Systems for Action
National Coordinating Center
Systems and Services Research to Build a Culture of Health

Income and Health Inequalities and their Relationship to Population Health Delivery Systems

Research In Progress Webinar
Wednesday, October 26, 2016 12:00-1:00pm ET/ 9:00-10:00am PT

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College of Public Health
Center for Public Health Systems and Services Research

Agenda

Presentation: **Glen P. Mays, Ph.D.,** Director, RWJF Systems for Action National Coordinating Center, University of Kentucky College of Public Health

Income and Health Inequalities and their Relationship to Population Health Delivery Systems

Commentary: **James P. Ziliak, Ph.D.,** Gatton Endowed Chair in Microeconomics and Director, Center for Poverty Research, University of Kentucky

Questions and Discussion

Presenter

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Income and Health Inequalities and their Relationship to Population Health Delivery Systems

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systemsforaction.org

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UNIVERSITY OF KENTUCKY
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Systems for Action
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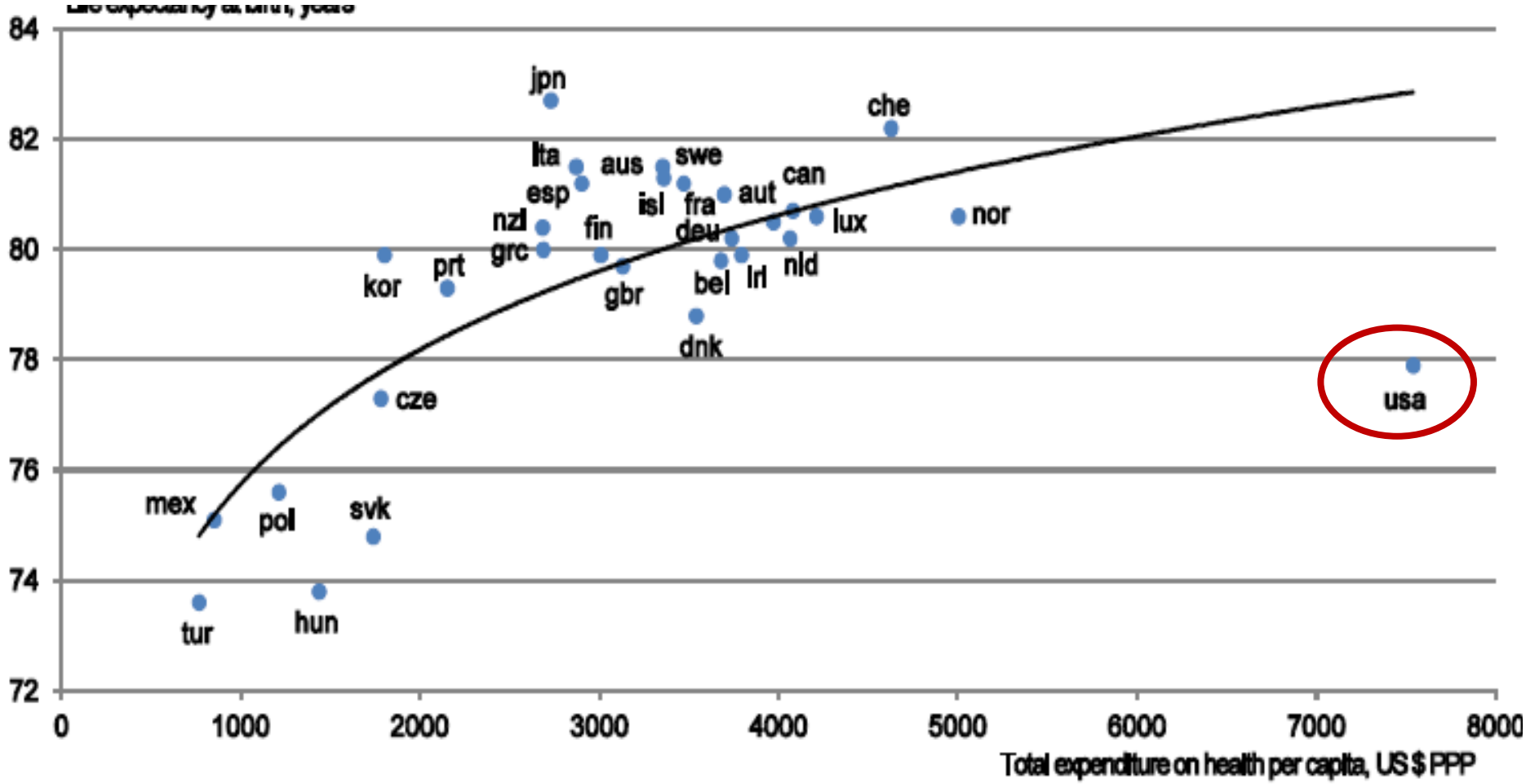
Systems and Services Research to Build a Culture of Health

Losing ground in population health

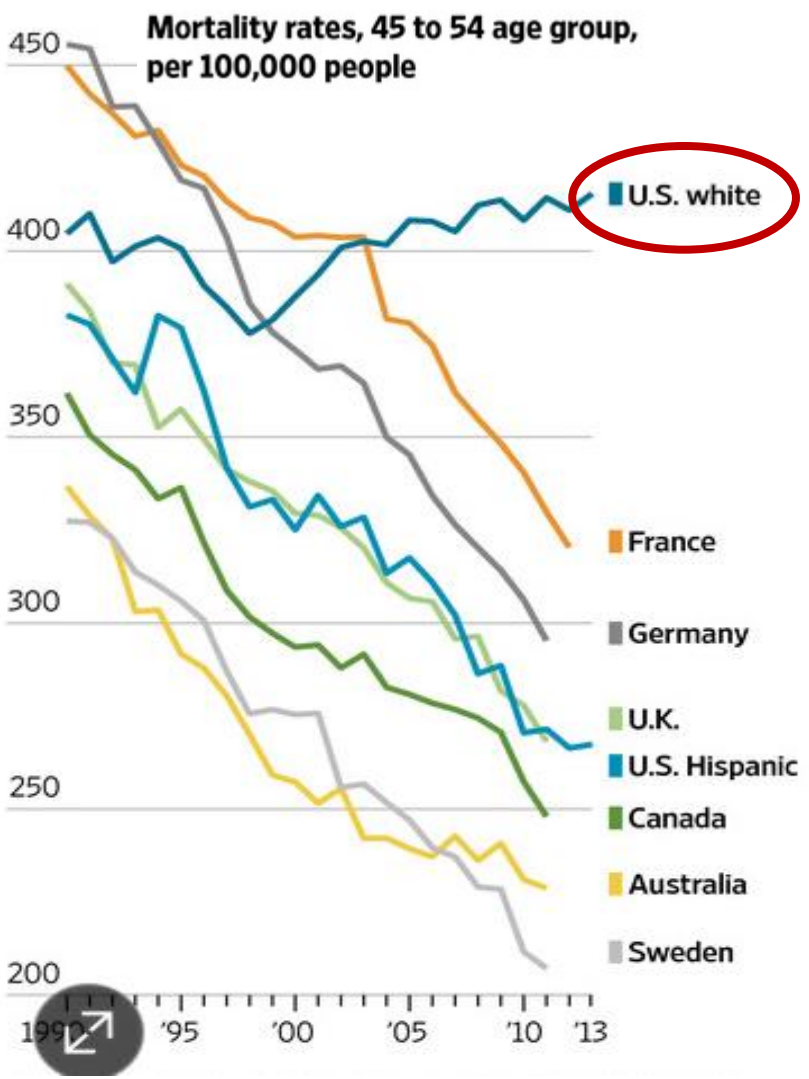


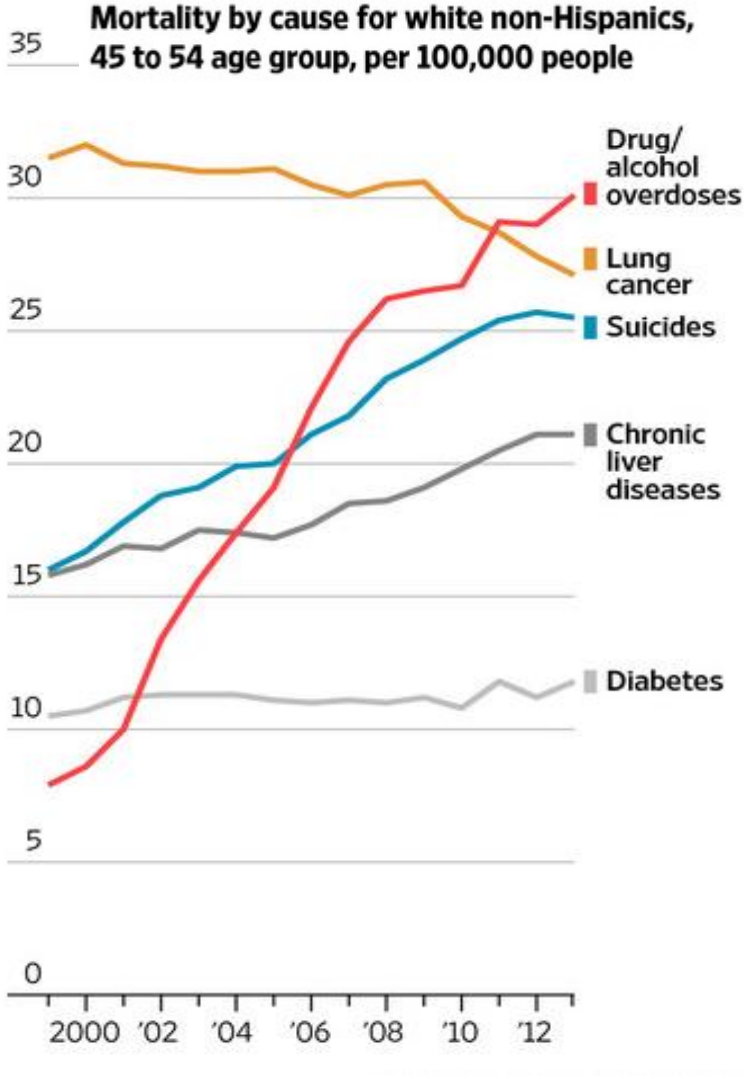
1. Or latest year available.

Source: OECD Health Data 2010.

WHO 2010

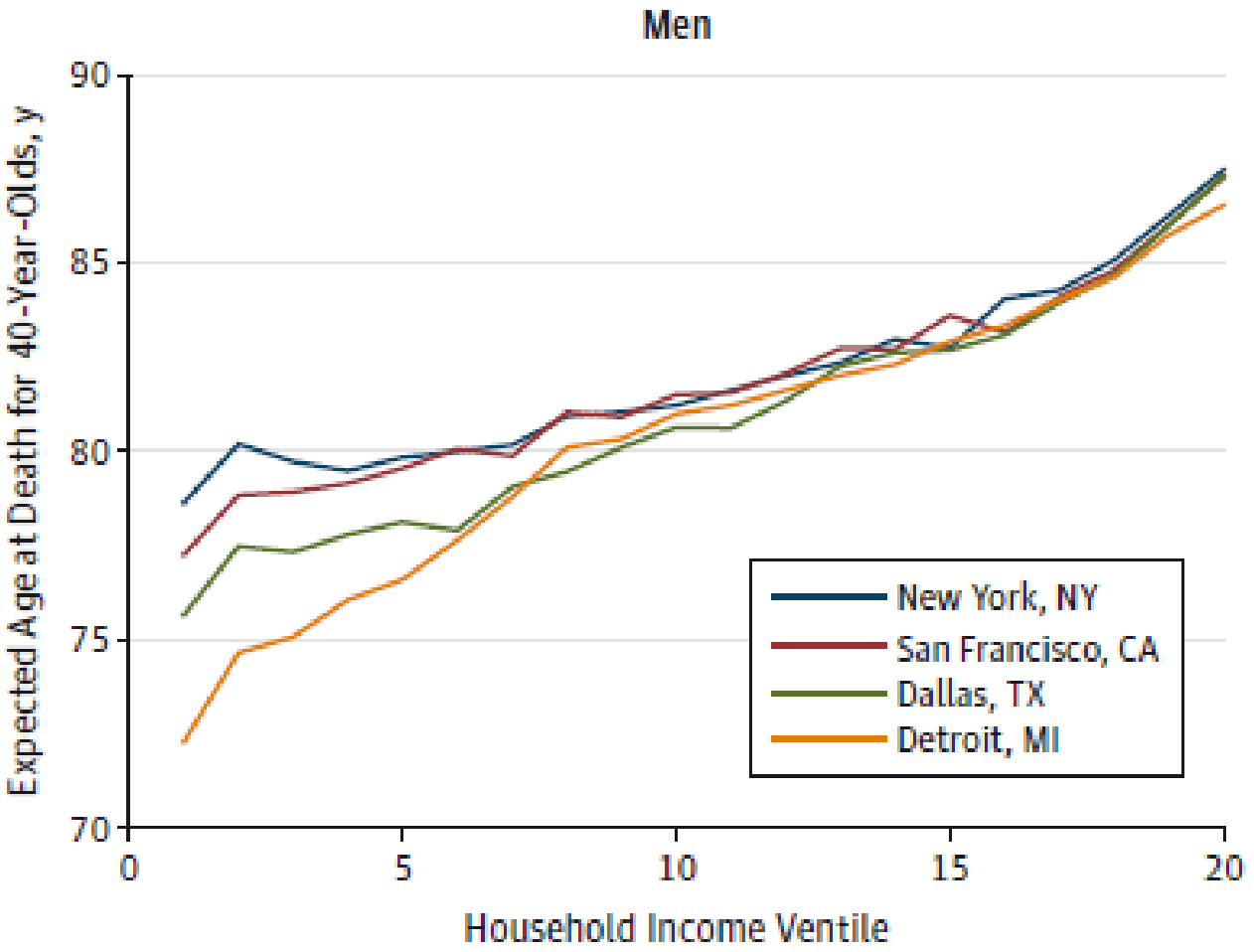
Losing ground in population health





Case A, Deaton A. Proceedings of the National Academy of Sciences 2015

Income disparities in population health



Chetty et al. JAMA 2016

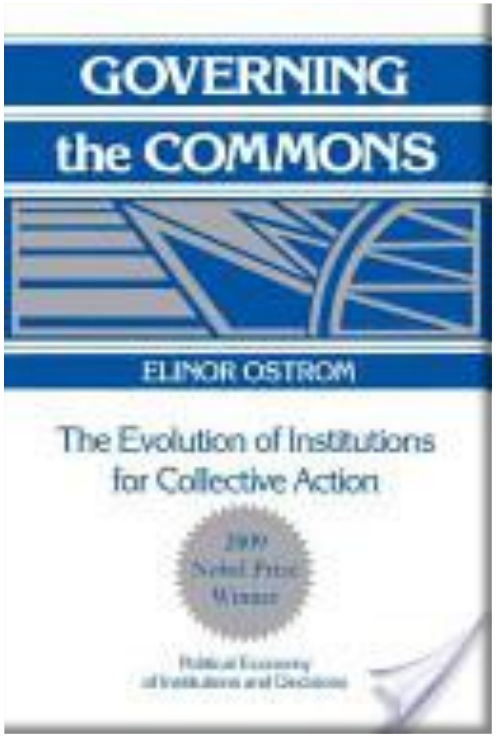
How do we support effective population health improvement strategies?

- 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 in government & private sector
    - Infrastructure
    - Information
    - Incentives

Mays GP. Governmental public health and the economics of adaptation to population health strategies. ***National Academy of Medicine Discussion Paper.*** 2014. http://nam.edu/wp-content/uploads/2015/06/EconomicsOfAdaptation.pdf

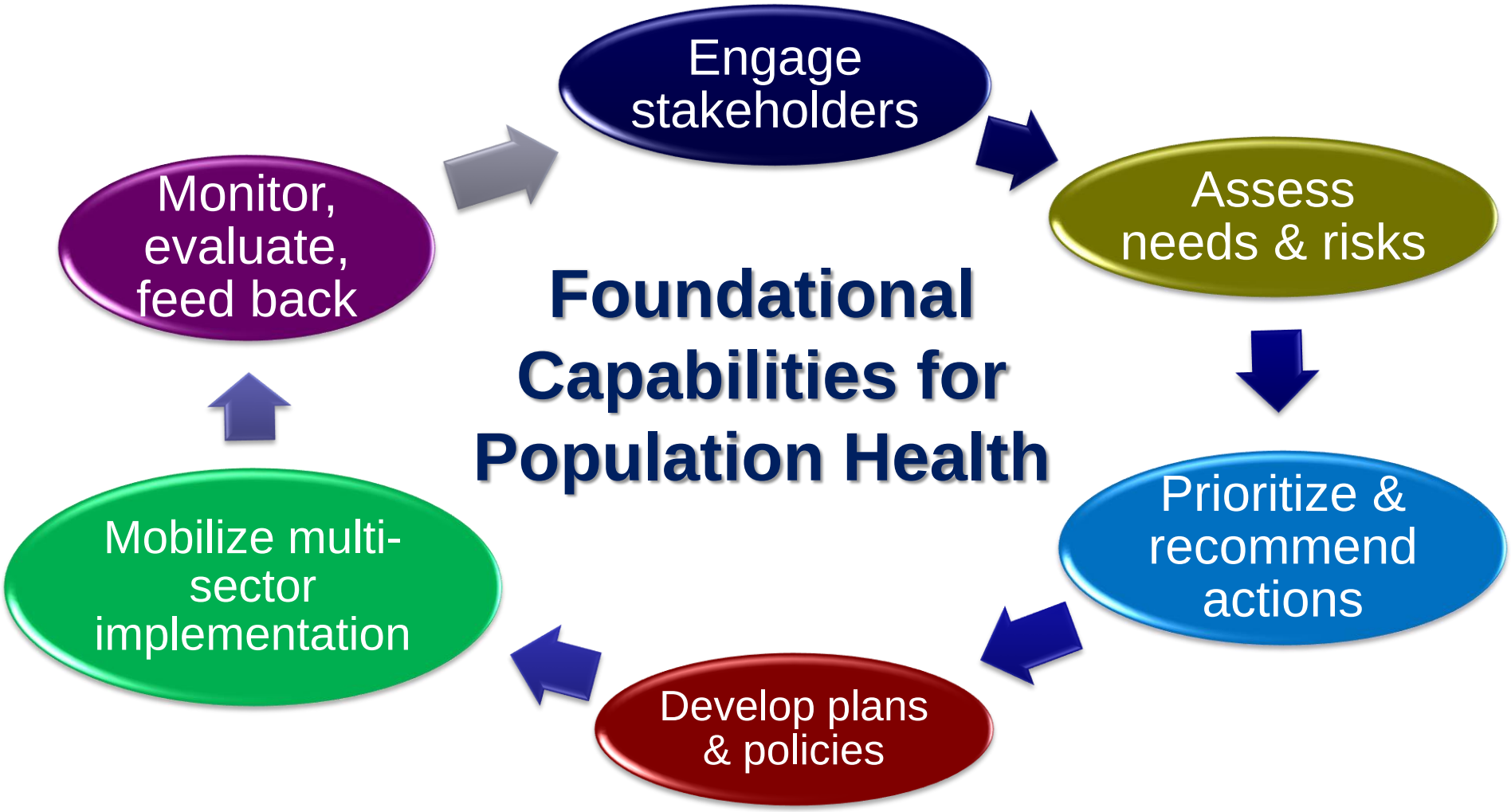
Challenge: overcoming collective action problems across systems & sectors

- Incentive compatibility → public goods
- Concentrated costs & diffuse benefits
- Time lags: costs vs. improvements
- Uncertainties about what works
- Asymmetry in information
- Difficulties measuring progress
- Weak and variable institutions & infrastructure
- Imbalance: resources vs. needs
- Stability & sustainability of funding



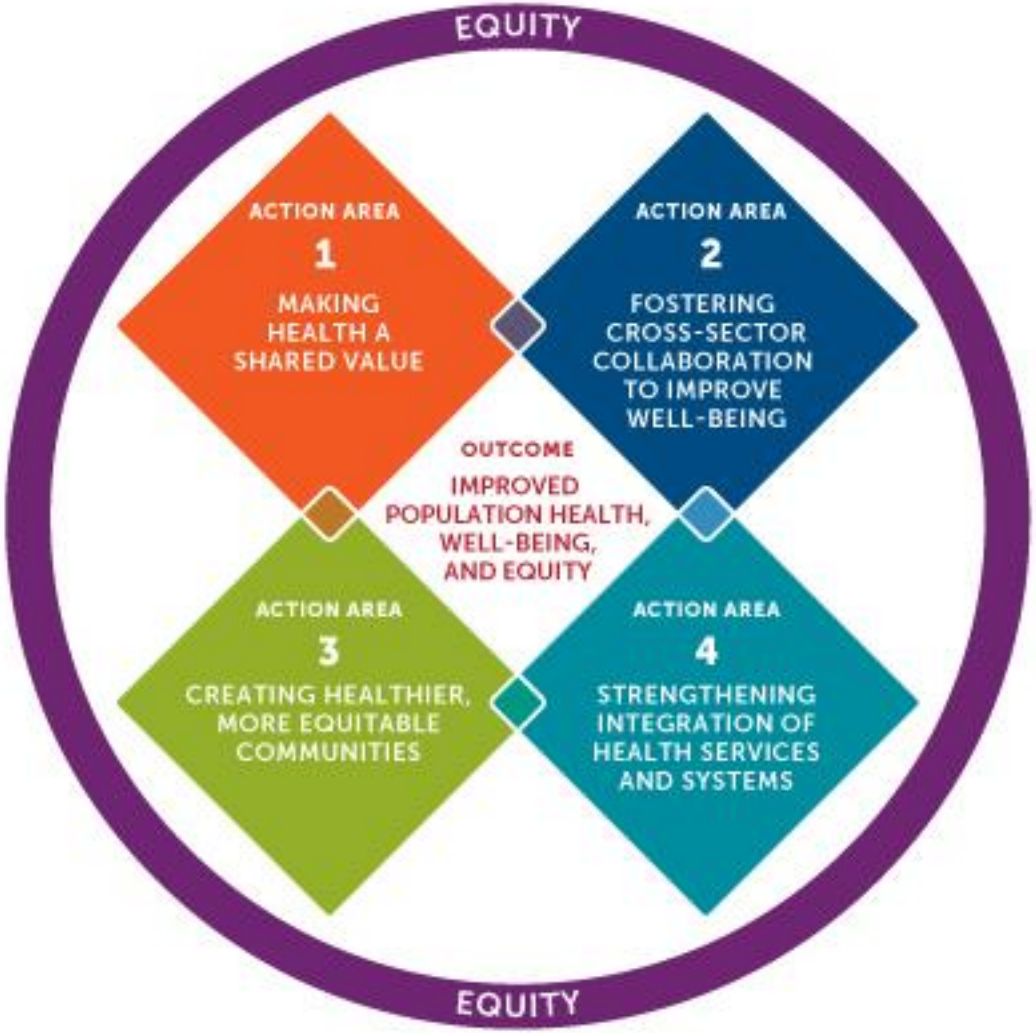
Ostrom E. 1994

Catalytic functions to support multi-sector actions in health



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

Guided by Culture of Health Action Framework



http://www.rwjf.org/en/culture-of-health/2015/11/measuring_what_matte.html

Robert Wood Johnson Foundation

Questions of interest

- How strong are the delivery systems that support foundational population health activities?
- How do these delivery systems change over time?

  Recession | Recovery | ACA implementation

- How do these delivery systems relate to income disparities in population health?

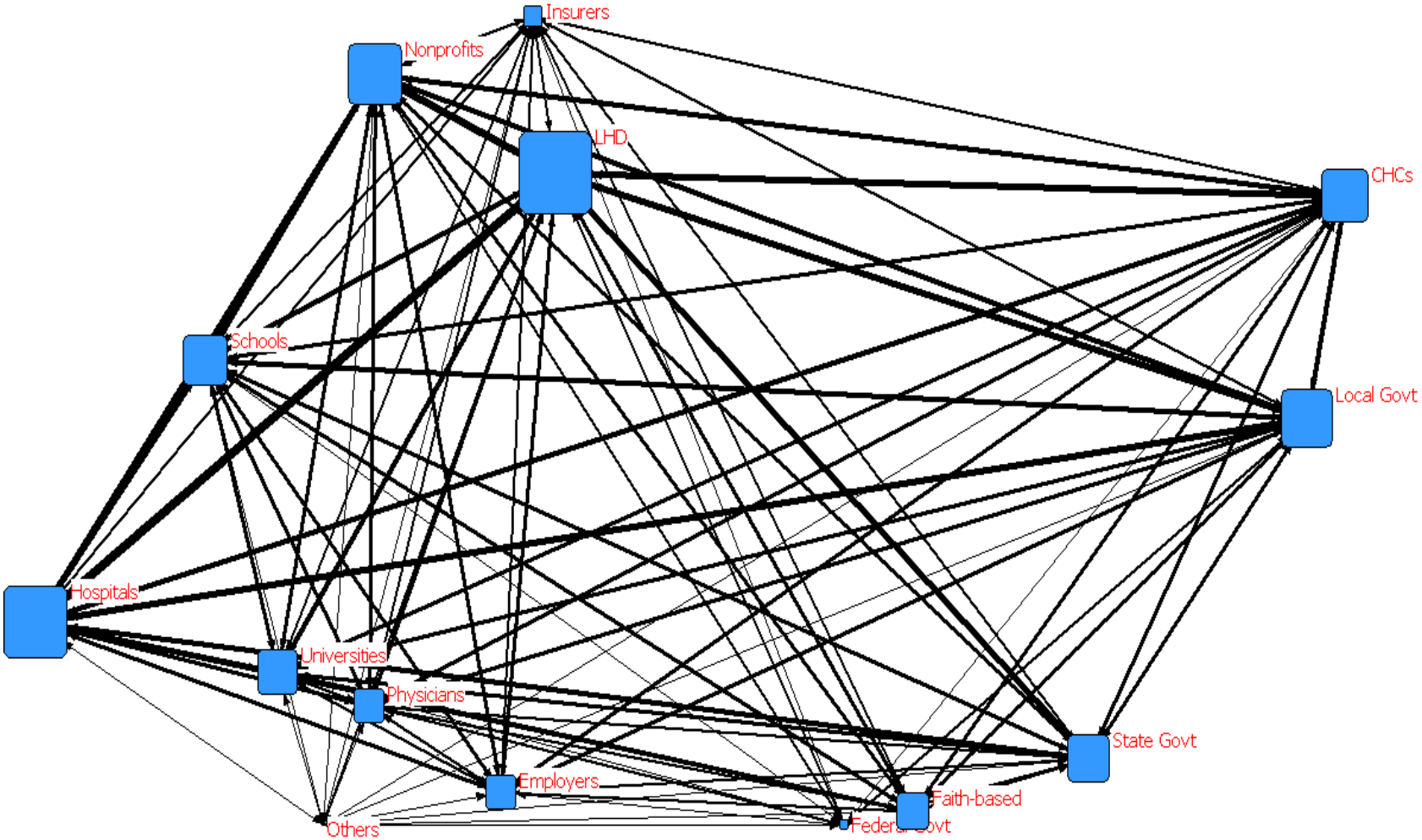
A useful lens for studying multi-sector work

National Longitudinal Survey of Public Health Systems

- Cohort of 360 communities with at least 100,000 residents
- Followed over time: 1998, 2006, 2012, 2014**, 2016
- Local public health officials report:
  - ***Scope***: availability of 20 recommended population health activities
  - ***Network***: organizations contributing to each activity
  - ***Centrality of effort***: contributed by governmental public health agency
  - ***Quality***: perceived effectiveness of each activity

** Expanded sample of 500 communities<100,000 added in 2014 wave

Mapping who contributes to population health

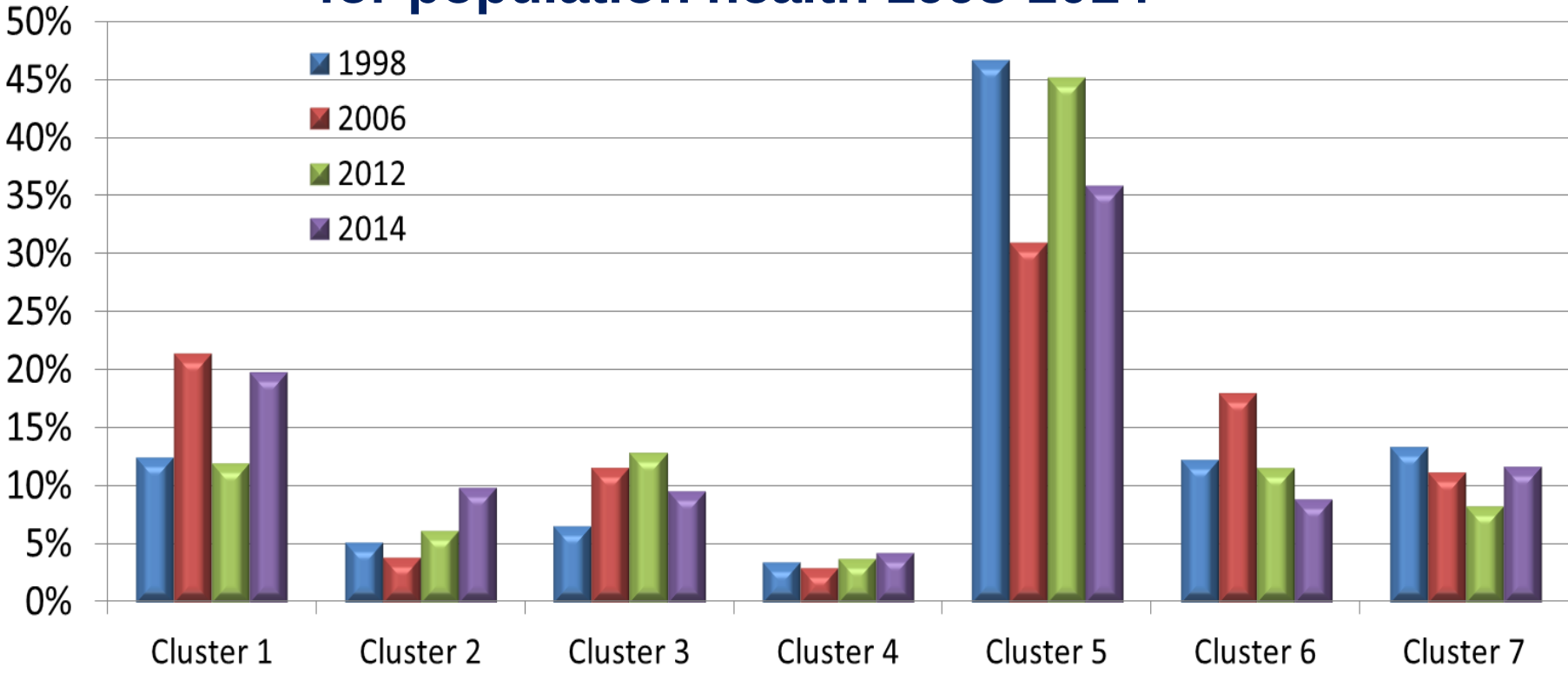


Node size = degree centrality

Line size = % activities jointly contributed (tie strength)

Mays GP et al. Understanding the organization of public health delivery systems: an empirical typology. *Milbank Q.* 2010;88(1):81–111.

Classifying multi-sector delivery systems for population health 1998-2014



	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Scope	High	High	High	Mod	Mod	Low	Low
Centrality	Mod	Low	High	High	Low	High	Low
Density	High	High	Mod	Mod	Mod	Low	Mod

Comprehensive
(High System Capital)

Conventional

Limited

Comprehensive Systems

One of RWJF's Culture of Health National Metrics

- ***Broad scope*** of population health activities
- ***Dense network*** of multi-sector relationships
- ***Central actors*** to coordinate actions

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

Data linkages expand analytic possibilities

- **Area Health Resource File**: health resources, demographics, socioeconomic status, insurance coverage
- **NACCHO Profile data**: public health agency institutional and financial characteristics
- **CMS Impact File & Cost Report**: hospital ownership, market share, uncompensated care
- **Dartmouth Atlas**: Area-level medical spending (Medicare)
- **CDC Compressed Mortality File**: Cause-specific death rates by county
- **Equality of Opportunity Project (Chetty)**: local estimates of life expectancy by income
- **National Health Interview Survey**: individual-level health
- **HCUP**: area-level hospital and ED use, readmissions

Chetty's data: life expectancy by income

- **Income data**: federal tax records for every filer for every year 1999-2014 (pre-tax household earnings): 1.4B person-years
- **Mortality data**: SSA death records: 6.8M deaths
- **Period life expectancy**: estimated conditional on income percentile at 40 years of age
- **Geography**: Life expectancy by income quartile estimated for counties (n>3000) and for commuting zones (n=741) by year

Estimating how population health delivery systems relate to life expectancy by income

- Panel regression estimation with fixed and random effects to account for repeated measures and clustering of public health jurisdictions within states
- Two-stage instrumental-variables model to estimate effect of system changes on life expectancy (residual inclusion method)

$$\text{Prob}(\text{System}_{ijt}=\text{Comprehensive}) = f(\text{Governance}, \text{Agency}, \text{Community})_{ijt} + \text{State}_j + \text{Year}_t$$

$$E(LE_{ijt}) = f(\text{System+resid}, \text{Agency}, \text{Community})_{ijt} + \text{State}_j + \text{Year}_t + \varepsilon_{ijt}$$

All models control for type of jurisdiction, population size and density, metropolitan area designation, income per capita, unemployment, poverty rate, racial composition, age distribution, physician and hospital availability, insurance coverage, and state and year fixed effects. **N=1019 community-years**

Implementation of population health activities, 1998-2014

	Activity	1998	2014	% Change
Assessment	1. Conduct periodic assessment of community health status and needs	71.5%	87.1%	21.8%
	2. Survey community for behavioral risk factors	45.8%	71.1%	55.2%
	3. Investigate adverse health events, outbreaks and hazards	98.6%	100.0%	1.4%
	4. Conduct laboratory testing to identify health hazards and risks	96.3%	96.1%	-0.2%
	5. Analyze data on community health status and health determinants	61.3%	72.7%	18.6%
	6. Analyze data on preventive services use	28.4%	39.0%	37.3%
Policy/Planning	7. Routinely provide community health information to elected officials	80.9%	84.0%	3.8%
	8. Routinely provide community health information to the public	75.4%	82.3%	9.1%
	9. Routinely provide community health information to the media	75.2%	89.0%	18.3%
	10. Prioritize community health needs	66.1%	83.6%	26.5%
	11. Engage community stakeholders in health improvement planning	41.5%	68.8%	65.7%
	12. Develop a community-wide health improvement plan	81.9%	87.9%	7.3%
	13. Identify and allocate resources based on community health plan	26.2%	41.9%	59.9%
	14. Develop policies to address priorities in community health plan	48.6%	56.8%	16.9%
	15. Maintain a communication network among health-related organizations	78.8%	85.3%	8.2%
Assurance	16. Link people to needed health and social services	75.6%	50.0%	-33.8%
	17. Implement legally mandated public health activities	91.4%	92.4%	1.1%
	18. Evaluate health programs and services in the community	34.7%	37.9%	9.4%
	19. Evaluate local public health agency capacity and performance	56.3%	56.1%	-0.3%
	20. Monitor and improve implementation of health programs and policies	47.3%	46.4%	-1.9%
	Mean performance of assessment activities (#1-6)	67.0%	77.7%	15.9%
	Mean performance of policy and planning activities (#7-15)	63.9%	75.5%	18.3%
	Mean performance of implementation and assurance activities (#16-20)	61.1%	56.6%	-7.3%
	Mean performance of all activities	63.8%	67.6%	6.0%

Organizational contributions to population health activities, 1998-2014

Type of Organization	% of Recommended Activities Implemented 1998	2014	Percent Change
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%

Changes in system prevalence and coverage

System Capital Measures	1998	2006	2012	2014
Comprehensive systems				
% of communities	**24.2%**	**36.9%**	**31.1%**	**39.5%**
% of population	**25.0%**	**50.8%**	**47.7%**	**47.2%**
Conventional systems				
% of communities	50.1%	33.9%	49.0%	40.2%
% of population	46.9%	25.8%	36.3%	32.5%
Limited systems				
% of communities	25.6%	29.2%	19.9%	20.3%
% of population	28.1%	23.4%	16.0%	19.6%

Mays GP, Hogg RA. Economic shocks and public health protections in US metropolitan areas. Am J Public Health. 2015;105 Suppl 2:S280-7.

Predictors of Comprehensive System Capital

Variable	Marginal Effect	S.E.	
Population size (10,000s)	0.033	0.009	***
Poverty rate (10%)	-0.033	0.016	**
Policy-making local BOH (0,1)	0.046	0.016	***
Centralized local health agency (0,1)	-0.087	0.036	**
Local control of health budget (0,1)	0.043	0.022	*
Local health tax/fee authority (0,1)	0.028	0.011	**

IVs

Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and year fixed effects. N=1019 community-years

Effects of Comprehensive System Capital on Life Expectancy

Variable	Coeff.	S.E.	
Single-equation estimates			
Bottom income quartile	2.36	1.21	
Top income quartile	-0.04	0.09	
Difference	-2.21	1.09	
IV Estimates			
Bottom income quartile	4.11	1.86	**
Top income quartile	0.85	0.48	
Difference	-3.02	1.44	**

Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and year fixed effects. N=1019 community-years

Some preliminary conclusions

- Post-recession progress in strengthening population health delivery systems
- Large potential reductions in preventable mortality over time (forthcoming)
- Multi-sector work in population health may also help to reduce disparities in life expectancy
- Inequities in population health activities are nontrivial

Ongoing work

- Robustness to alternative specifications
- Lagged and cumulative effects
- Trajectories of system strength over time
- Proximal outcomes
- Value-added of specific combinations of activities and organizations

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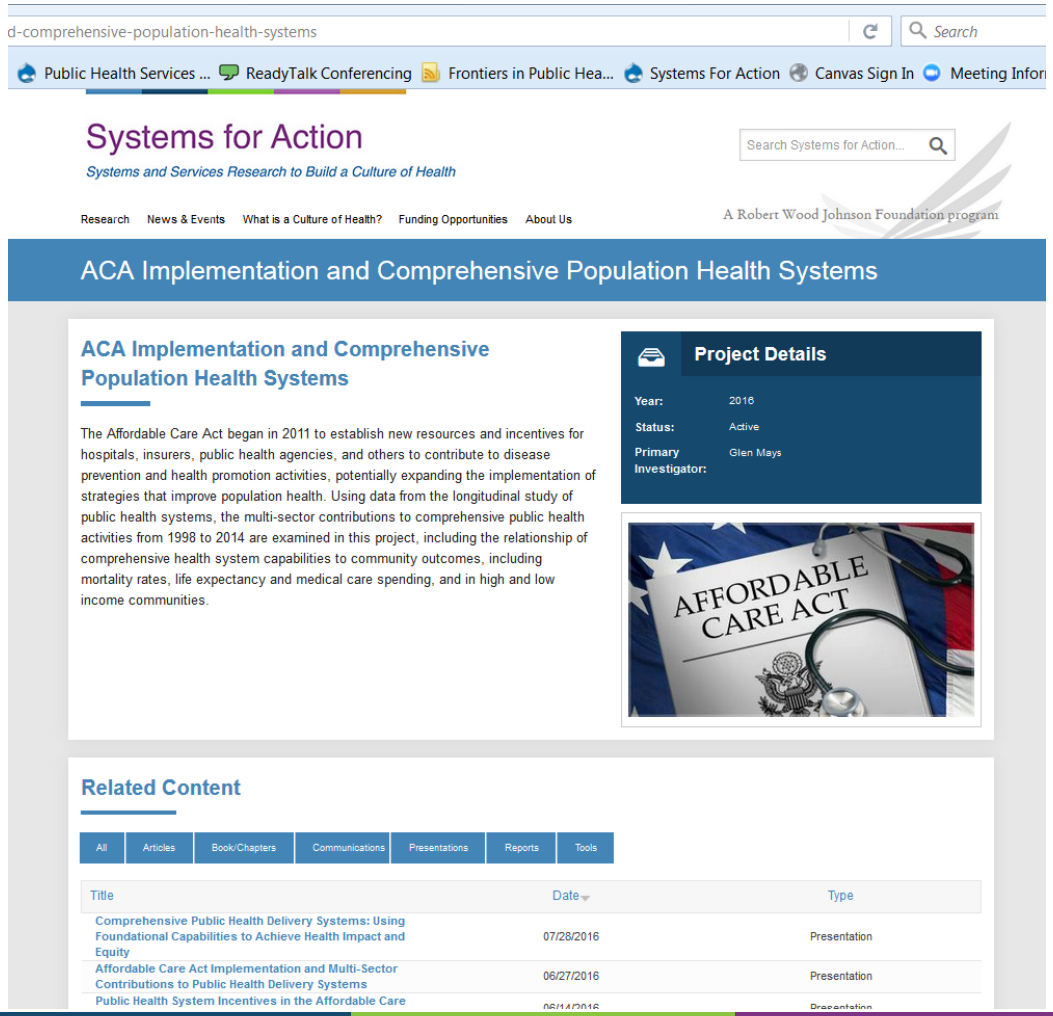
Project Updates

go to: http://systemsforaction.org/projects/aca-implementation-and-comprehensive-population-health-systems



Commentary

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Questions and Discussion

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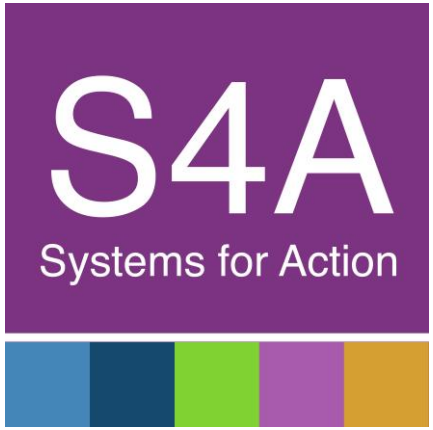
Upcoming Webinars: S4A Collaborating Research Centers
November 9, 2016, 12 pm ET **FINANCING AND SERVICE DELIVERY INTEGRATION FOR MENTAL ILLNESS AND SUBSTANCE ABUSE** ***William J. Riley, PhD**, School for Science of Health Care Delivery, and* ***Michael Shafer, PhD,** School of Criminology and Criminal Justice, Arizona State University*
November 16, 2016, 1 pm ET **THE COMPREHENSIVE CARE, COMMUNITY, AND CULTURE PROGRAM** ***David Meltzer, MD, PhD,** Director of the Center for Health and the Social Sciences, and* ***Harold Pollack, PhD,** School of Social Service Administration, and Co-Director of The University of Chicago Crime Lab, The University of Chicago*
December 7, 2016, 12 pm ET **IMPROVING POPULATION AND CLINICAL HEALTH WITH INTEGRATED SERVICES AND DECISION SUPPORT** ***Paul K. Halverson, DrPH,** Dean, and **Joshua R. Vest, PhD**, Associate Professor, Health Policy and Management, Indiana University Richard M. Fairbanks School of Public Health in Indianapolis*

Thank you for participating in today's webinar!



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Speaker Bios

Dr. Mays directs the Systems for Action National Coordinating Center, and is the Scutchfield Endowed Professor of Health Services & Systems Research at the University of Kentucky College of Public Health. He also serves as director of the Center for Public Health Systems and Services Research within the College of Public Health, and associate director of the Center for Health Services Research within the College of Medicine. Dr. Mays' research focuses on strategies for organizing and financing public health services, preventive care, and care management systems for underserved and high-risk populations. A graduate of Brown University, Dr. Mays earned Ph.D. and M.P.H. degrees in health policy and administration from the University of North Carolina-Chapel Hill, and completed a postdoctoral fellowship in health economics at Harvard Medical School. Prior to joining Kentucky, he chaired the Department of Health Policy and Management at the University of Arkansas for Medical Sciences for eight years and served on the inaugural faculty of the Clinton School for Public Service.

Dr. Ziliak is co-investigator at the Systems for Action National Program Office. Dr. Ziliak also holds the Carol Martin Gatton Endowed Chair in Microeconomics in the Department of Economics, and is Founding Director of the Center for Poverty Research at the University of Kentucky. He served as assistant and associate professor of economics at the University of Oregon from 1993-2002, and has held visiting positions at the Brookings Institution, University College London, University of Michigan, and University of Wisconsin. During the 2015-2016 academic year he was Visiting Scholar at the Russell Sage Foundation and Visiting Professor at University College London. His research expertise is in the area of labor economics, with particular emphasis on U.S. poverty, food insecurity, and tax and transfer policy. Recent projects include trends in earnings and income volatility; the origins of persistently poor regions in America; the causes and consequences of food insecurity; and the effect of survey nonresponse on the level and trends in poverty and inequality.