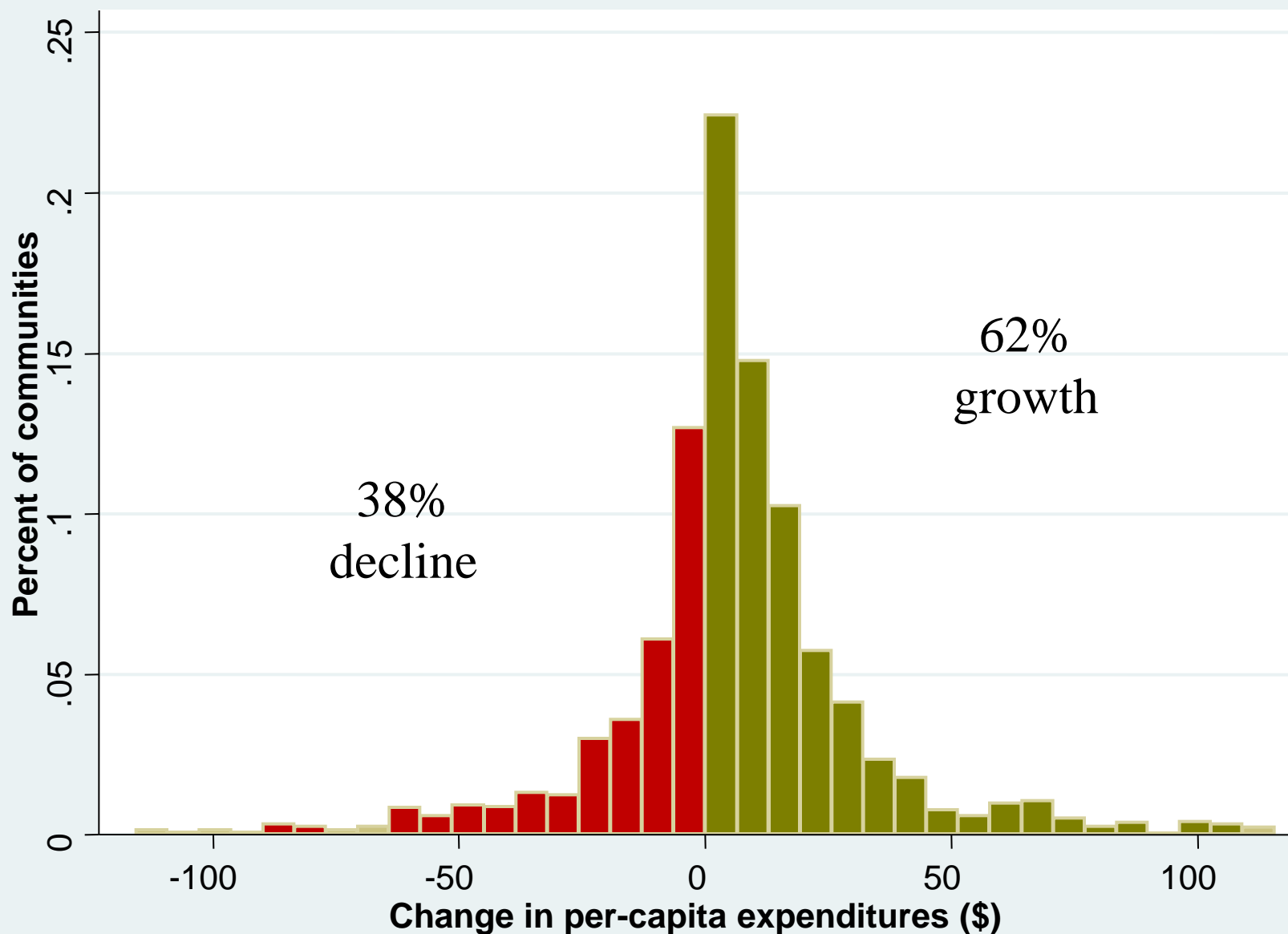


NACCHO 2010

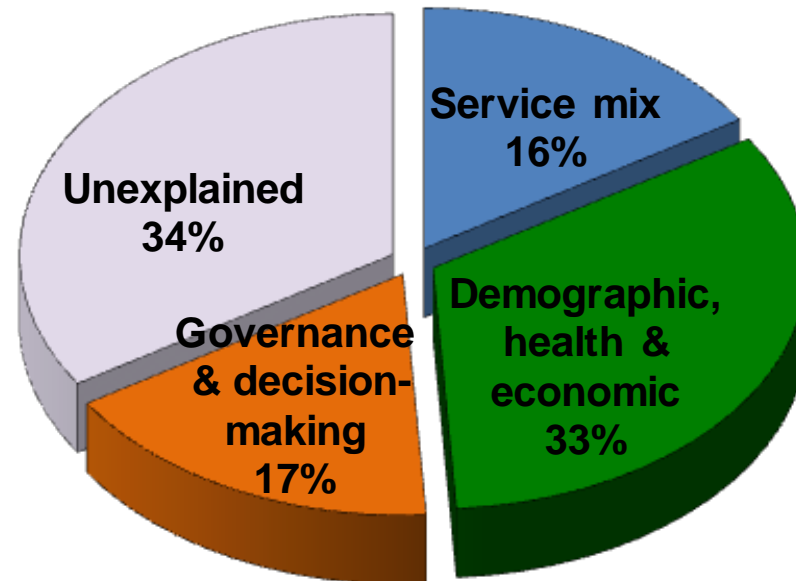
Local variation in public health spending



Changes in local public health spending 1993-2010

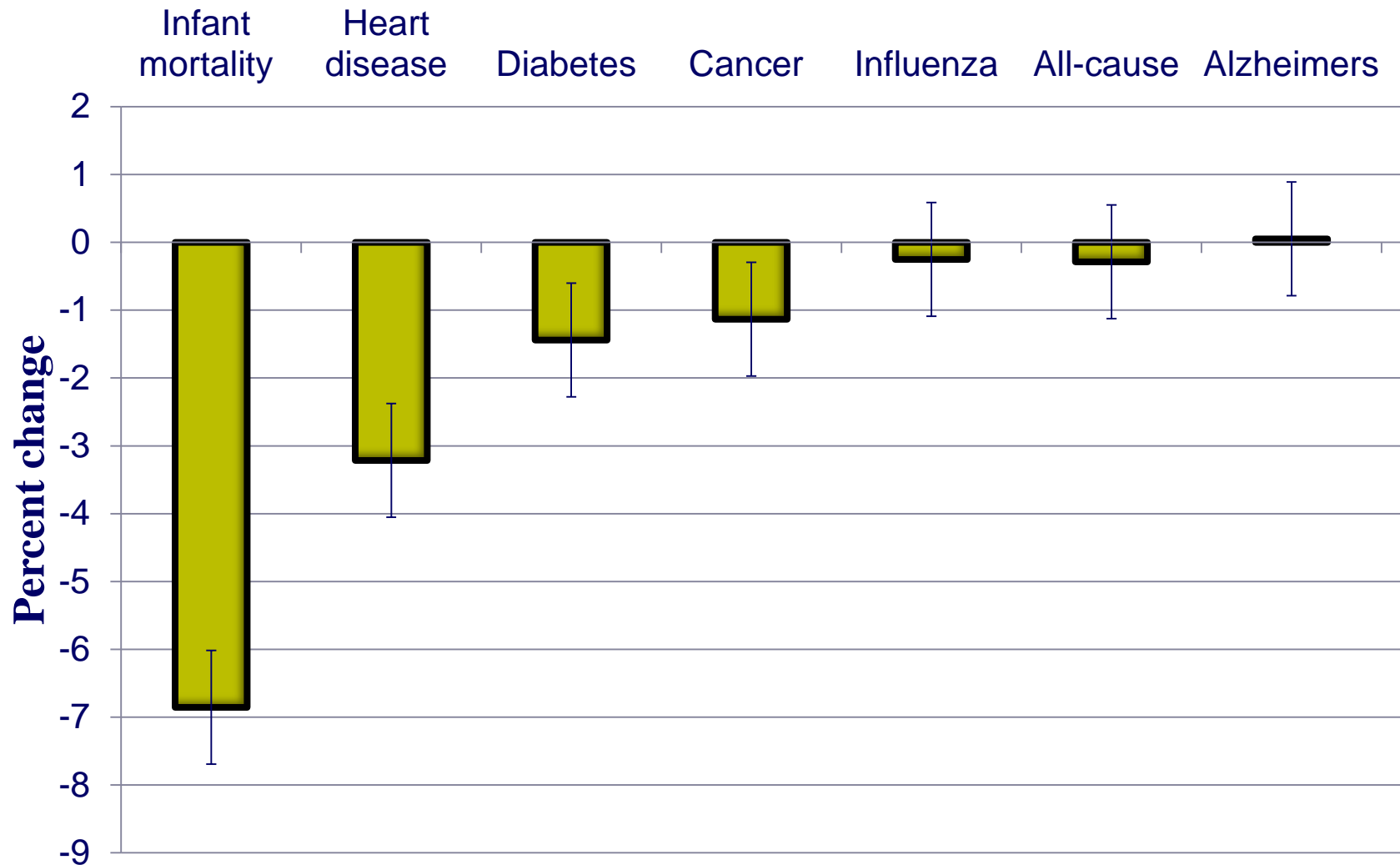


Determinants of local public health spending levels



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

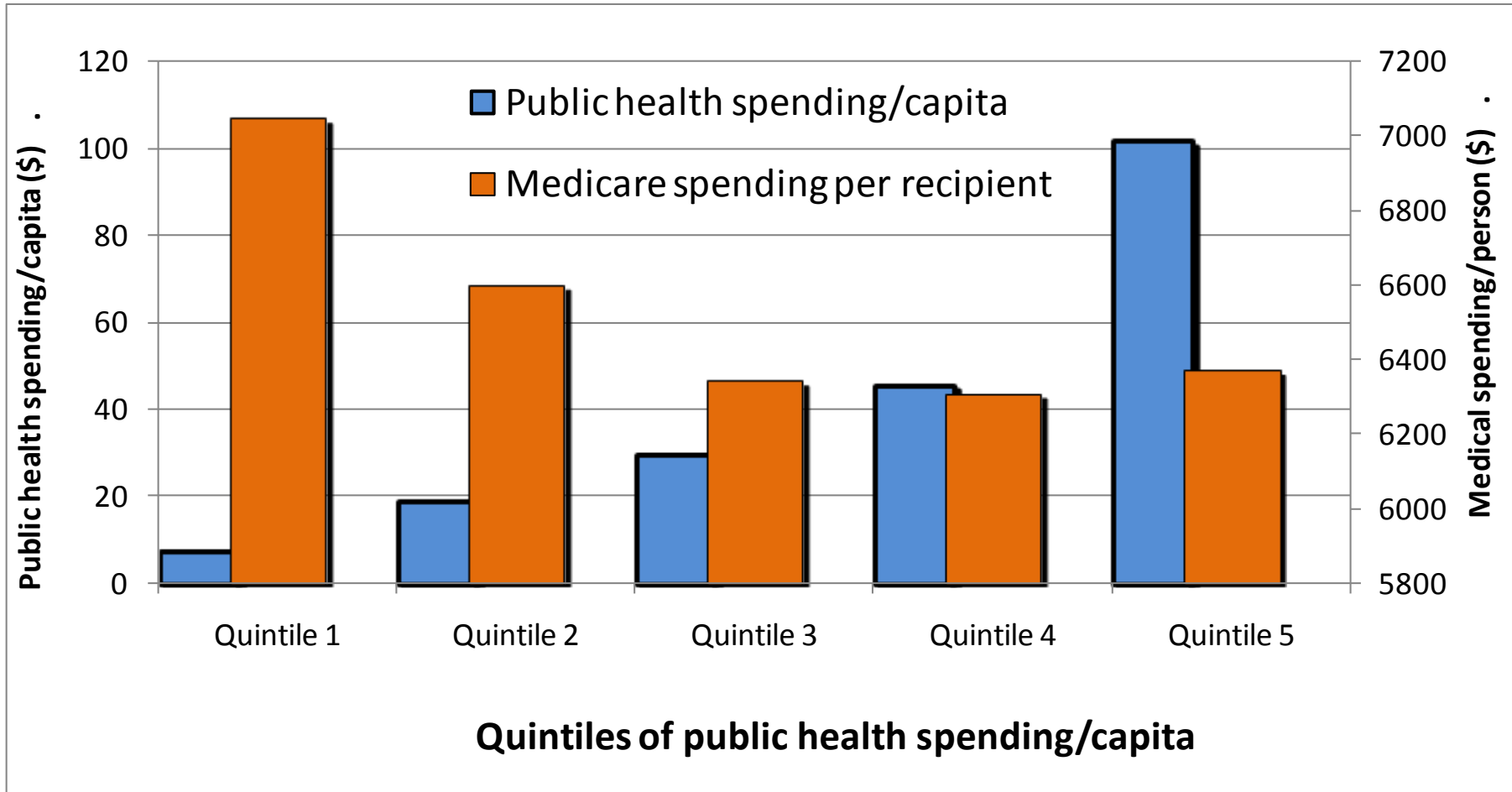
Mortality reductions attributable to local public health spending, 1993-2008



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

Medical Care Offsets Attributable to Local Public Health Spending, 1993-2008

Medical Cost Offset = 0.88%



Effects of public health spending on medical care spending 1993-2008

Change in Medical Care Spending Per Capita Attributable to 10% Increase in Public Health Spending Per Capita

<u>Model</u>	<u>N</u>	<u>Elasticity</u>	<u>S.E.</u>	
One year lag	8532	-0.88	0.13	***
Five year lag	6492	-1.12	0.53	**
Ten year lag	4387	-1.79	1.12	

log regression estimates controlling for community-level and state-level characteristics

*p<0.10 **p<0.05 ***p<0.01

Mays et al. forthcoming

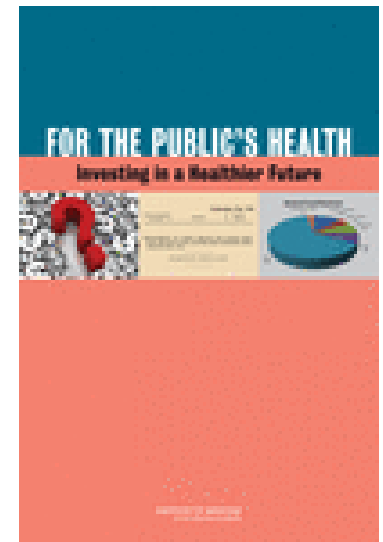
Estimated value of public health spending

10% increase in public health spending
in the average U.S. community:

Public health cost	\$594,291
Medical cost offset (Medicare)	-\$515,114
Life years gained	148
Net cost/life year	\$534

2012 Institute of Medicine Recommendations

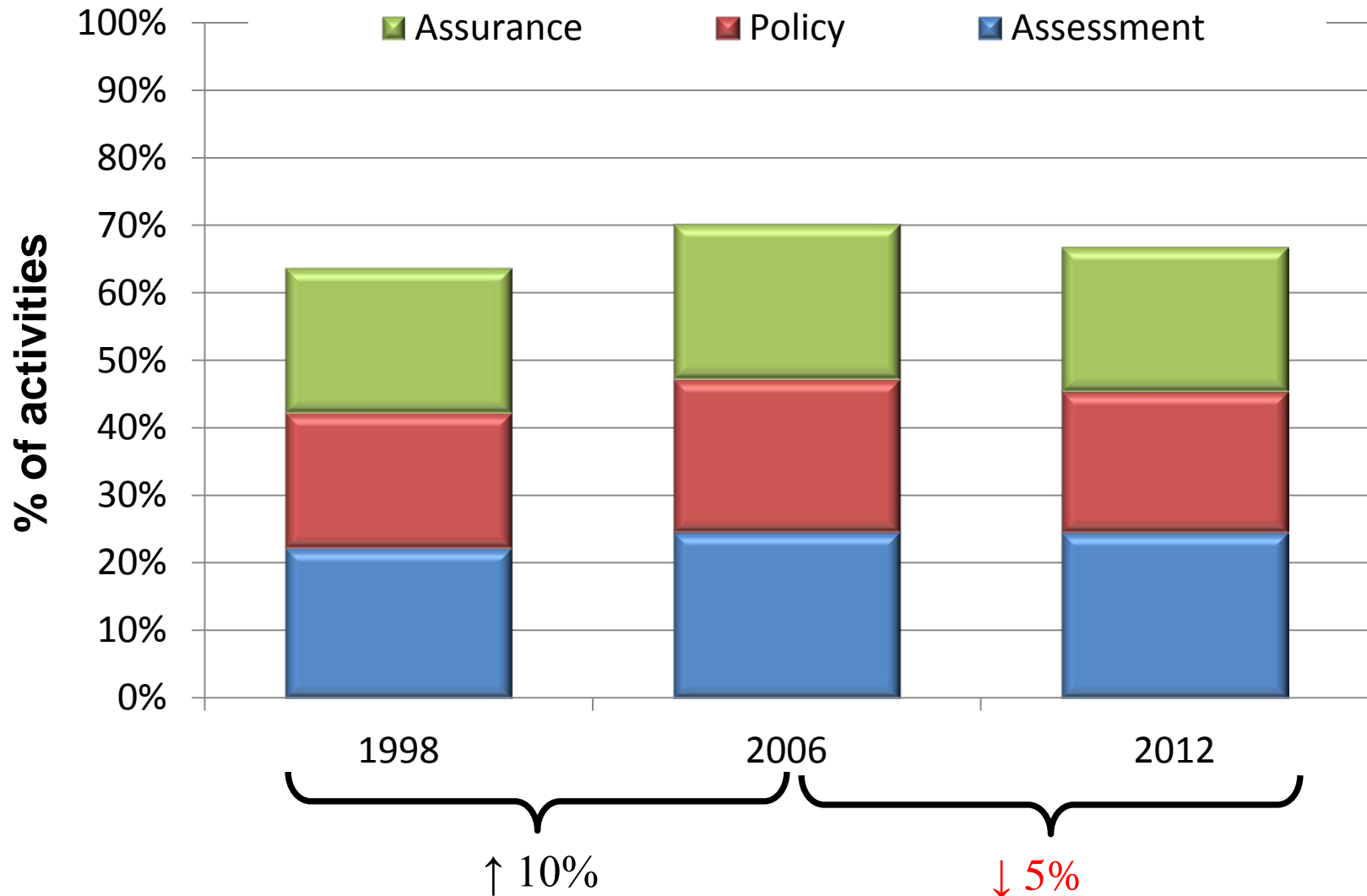
- ◆ Double current federal spending on public health
- ◆ Allow greater flexibility in how states and localities use federal public health funds
- ◆ Identify components and costs of a minimum package of public health services
- ◆ Implement national chart of accounts for tracking spending & funds flow
- ◆ Expand research on costs and effects of public health delivery



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

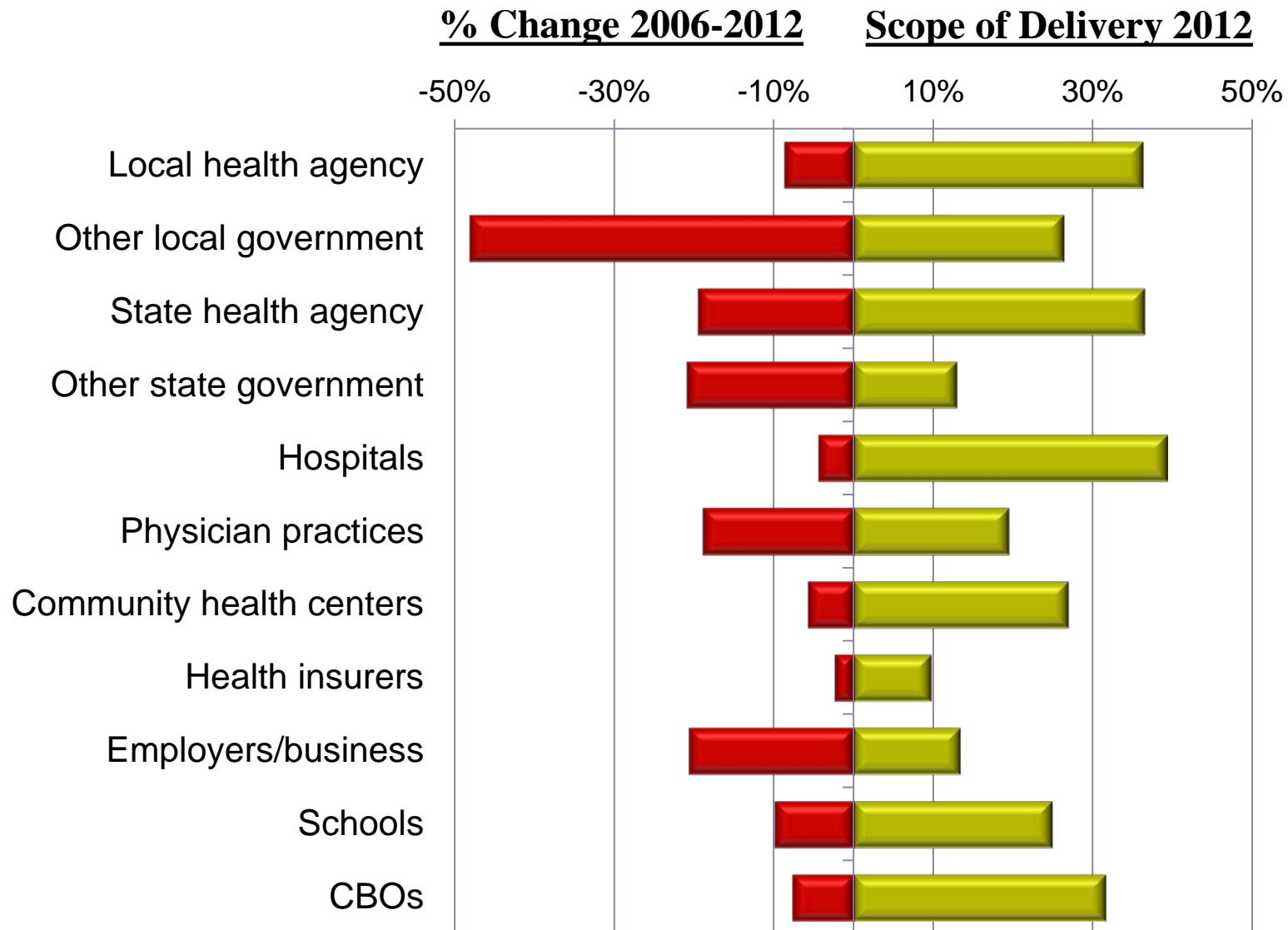
Learning about ROI through natural experiments

Delivery of recommended public health activities

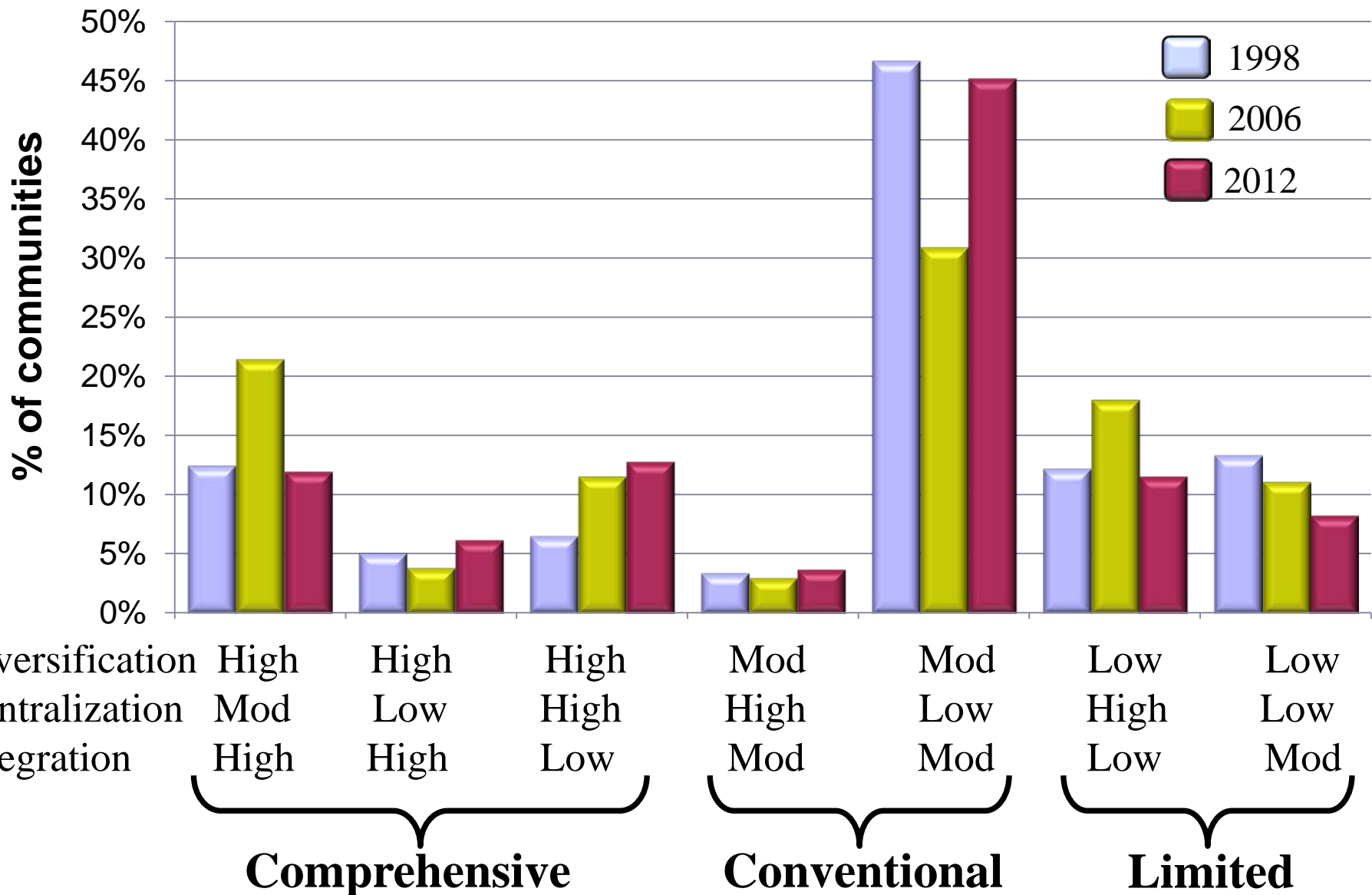


National Longitudinal Survey of Public Health Systems, 2012

Organizations engaged in local public health delivery



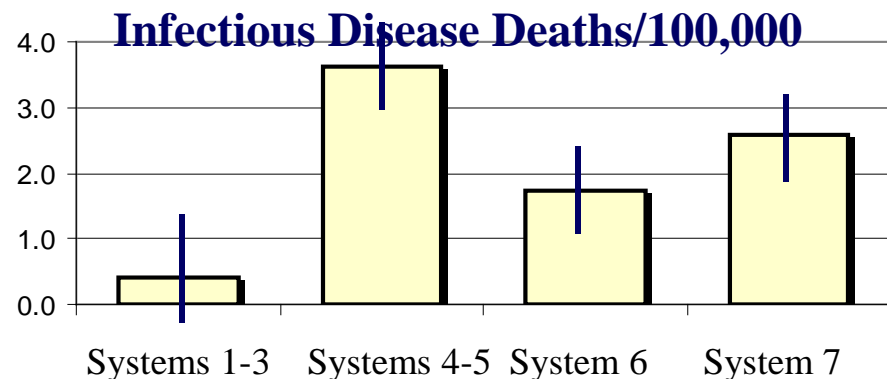
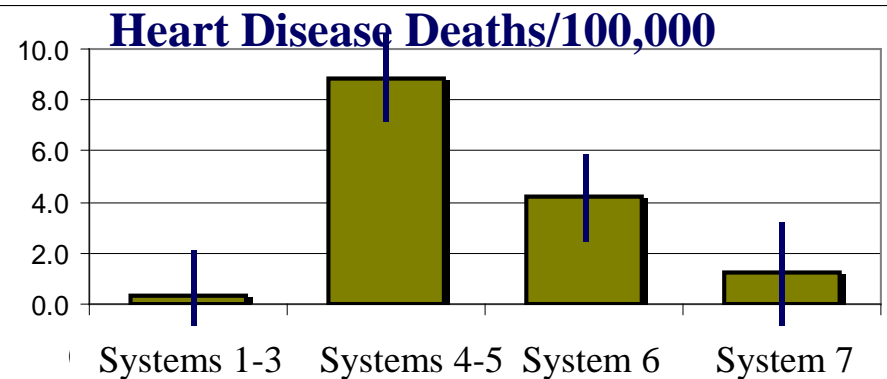
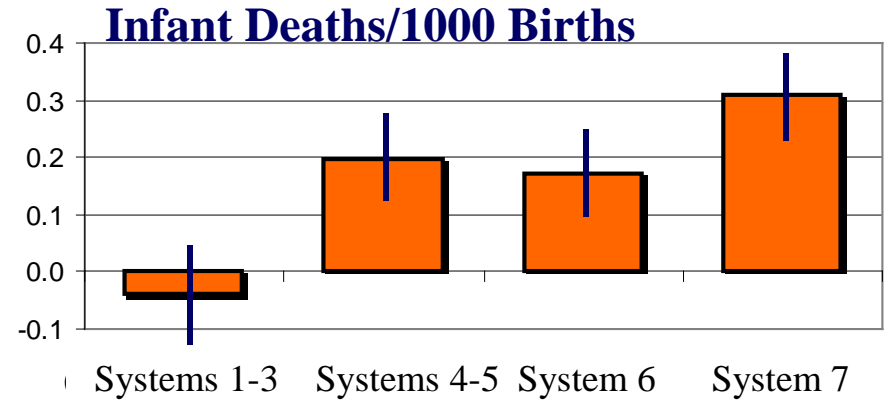
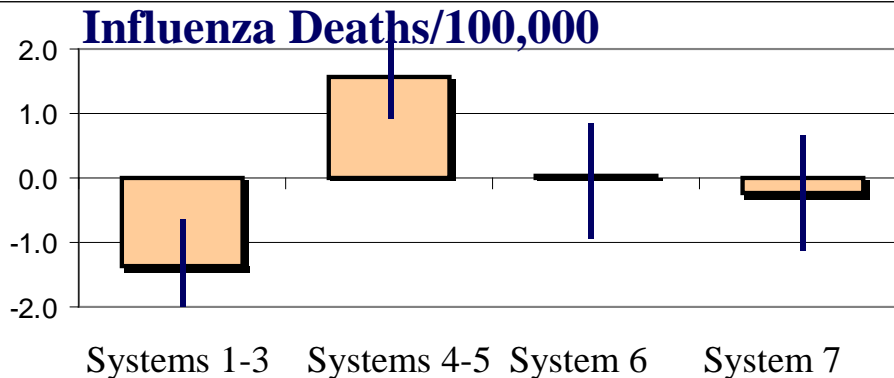
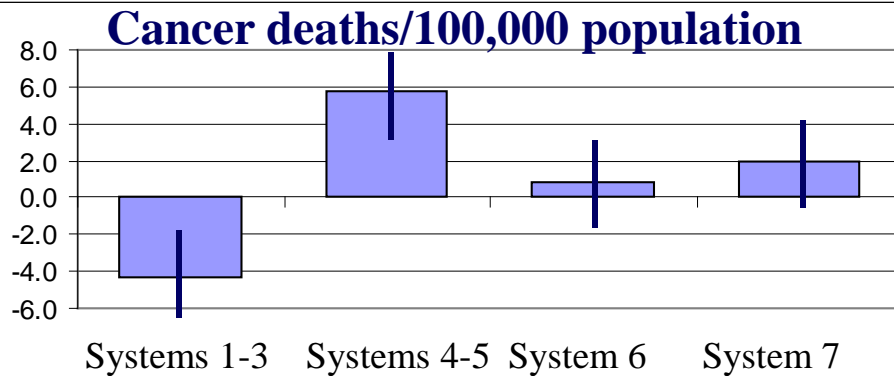
A typology of public health delivery systems



Source: Mays et al. 2010; 2012

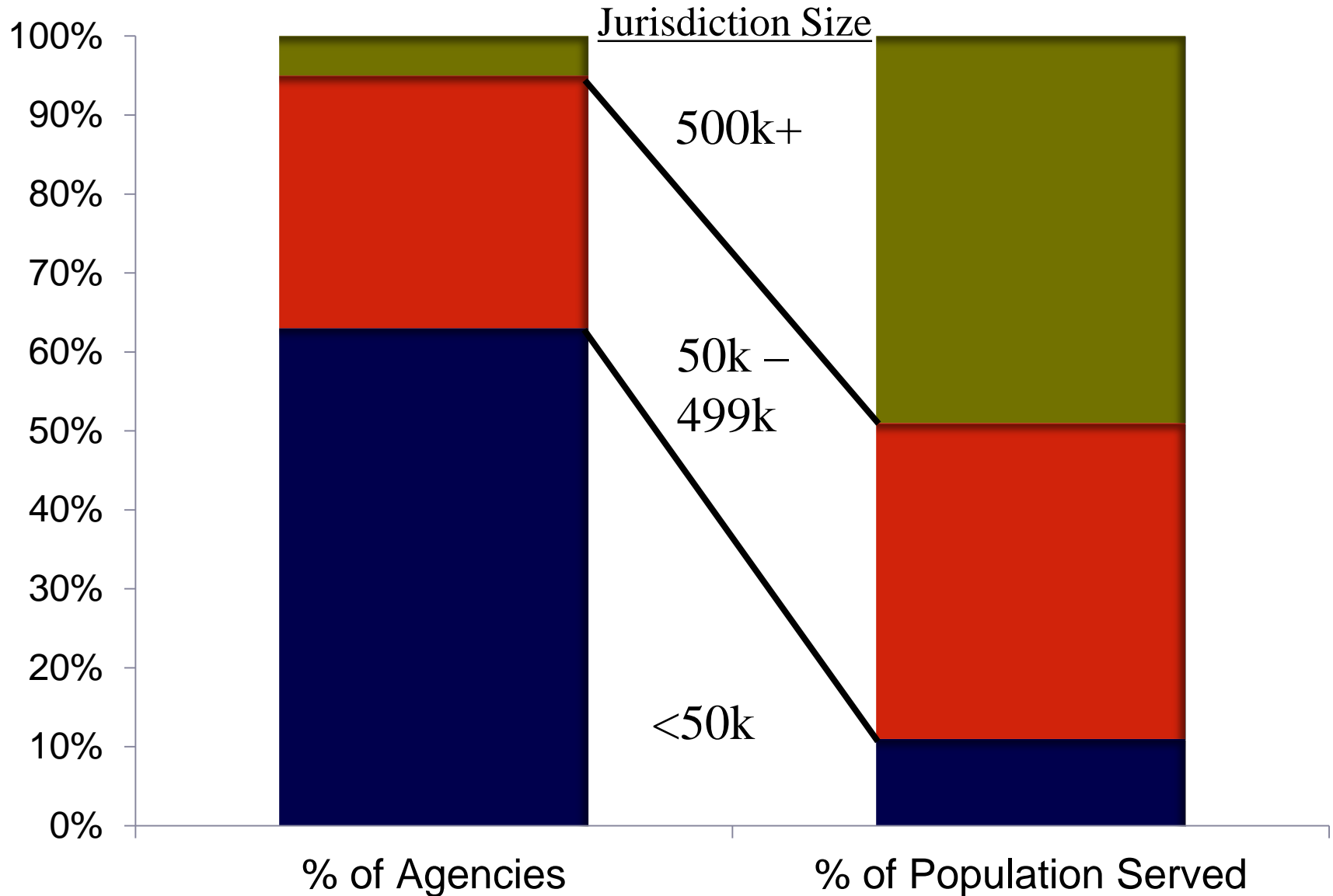
Health outcomes and delivery system change

Percent Changes in Preventable Mortality Rates by Delivery System Type



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

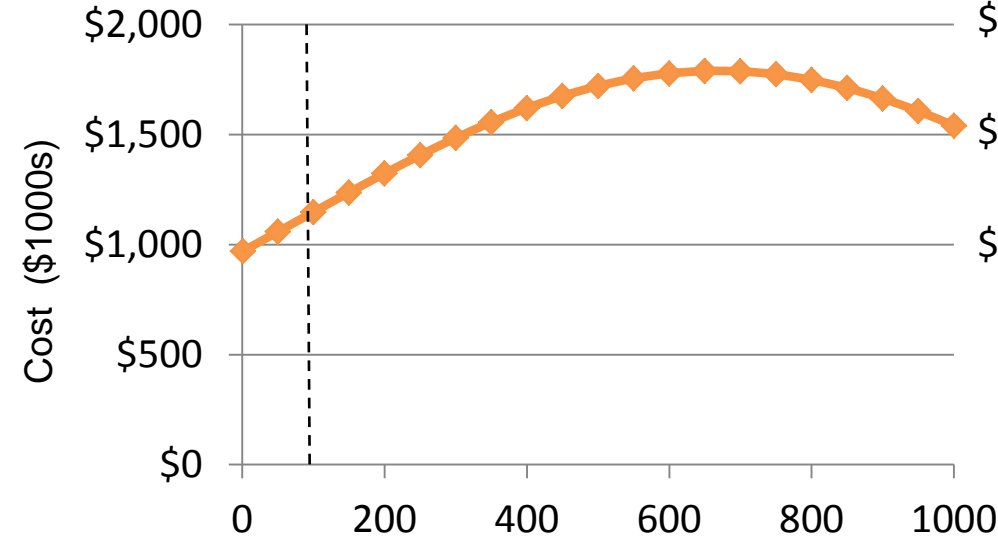
What about efficiency in public health delivery?



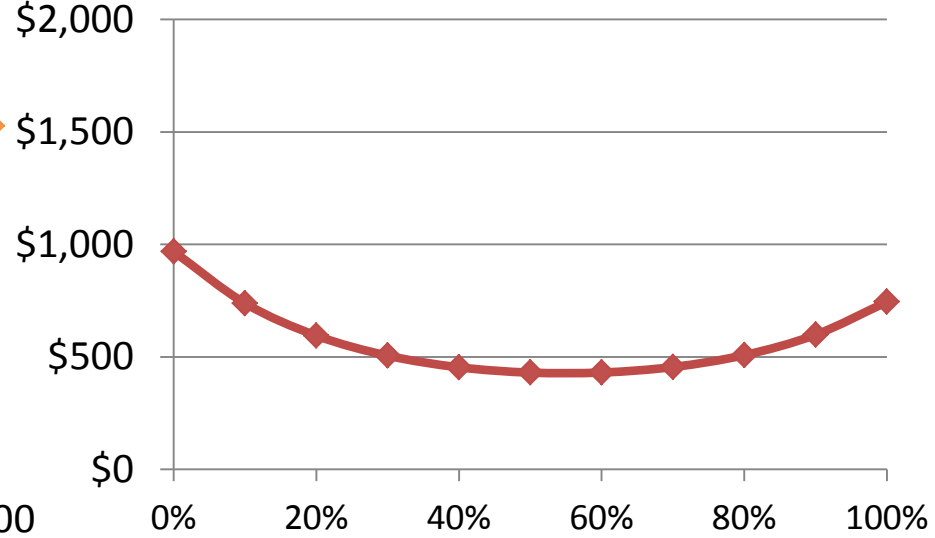
Source: 2010 NACCHO National Profile of Local Health Departments Survey

Economies of scale and scope in public health

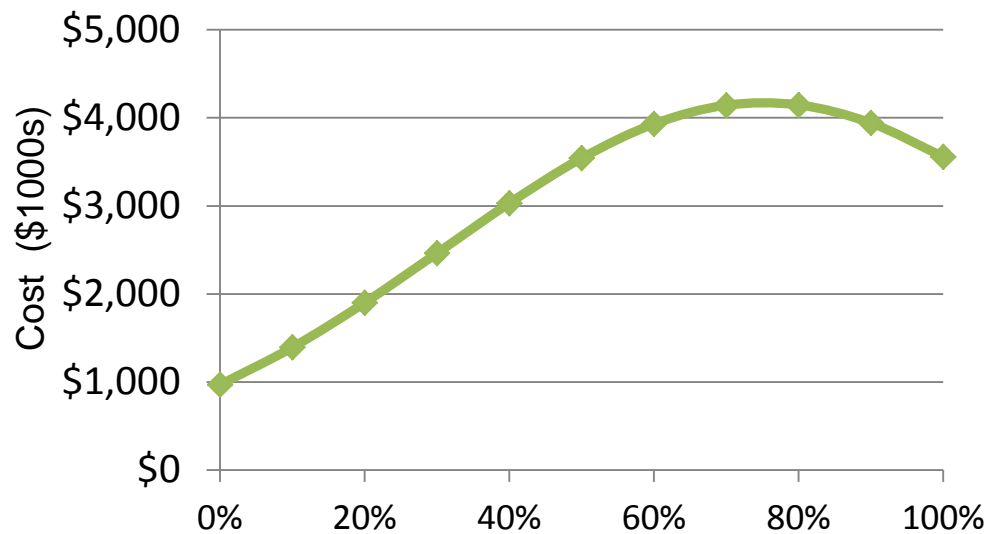
Scale (Population in 1000s)



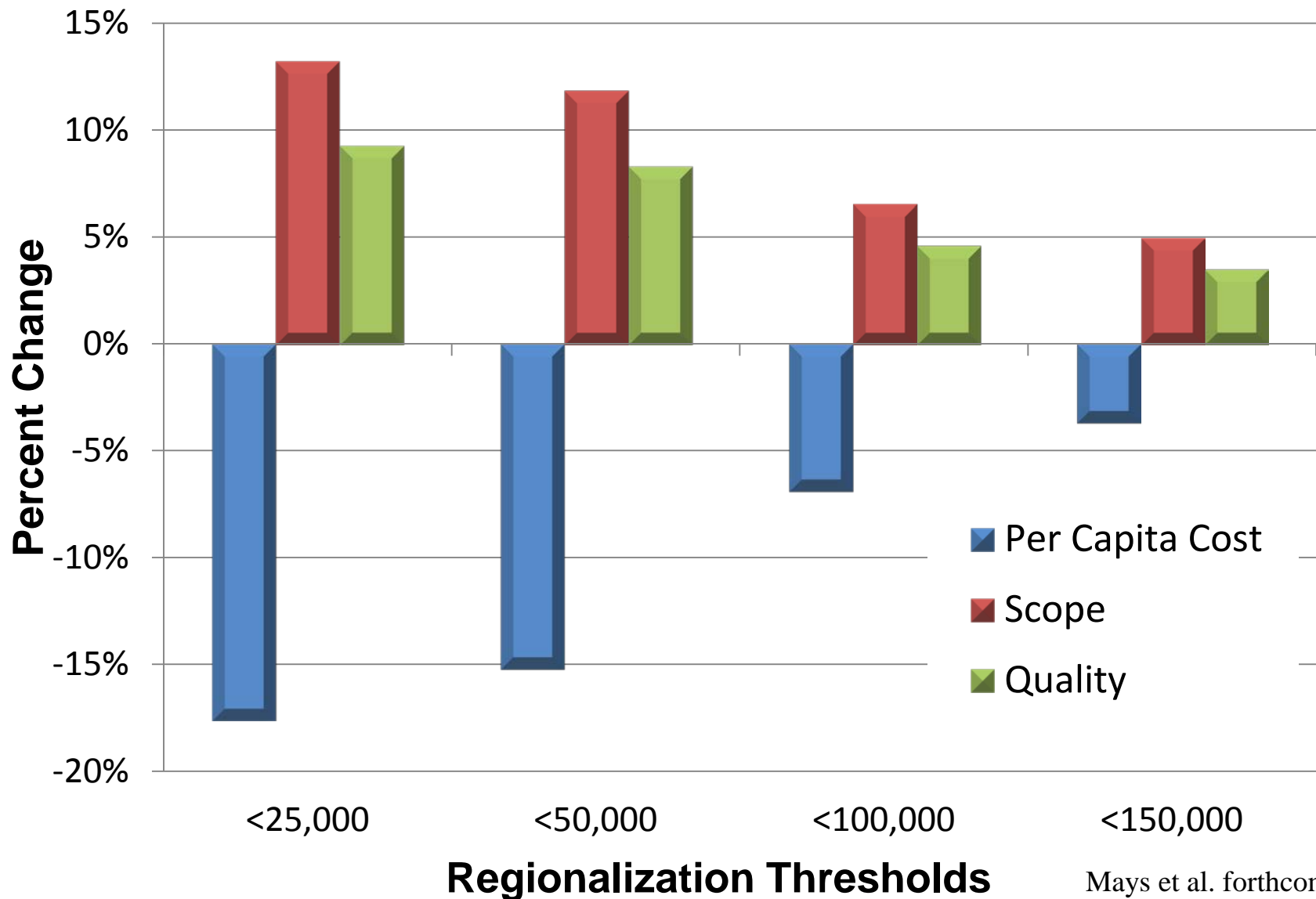
Quality (Perceived Effectiveness)



Scope (% of Activities)



Simulated effects of regionalization in public health delivery



Producing more and better ROI evidence: public health services & systems research

A field of inquiry examining the *organization*, *financing*, and *delivery* of public health services at local, state and national levels, and the *impact* of these activities on population health

PHSSR and policy relevance

Subtitle D—Support for Prevention and Public Health Innovation

Patient Protection and Affordable Care Act of 2010

SEC. 4301. RESEARCH ON OPTIMIZING THE DELIVERY OF PUBLIC HEALTH SERVICES.

(a) **IN GENERAL.**—The Secretary of Health and Human Services (referred to in this section as the “Secretary”), acting through the Director of the Centers for Disease Control and Prevention, shall provide funding for research in the area of public health services and systems.

(b) **REQUIREMENTS OF RESEARCH.**—Research supported under this section shall include—

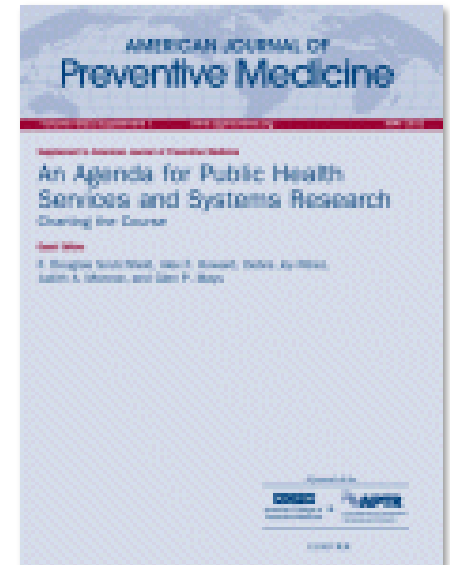
(1) examining evidence-based practices relating to prevention, with a particular focus on high priority areas as identified by the Secretary in the National Prevention Strategy or Healthy People 2020, and including comparing community-based public health interventions in terms of effectiveness and cost;

(2) analyzing the translation of interventions from academic settings to real world settings; and

(3) identifying effective strategies for organizing, financing, or delivering public health services in real world community settings, including comparing State and local health department structures and systems in terms of effectiveness and cost.

A national research agenda

- Public health system organization and structure
- Public health financing and economics
- Public health workforce
- Public health information and technology
- Cross-cutting elements
 - Quality
 - Law and policy
 - Equity and disparities
 - Metrics and data
 - Analytic methods



What are Public Health PBRNs?

A collection of ***public health agencies*** and their ***partner organizations*** engaged in an ongoing collaboration with an ***academic research center*** to conduct rigorous, applied studies of strategies for organizing, financing, and/or delivering public health services in ***real-world community settings***.

How can PBRNs help?

- Practice partners to help identify the most pressing questions to answer
- Multiple practice settings for analysis and comparison
- Research partners to help design studies that balance rigor, relevance, feasibility
- Collaborative interpretation of results
- Translating results to timely practice and policy actions



PBRN Performance in Engaging Practice Settings

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

<u>Activity</u>	PBRN Agencies		National Sample		
	<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		

Estimating ROI in public health: National Public Health Improvement Initiative

- ◆ **Goal:** Develop ROI approaches to assess value of improvements in public health capacity, infrastructure, administrative processes
- ◆ **Near-term:** capture effects on labor costs, time costs, productivity
- ◆ **Longer-term:** capture effects on program delivery (reach, effectiveness), population health
- ◆ Beta version of ROI tool:
http://works.bepress.com/glen_mays/64/



Public Health
Prevent. Promote. Protect.

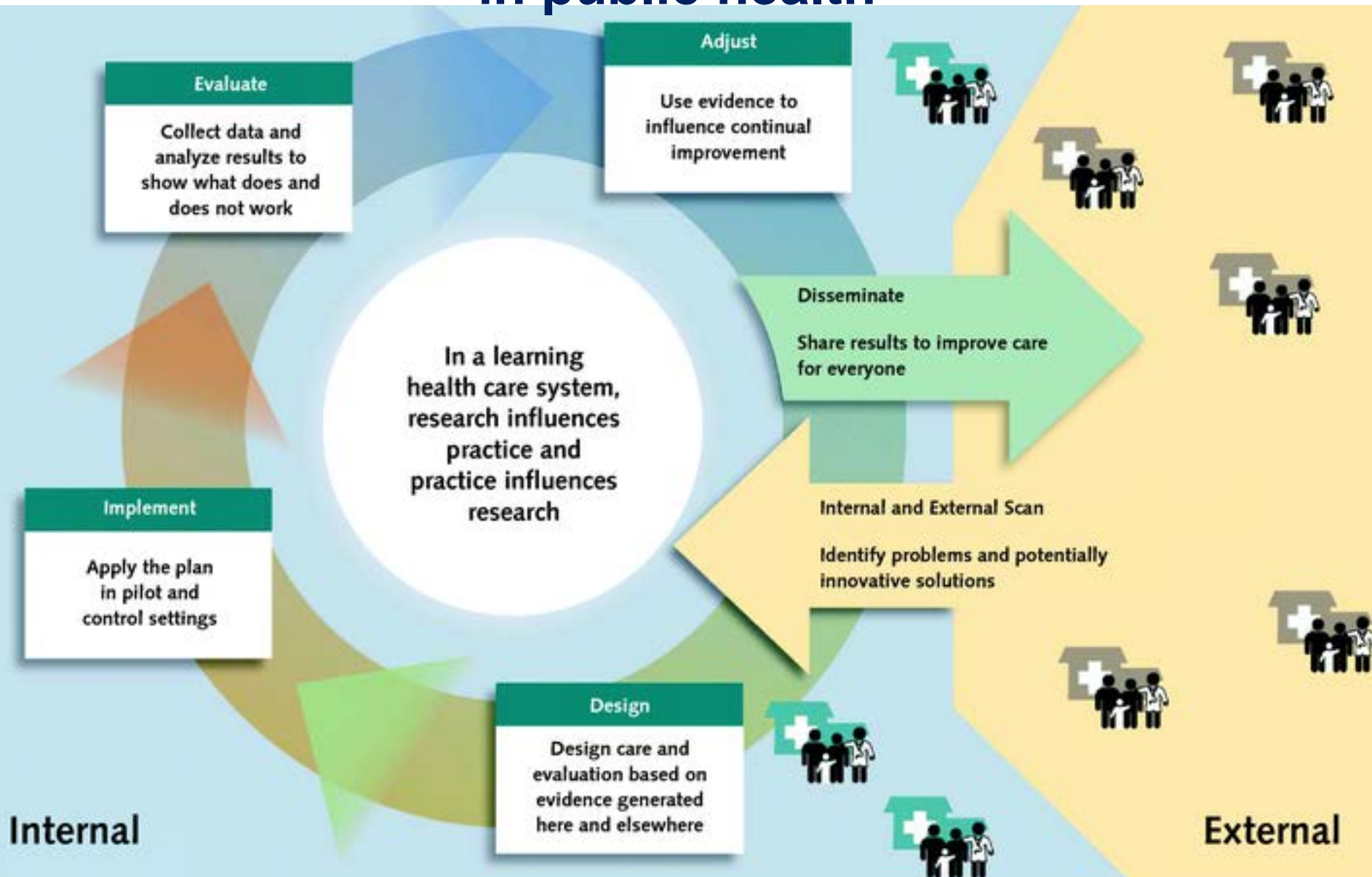
Implications for Policy and Practice

- ◆ Mortality reductions achievable through increases in public health spending may equal or exceed the reductions produced by expansions in medical care or insurance coverage
- ◆ Increased public health investments help to reduce geographic disparities in population health and bend the medical cost curve
- ◆ Gains from increased federal investments may be offset by reductions in state and local spending

Implications: Advancing ROI Analysis in Public Health

- ◆ Enhanced tracking of public health expenditures
- ◆ Enhanced monitoring of program performance
 - Reach/targeting
 - Effectiveness
 - Efficiency
 - Equity
- ◆ Analysis of cross-cutting infrastructure needed to implement/maintain programs

Implications: toward a rapid-learning system in public health



For More Information



Supported by The Robert Wood Johnson Foundation

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