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# The Economics of Implementing Population Health Strategies

Glen P Mays, *University of Kentucky*

# The Economics of Implementing Population Health Strategies:

## Progress in Public Health Services & Systems Research

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Center for Public Health Systems and Services Research

# Why economics?

**Successful strategies to scale up and spread complex community-level interventions require an understanding of the resources required for implementation, how best to distribute them among supporting institutions, and how resource consumption and distribution varies across settings.**

# Failures in public health implementation

Many evidence-based public health strategies reach less than half of U.S. populations at risk:

- Smoking cessation
- Influenza vaccination
- Hypertension control
- Nutrition & physical activity programs
- HIV prevention
- Family planning
- Substance abuse prevention
- Interpersonal violence prevention
- Maternal and infant home visiting for high-risk populations

# What gets implemented in public health?

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

- Communicable disease control
- Chronic disease and injury prevention
- Epidemiologic surveillance & investigation
- Community health assessment & planning
- Public 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.

# Economics & public health implementation

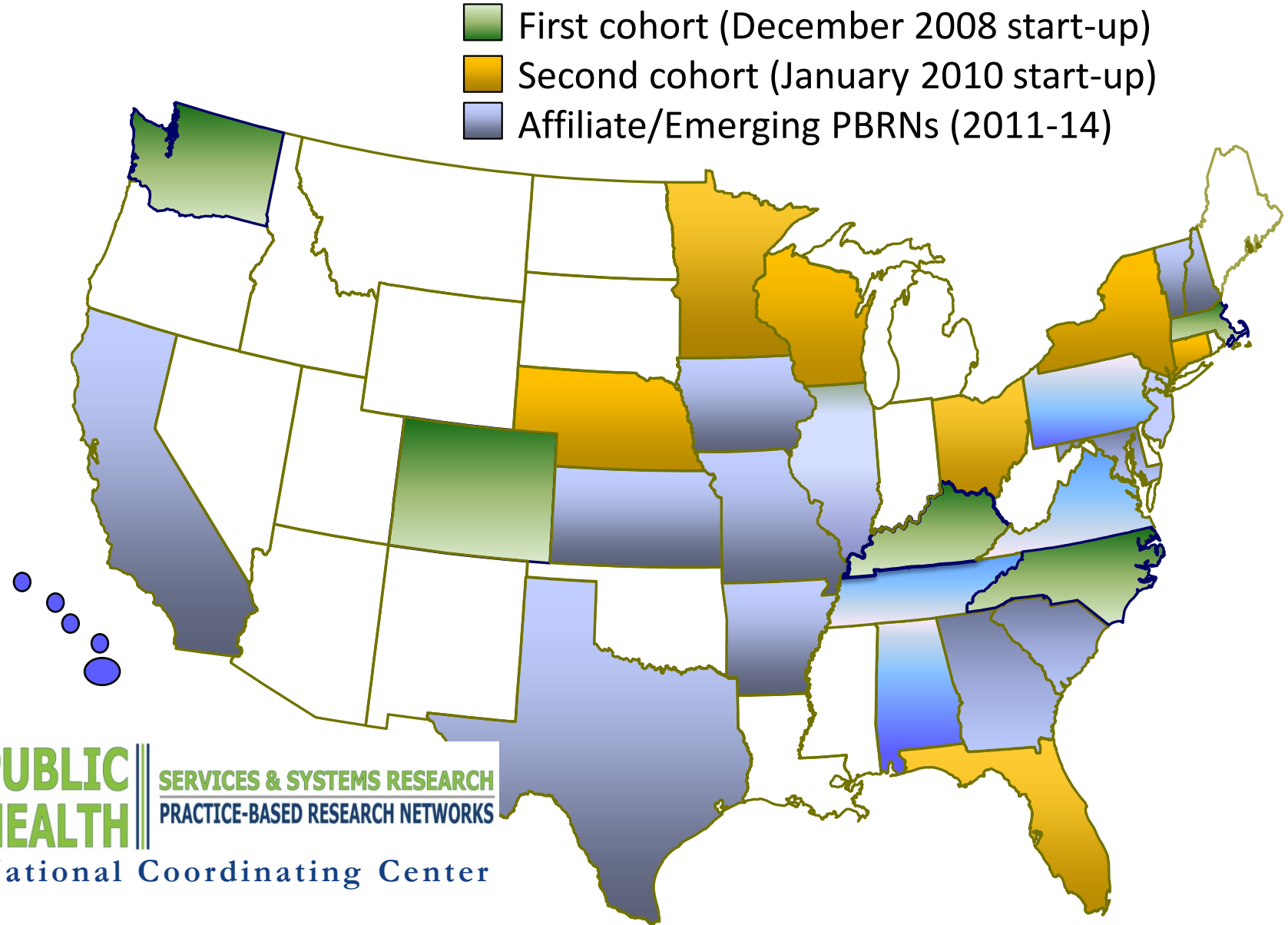
**>75%** of US health spending is attributable to conditions that are largely preventable

- 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

CDC 2008 and CMS 2013

# Public health implementation research:
## PHSSR and Public Health PBRNs

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# Ongoing studies of the economics of implementation in public health

**Macro**

- National Longitudinal Survey of Public Health Systems
- Multi-network Practice and Outcome Variation Study (MPROVE)
- Public Health Delivery and Cost (DACS)
- Costing Foundational Public Health Capabilities

**Micro**

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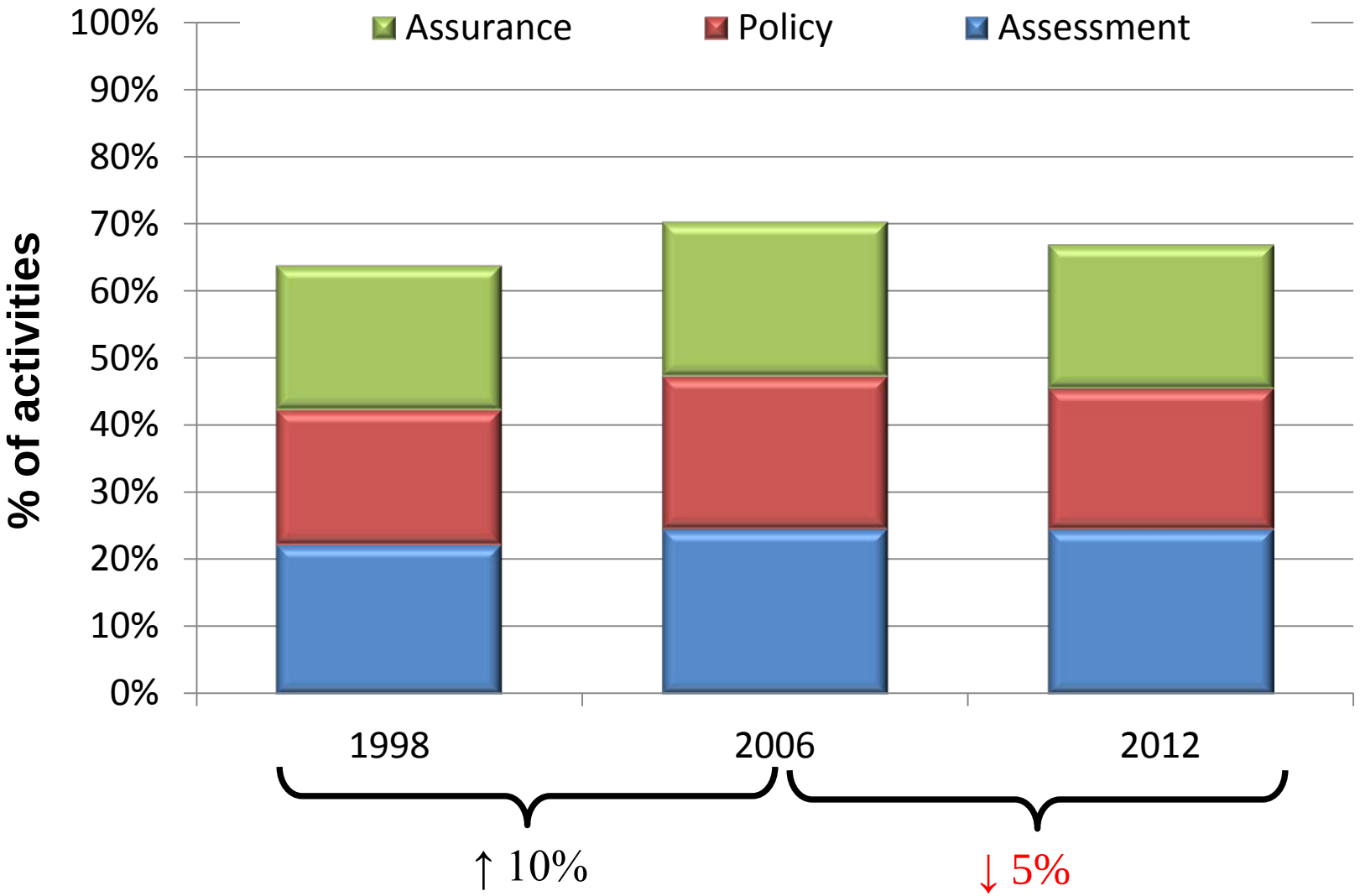
# 1 - National Longitudinal Survey of Public Health Systems

- Cohort of 360 communities with at least 100,000 residents
- Followed over time: 1998, 2006, 2012, 2014
- Measured from local public health official's perspective:
  - ***Scope***: availability of 20 recommended public health activities
  - ***Network***: types of organizations contributing to each activity
  - ***Effort***: contributed by designated local public health agency
  - ***Quality***: perceived effectiveness of each activity
- Linked with organizational and financial data from NACCHO's National Profile of Local Health Departments

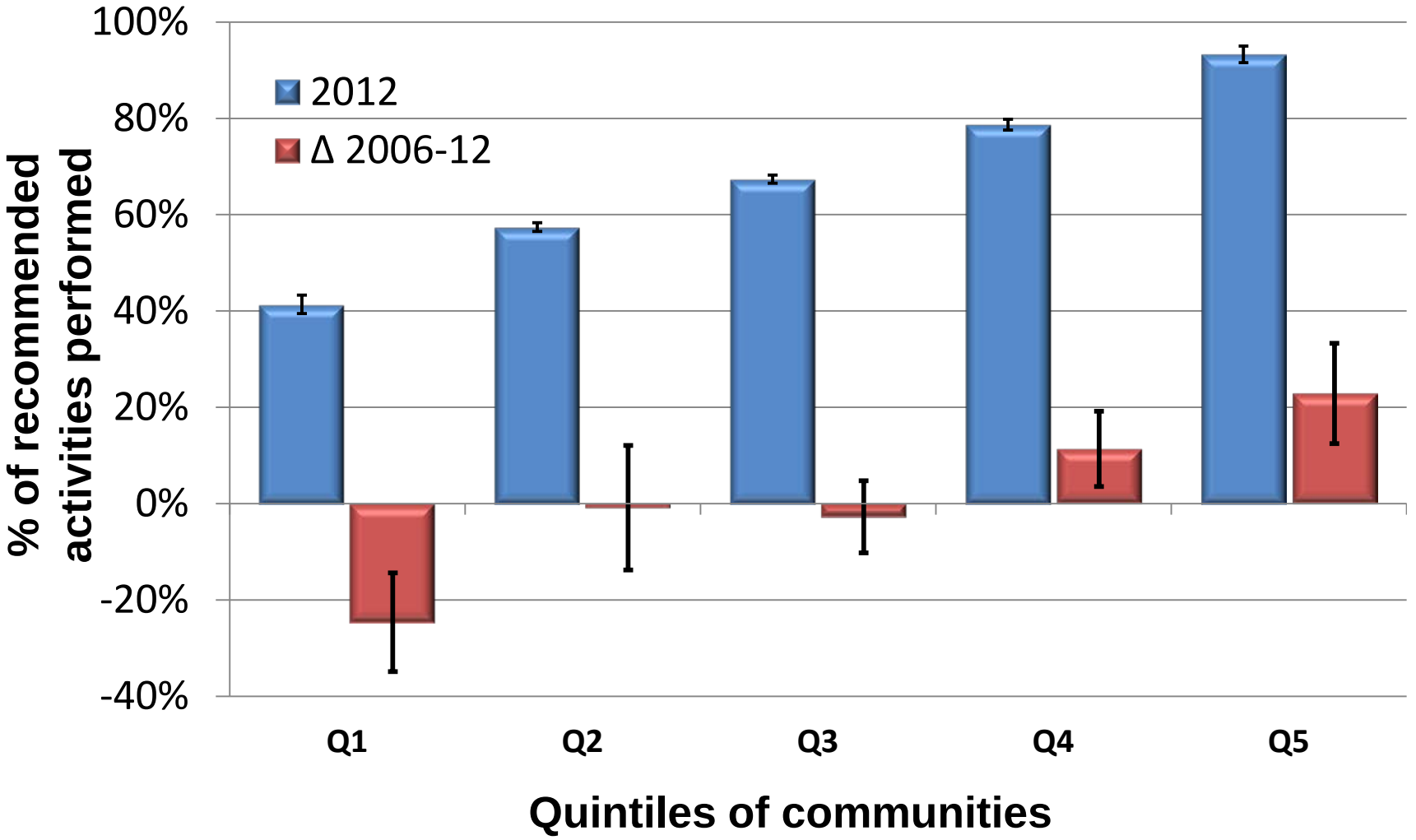
# Delivery of recommended public health activities in U.S. communities




National Longitudinal Survey of Public Health Systems, 2012

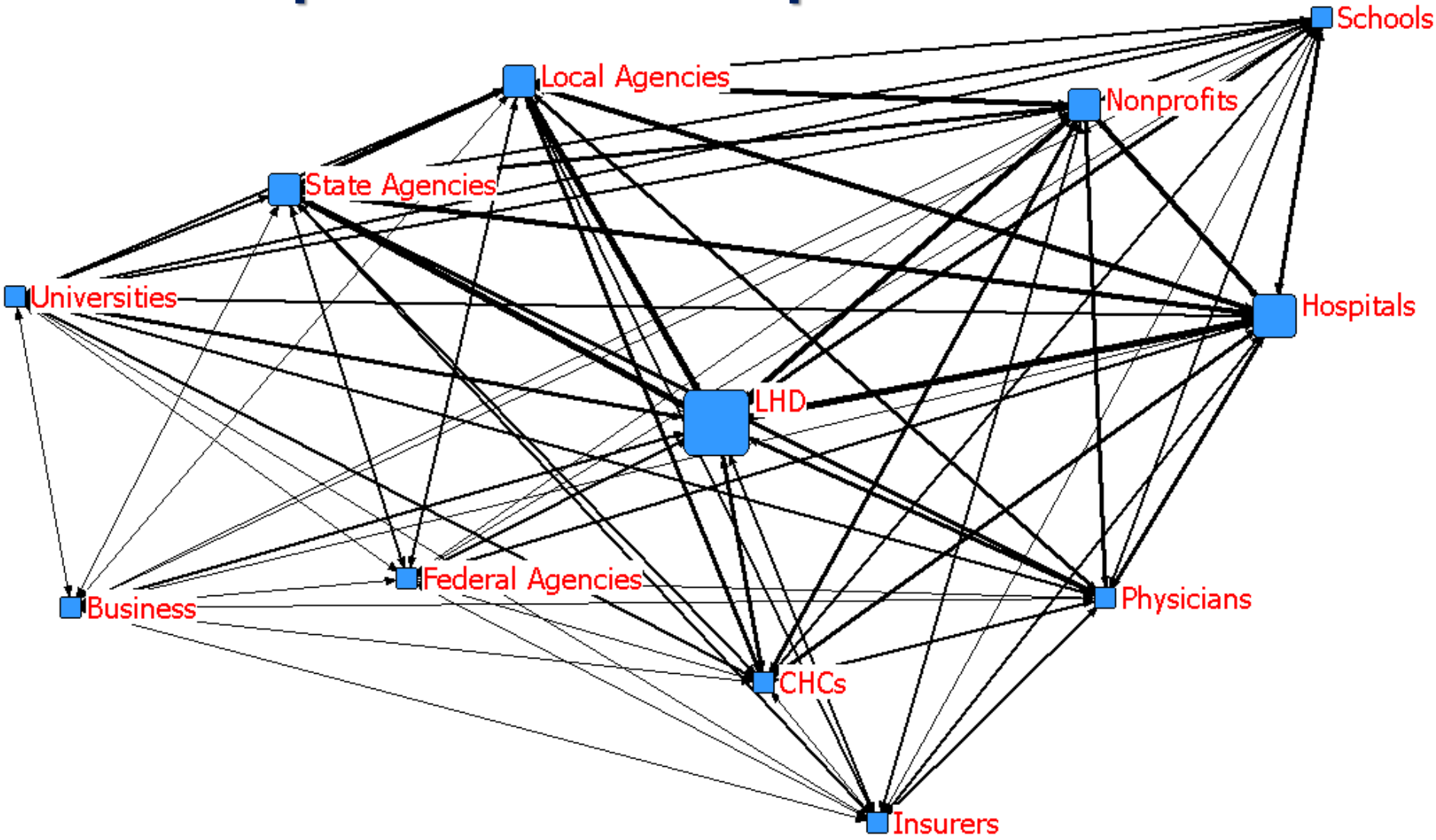
# Variation and Change in Delivery

## Delivery of recommended public health activities, 2006-12



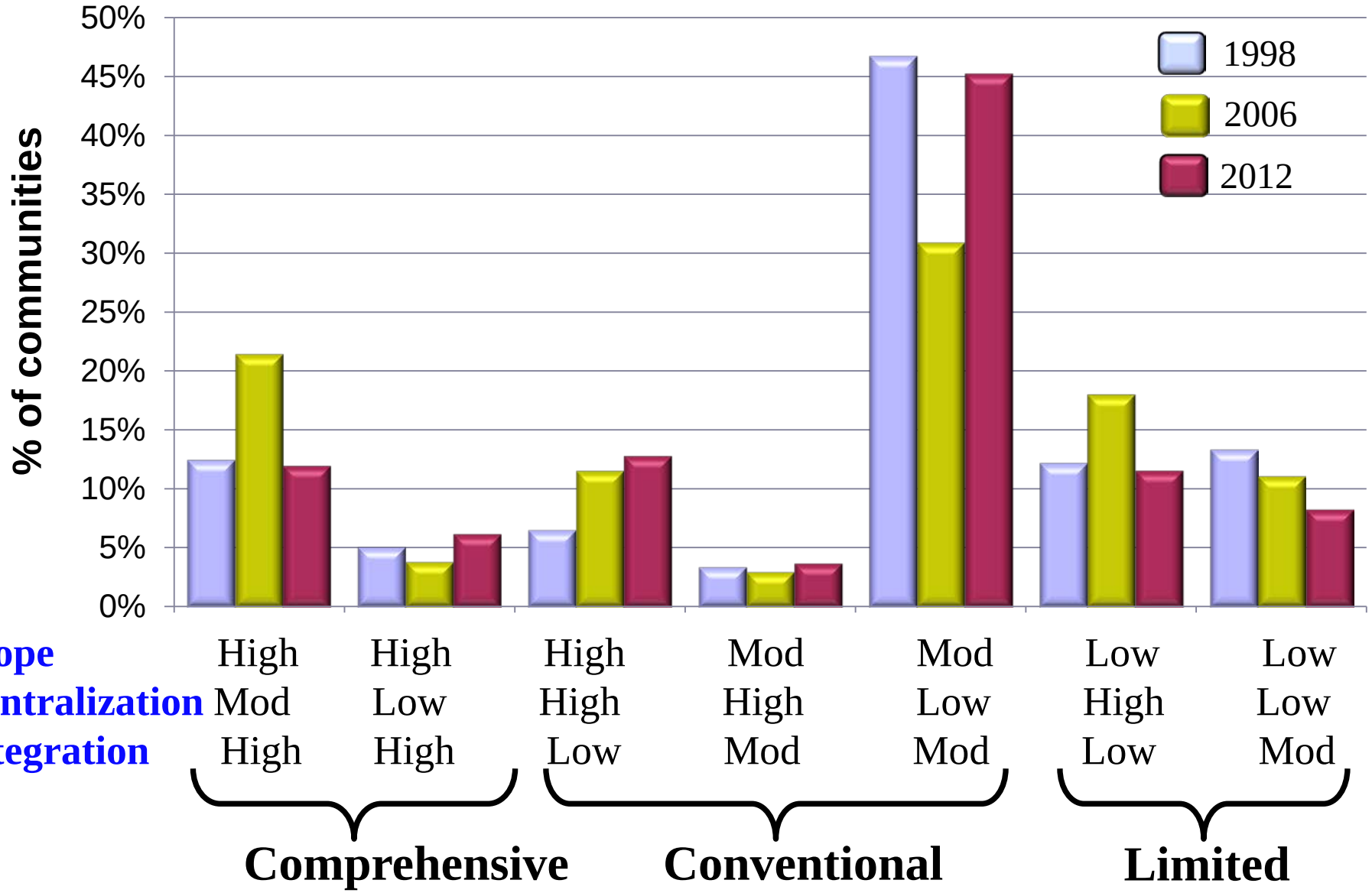

National Longitudinal Survey of Public Health Systems, 2012

# Patterns of interaction in public health implementation



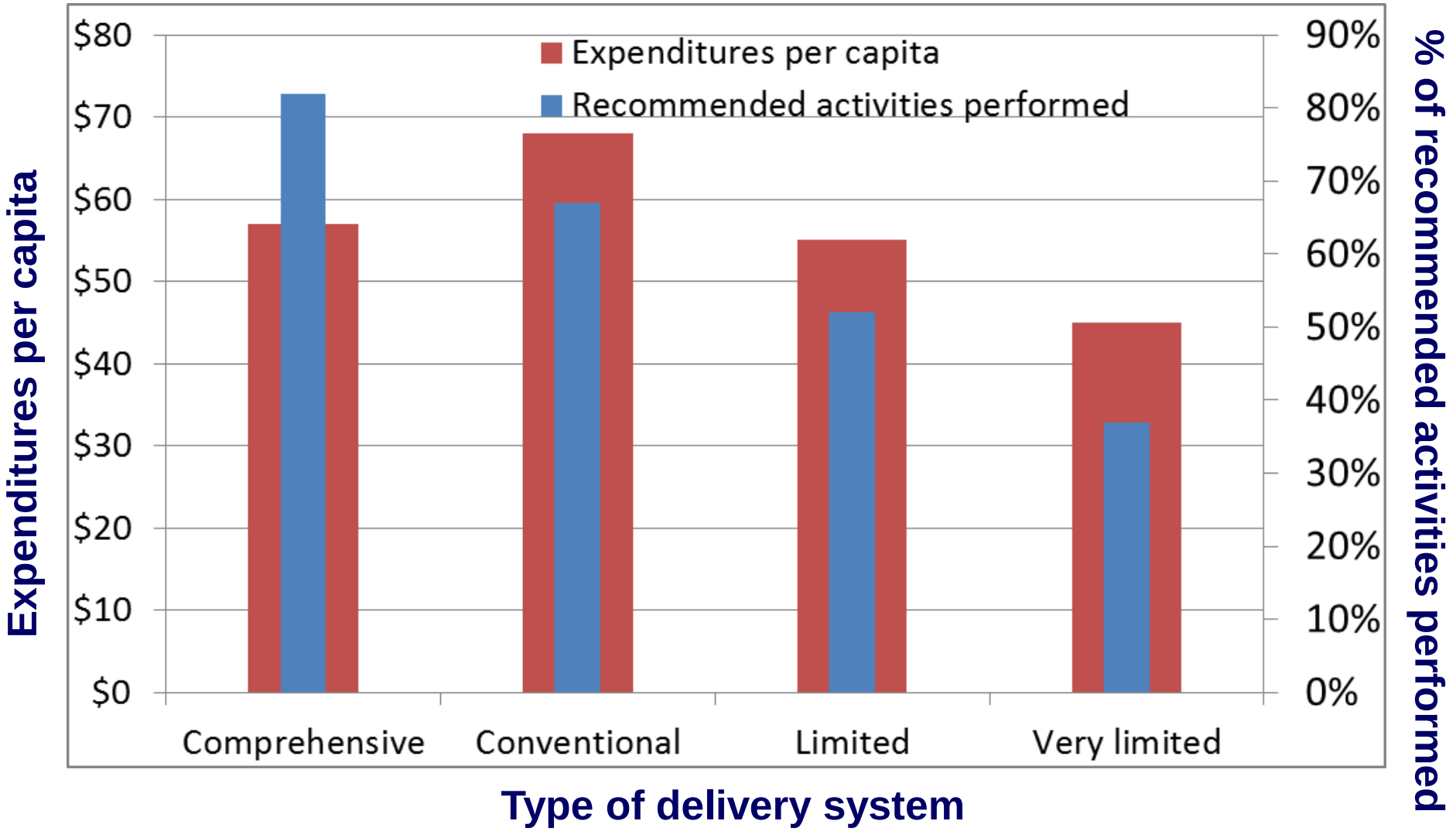

National Longitudinal Survey of Public Health Systems, 2012

# Seven types of public health delivery systems




Source: Mays et al. 2010; 2012

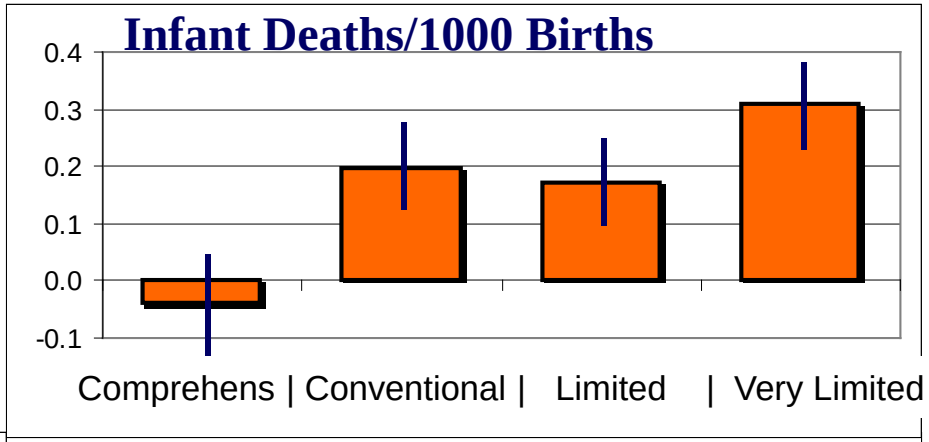
# Integrated systems do more with less

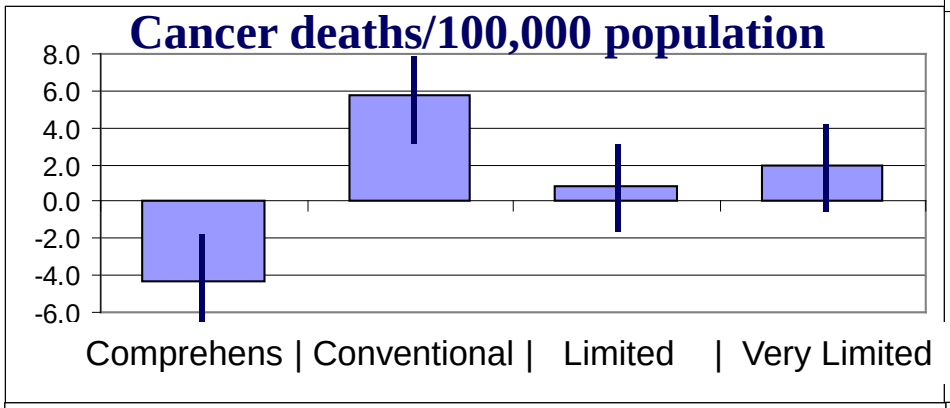


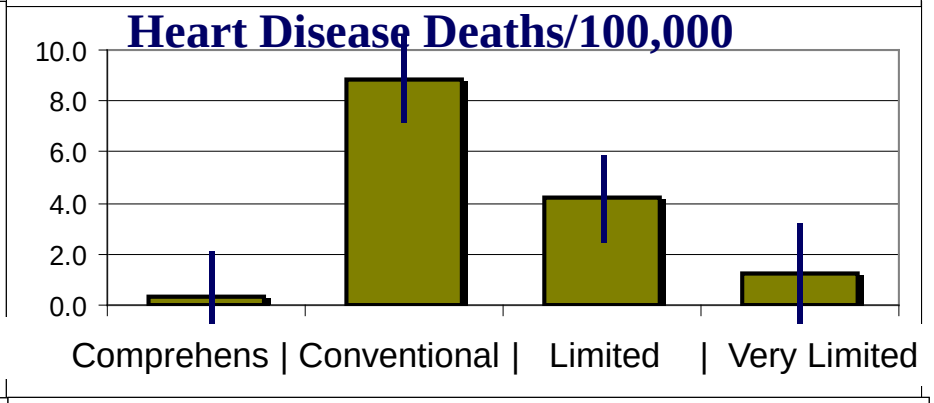

National Longitudinal Survey of Public Health Systems, 2012

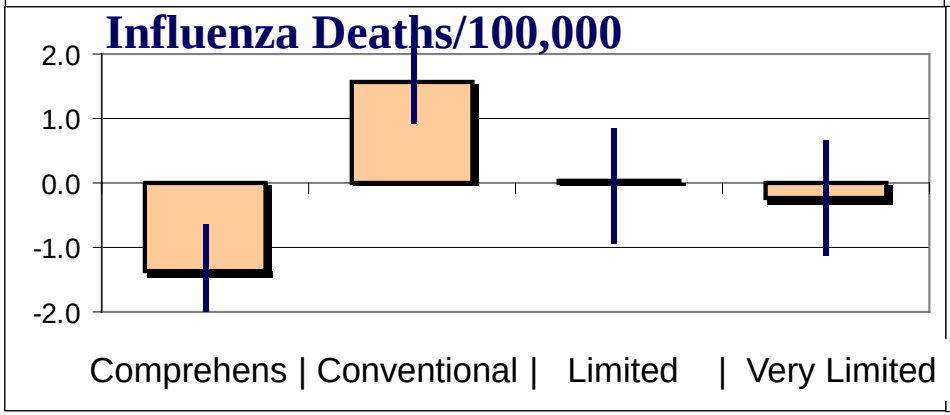
# Integrated systems achieve better health outcomes

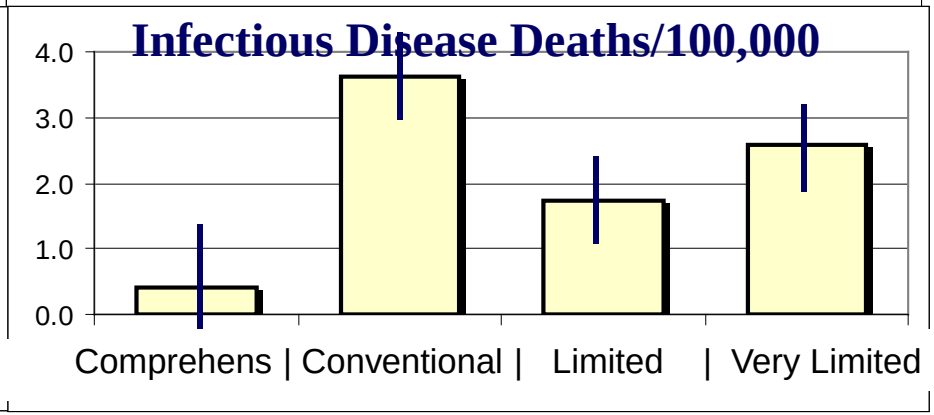
**Percent Changes in Preventable Mortality Rates Attributable to Delivery System Type**



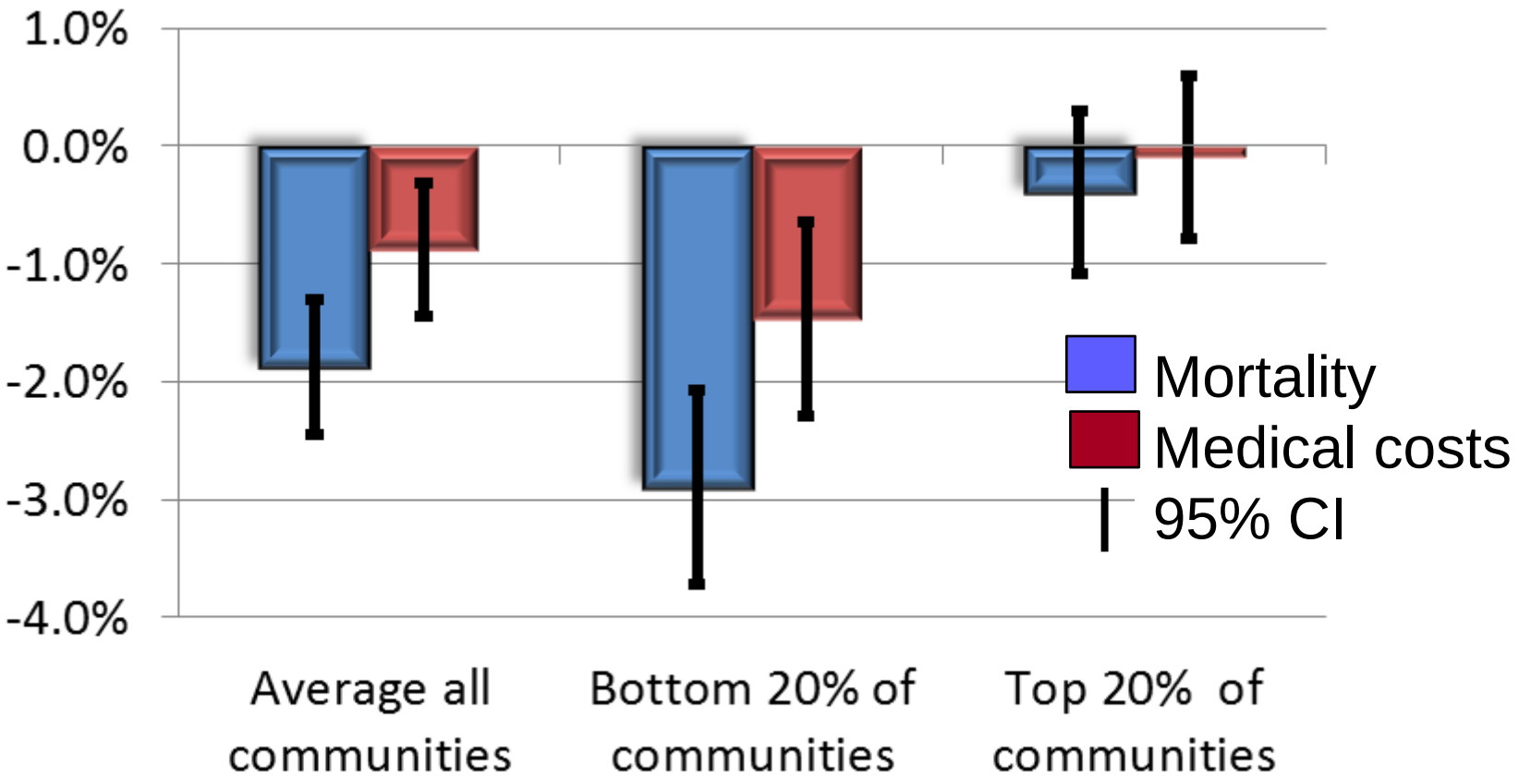




Fixed-effects models control for population size, density, age composition, poverty status, racial composition, and physician supply

# Integrated systems generate larger health & economic gains in low-resource communities

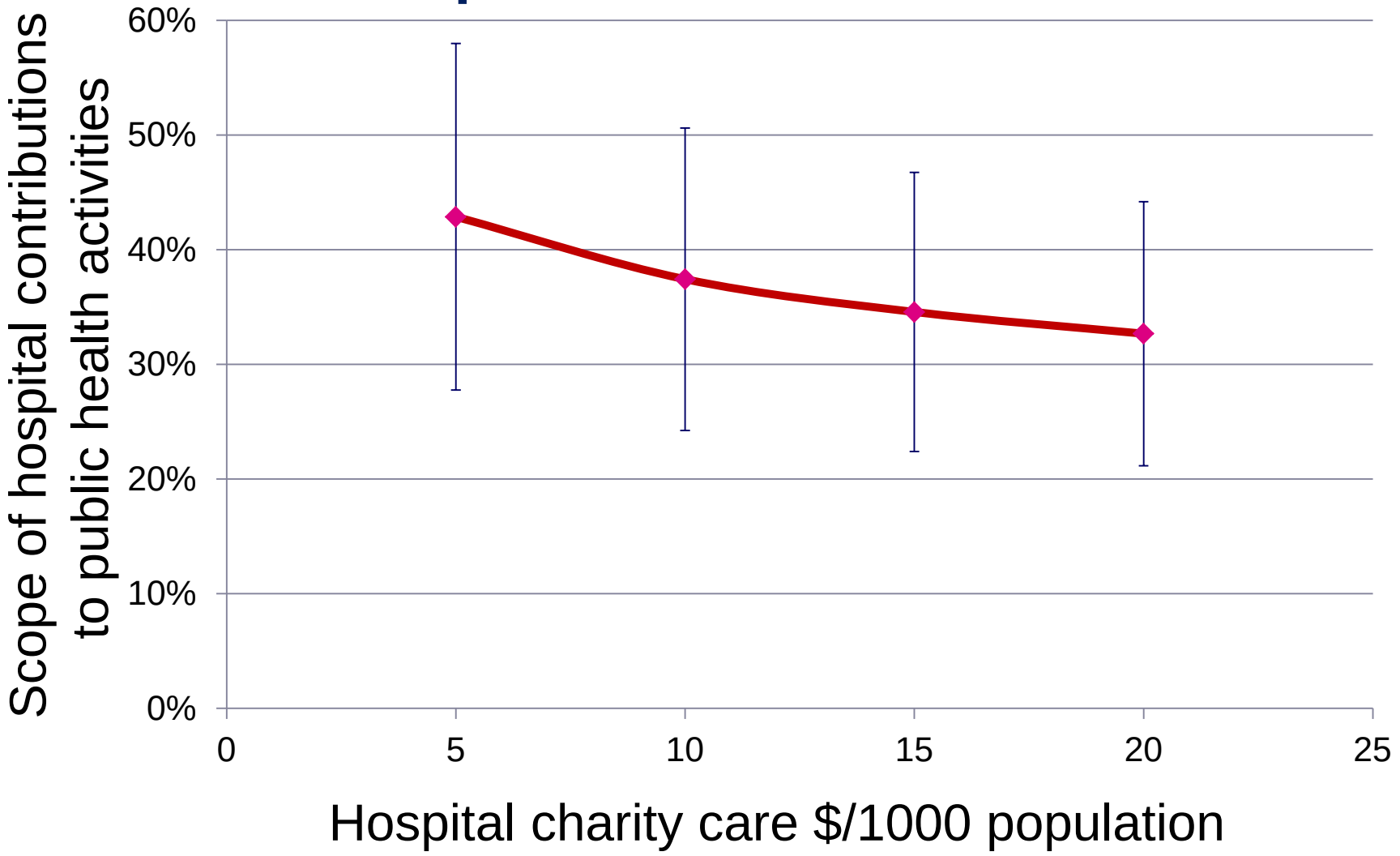
## Impact in Low-Income vs. High Income Communities




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

Mays et al. forthcoming 2014

# Estimated crowd-out in hospital contributions to public health activities




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

# 2 - Multi-Network Practice and Outcome Variation Examination Study (MPROVE)

**6 states → 305 community settings**

- Identify implementation measures high-value services:
  - **Chronic disease prevention**
  - **Communicable disease control**
  - **Environmental health protection**
- Create registry of measures: consistent across communities
- Profile geographic variation in the delivery of selected public health services across local communities
- Decompose variation into attributable components:
  - need-sensitive or preference-sensitive factors
  - supply-sensitive factors
- Examine associations between service delivery & outcomes

# 3 - Public Health Delivery and Cost Studies (DACS)

**11 states → 250 community settings**

- Adapt & apply established cost measurement/estimation methodologies to public health settings
- Identify the costs of implementing selected high-value public health services
- Assess how costs vary across institutional and community settings
- Examine the determinants and consequences of variation in the costs of implementation
  - Economies of scale and scope
  - Efficiency & productivity
  - Equity

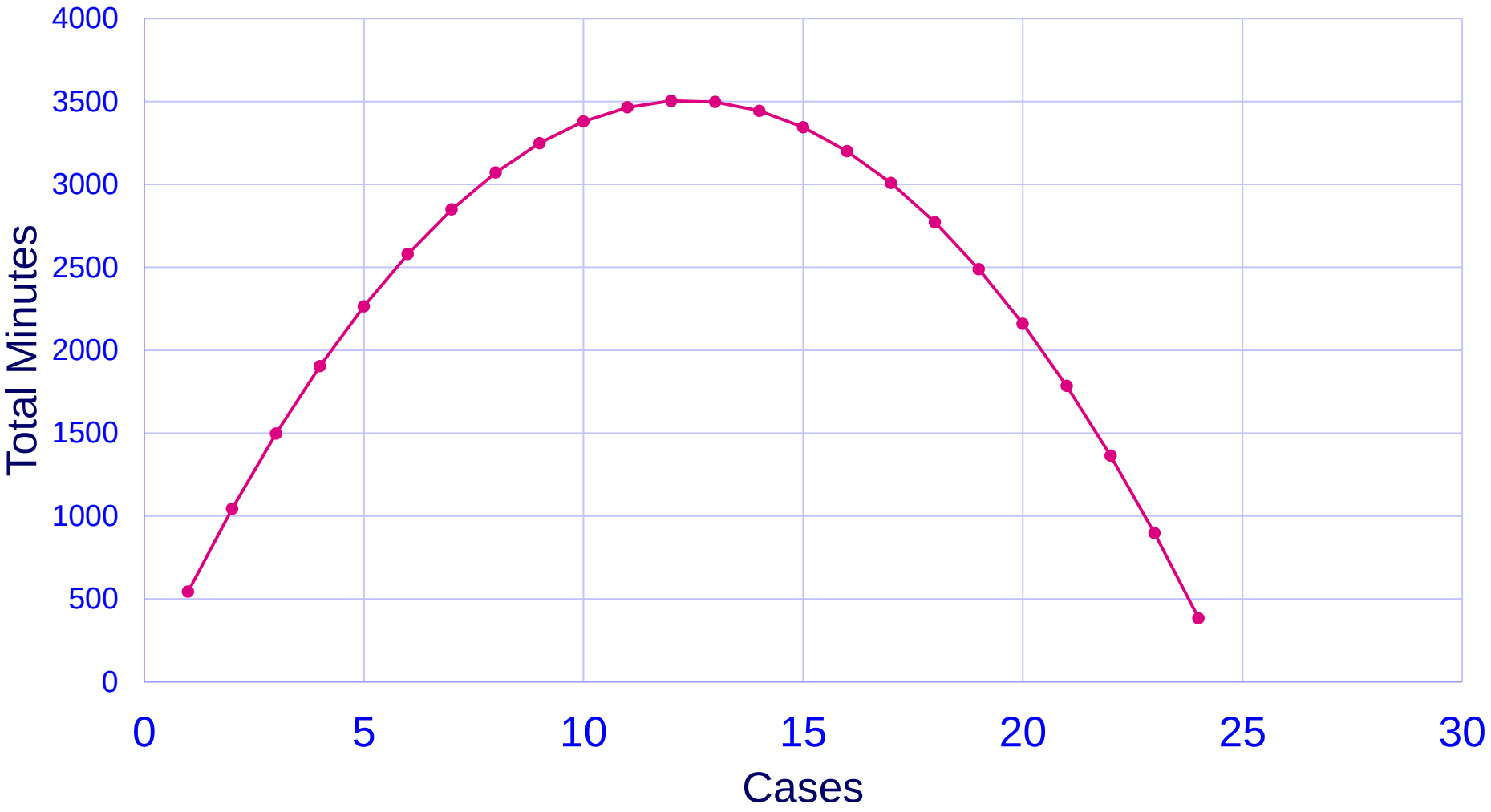
# MPROVE measurement dimensions

- ***Availability/Scope:*** specific activities produced
- ***Volume/Intensity:*** Frequency of producing activity over period of time
- ***Capacity:*** Labor and capital inputs assigned to an activity
- ***Reach:*** Proportion of target population reached by activity
- ***Quality:*** effectiveness, timeliness, equity of activity
- ***Efficiency:*** resources required to produce given volume of activity

# DACS cost estimation methods

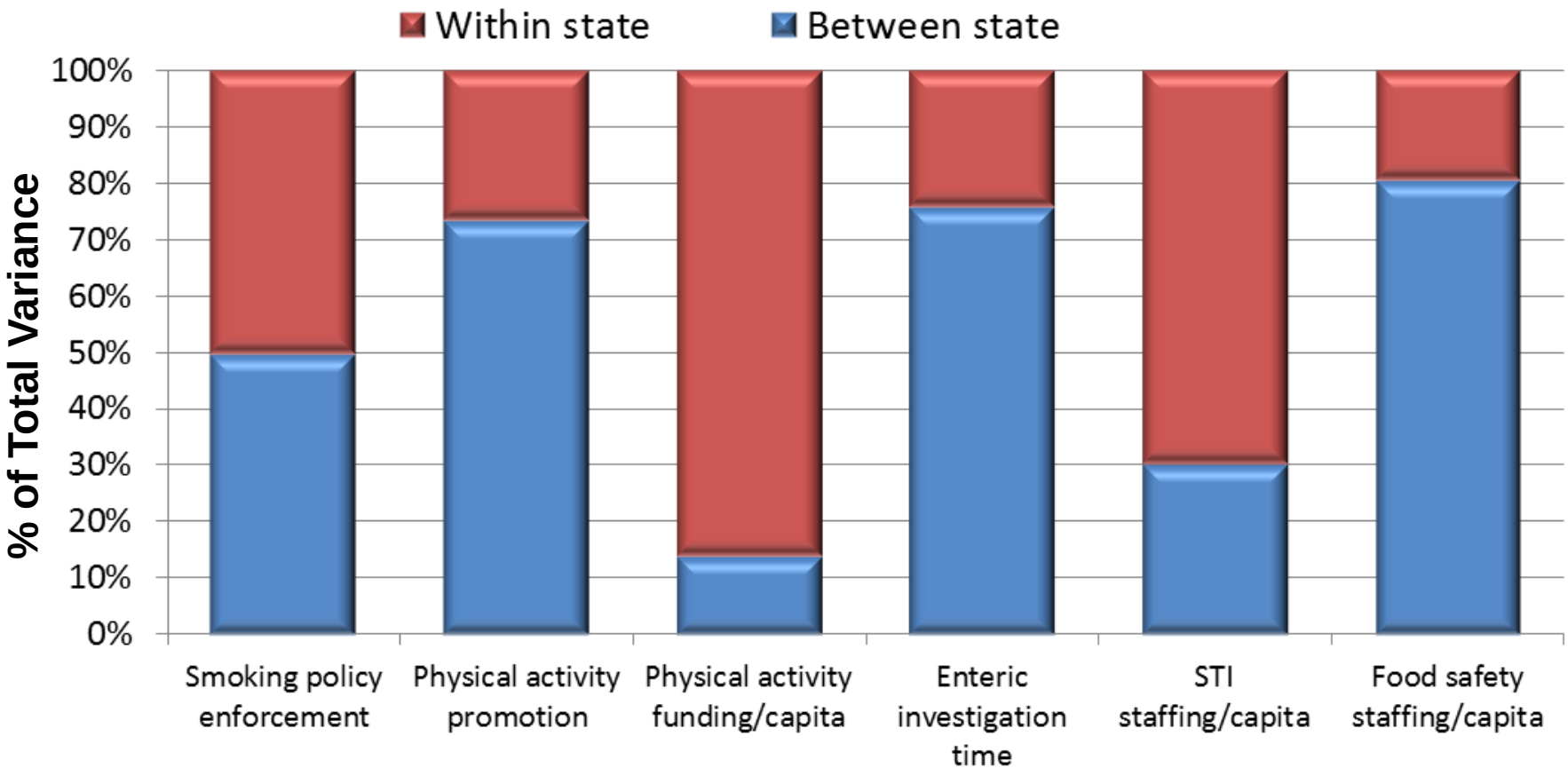
- Retrospective “cost accounting” methods
  - Modeling and decomposition using administrative records
  - Surveys with staff and/or administrators
- Concurrent “actual cost” methods (micro-costing)
  - Time studies with staff
  - Activity logs with staff
  - Direct observation
- Prospective “expected cost” methods
  - Vignettes
  - Surveys with staff and/or administrators
  - Delphi group processes

# DACS Example: Returns to Scale in Implementing Disease Investigation in Colorado



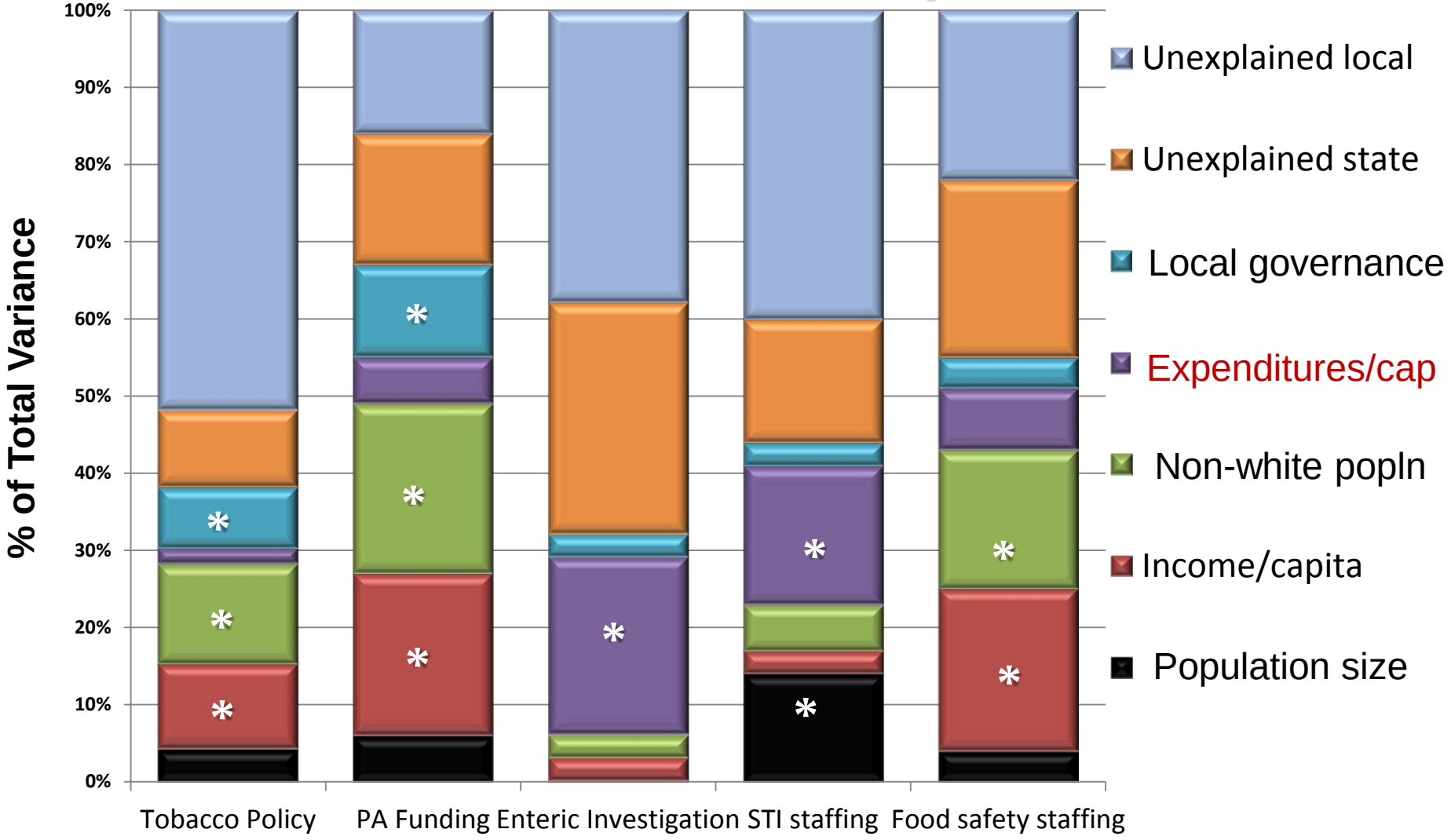

Atherly et al. University of Colorado and Colorado Public Health PBRN.
http://www.ucdenver.edu/academics/colleges/PublicHealth/research/centers/RMPRC/projects/Pages/COPHPBRN.aspx

# Overall Patterns of Variation in Local Public Health Implementation




Estimates from random effects regression models

# Correlates of Variation in Local Public Health Implementation

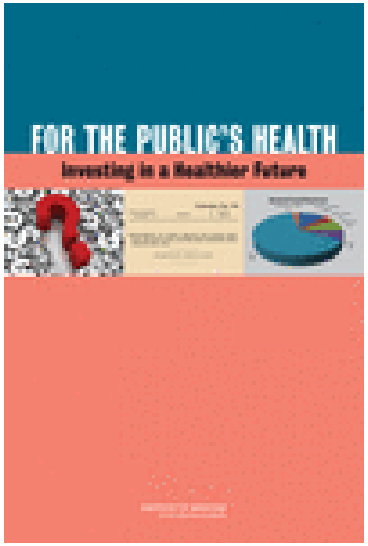



Estimates from state fixed-effects regression models *p<0.05

# 4 – Costing Foundational Capabilities

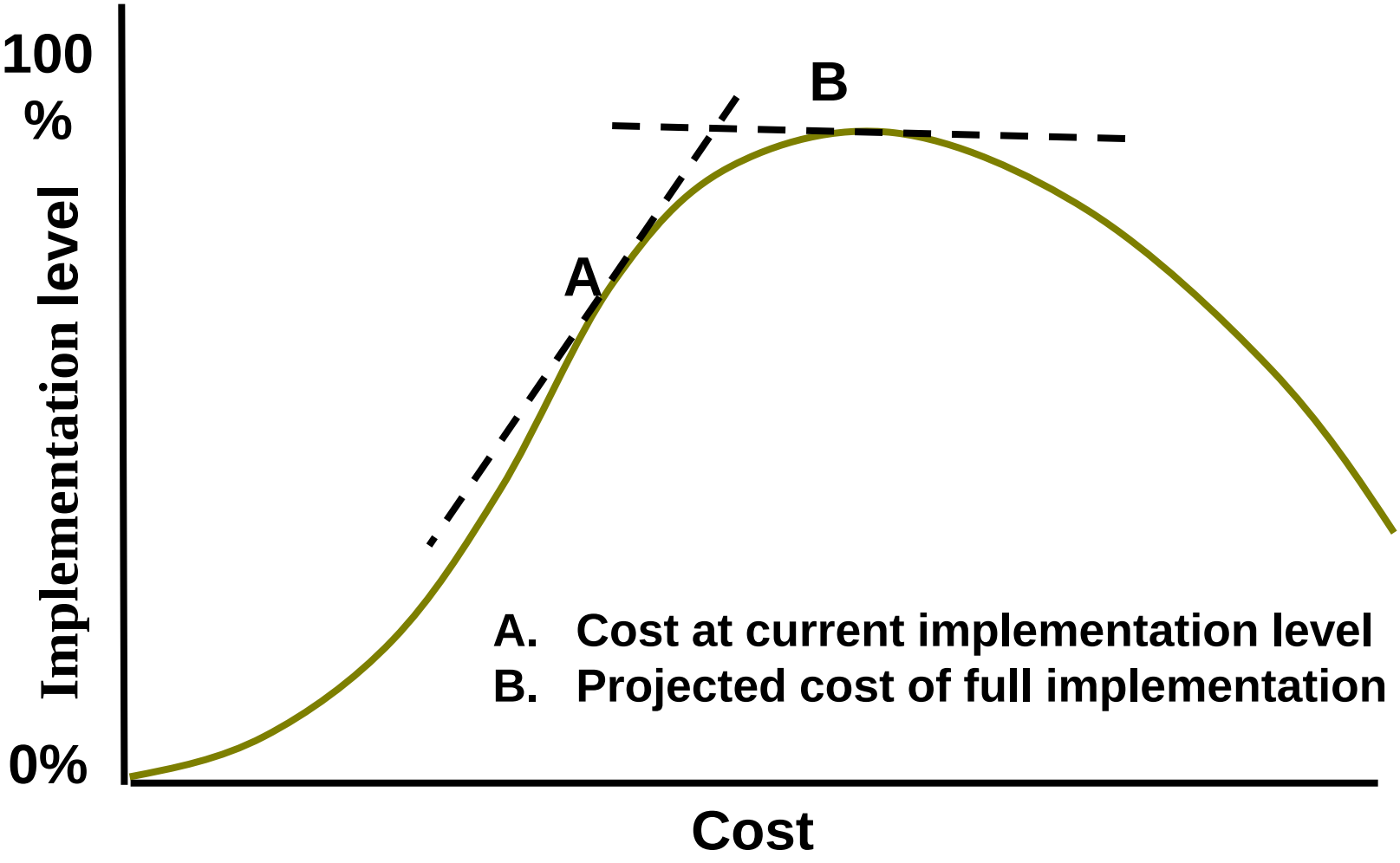
**2012 Institute of Medicine Recommendations**

- 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.

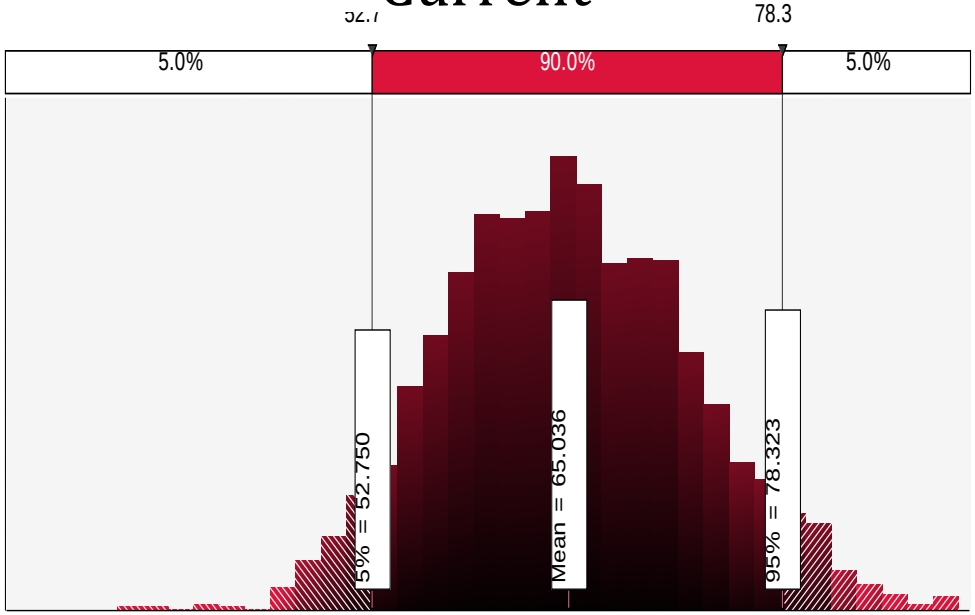
# Estimation of "projected" costs from current implementation ratings



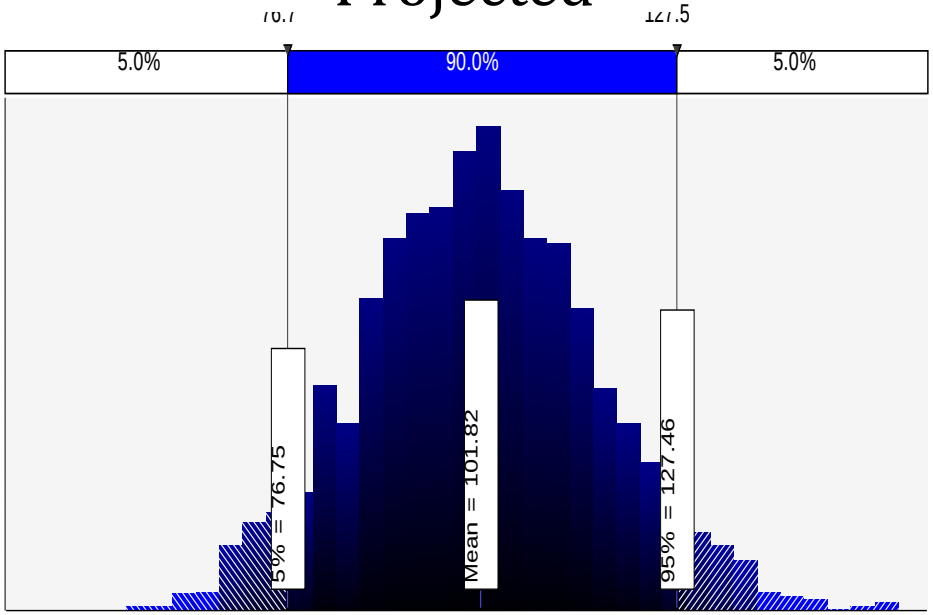

**Estimating the Costs of Foundational Public Health Capabilities: A Recommended Methodology**
Available at http://works.bepress.com/glen_mays/128/

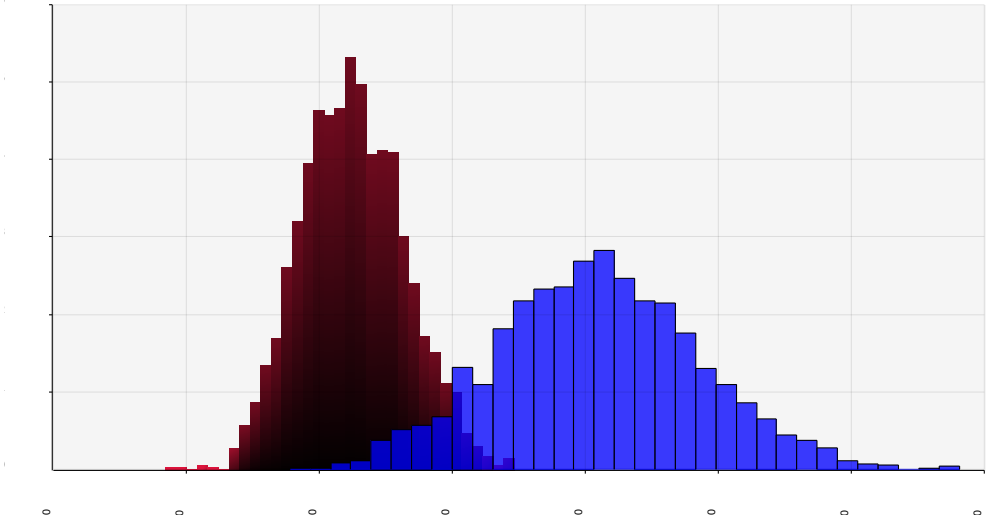
# Pilot Estimates: Current and Projected Costs of Foundational Capabilities

## Current




## Projected

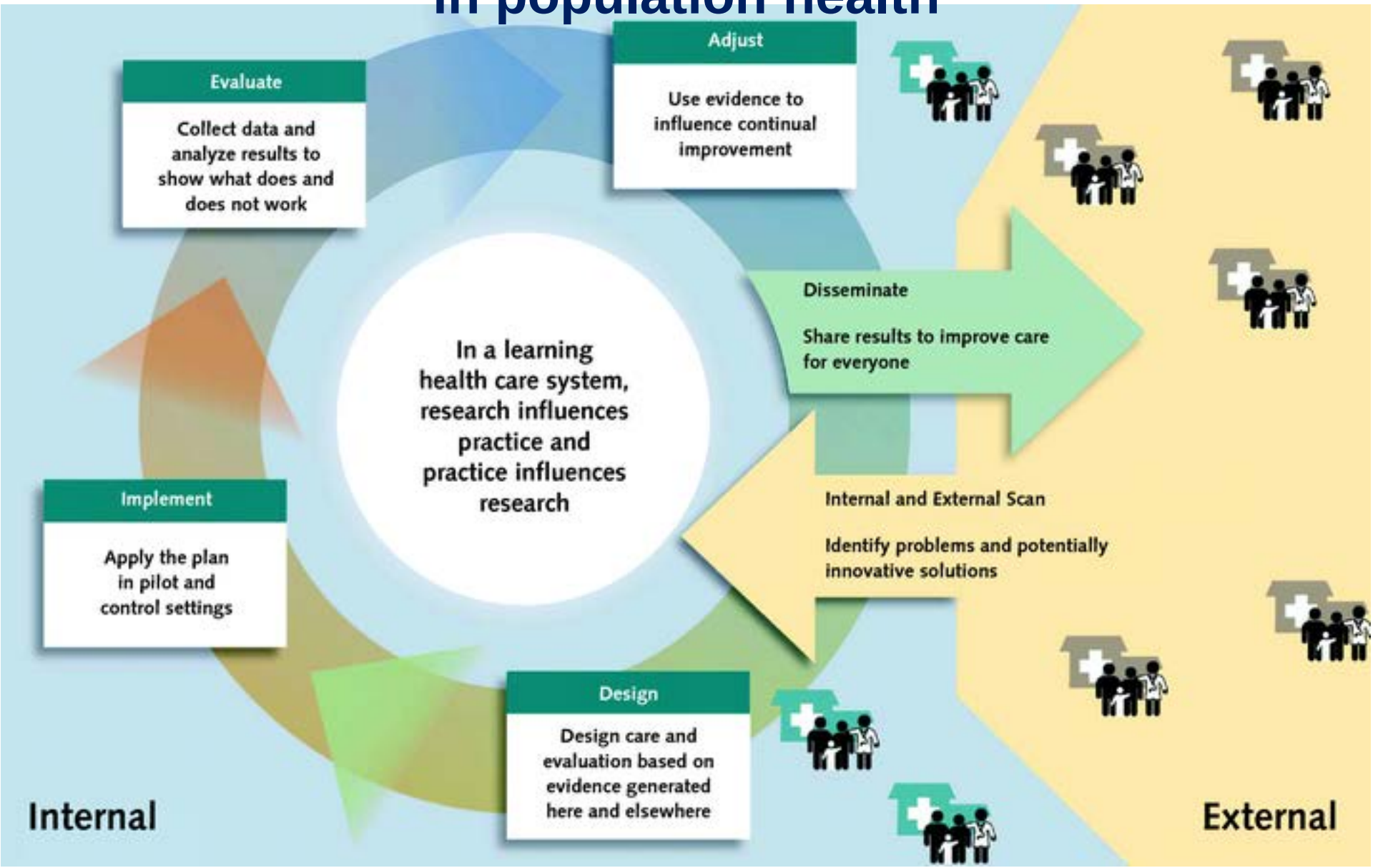


# Ongoing cross-state analyses

- Predictive & convergent validity tests
- Refining patterns & determinants of variation
  - Disentangling demand (need) from supply
  - System structure
  - Geospatial
  - Within and across domains of activity: composite measures
- Identifying population health correlates of variation

# Toward a “rapid-learning system” in population health




Green SM et al. *Ann Intern Med*. 2012;157(3):207-210

# More Information

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