

The Economics of Implementing Population Health Strategies:

Progress in Public Health Services & Systems Research

Glen Mays, PhD, MPH
University of Kentucky

glen.mays@uky.edu

7th Annual Conference on the Science of Dissemination & Implementation | Bethesda MD
9 December 2014



National Coordinating Center



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



Economics & public health implementation

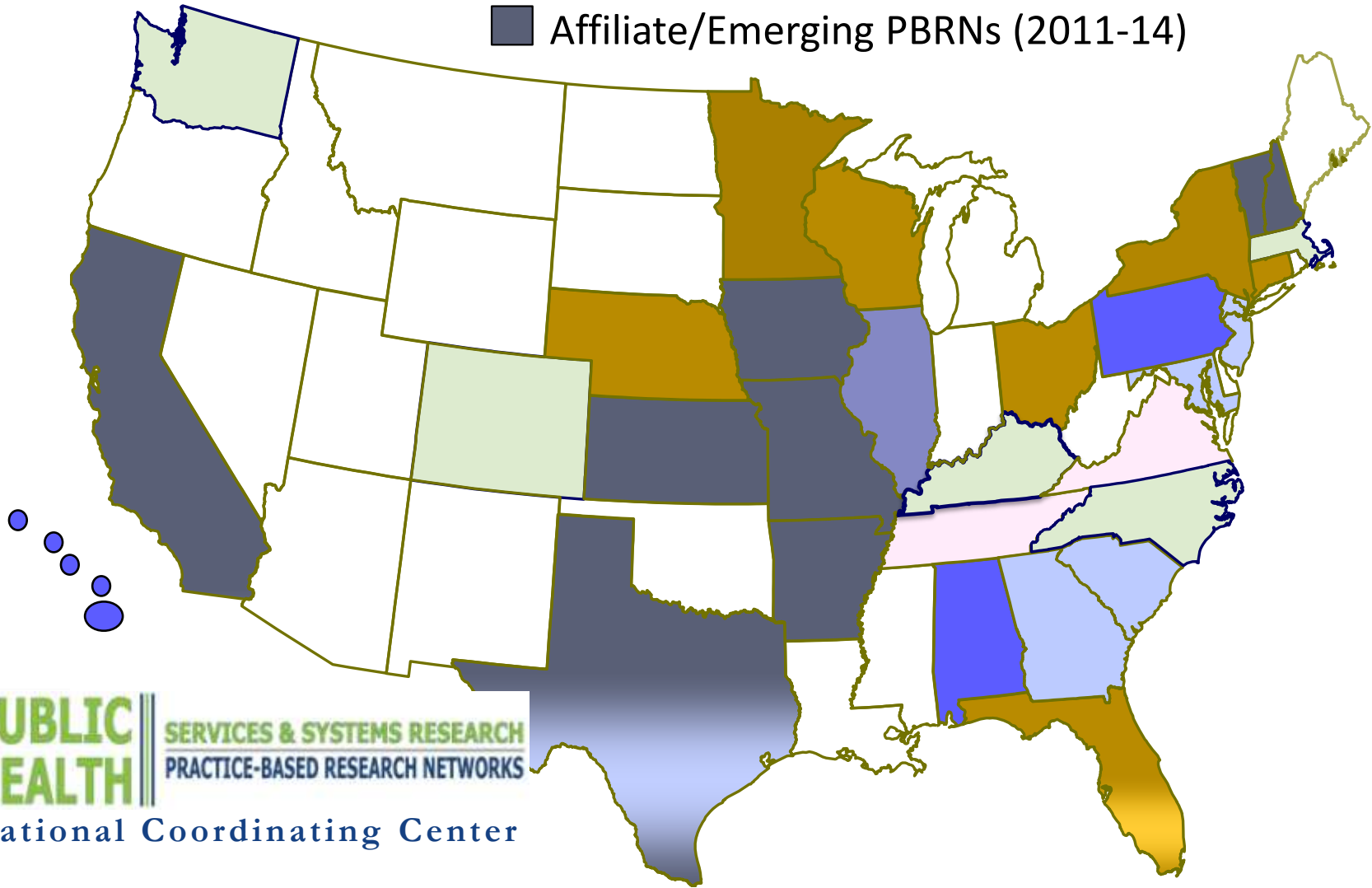
>75% of US health spending is attributable to conditions that are largely preventable

- 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

Public health implementation research: PHSSR and Public Health PBRNs

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



Ongoing studies of the economics of implementation in public health

Macro



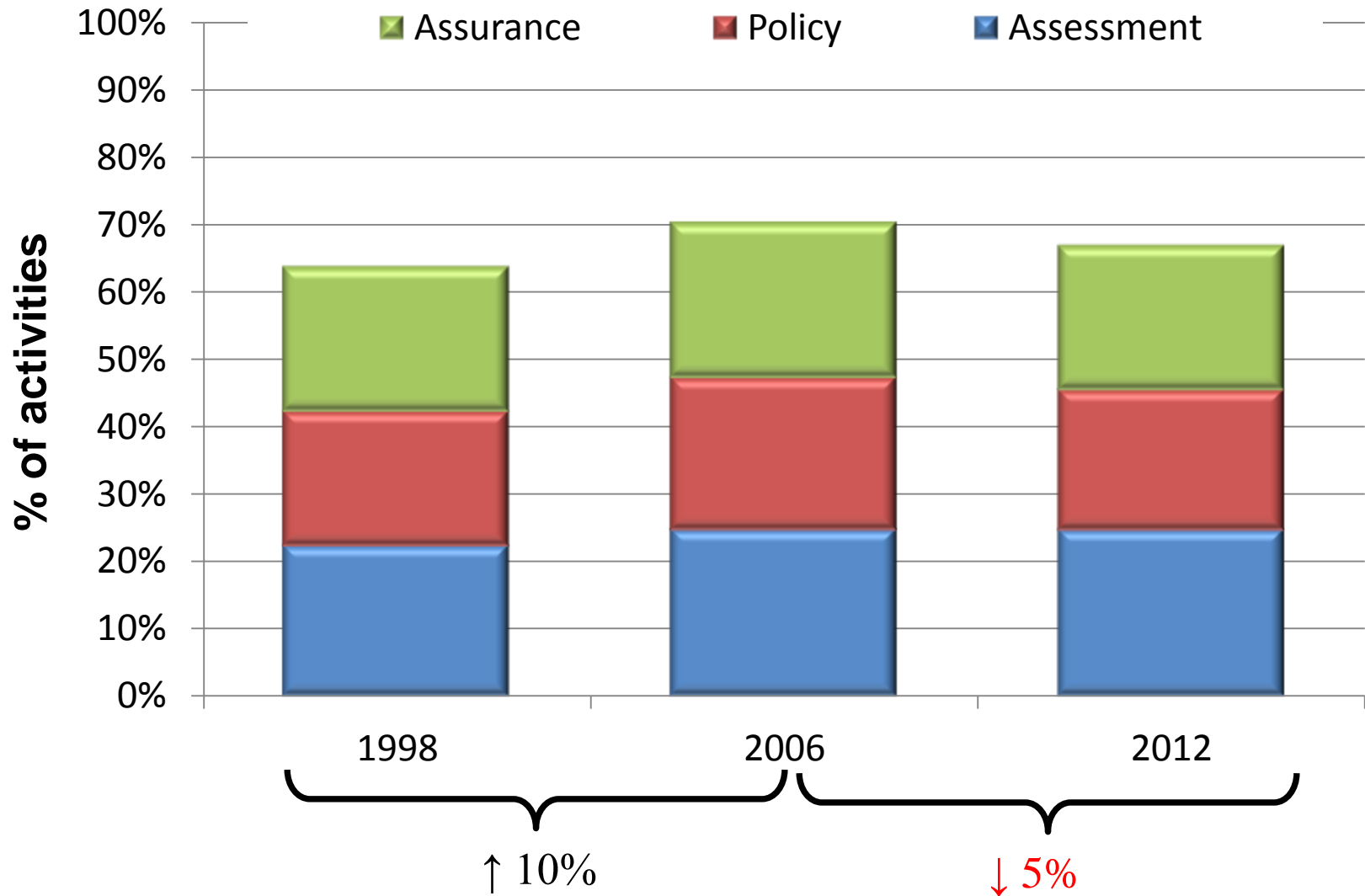
- National Longitudinal Survey of Public Health Systems
- Multi-network Practice and Outcome Variation Study (MPROVE)
- Public Health Delivery and Cost Studies (DACCS)
- Costing Foundational Public Health Capabilities

Micro

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

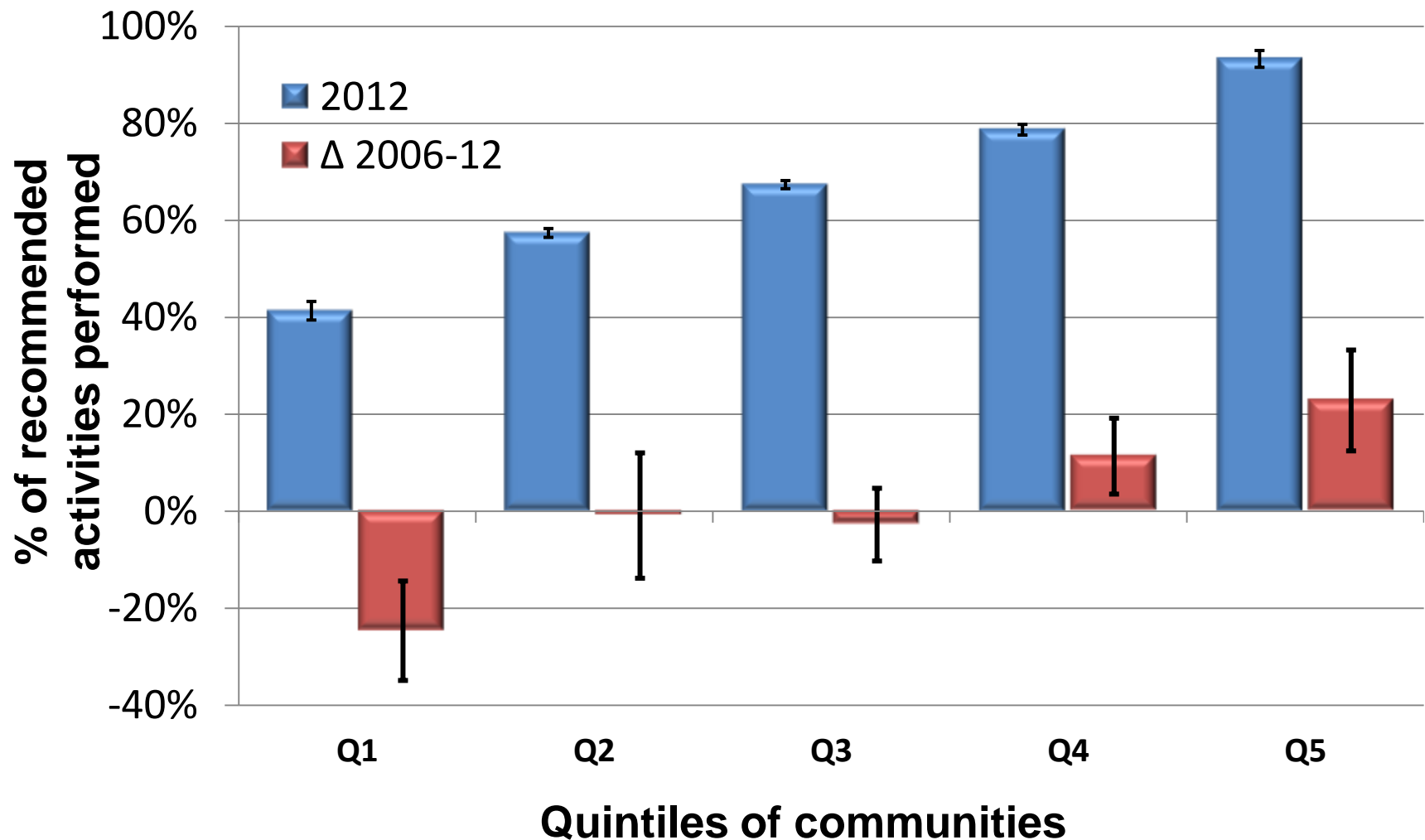
Delivery of recommended public health activities in U.S. communities



National Longitudinal Survey of Public Health Systems, 2012

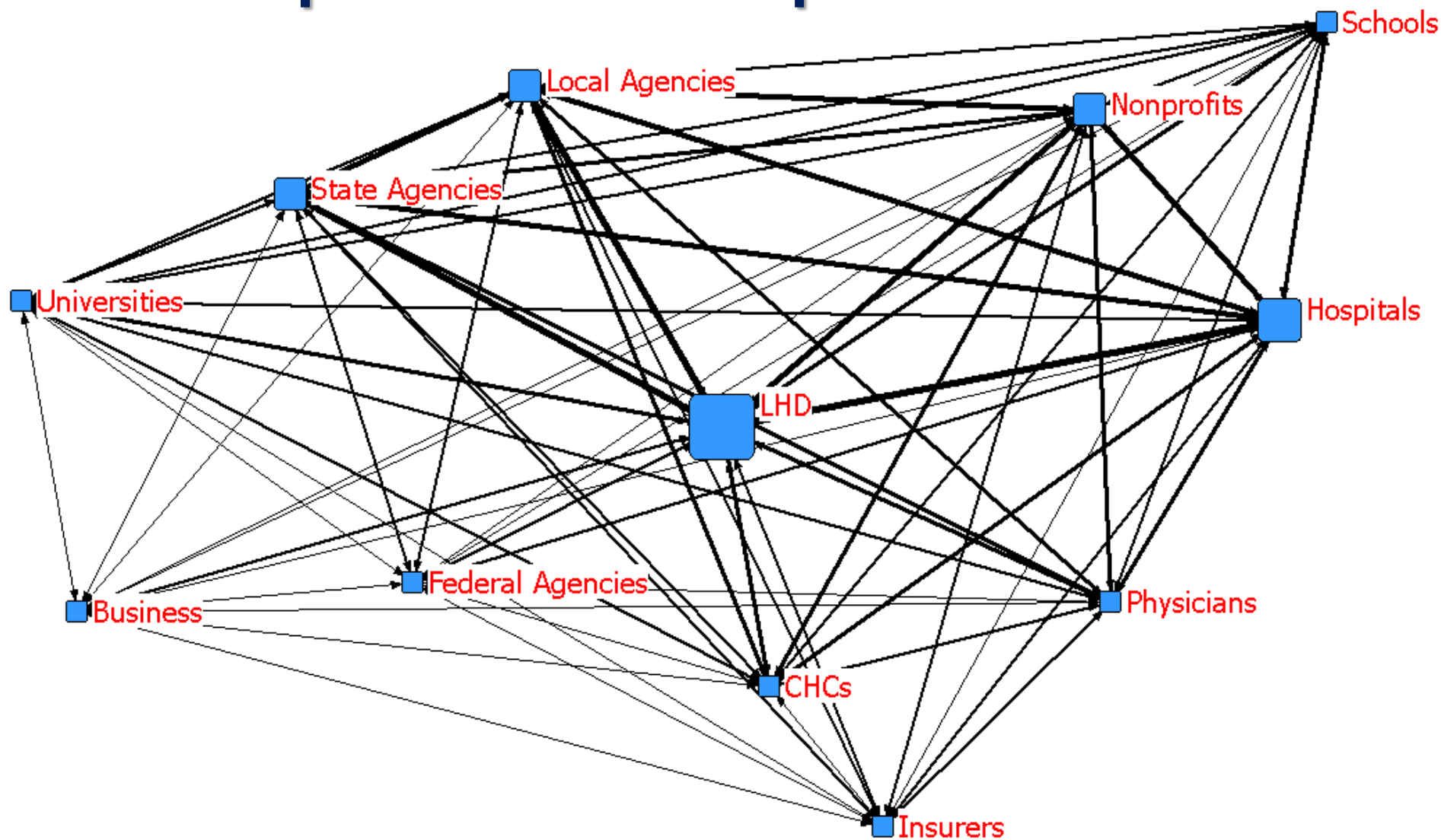
Variation and Change in Delivery

Delivery of recommended public health activities, 2006-12



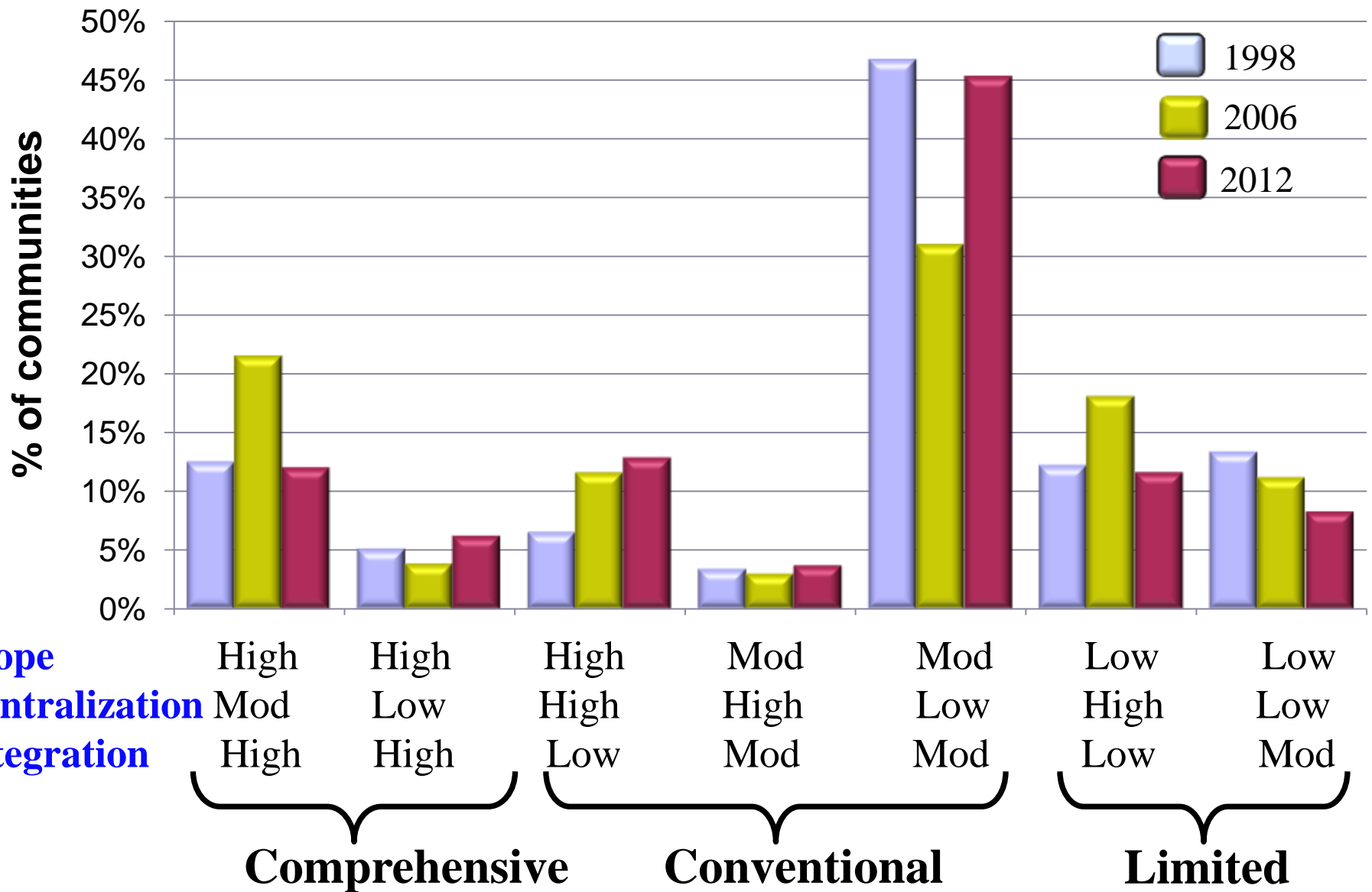
National Longitudinal Survey of Public Health Systems, 2012

Patterns of interaction in public health implementation



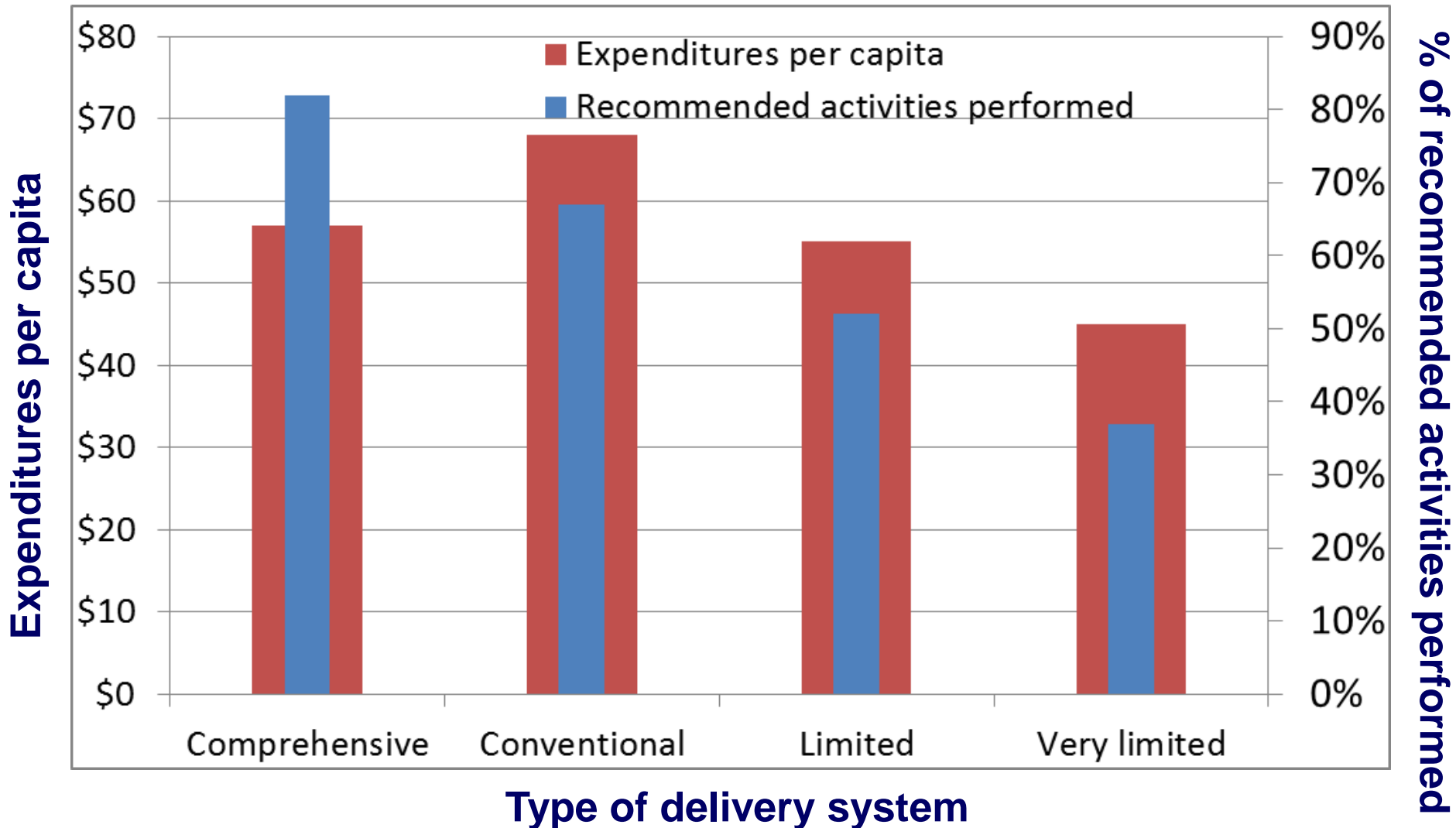
National Longitudinal Survey of Public Health Systems, 2012

Seven types of public health delivery systems



Source: Mays et al. 2010; 2012

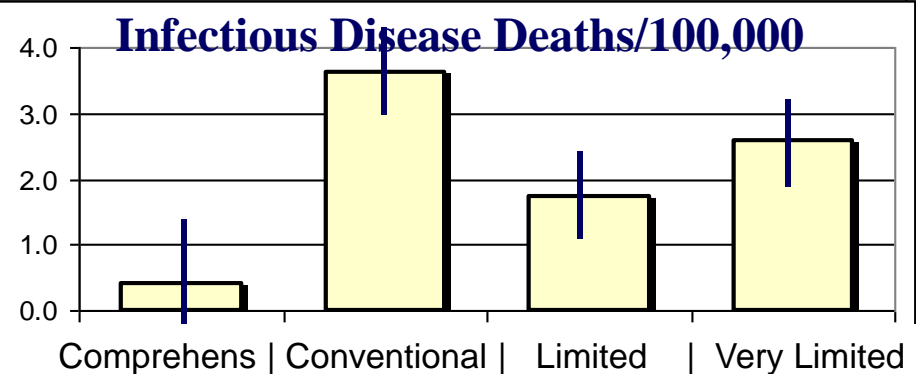
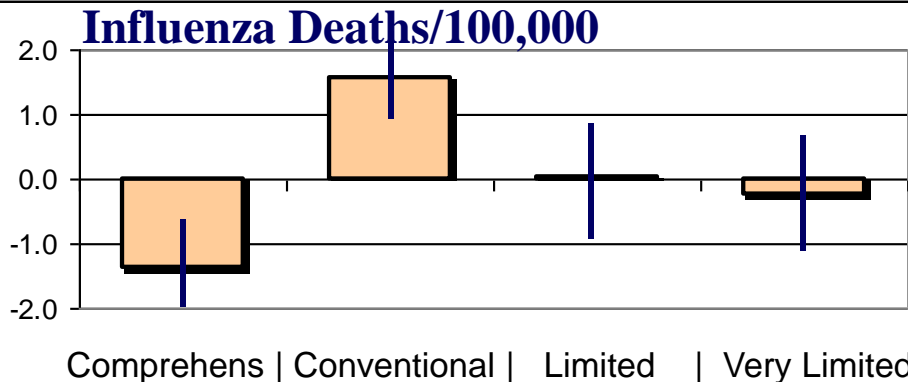
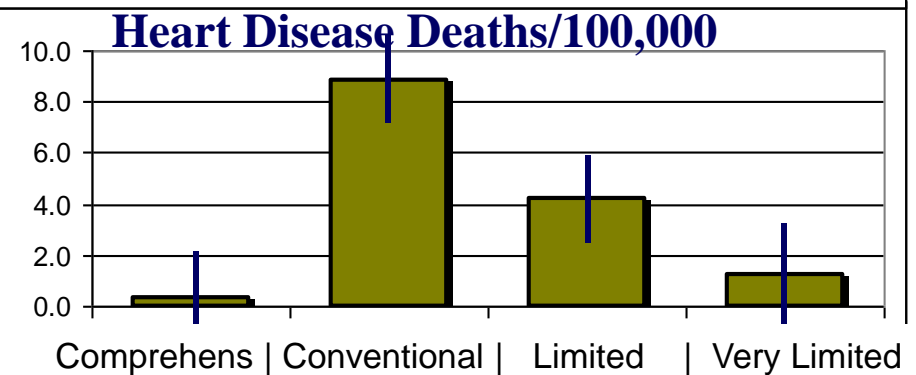
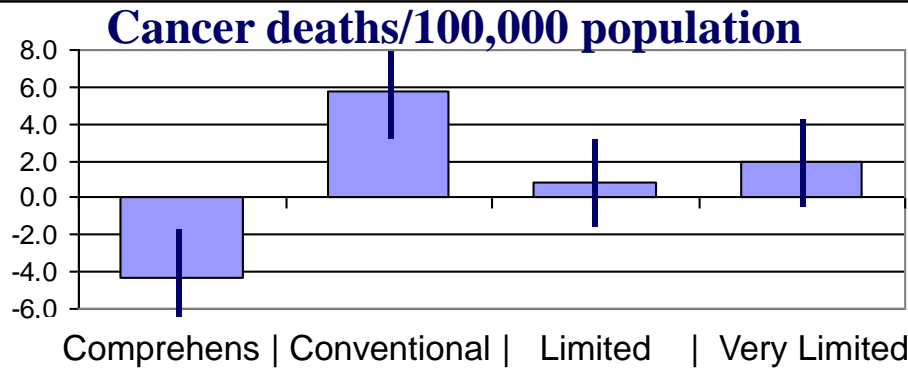
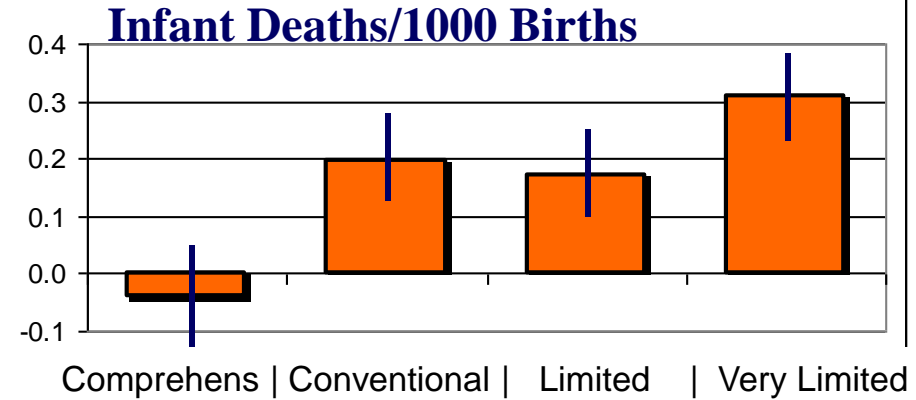
Integrated systems do more with less



National Longitudinal Survey of Public Health Systems, 2012

Integrated systems achieve better health outcomes

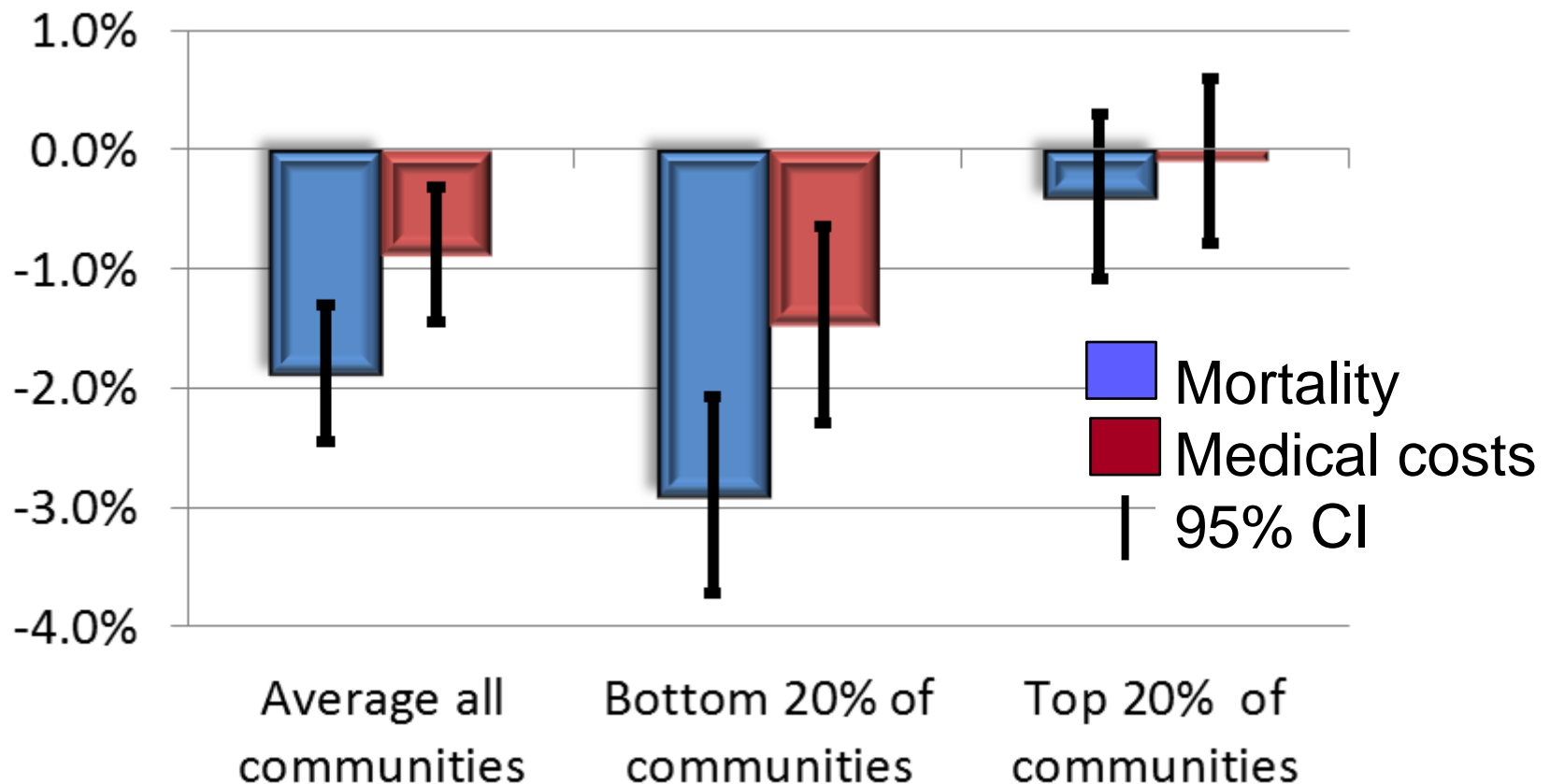
Percent Changes in Preventable Mortality Rates Attributable to Delivery System Type



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

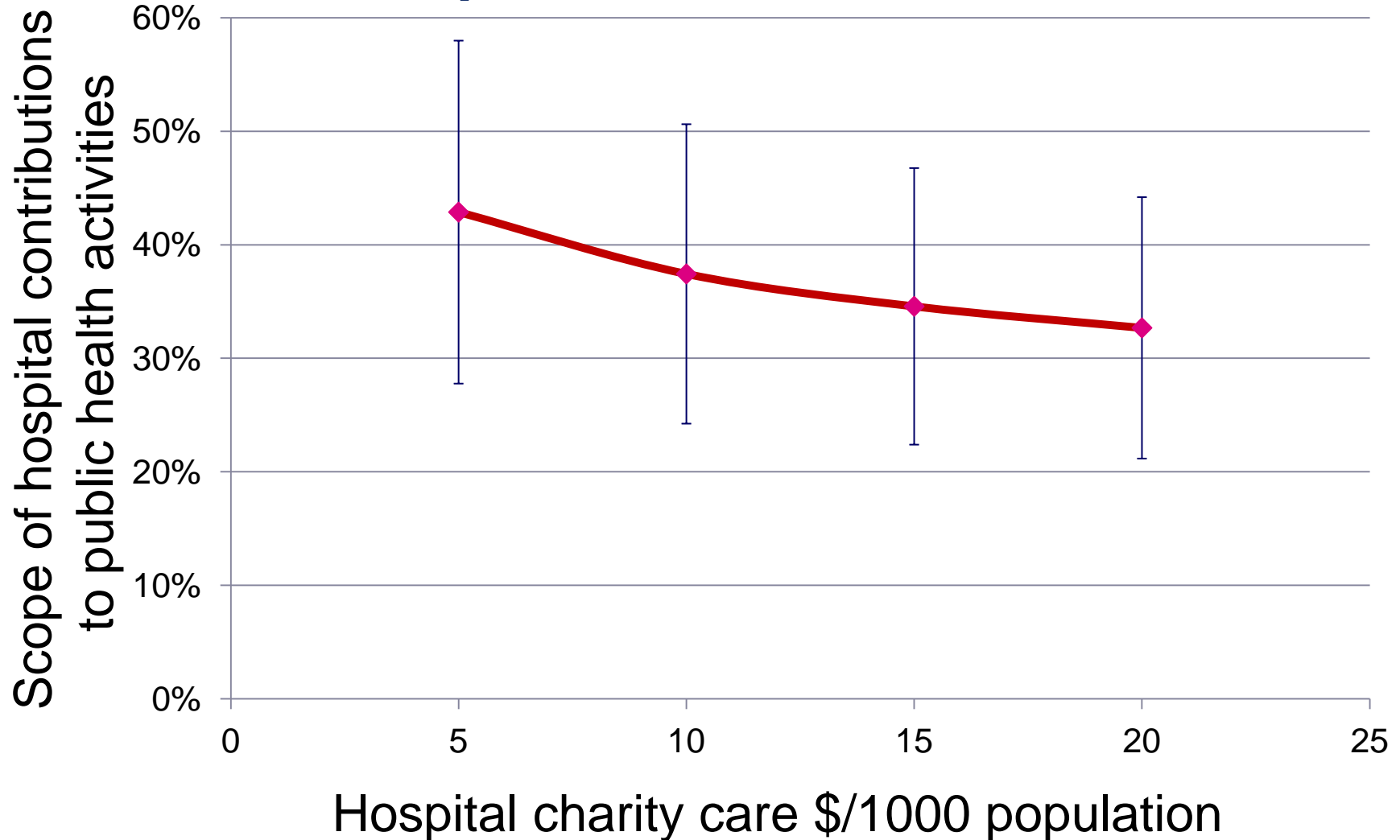
Integrated systems generate larger health & economic gains in low-resource communities

Impact in Low-Income vs. High Income Communities



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

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

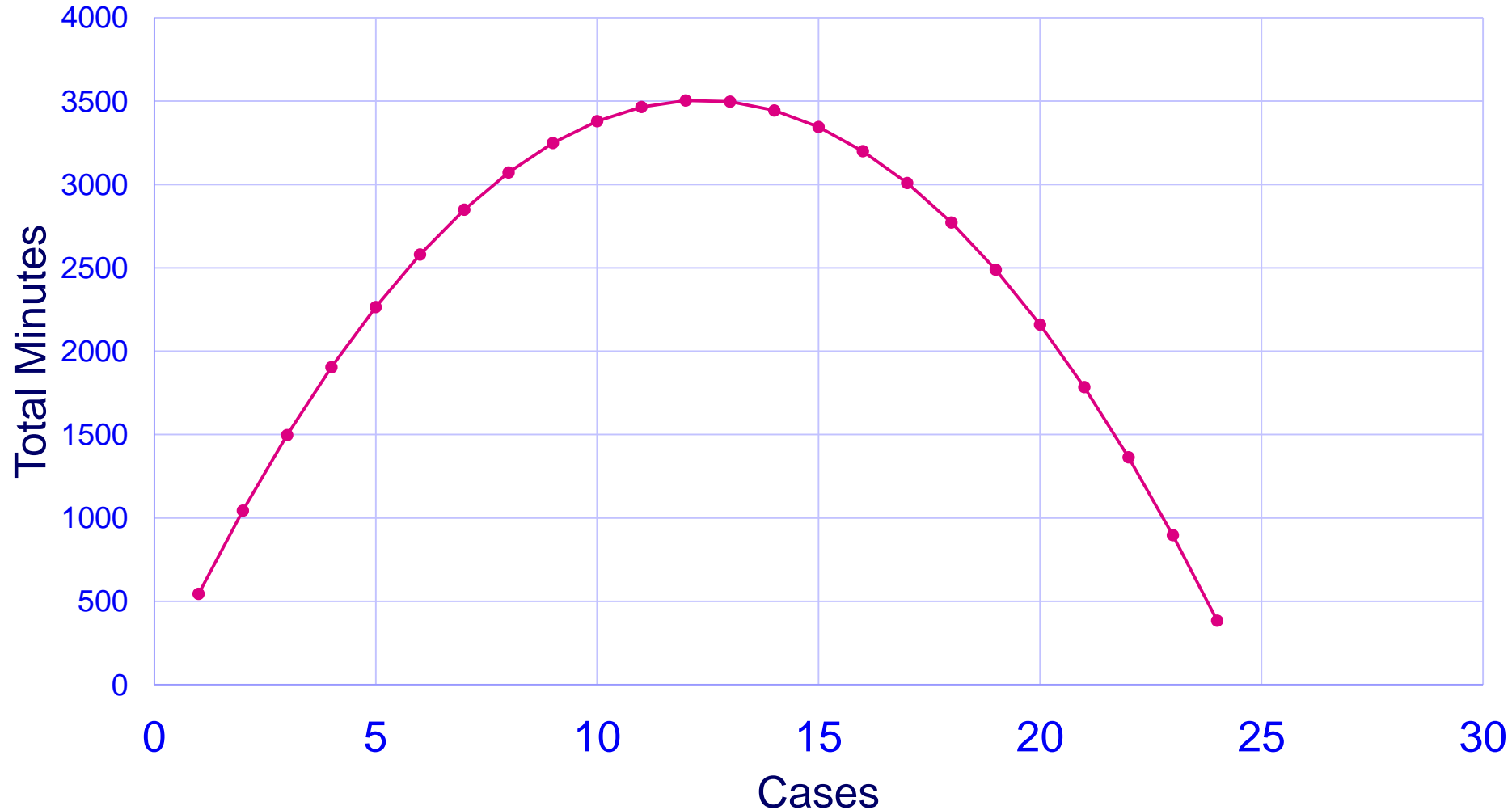
MPROVE measurement dimensions

- ***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

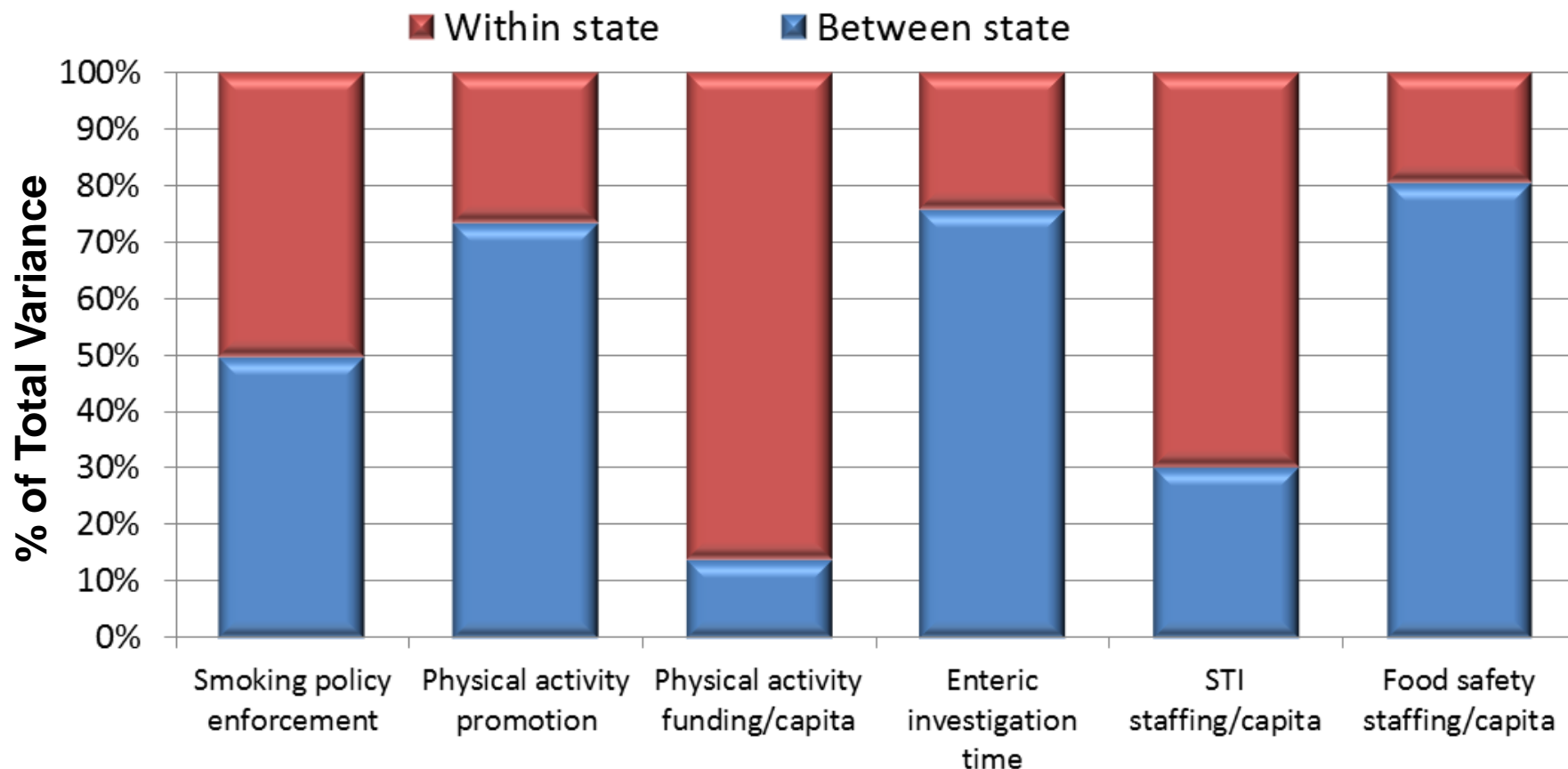
DACS Example: Returns to Scale in Implementing Disease Investigation in Colorado



Atherly et al. University of Colorado and Colorado Public Health PBRN.

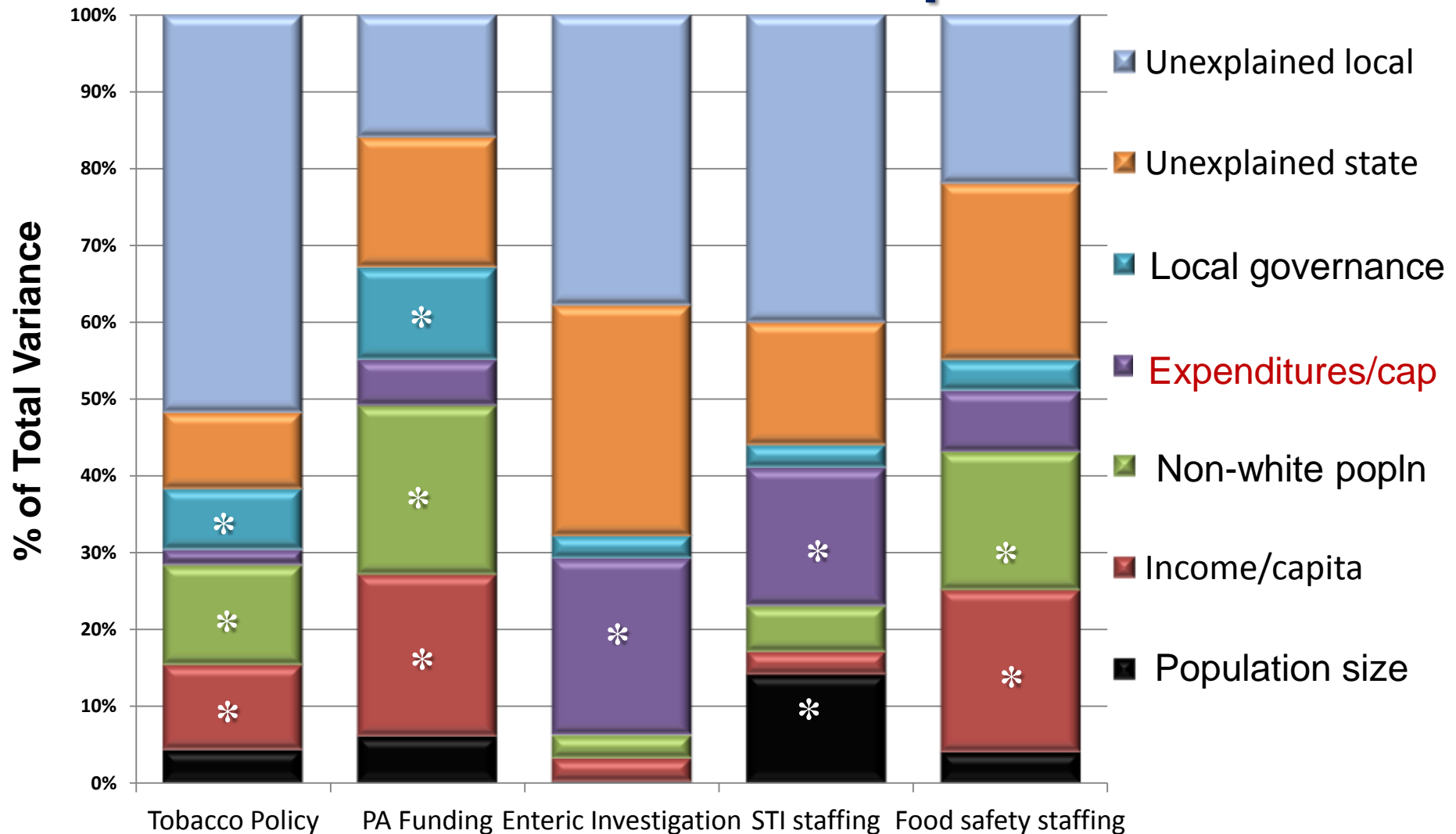
<http://www.ucdenver.edu/academics/colleges/PublicHealth/research/centers/RMPRC/projects/Pages/COPHPBRN.aspx>

Overall Patterns of Variation in Local Public Health Implementation



Estimates from random effects regression models

Correlates of Variation in Local Public Health Implementation



4 – Costing Foundational Capabilities

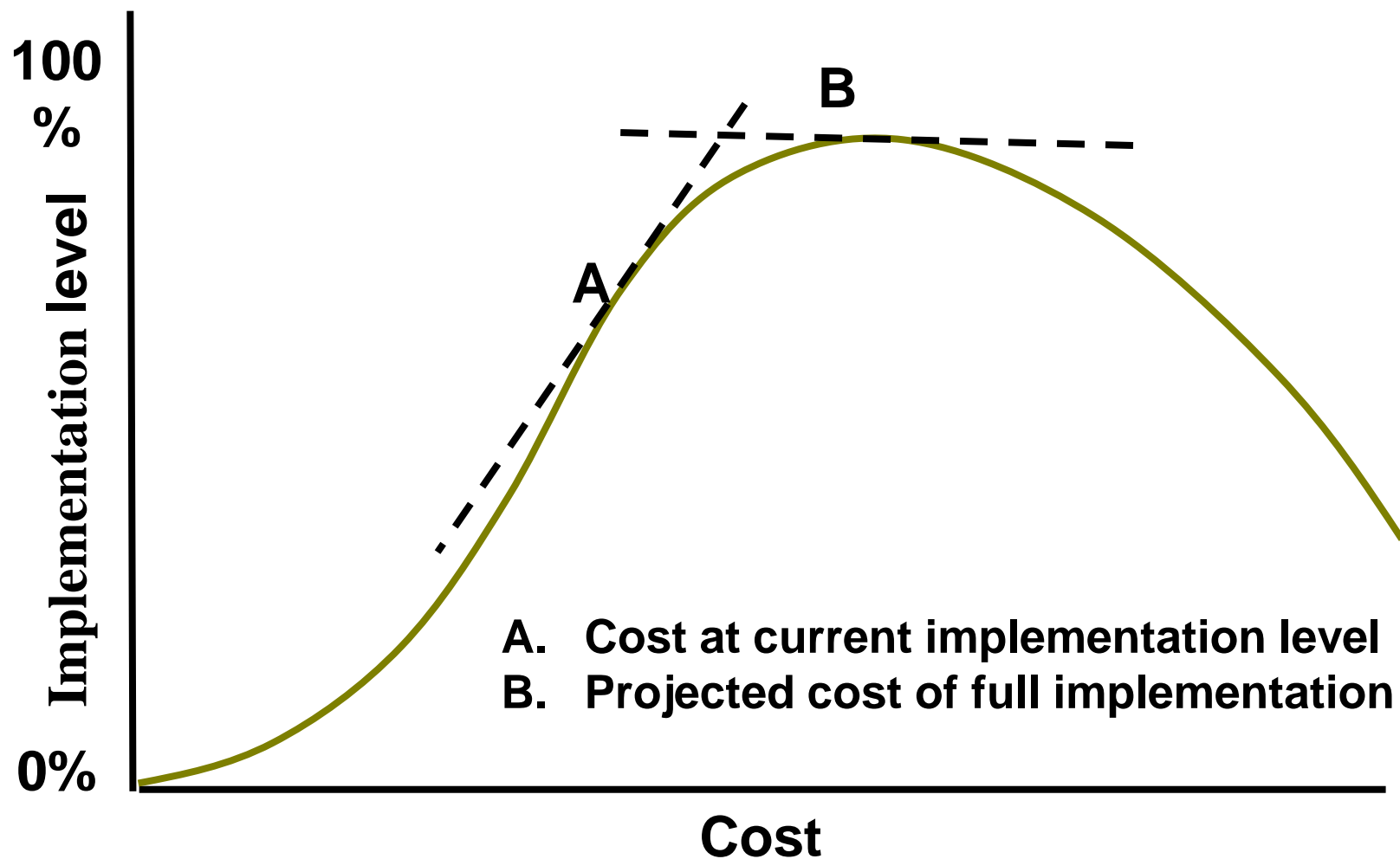
2012 Institute of Medicine Recommendations

- 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

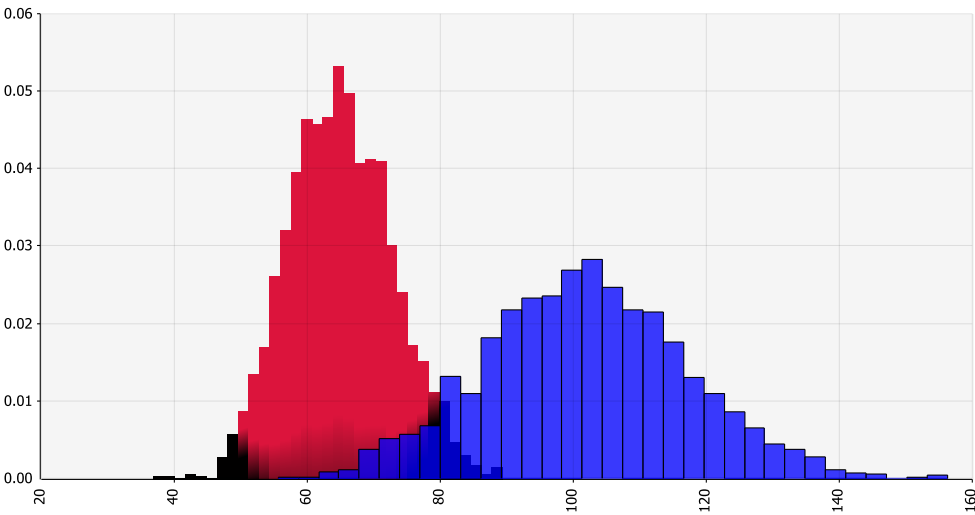
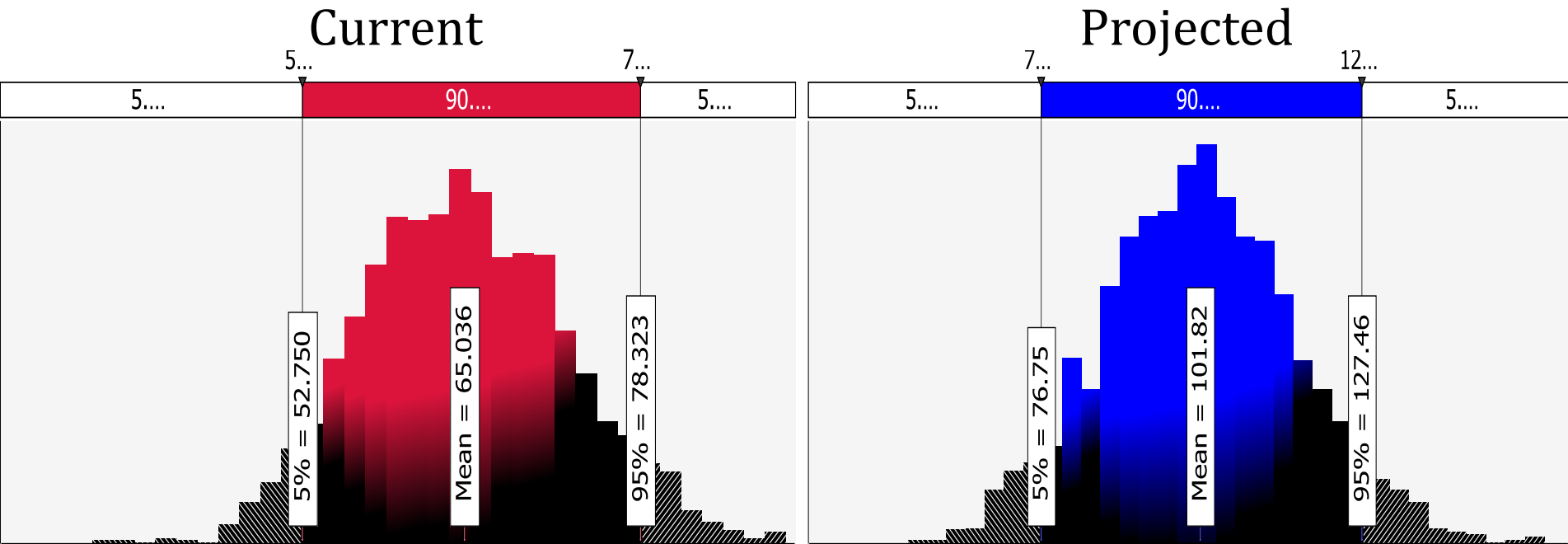


Institute of Medicine. For the Public's Health: Investing in a Healthier Future. Washington, DC: National Academies Press; 2012.

Estimation of “projected” costs from current implementation ratings



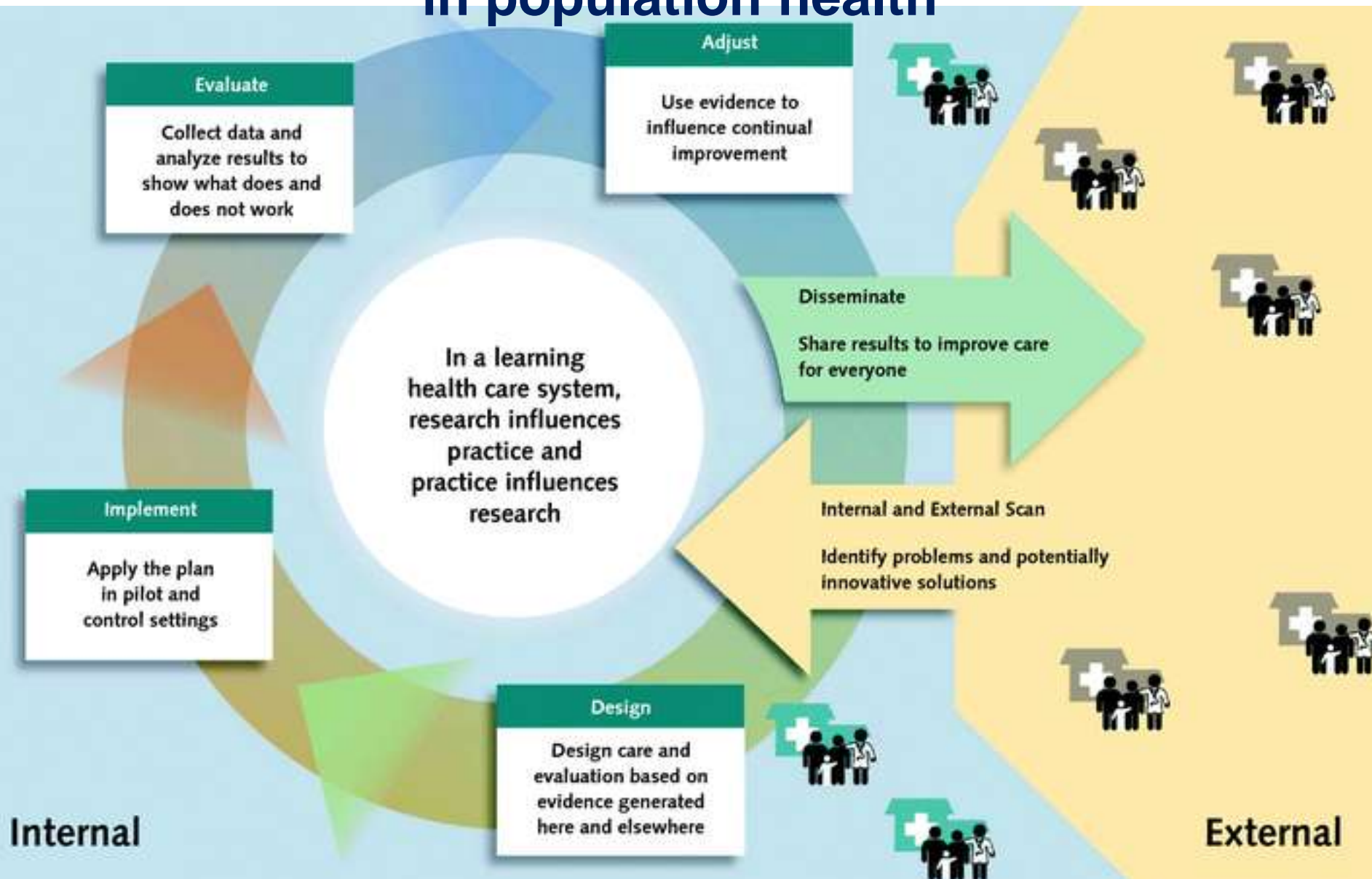
Pilot Estimates: Current and Projected Costs of Foundational Capabilities



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



More Information



Supported by The Robert Wood Johnson Foundation

Glen P. Mays, Ph.D., M.P.H.

glen.mays@uky.edu

Email: publichealthPBRN@uky.edu

Web: www.publichealthsystems.org

Journal: www.FrontiersinPHSSR.org

Archive: works.bepress.com/glen_mays

Blog: publichealtheconomics.org



University of Kentucky College of Public Health
Lexington, KY