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# Preventable Death Rates Fell Where Communities Expanded Population Health Activities through Multi-sector Networks

Glen P. Mays, *University of Kentucky*



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# Preventable Death Rates Fell Where Communities Expanded Population Health Activities through Multi-sector Networks

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**Systems for Action**

**National Coordinating Center**

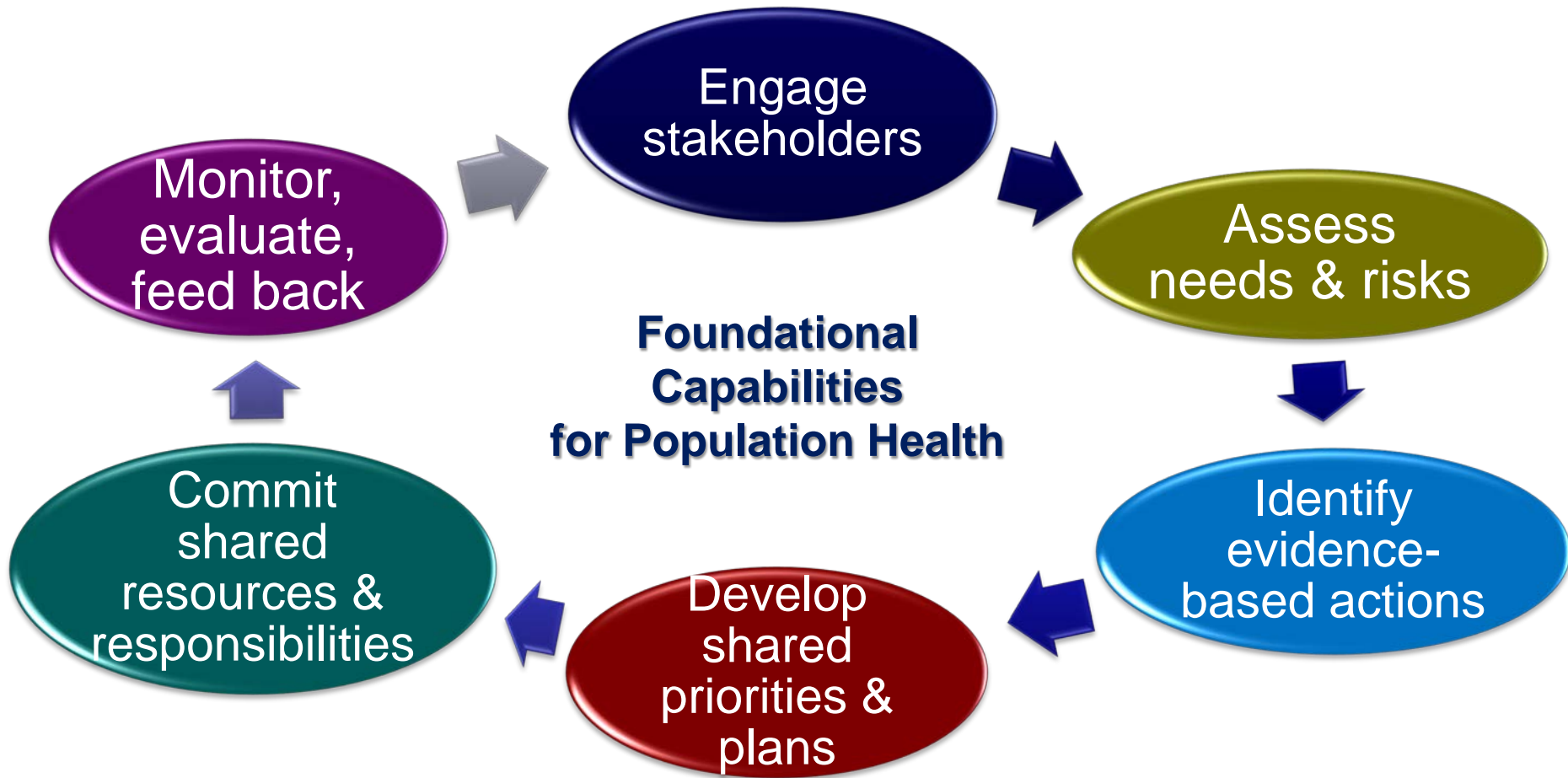
*Systems and Services Research to Build a Culture of Health*

# Defining Population Health

- Designed to achieve **large-scale** health improvement: neighborhood, city/county, region
- Target **fundamental** and often **multiple** determinants of health
- Mobilize the **collective actions** of multiple stakeholders and sectors
  - Infrastructure
  - Information
  - Incentives

National Academy of Medicine Roundtable on Population Health, 2015

# Widely recommended activities to support multi-sector initiatives in population health



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

Motivation

Approach

Results

Discussion

# Measuring implementation of recommended population health activities

## National Longitudinal Survey of Public Health Systems

- Cohort of 360 communities with at least 100,000 residents
- Followed over time: 1998, 2006, 2012, 2014
- Local public health officials report:
  - **Scope**: availability of 20 recommended population health activities
  - **Network density**: organizations contributing to each activity
  - **Network centrality**: distribution of effort across organizations

# Defining Comprehensive Delivery Systems for Population Health Activities

- Implement a ***broad scope*** of population health activities
- Through ***dense networks*** of multi-sector relationships
- Including ***central actors*** to coordinate actions

## One of RWF's Culture of Health Metrics

### Access to public health

Overall, 47.2 percent of the population is covered by a comprehensive public health system. Individuals are more likely to have access if they are non-White (51.5 percent vs. 45.5 percent White) or live in a metropolitan area (48.7 percent vs. 34.1 percent in nonmetropolitan areas).

47.2%

of population served by a comprehensive public health system

<http://www.cultureofhealth.org/en/integrated-systems/access.html>

Motivation

Approach

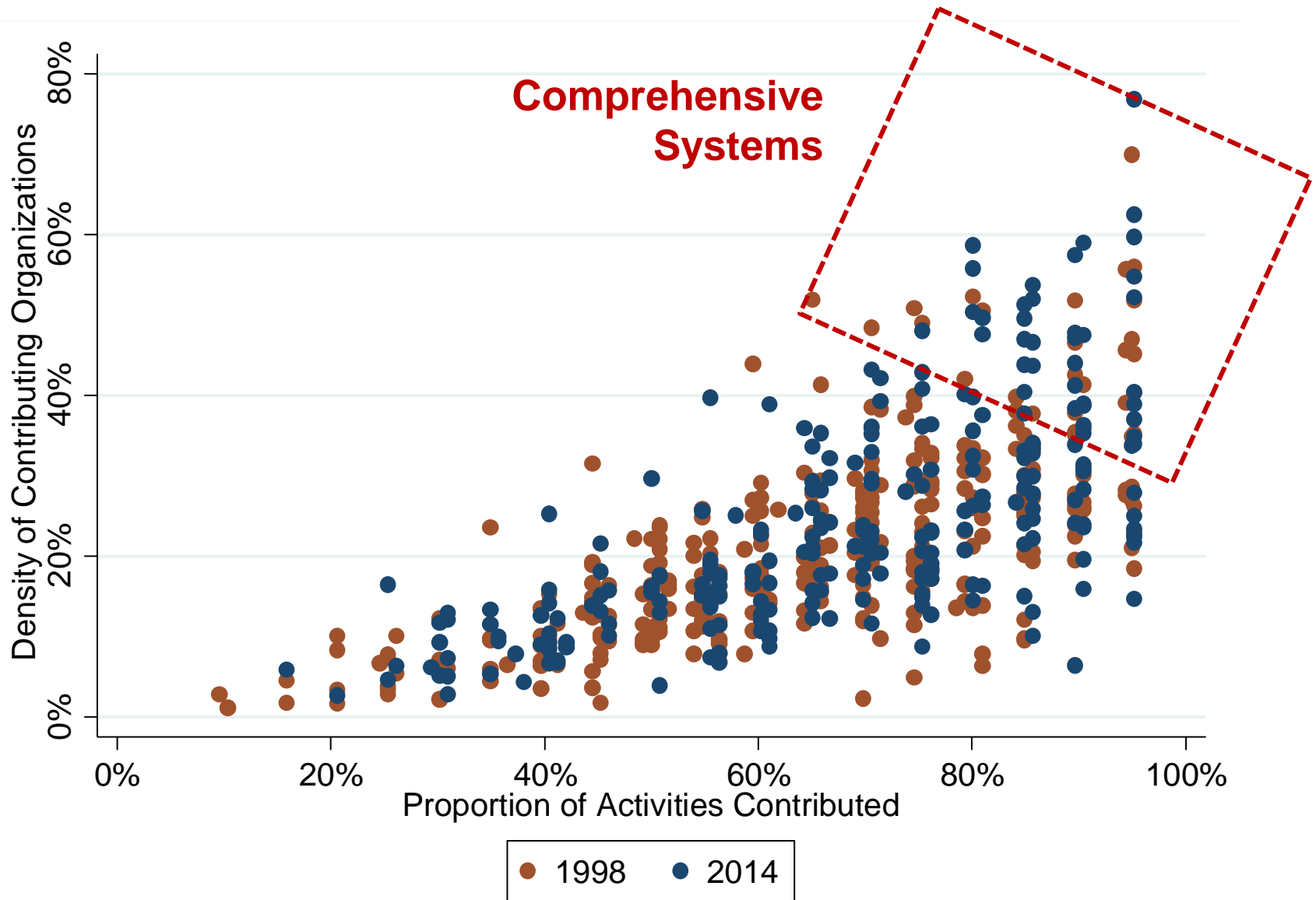
Results

Discussion

# Estimating health outcomes associated with population health delivery systems

- **Outcomes:** all-cause mortality and deaths due to heart disease, diabetes, cancer, influenza, infant mortality, and residual
- **Exposure:** communities with/without a comprehensive system
- **Controls:** population size and density, metropolitan area designation, income per capita, unemployment, poverty rate, racial composition, age distribution, physician and hospital availability, insurance coverage, state and year fixed effects.
- **Estimation:** panel regression with fixed and random effects to account for repeated measures and clustering of communities within states
- Two-stage instrumental-variables model to estimate effect of system changes on mortality rates (residual inclusion method)
- **N=1019 community-years**

# Network density and scope of population health activities



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# Organizational contributions to population health activities, 1998-2014

## % of Recommended Activities Implemented

<u>Type of Organization</u>	<u>1998</u>	<u>2014</u>	<u>Percent Change</u>
Local public health agencies	60.7%	67.5%	11.1%
Other local government agencies	31.8%	33.2%	4.4%
State public health agencies	46.0%	34.3%	-25.4%
Other state government agencies	17.2%	12.3%	-28.8%
Federal government agencies	7.0%	7.2%	3.7%
Hospitals	37.3%	46.6%	24.7%
Physician practices	20.2%	18.0%	-10.6%
Community health centers	12.4%	29.0%	134.6%
Health insurers	8.6%	10.6%	23.0%
Employers/businesses	16.9%	15.3%	-9.6%
Schools	30.7%	25.2%	-17.9%
Universities/colleges	15.6%	22.6%	44.7%
Faith-based organizations	19.2%	17.5%	-9.1%
Other nonprofit organizations	31.9%	32.5%	2.0%
Other	8.5%	5.2%	-38.4%
<b>Comprehensive systems (prevalence)</b>	<b>24.2%</b>	<b>39.5%</b>	<b>63.2%</b>

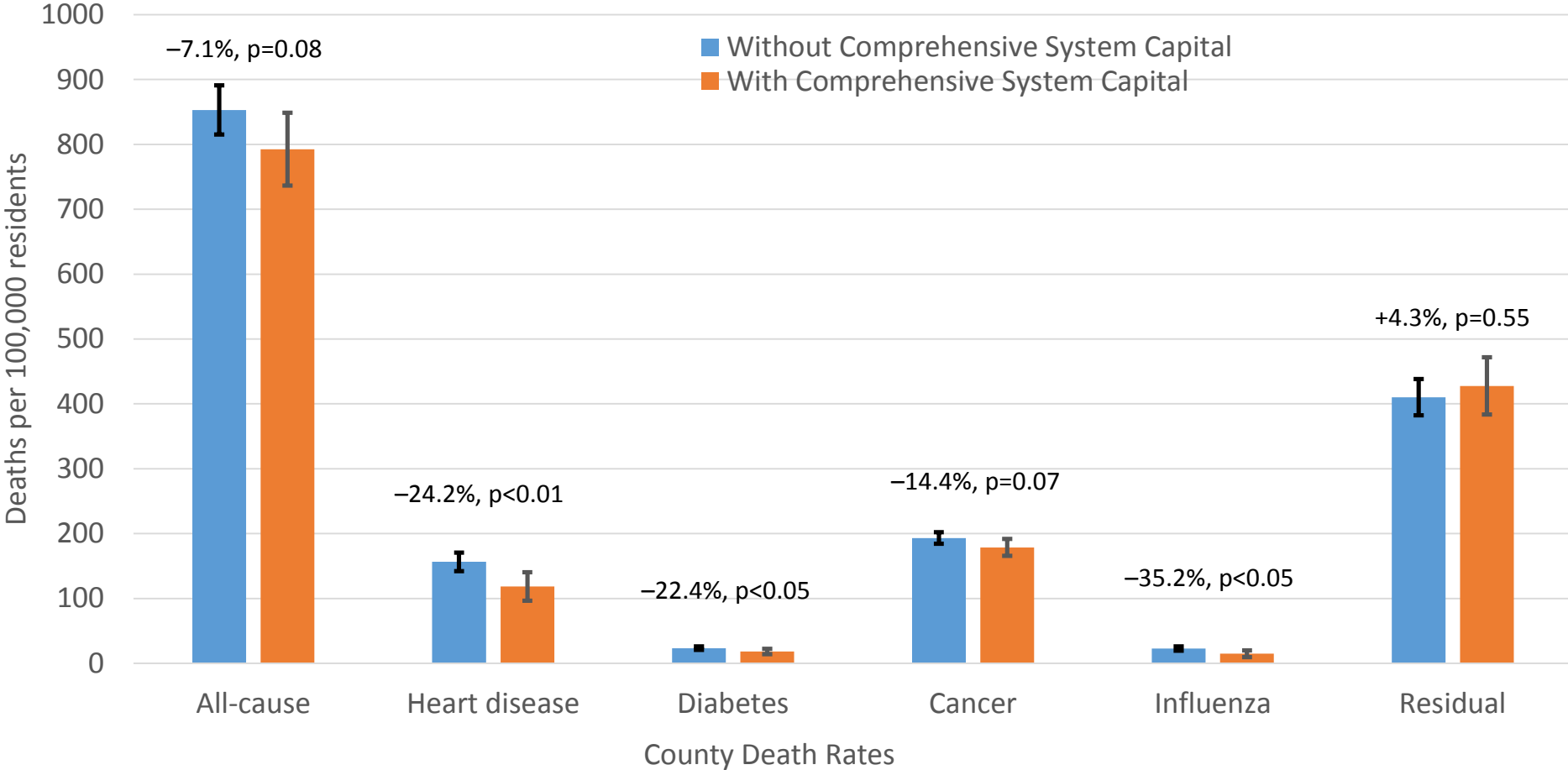
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# Mortality reductions associated with comprehensive systems 1998-2014



Instrumental variables estimates controlling for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. N=1019 community-years

# Conclusions and implications

- Large health gains accrue to comprehensive systems
- Dense collaborative networks do more than just plan: prioritize, invest, evaluate, repeat (crowd-sourcing)
- Equity and opportunity: two-thirds of communities currently lack comprehensive systems
- ACA incentives and resources may help:
  - Hospital community benefit
  - Value-based health care payments
  - Insurer and employer incentives
  - Public health agency accreditation
- Sustainability and resiliency are not automatic

# For More Information

## Systems for Action

National Coordinating Center

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