Does Local Public Health Spending Improve Community Health?

An Instrumental Variables Analysis

Glen P. Mays, PhD
Department of Health Policy and Management
Fay W. Boozman College of Public Health
University of Arkansas for Medical Sciences

UAMS
FAY W. BOOZMAN COLLEGE OF PUBLIC HEALTH
UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES

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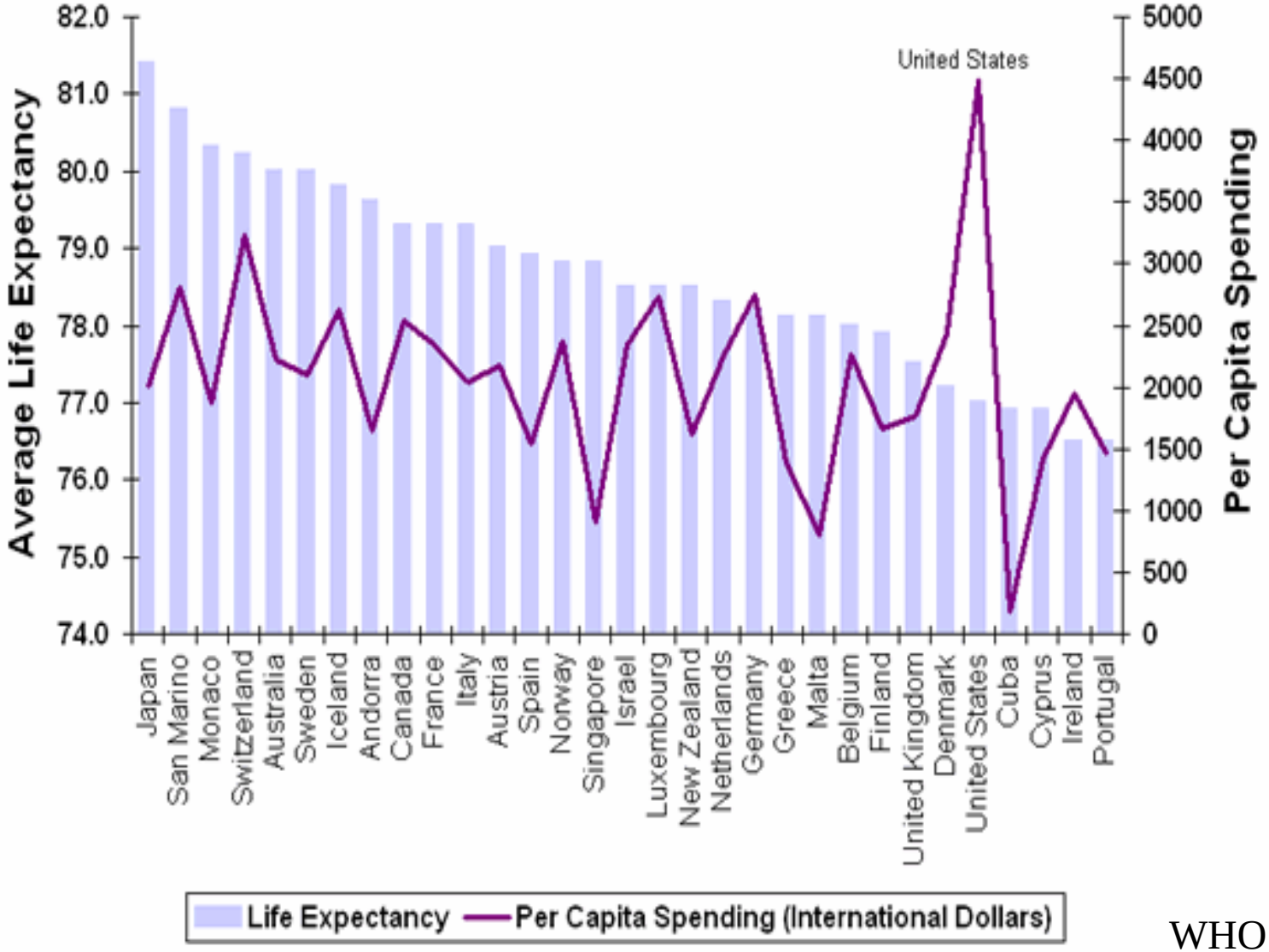
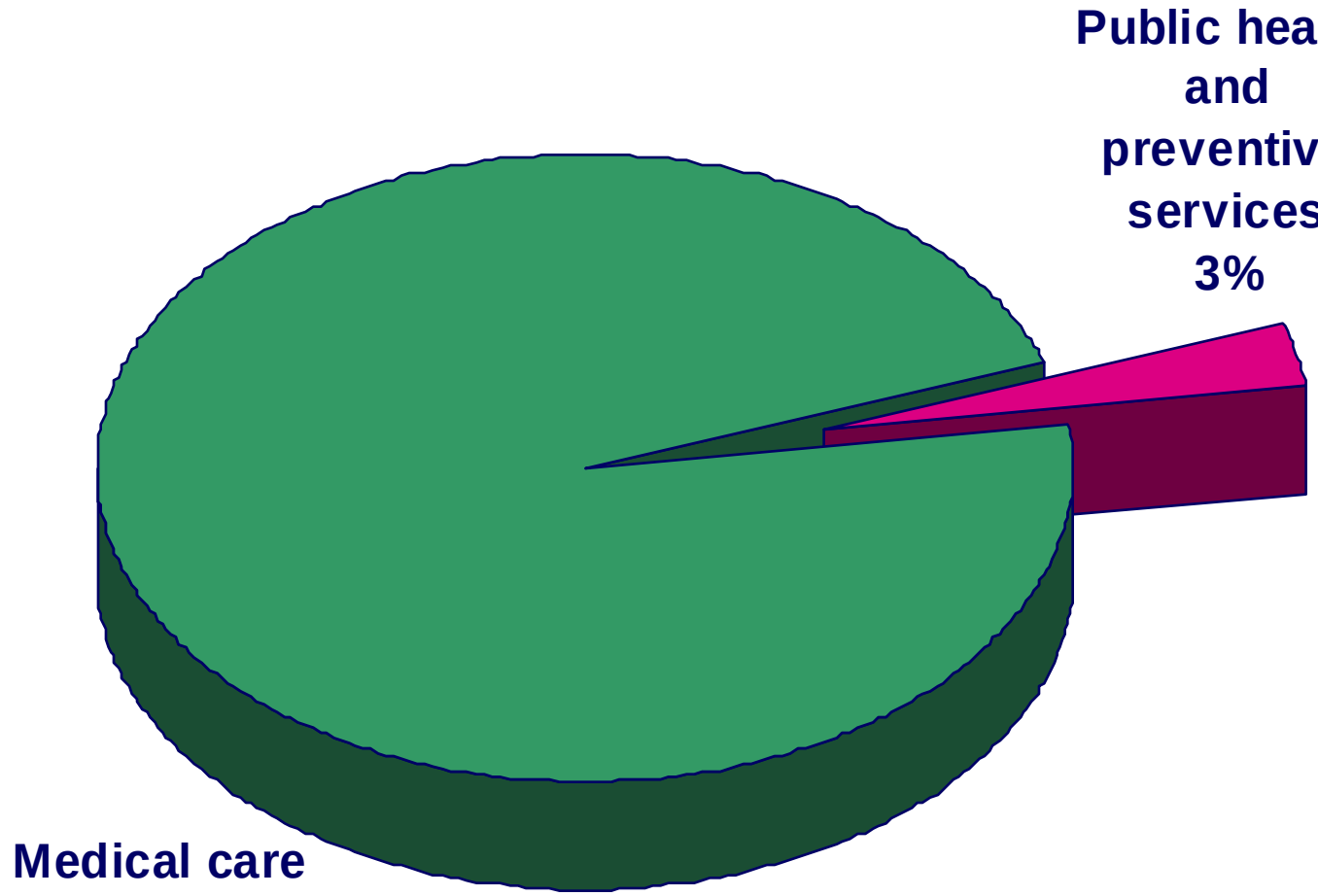
Getting what we pay for?

The Cost of a Long Life



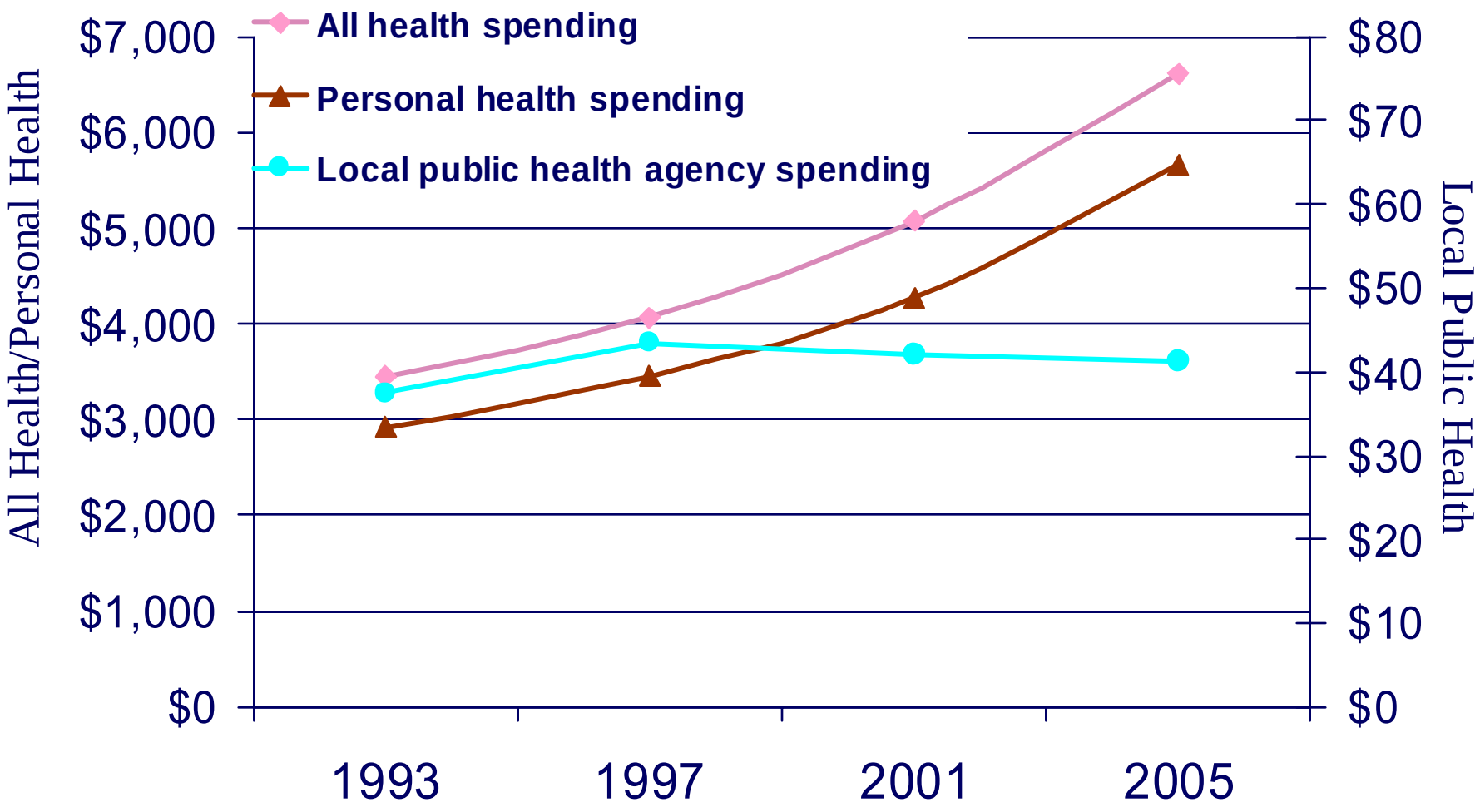
WHO 2005

Public health's share of national spending



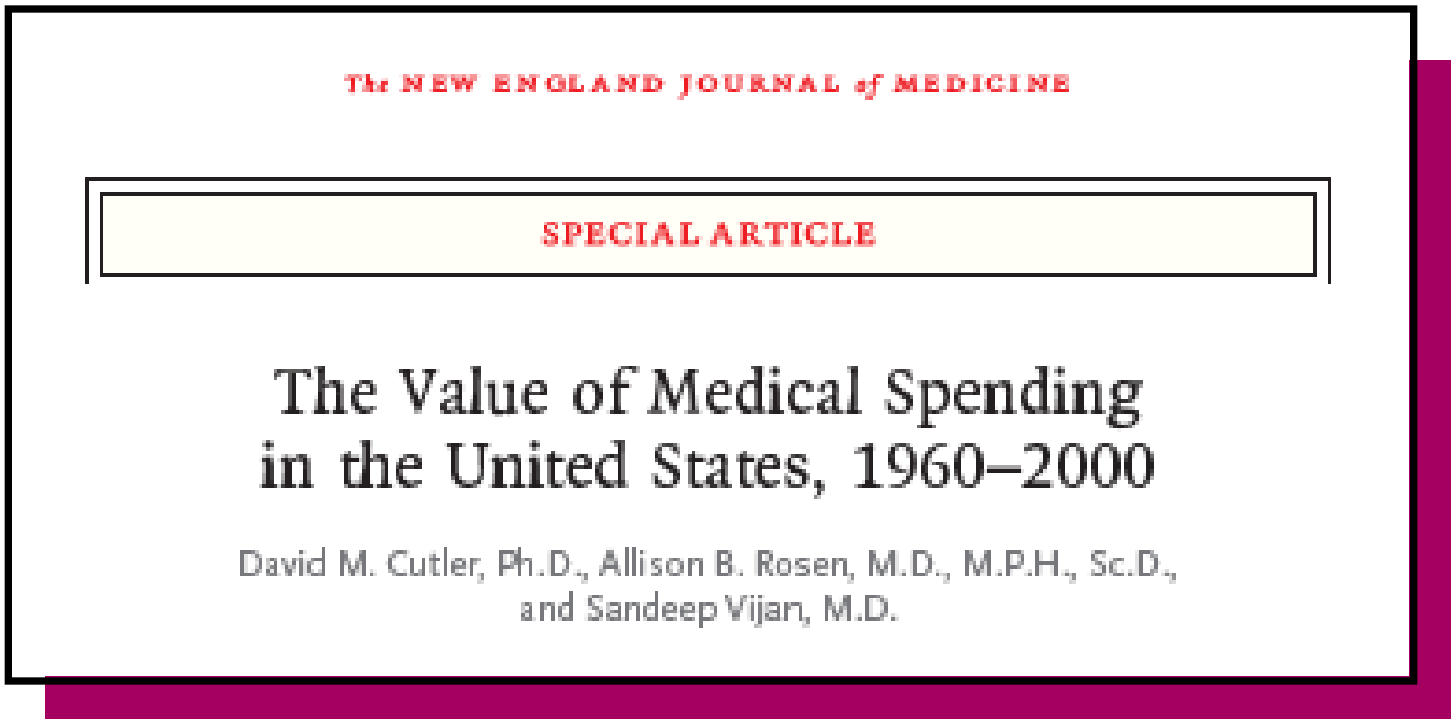
Batelle 1993, CMS 2005, NASBO 2005

Trends in per-capita spending



Analysis of CMS and NACCHO data

Mortality and medical spending



- Half of all gains due to medical care
- $31,600 per year of life gained

Mortality and medical resources

Mortality and Physician Supply: Does Region Hold the Key to the Paradox?

Thomas C. Ricketts and George M. Holmes

Table 2: Relationship between Primary Care and Specialty Physician Ratios and Mortality Rates: Regression Coefficients, Standard Errors, and Statistical Significance, 1996–2000; U.S. Counties in 49 States

		Primary Care			*Specialist*			
Mortality Measure (per 10,000)	*Unadjusted*		*Adjusted*		*Unadjusted*		*Adjusted*	
	Coefficient	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*
All cause	0.2333**	0.0939	0.4098****	0.0788	−0.4507****	0.0554	−0.0028	0.0437
Heart	−0.1883****	0.0279	−0.0583**	0.0288	−0.0914****	0.0136	−0.0017	0.0154
Cancer	−0.0498**	0.0201	0.0194	0.0207	−0.0032	0.0090	0.0215**	0.0104

Note: ** $p < .05$; **** $p < .001$.

Source: National Center for Health Workforce Analysis, BHPr, HRSA, 1998–2002 Area Resource Files. National Center for Health Statistics, CDC.

Compressed Mortality Files for 1996–2000.

Research question of interest

Are changes in local public health spending within a community over time associated with changes in the community's health outcomes?

Data used in empirical work

- Financial and institutional data collected on the national population of local public health agencies (N≈3000) in 1993, 1997, and 2005
- Residual state spending estimates from US Census of Governments
- Residual federal spending estimates from Consolidated Federal Funding Report
- Community characteristics obtained from Census and Area Resource File (ARF)

Analytical approach

- Dependent variables
  - Infant mortality
  - Total mortality
  - Cause-specific mortality: heart disease, cancer, diabetes, influenza
- Independent variables of interest
  - Local spending per capita, all sources
  - Residual state spending per capita (funds not passed thru to local agencies)
  - Direct federal spending per capita

Analytical approach

- Problem: funding often targeted to communities based in part on risk, burden, “need”
- Solution: Fixed effects, instrumental variables
- Identify exogenous sources of variation in spending, unrelated to outcomes
  - Local board of health with policy-making authority
- Controls for unmeasured factors that jointly influence spending and outcomes

Analytical approach

- Hierarchical multivariate regression models used to test associations between spending, performance, and outcomes while controlling for other factors

$$Ln(Spending_{iit}) = \beta Agency_{ijt} + \delta Community_{iit} + \lambda State_{jt} + \mu_i + \varphi_t + \varepsilon_{ijt}$$

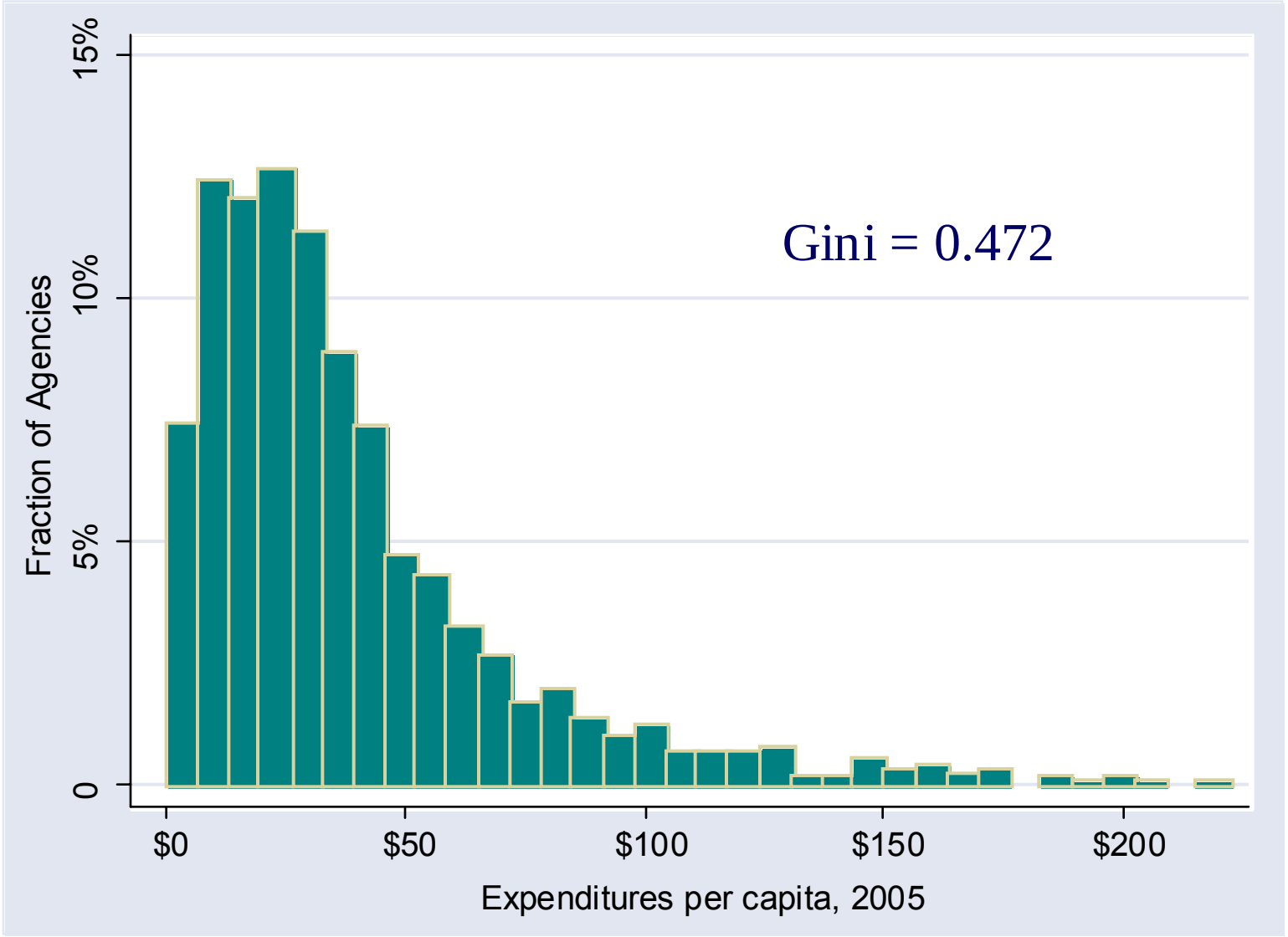
$$Ln(Outcome_{ijt}) = \alpha Ln(Spending_{ijt}) + \beta Agency_{ijt} + \delta Community_{ijt} + \lambda State_{jt} + \mu_i + \varphi_t + \varepsilon_{ijt}$$

Analytical approach

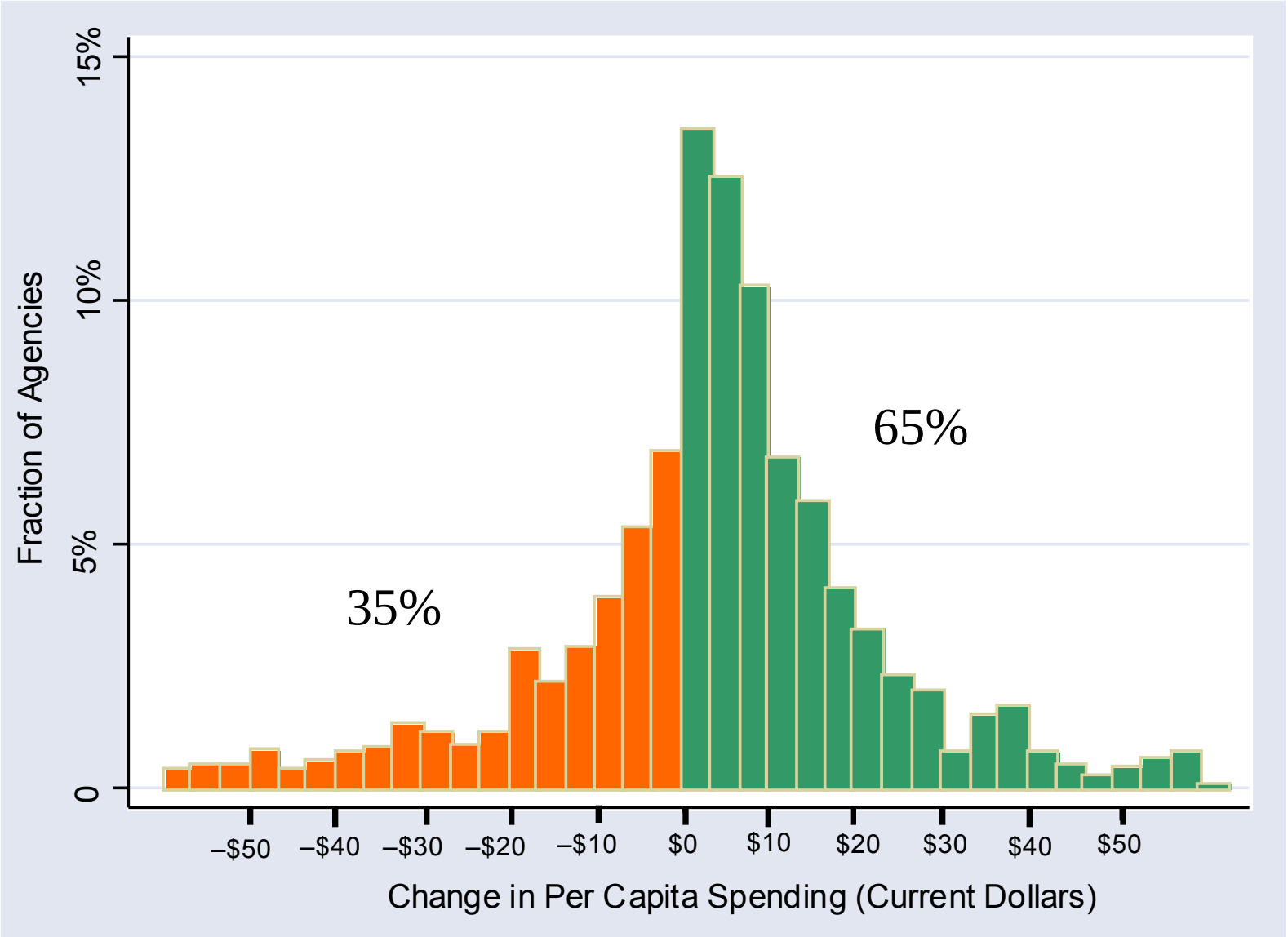
Other Variables Used in the Models

- ***Agency characteristics***: type of government jurisdiction, scope of services offered, state-local relationships, *local BOH*
- ***Community characteristics***: population size, poverty, education, age distributions, physicians per capita, Medicare spending per capita, CHC funding per low income, *community fixed effects*
- ***State characteristics***: Private insurance coverage, Medicaid coverage

Variation in Local Public Health Spending



Change in Local Public Health Spending, 1993-2005



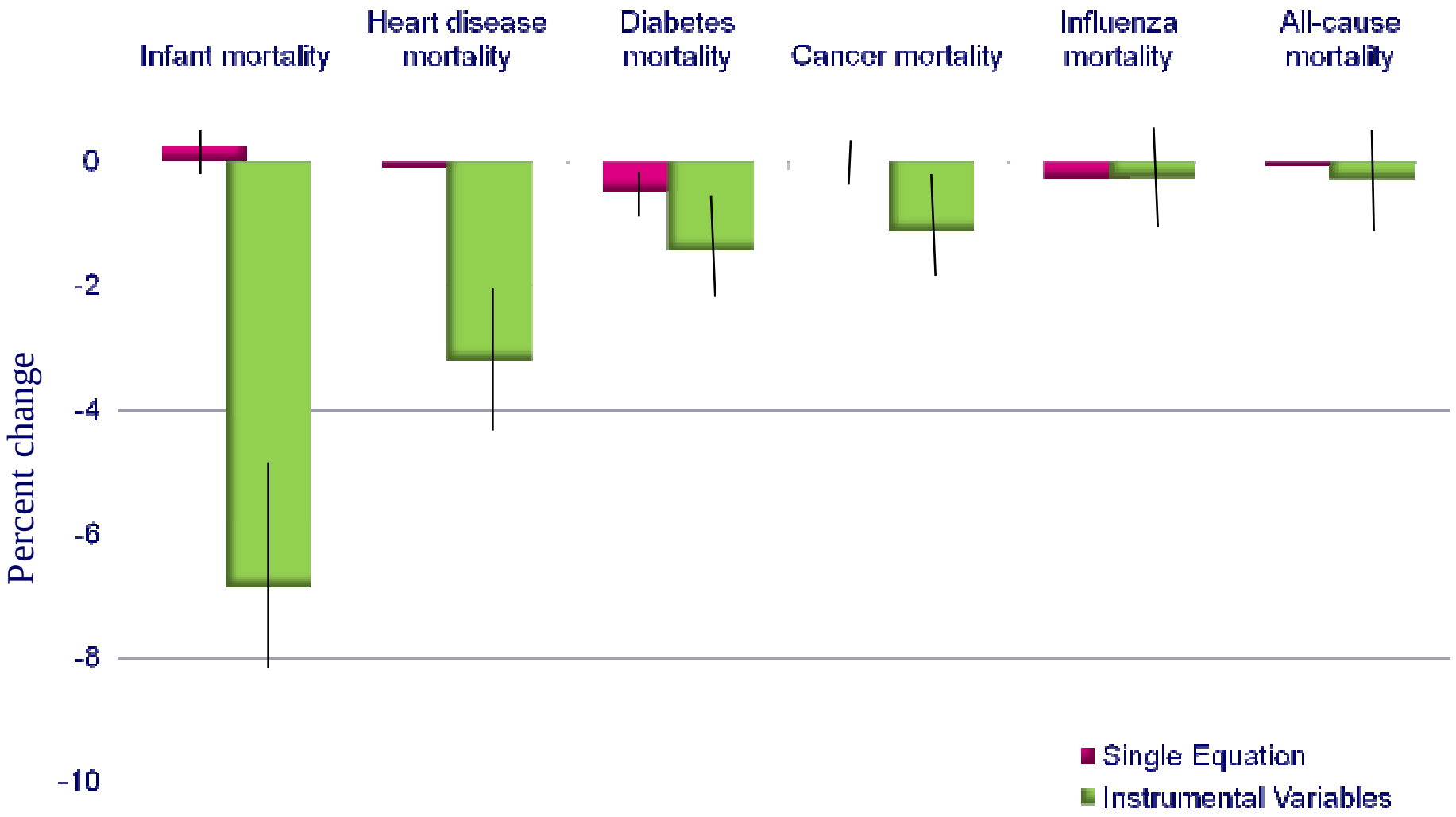
Correlates of Public Health Spending

Variable	Coefficient	95% CI
Policy-making BOH (1=Yes)	0.145**	(0.099, 0.196)
Population size (log)	-0.136***	(-0.168, -0.103)
Income per capita (log)	0.196**	(0.001, 0.392)
Local tax burden (% of income)	0.234**	(0.032, 0.436)
Hospital beds per 10,000	-0.002**	(-0.001, 0.003)
Scope of services offered		
Clinical preventive (%)	0.818***	(0.666, 0.970)
Population-based (%)	0.217**	(0.066, 0.369)
Regulatory/licensing (%)	0.223***	(0.103, 0.344)

**p<0.05 ***p<0.01

Hierarchical logistic regression estimates controlling for community-level and state-level characteristics

Estimated Effects of 10% Increase in Public Health Spending



Fixed effect regression estimates controlling for community-level and state-level characteristics

Implications for Policy and Practice

- Local public health spending varies widely across communities
- Communities with higher spending experience lower mortality from leading preventable causes of death
- Differences in public health resources may contribute to differences in health outcomes

Implications for Policy and Practice

- Mortality reductions achievable through increases in public health spending may exceed the reductions produced by similar expansions in local medical care resources
  - Cost per life-year gained: $12,200 - $25,600
- Findings reveal some targeting of funds to communities with greatest needs