

Fall October 10, 2014

How Can Public Health Economics Help Health Systems Focus Upstream?

Glen P Mays, *University of Kentucky*

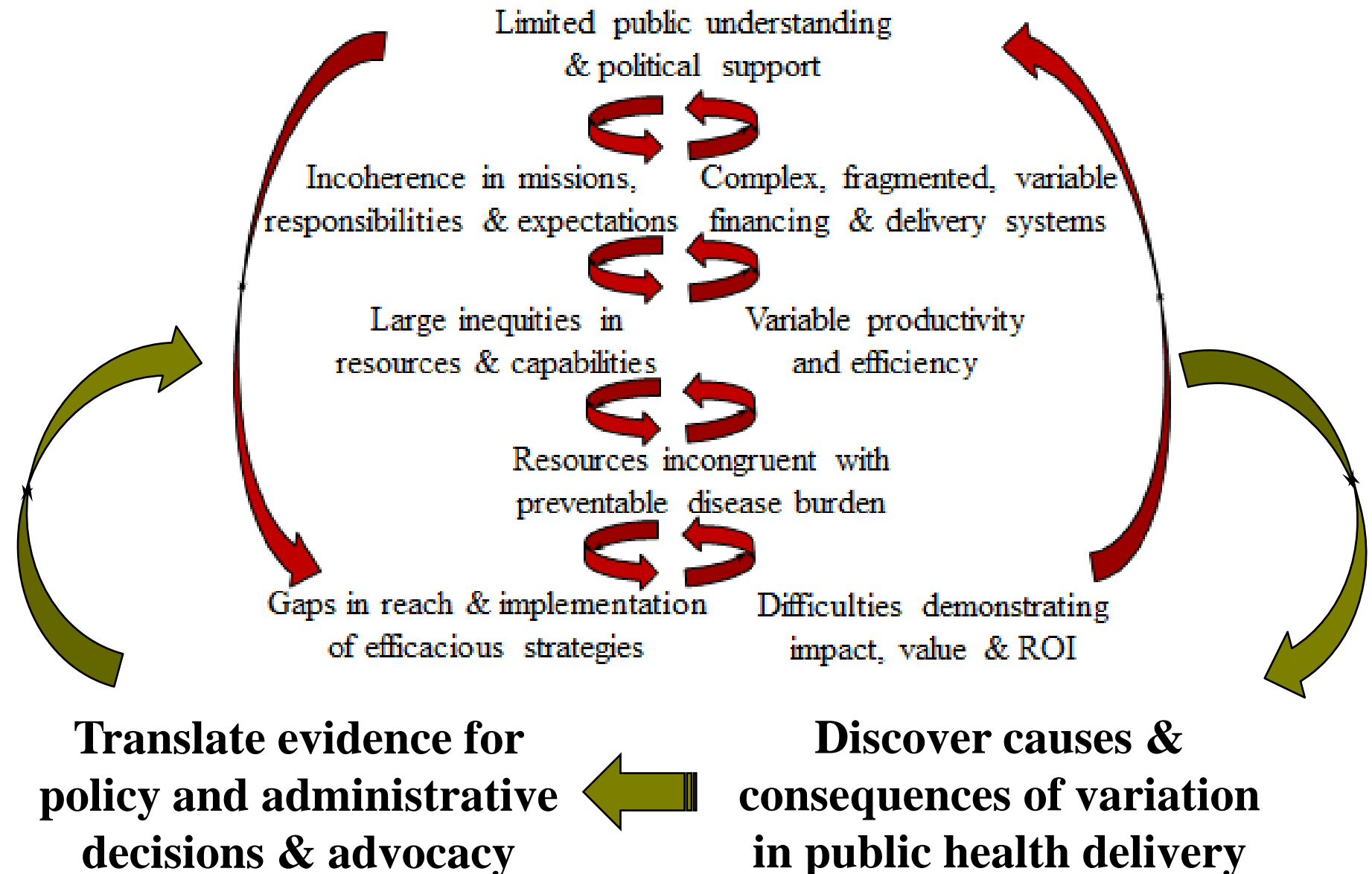
How Can Public Health Economics Help Health Systems Focus Upstream?

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British Columbia Ministry of Health | Population and Public Health Division | 10 October 2014

Vicious cycles to learning systems



What's the big deal about costs?

“Poor costing systems have disastrous consequences. It is a well-known management axiom that what is not measured cannot be **managed or improved**. Since providers misunderstand their costs, they are unable to **link cost to process improvements or outcomes**, preventing them from making good decisions....Poor cost measurement [leads] to huge **cross-subsidies across services**...Finally, poor measurement of costs and outcomes also means that effective and efficient providers **go unrewarded**.”



— R.S. Kaplan and M.E. Porter, The big idea: how to solve the cost crisis in health care. *Harvard Business Review*, 2011.

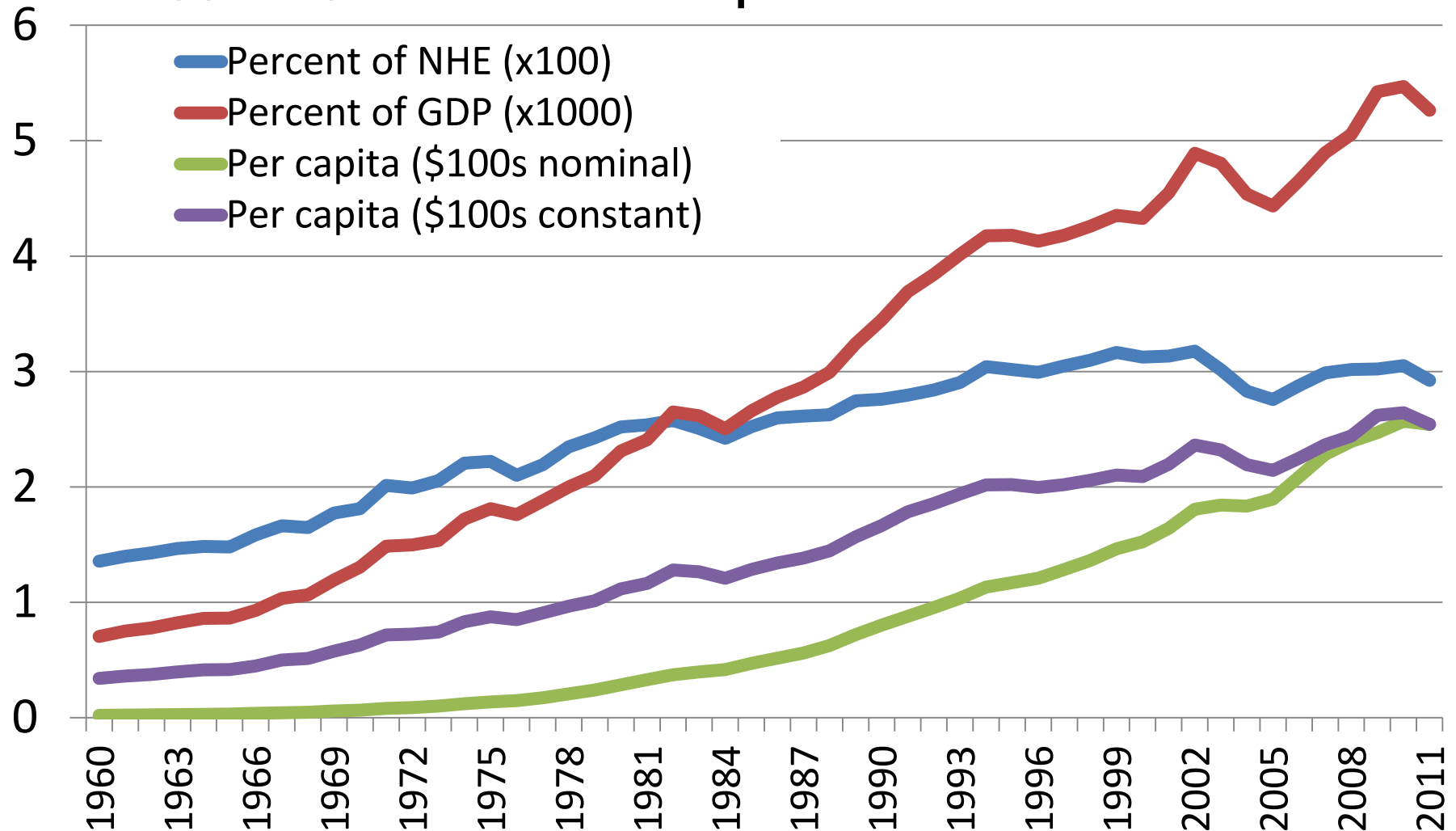
Informing practice and policy decisions

- Align spending with preventable disease burden
- Identify and address inequities in resources
- Improve productivity and efficiency
- Demonstrate value: linking spending to outcomes
- Strengthen fiscal policy: financing mechanisms



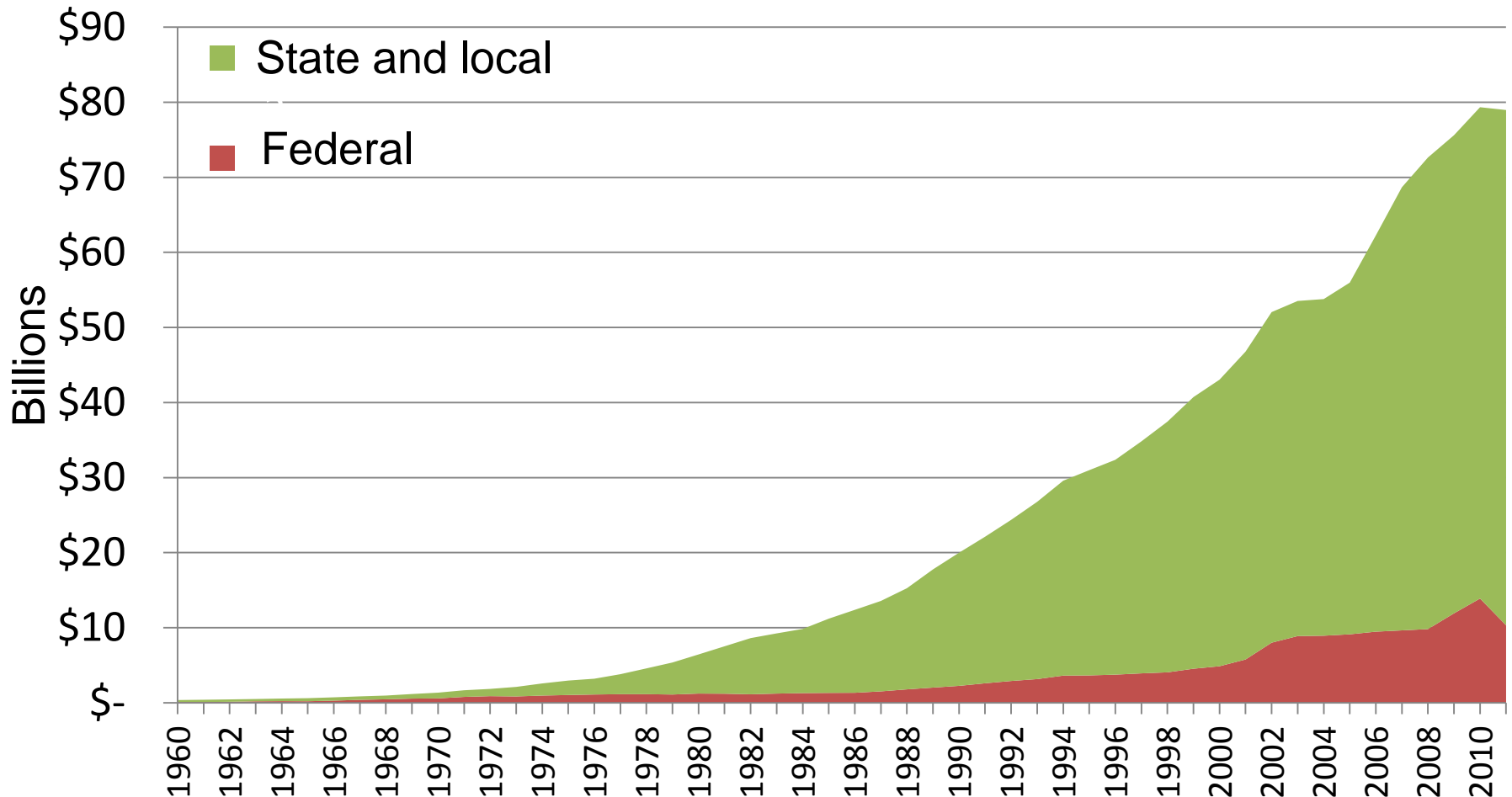
Public health economics in the U.S.

Governmental Expenditures for Public Health Activity, USDHHS National Health Expenditure Accounts

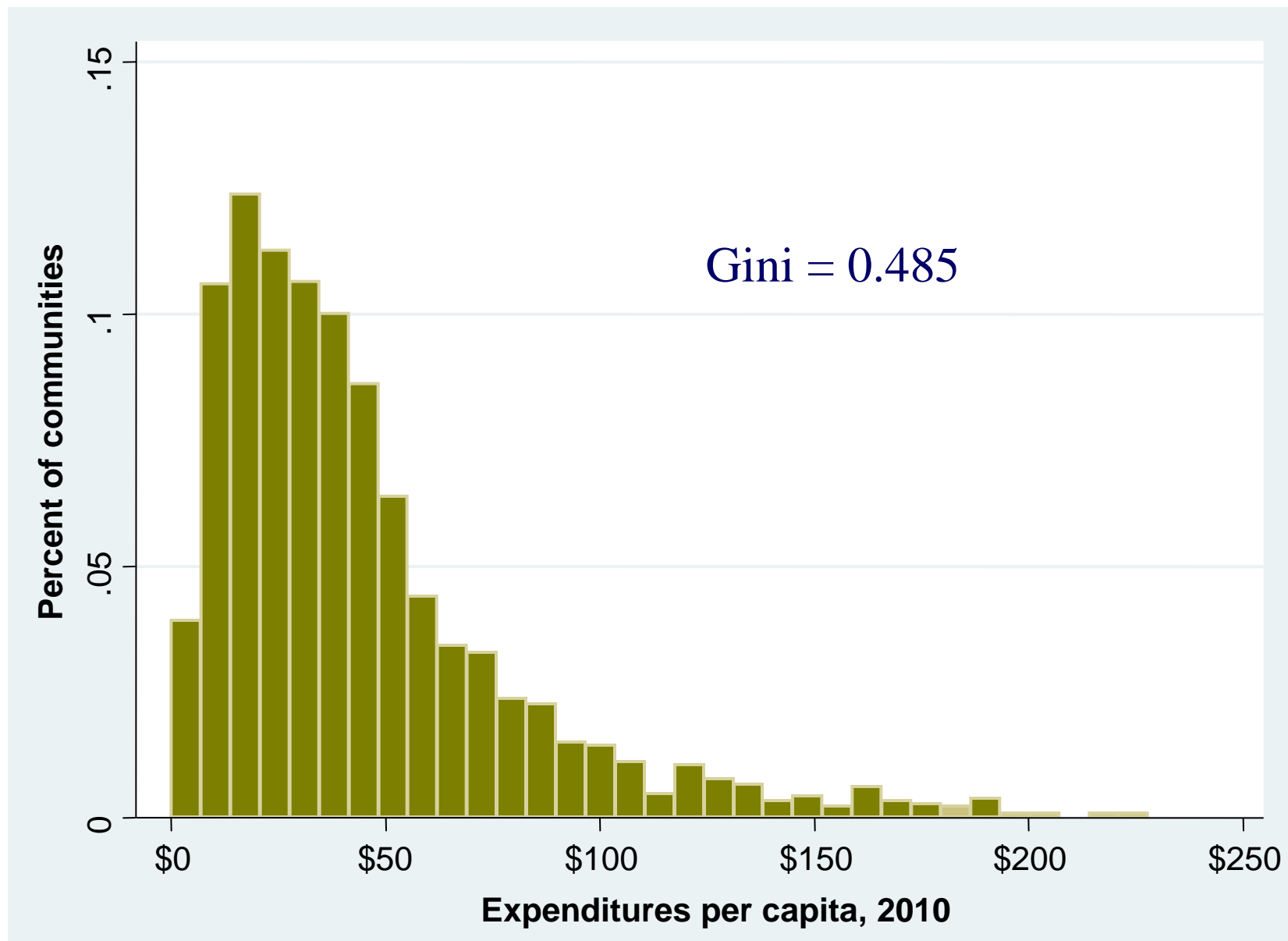


Public health economics in the U.S.

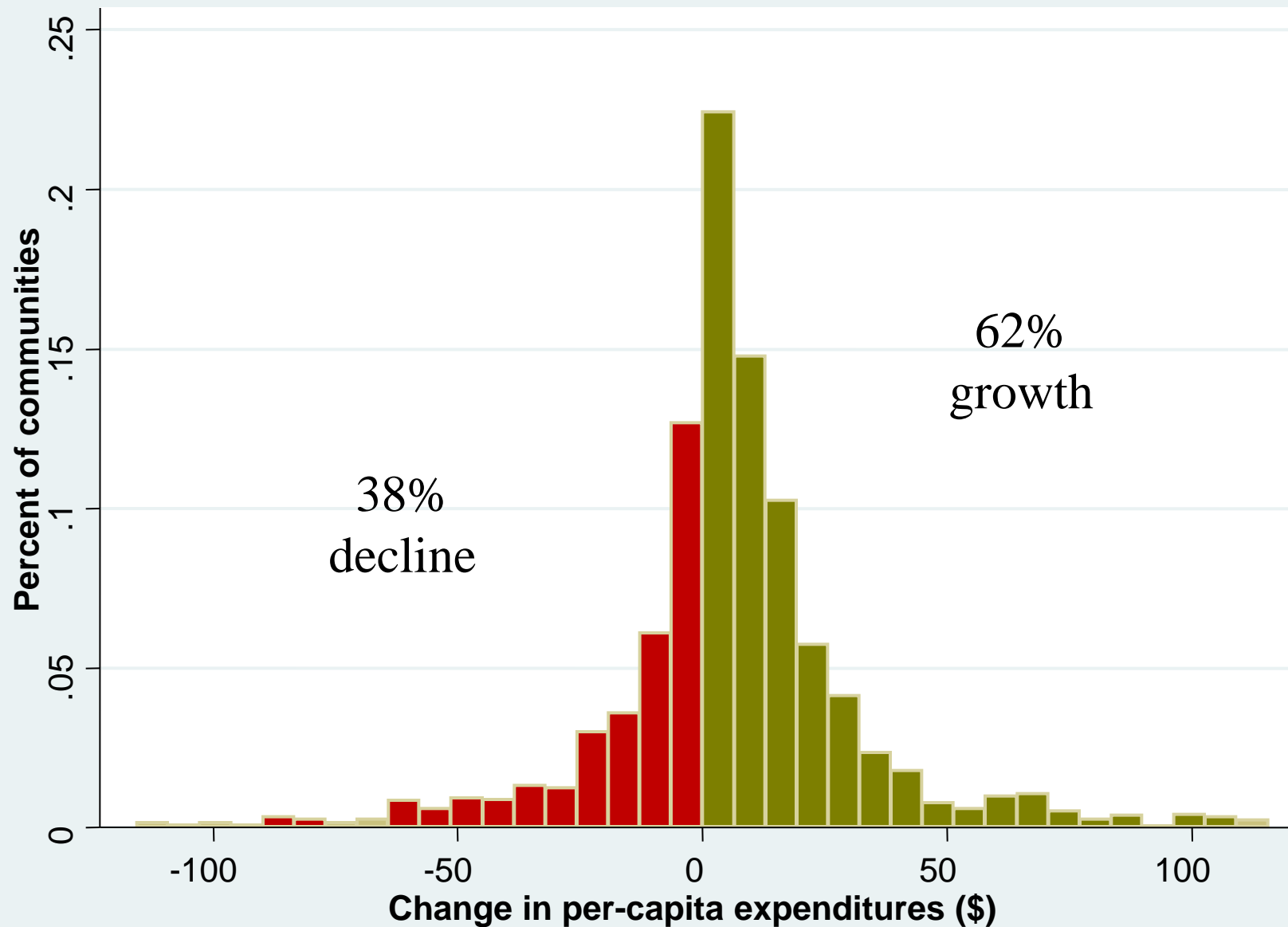
Governmental Expenditures for Public Health Activity, USDHHS National Health Expenditure Accounts



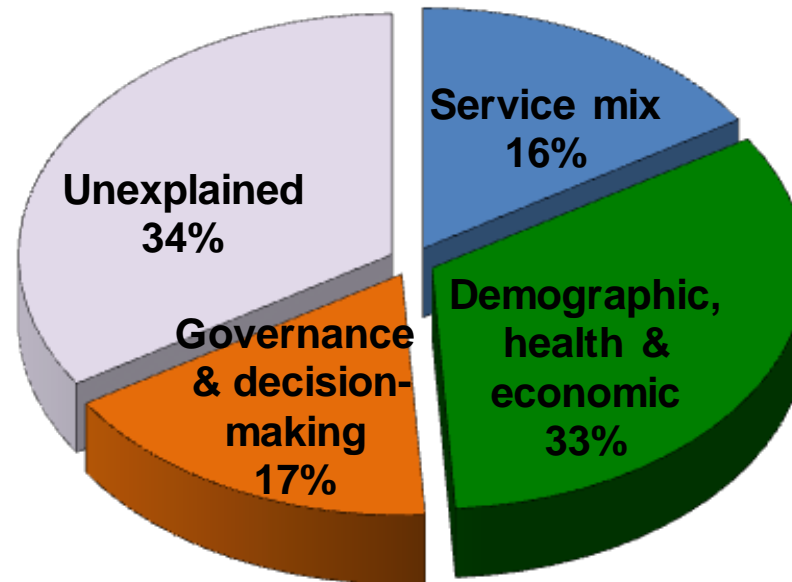
Variation in Local Public Health Spending



Changes in Local Public Health Spending 1993-2010

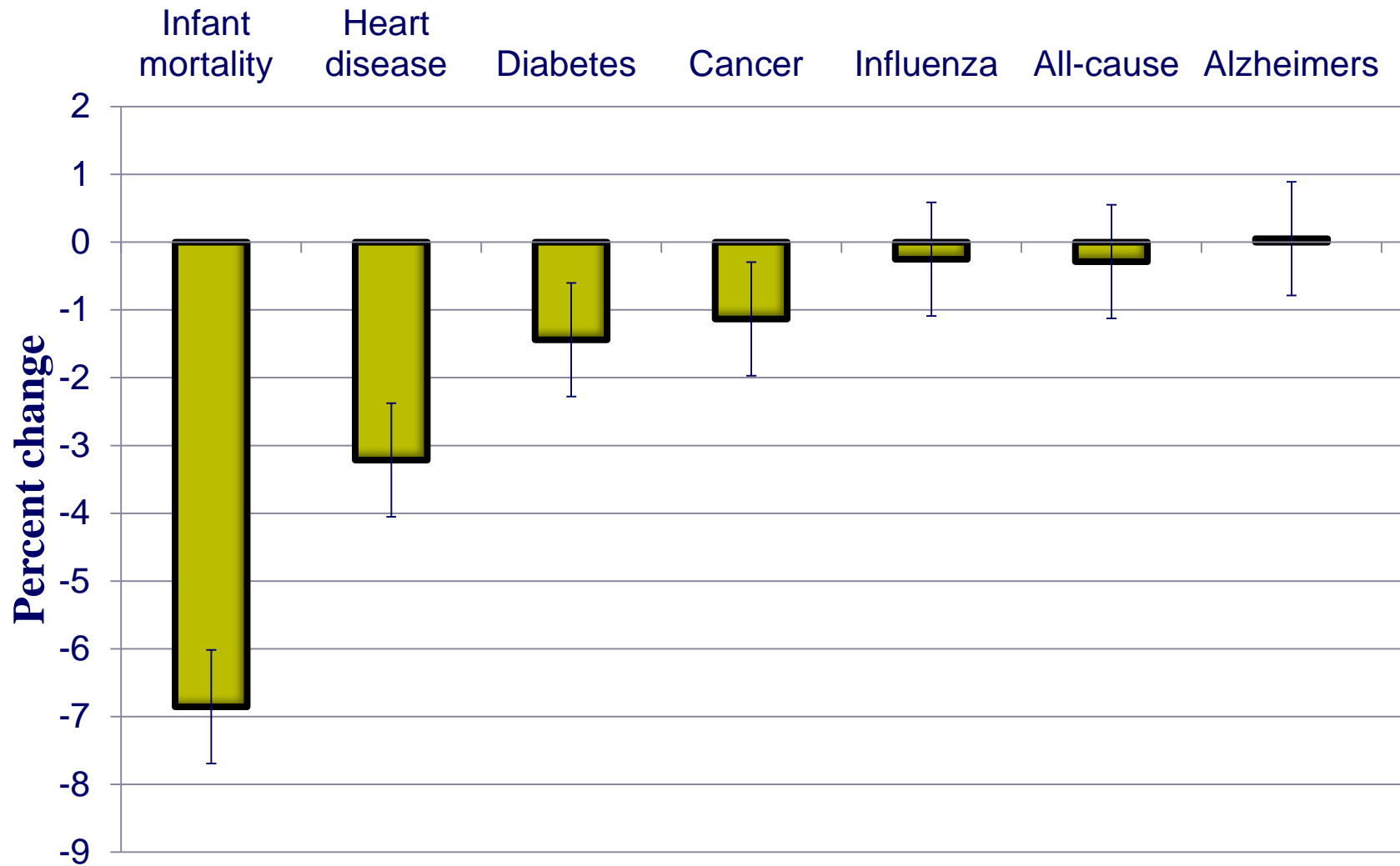


Determinants of Local Public Health Spending Levels



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

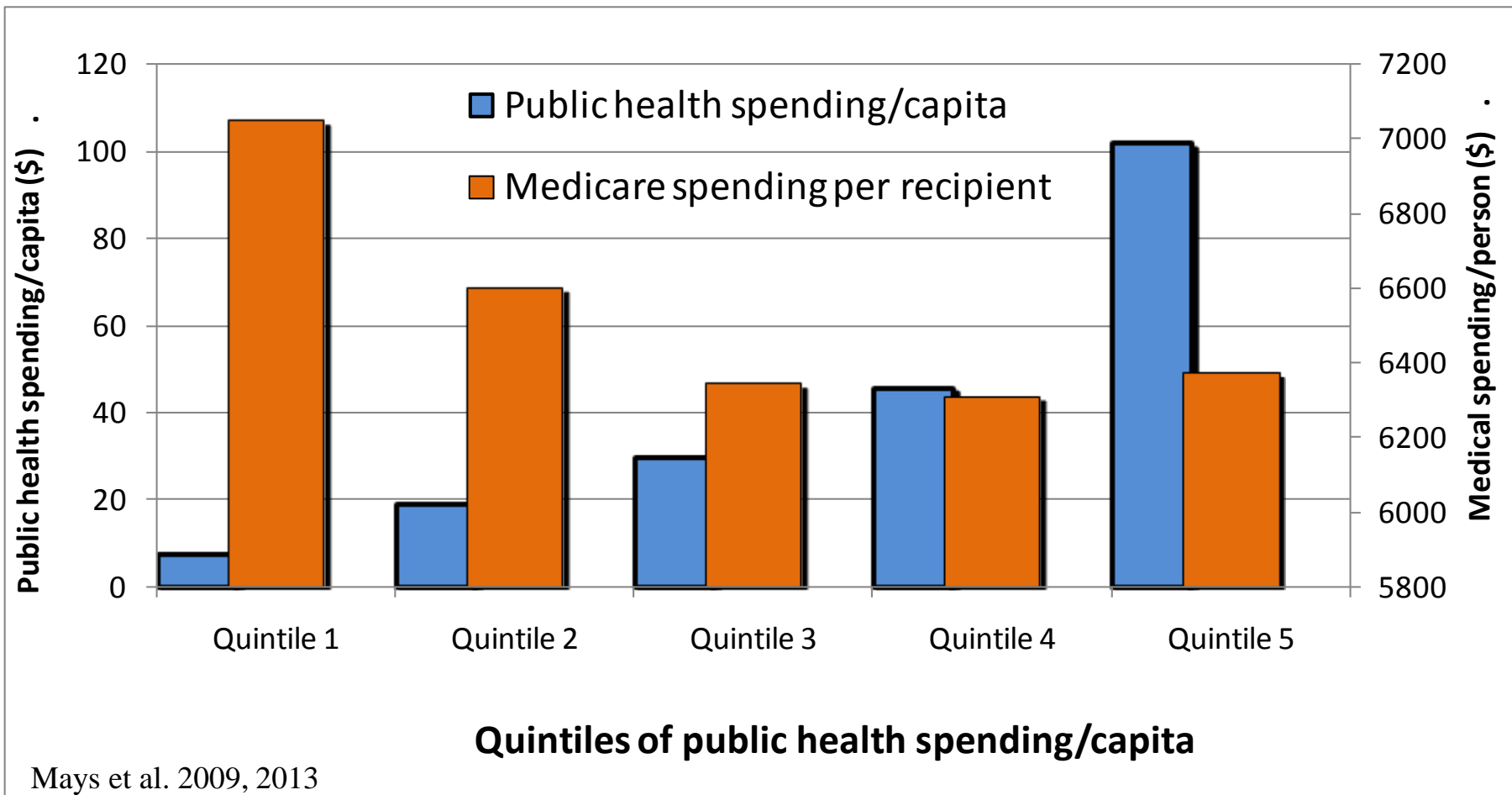
Mortality reductions attributable to local public health spending, 1993-2008



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



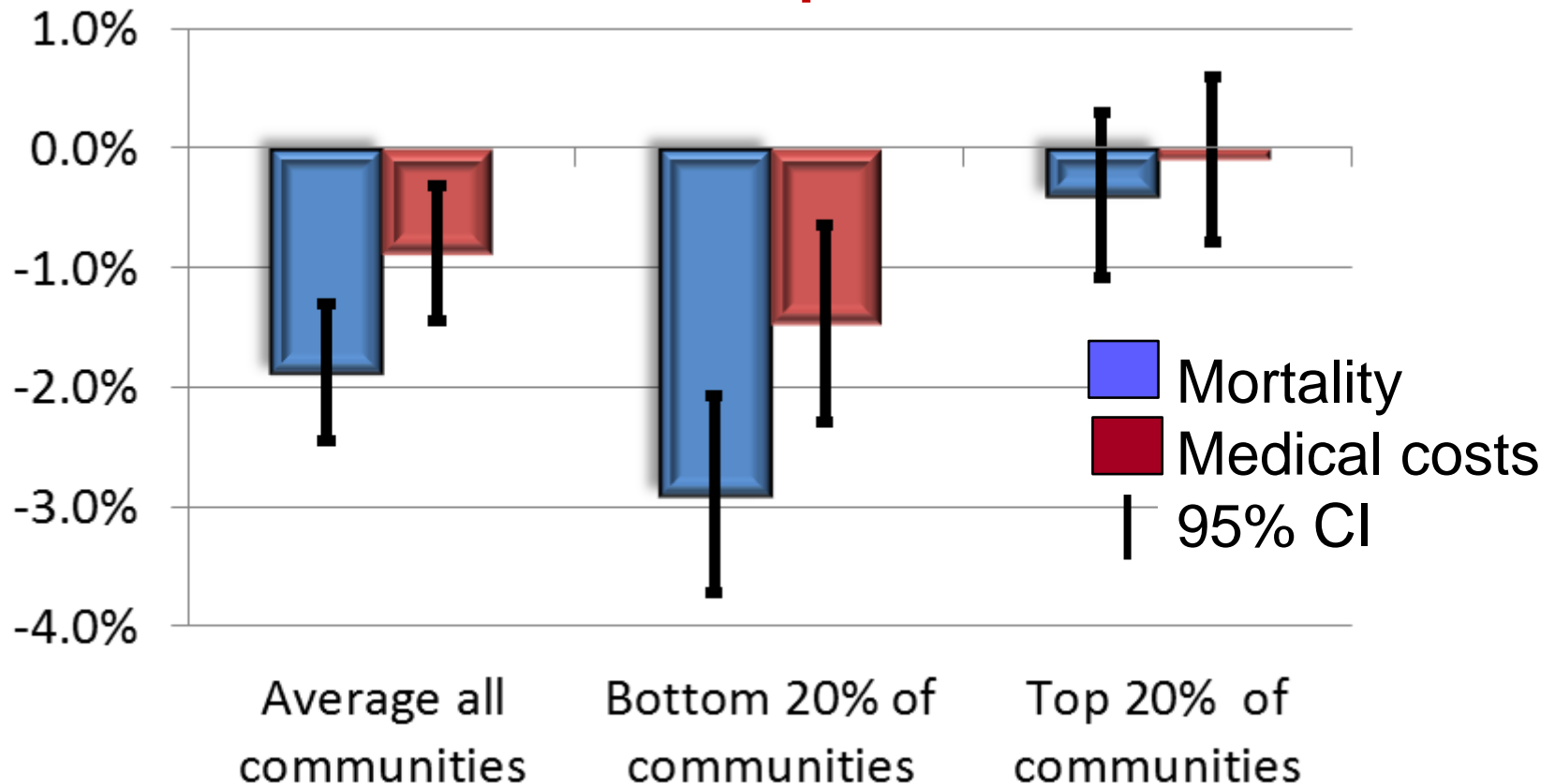
Estimating value for public health spending

1.2% increase in public health spending in the average community over 10 years:

Public health cost	\$7.2M
Medical cost offset	-\$6.3M (Medicare only)
Deaths averted	175.8
Life years gained	1758
Net cost/LY	\$546

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

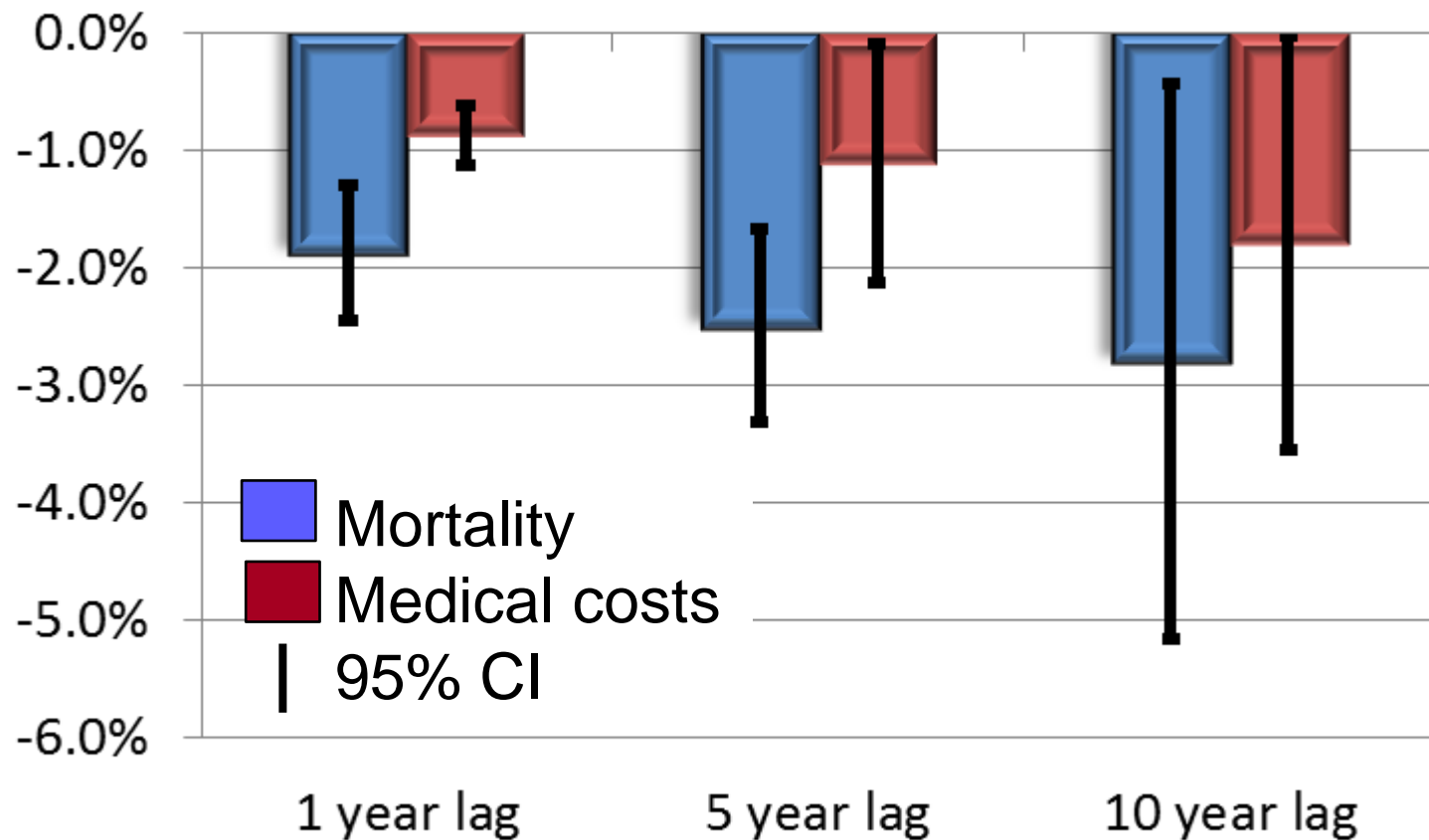
Impact of 10% Increase in Public Health Spending/Capita
Based on Income Per Capita in Communities



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

How long does it take: Cumulative effects of public health spending

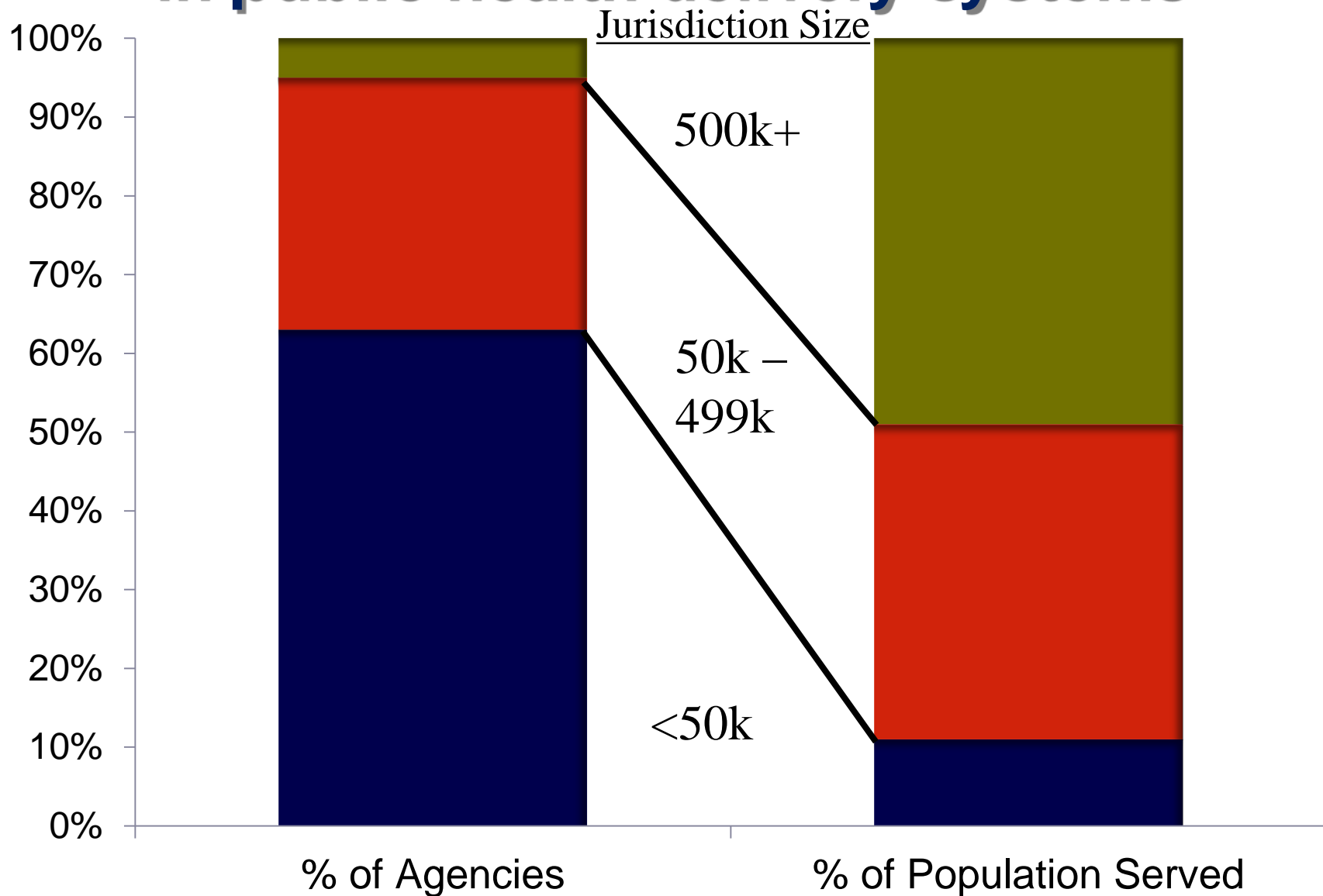
Changes in Mortality and Medical Care Spending Attributable to 10% Increase in Public Health Spending /Capita



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

Mays et al. forthcoming 2014

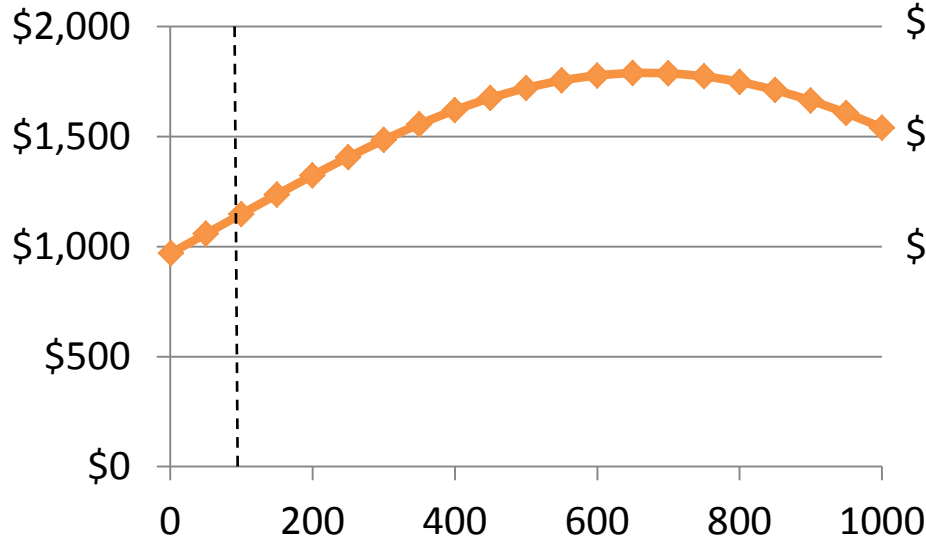
Economies of scale and scope in public health delivery systems



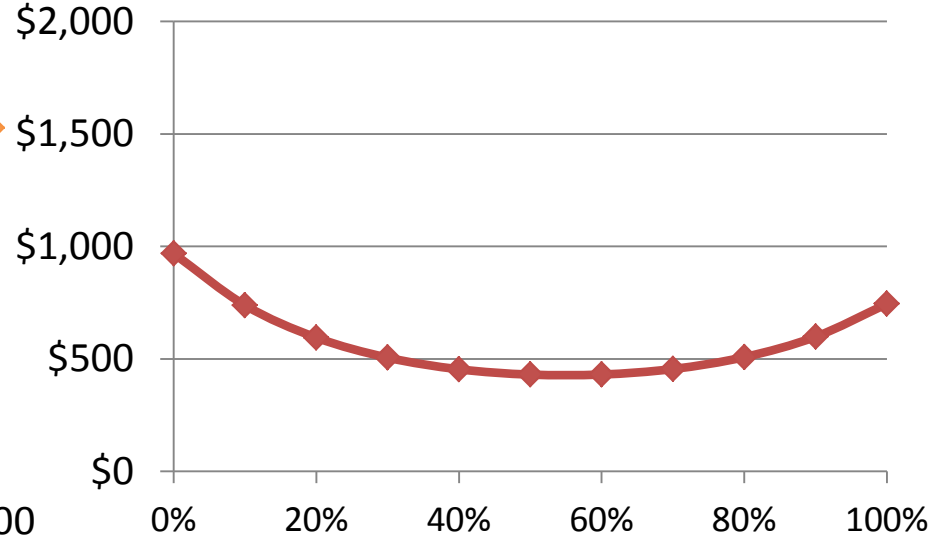
Source: 2010 NACCHO National Profile of Local Health Departments Survey

Empirical estimates of scale and scope economies

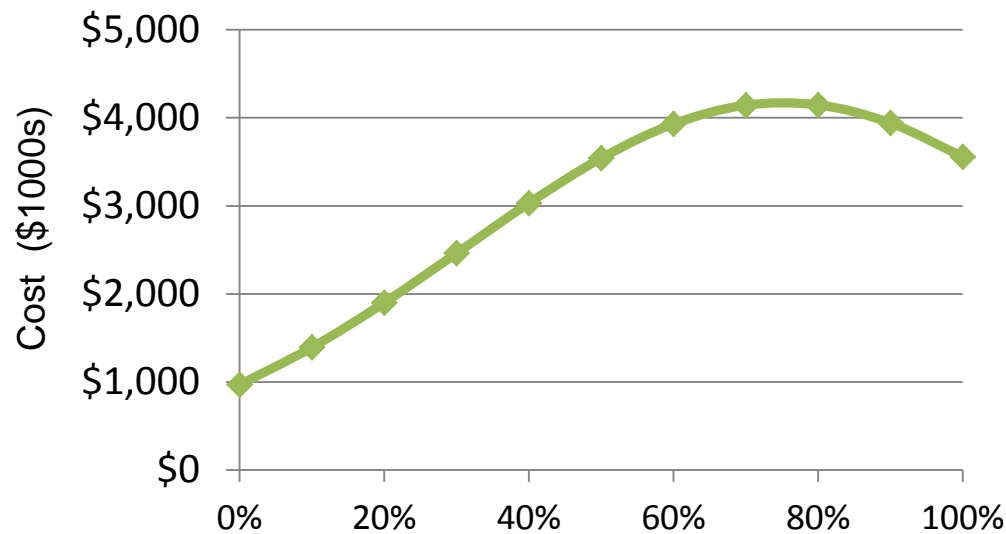
Scale (Population in 1000s)



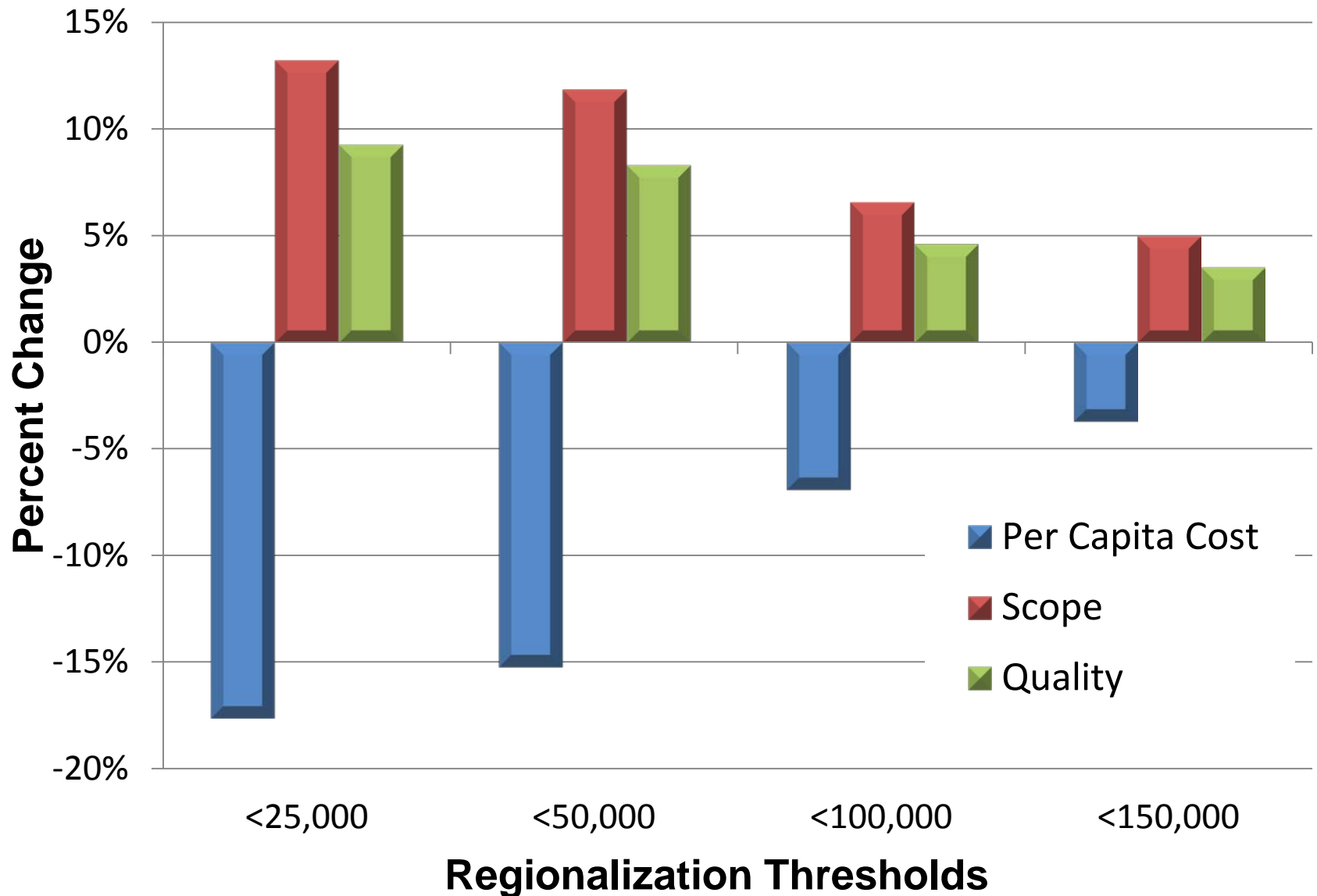
Quality (Perceived Effectiveness)



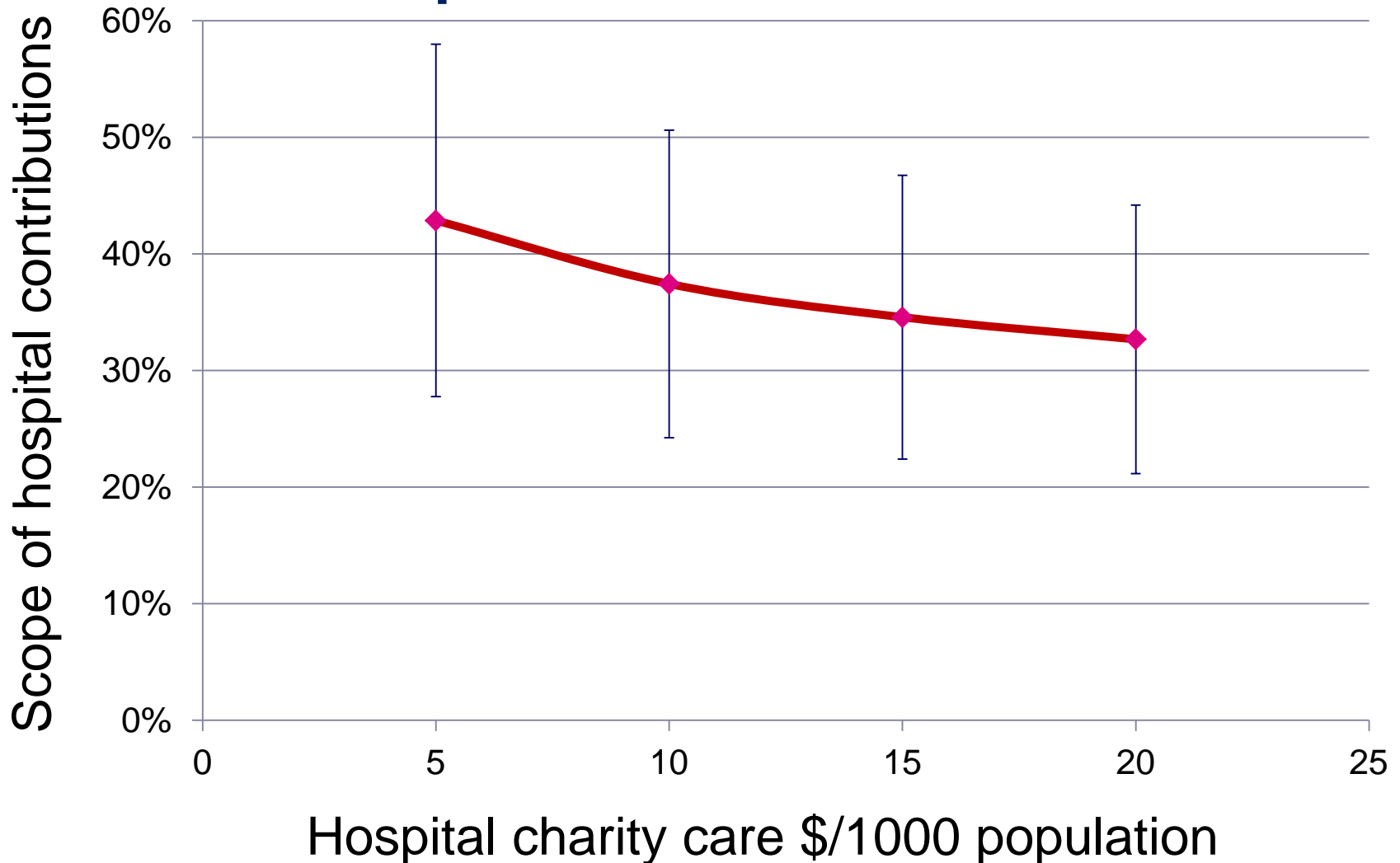
Scope (% of Activities)



Simulated Effects of Regionalization



Estimated crowd-out in hospital contributions to public health activities

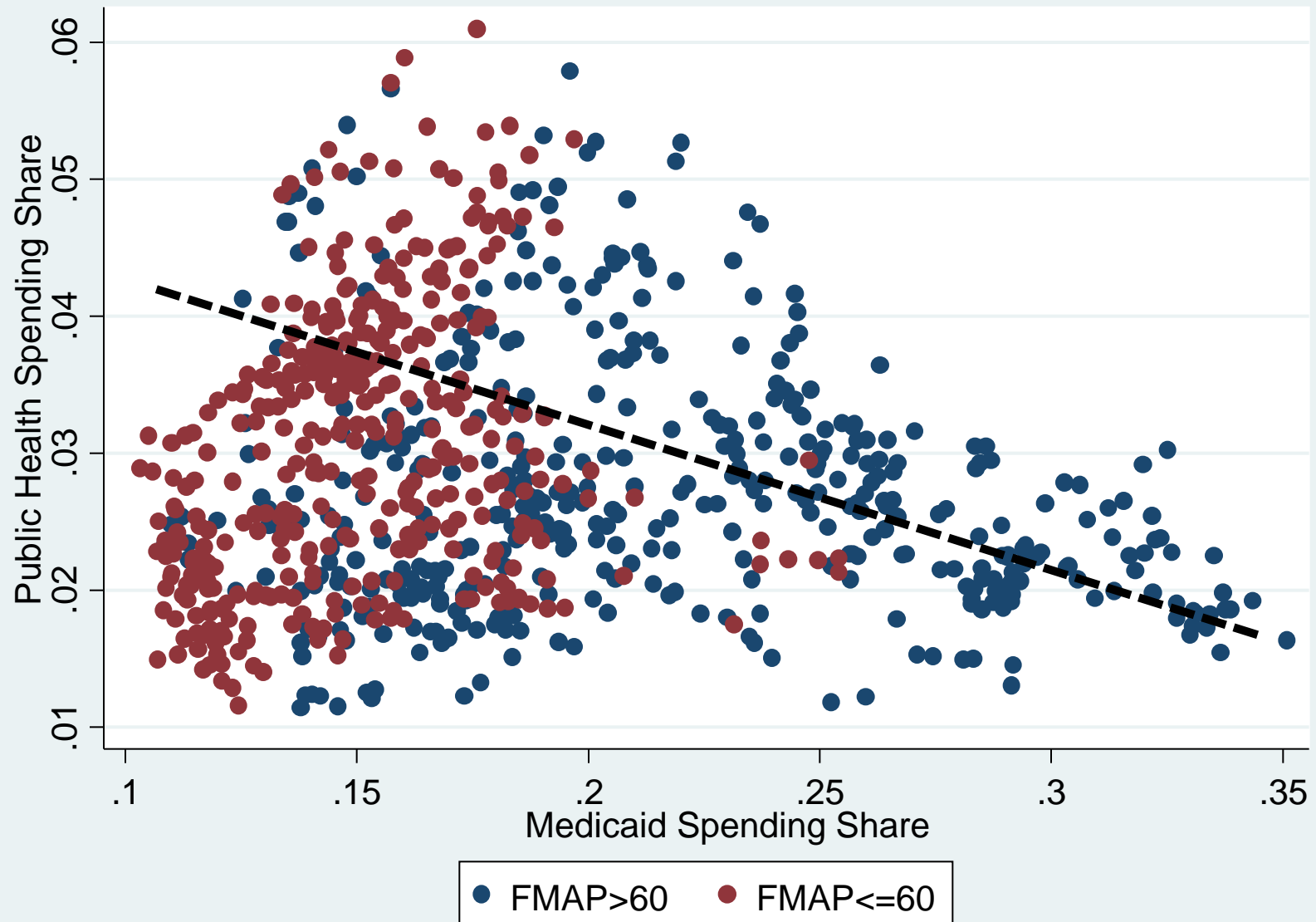


Note: GLLAMM estimates, holding all other variables constant in the model

Crowding Out: Medicaid and Public Health Spending under Health Reform

- Do states respond to increases in Medicaid spending by changing (reducing) spending on other public health activities?
- What are the likely health and economic effects of Medicaid-induced changes in public health spending?

Results: Medicaid and Public Health Shares of State Spending



Results: Estimated Crowd Out Effects

Effects of 10% Growth in Medicaid Spending Share on Public Health Spending Share

<u>Model</u>	<u>Coeff.</u>	<u>S.E.</u>		<u>Per Capita Δ</u>
State PH spending	-0.82	0.31	***	-13.1%
Local PH spending	-0.77	0.38	***	-14.8%

***p<0.01

Projected Health Effects of Crowd Out

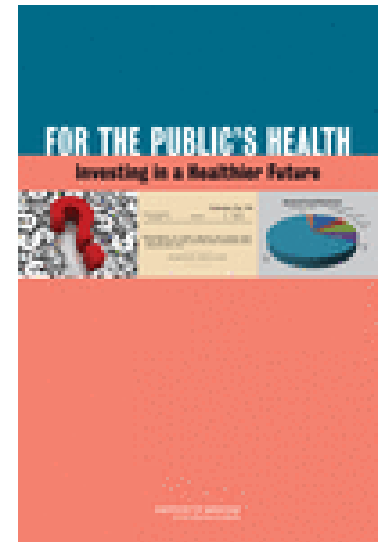
- At median levels of crowd-out:
 - 12.3% increase in infant mortality rate
 - 5.5% increase in cardiovascular mortality rate
 - 2.7% increase in diabetes mortality rate
 - 1.9% increase in cancer mortality rate
- Reduce or fully offset the direct mortality gains from increases in health insurance coverage (e.g. Sommers et al 2014)

Using 10-year mortality effect estimates from Mays and Smith, *Health Affairs* 2011

Toward a deeper understanding of costs & returns

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



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

Cost data collection methods

➤ Prospective “expected cost” methods

- Vignettes
- Surveys with staff and/or administrators
- Delphi group processes

➤ Concurrent “actual cost” methods (micro-costing)

- Time studies with staff
- Activity logs with staff
- Direct observation

➤ Retrospective “cost accounting” methods

- Modeling and decomposition using administrative records
- Surveys with staff and/or administrators

Examples: Survey methods

SPECIAL REPORT



The NEW ENGLAND
JOURNAL of MEDICINE

Results and Policy Implications of the Resource-Based Relative-Value Study

William C. Hsiao, Ph.D., Peter Braun, M.D., Daniel Dunn, Ph.D., Edmund R. Becker, Ph.D., Margaret DeNicola, M.P.H., and Thomas R. Ketcham, M.P.H.

N Engl J Med 1988; 319:881-888 | [September 29, 1988](#) | DOI: 10.1056/NEJM198809293191330

Four dimensions of work:

- Time
- Cognitive effort
- Physical effort
- Stress

Additional cost components:

- Practice expense
- Malpractice expense

Examples: Survey methods



- ◆ Surveys program managers
- ◆ Refers to expenditure records (not budgets)
- ◆ Explicit allocation of resources across multiple programs
- ◆ Available at:

<http://www.rti.org/page.cfm?objectid=7E6095C8-AE6E-4568-874839C81FAD414B>

Zarkin GA, Dunlap LJ, Homs G. The substance abuse services cost analysis program (SASCAP): a new method for estimating drug treatment services costs, **Evaluation and Program Planning** 2004; 27(1): 35-43,

Examples: Medicaid administrative claiming

- ✦ Public health agencies that claim Medicaid reimbursement for outreach and enrollment activities
- ✦ Requires periodic time studies to document agency time and effort devoted to reimbursable activities

Key issues: cost of capabilities

- ✦ Delineating state vs. local roles and division of effort
- ✦ Identifying scale and scope effects
 - By population served
 - By range of programs supported (portfolio effect)
- ✦ Identifying input factors that affect costs
 - Resource prices
 - Case mix
- ✦ Identifying key output differences across settings
 - Intensity
 - Quality
 - Reach

Defining what to cost: the public health package

- ✦ Washington State's Foundational Public Health Services
- ✦ Ohio's Public Health Futures Committee: Minimum Package of Services
- ✦ Colorado's Core Public Health Services



- ✦ National Workgroup on Foundational Public Health Capabilities

Defining what to cost:

Washington Public Health
Improvement Partnership

FOUNDATIONAL PUBLIC HEALTH SERVICES	FOUNDATIONAL CAPABILITIES	Foundational Programs	Additional Important Services
		Communicable Disease Control	Chronic Disease & Injury Prevention
		Environmental Public Health	Maternal/Child/Family Health
		Access/Linkage with Clinical Health Care	Vital Records
		← ACROSS ALL PROGRAMS →	
		Assessment (surveillance and epidemiology)	
		Emergency preparedness and response (all hazards)	
		Communications	
FOUNDATIONAL PUBLIC HEALTH SERVICES	FOUNDATIONAL CAPABILITIES	Policy development and support	
		Community partnership development	
		Business competencies	

Washington's Cost Estimates (preliminary)

Estimated Cost of Providing Foundational Public Health Services Statewide

Services Ranked By Cost	Total Estimated Cost of FPHS	State Dept. of Health	Local Health Jurisdictions	<div> <div></div> State DOH <div></div> LHJs </div>	
<u>Foundational Capabilities</u>	75,700,000	27,750,000	47,945,000	37%	63%
A. Assessment	11,350,000	5,410,000	5,935,000	48%	52%
B. Emergency Preparedness and Response	10,825,000	3,620,000	7,205,000	33%	67%
C. Communication	3,960,000	750,000	3,210,000	19%	81%
D. Policy Development and Support	4,415,000	1,115,000	3,300,000	25%	75%
E. Community Partnership Development	4,885,000	860,000	4,025,000	18%	82%
F. Business Competencies	40,265,000	15,995,000	24,270,000	40%	60%
<u>Foundational Programs</u>	252,290,000	134,890,000	117,405,000	53%	47%
A. Communicable Disease Control	33,760,000	9,010,000	24,750,000	27%	73%
B. Chronic Disease and Injury Prevention	24,855,000	12,590,000	12,265,000	51%	49%
C. Environmental Public Health	95,800,000	33,760,000	62,045,000	35%	65%
D. Maternal/Child/Family Health	25,175,000	13,765,000	11,410,000	55%	45%
E. Access/Linkage with Clinical Health Care	65,585,000	62,145,000	3,440,000	95%	5%
F. Vital Records	7,115,000	3,620,000	3,495,000	51%	49%
Total Cost	327,990,000	162,640,000	165,350,000	50%	50%

Source: DOH, 2013; Participating LHJs, 2013; and BERK, 2013.

Local per capita: \$24.0 State per capita: \$23.6

Source: Washington Public Health Improvement Partnership. Foundational Public Health Services Preliminary Cost Estimation Model. 2013.

Defining what to cost: Ohio

Figure 1.

Ohio Minimum Package of Local Public Health Services

CORE PUBLIC HEALTH SERVICES

All local health departments should be responsible for providing the following services in their district, directly or by contracting

- Environmental health services
- Communicable disease control
- Epidemiology services
- Access to birth and death records
- Health promotion and prevention
- Emergency preparedness
- Linking people to health services
- Community engagement

OTHER PUBLIC HEALTH SERVICES

Local health departments play a role in assuring these services are provided in their community, by public health or other organizations

- Clinical preventive and primary care services (e.g., immunizations, clinics)
- Specific maternal and child health programs (e.g., WIC, Help Me Grow)
- Non-mandated environmental health services (e.g., lead screening)
- Other optional services (e.g., home health, school nurses)

FOUNDATIONAL CAPABILITIES

All local health departments should have access to the following skills and resources.
Access can occur through cross-jurisdictional sharing.

- Quality assurance
- Information management and analysis
- Policy development
- Resource development
- Legal support
- Laboratory capacity
- Support and expertise for community engagement strategies



Governor's Office of
Health Transformation

Source: Association of Ohio Health Commissioners, *Public Health Futures: Considerations for a new framework for local public health in Ohio* (June 15, 2012).

Ohio's Cost Estimates (preliminary)

Exhibit 4. Model of Core Spending.

Core spending	Multipliers			Sample Computation		
	A	B	C	D	E = B * D	F = C * D
	Estimated impact of agency features	Estimated impact of population features	Quick estimate	Actual	Computed estimate B	Computed estimate C
Type of agency = city	-0.4340	0.0000		0.0000	0.0000	
Type of agency = county	0.0000	0.0024		1.0000	0.0024	
Population size (log)	0.8572	0.9053	0.9701	10.4096	9.4235	10.0979
Percent population rural	0.2747	0.5795	0.7892	0.6458	0.3742	0.5097
Percent population nonwhite	2.5749	2.7096	2.9770	0.0291	0.0790	0.0868
Percent non-English speaking	1.0886	-5.5211		0.0050	-0.0276	
Percent 65 + years old (%)	-2.1059	0.3036		0.1407	0.0427	
Income per capita (\$100,000)	-2.3900	-1.1500		0.1984	-0.2281	
Percent uninsured (%)	-1.3601	3.4406		0.1095	0.3768	
Physicians per 100,000 population	0.0006	0.0004		27.1000	0.0120	
NACCHO % of Core Svc	1.0009	1.4116		0.6500	0.9175	
Constant	4.9783	2.9009	3.0476		2.9009	3.0476
Total				1,127,485	1,059,516	929,085

Local per capita: \$32.2

Source: Patrick Bernet and Ohio Research Association for Public Health Improvement.

www.raphi.org

Defining what to cost: Colorado

Colorado Core Public Health Services

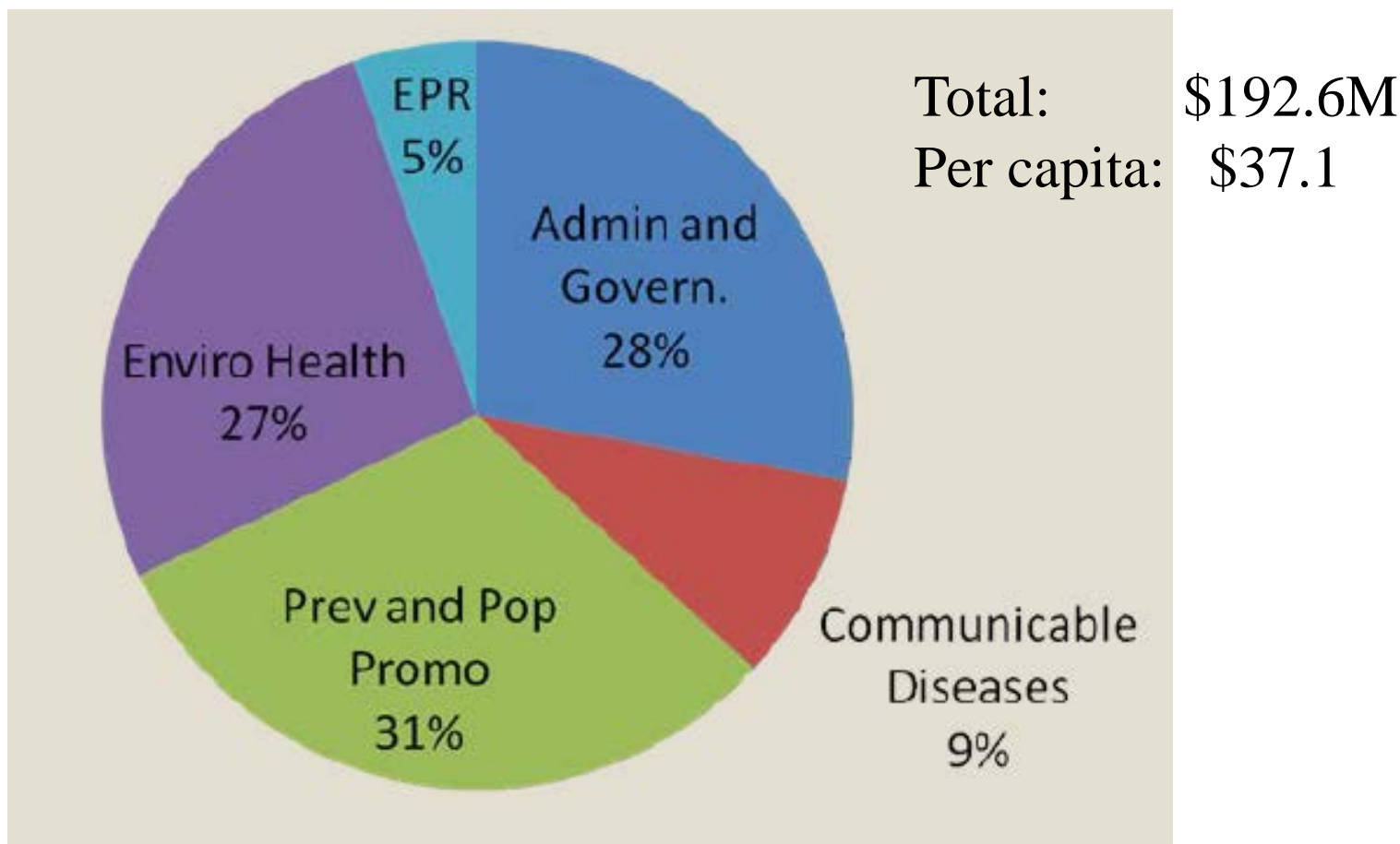


- Core Services Promulgated into Rule October 2011:
 - Assessment, Planning, and Communication
 - Vital Records and Statistics
 - Communicable Disease Prevention, Investigation, and Control
 - Prevention and Population Health Promotion
 - Emergency Preparedness and Response
 - Environmental Health
 - Administration and Governance

...performed in accordance with the 10 Essential Public Health Services

Colorado's Cost Estimates (preliminary)

Colorado Local Core Public Health Services, 2012



Source: Lampe et al. Colorado Public Health PBRN Research-in-Progress, 2013

http://www.publichealthsystems.org/uploads/docs/MonthlyPBRN_WebinarSlides_091913.pdf.

Ongoing work: Public Health Delivery and Cost Studies (DACs)

- Set of 11 new studies conducted by PBRNs
- Focus on 1 or more public health services
- Estimate costs and cost variation across multiple settings
- Identify factors that drive variation in costs
- Use standardized approaches to cost measurement and cost analysis
- Scale up to produce national estimates of resource requirements for “minimum package”

Toward a “rapid-learning system” in public health



For More Information



Supported by The Robert Wood Johnson Foundation

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