



# Comprehensive Population Health Systems & Hospital Uncompensated Care Costs

*Research In Progress Webinar*

*Wednesday, August 23, 2017*

*12:00-1:00pm ET/ 9:00am-10:00am PT*

*Funded by the Robert Wood Johnson Foundation*

# Agenda

## Comprehensive Population Health Systems & Hospital Uncompensated Care Costs

**Welcome:** **Rick Ingram, DrPH**, Assistant Professor, University of Kentucky College of Public Health

**Presenter:** **C.B. Mamaril, PhD, MS**, Research Assistant Professor, University of Kentucky College of Public Health [cbmamaril@uky.edu](mailto:cbmamaril@uky.edu)

**Commentary:** **Michael A. Stoto, PhD**, Professor of Health Systems Administration and Population Health, Georgetown University [mike.stoto@gmail.com](mailto:mike.stoto@gmail.com)

## Questions and Discussion

# Presenter



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# Comprehensive Population Health Systems and Hospital Uncompensated Care Costs

C.B. Mamaril

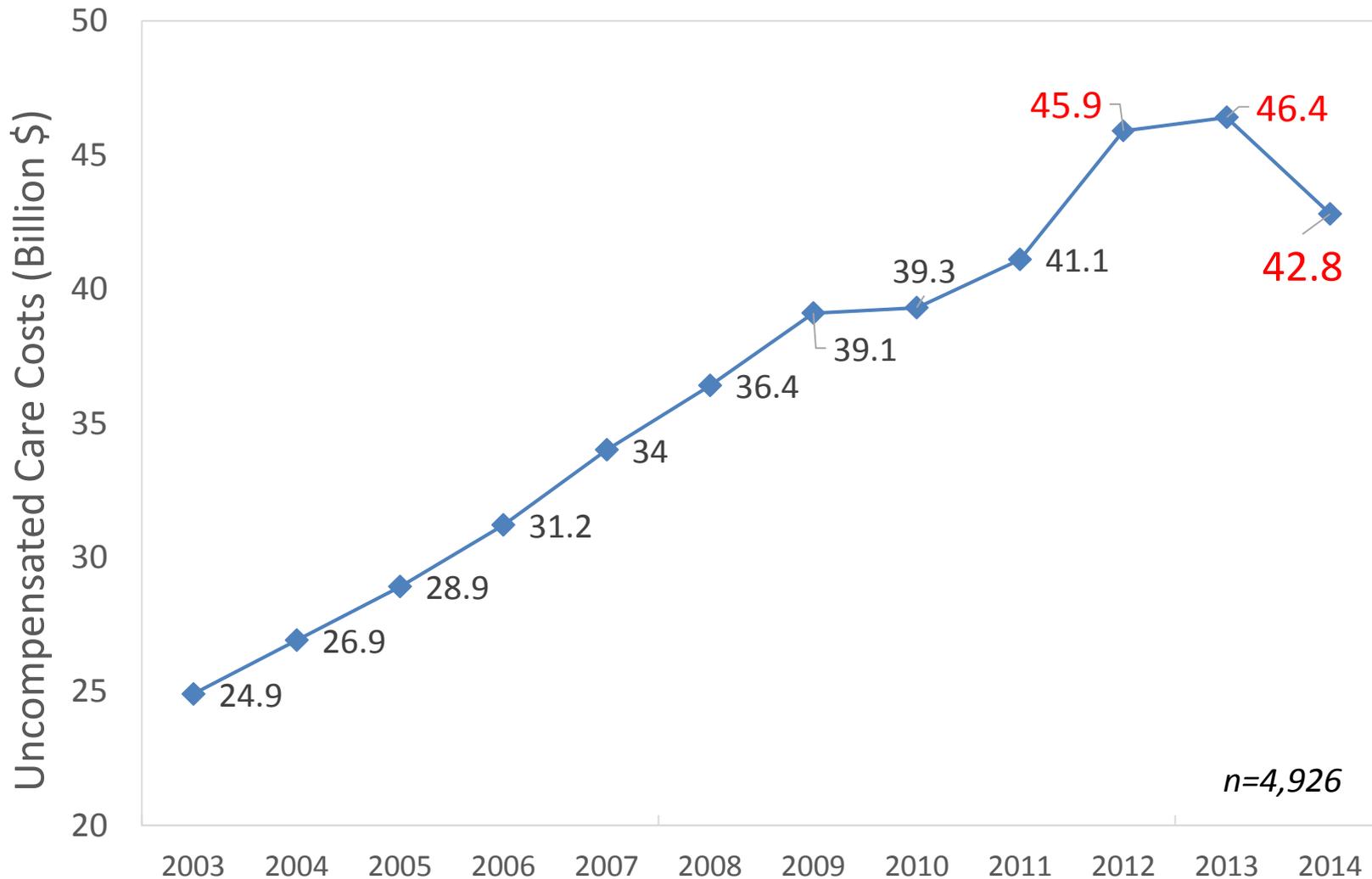
Systems for Action National Program Office  
University of Kentucky College of Public Health

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- Robert Wood Johnson Foundation
- S4A Intramural Research Team  
Nurlan Kussainov, John Poe, Dominique Zephyr  
Other contributors to NLSPHS related research:  
Rachel Hogg-Graham, Lava Timsina, Rick Ingram

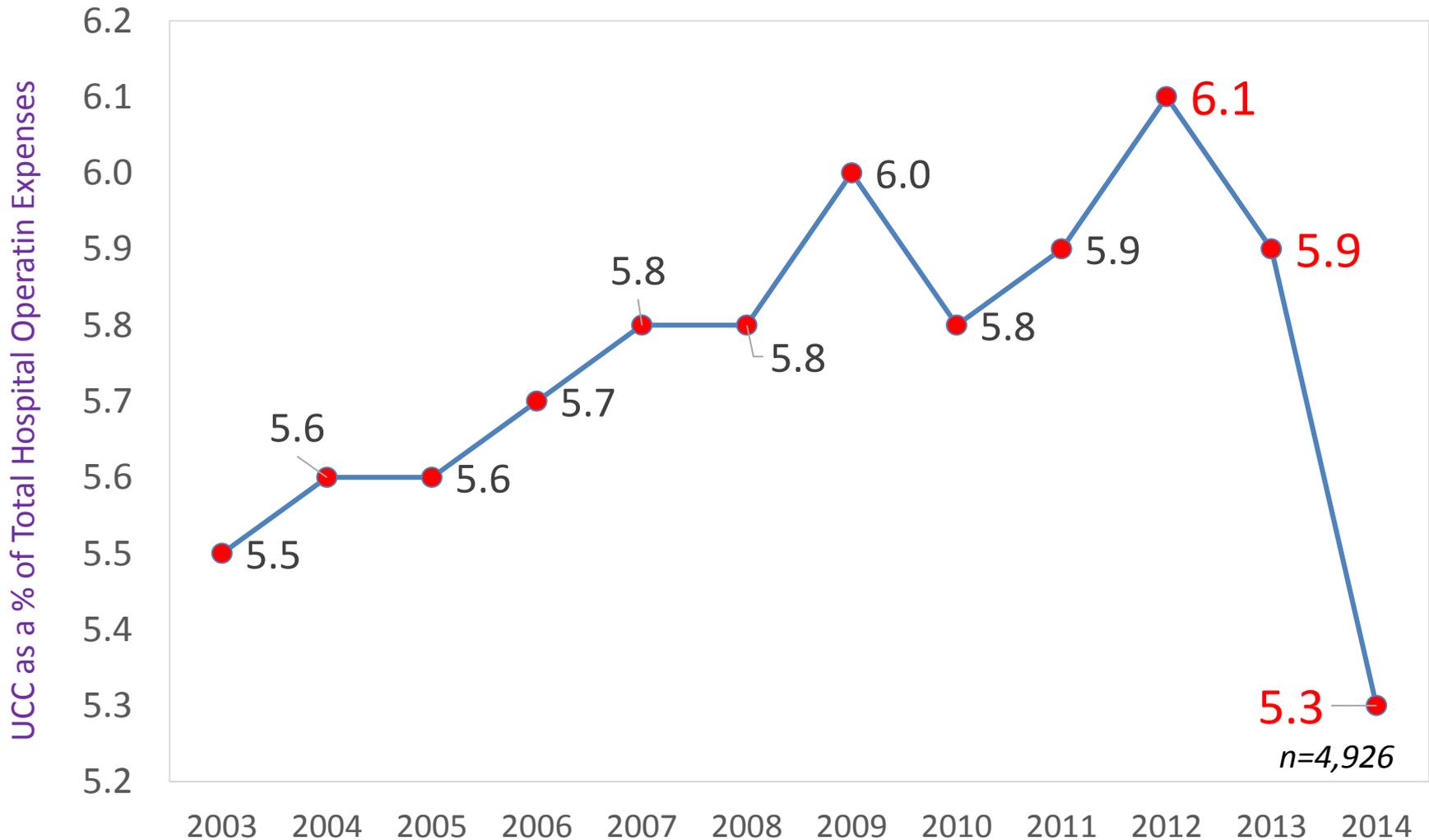
- Uncompensated care (UCC) - overall measure of hospital care provided for which no payment was received from patient or insurer. Sum of hospital's bad debt and charity care.
- Cumulatively since 2000, total UCC estimated at more than \$502 billion. From 1990-2013, average annual increase of 6% (AHA stats). ACA passed to reduce UCC burden due to the uninsured.
- Since ACA / Medicaid expansion has resulted in lowering UCC burden – In Ct (Nikpay et al 2015) & nationally (Dranove et al 2016).
- Non-for-profit hospitals (NFPs) spend more on charity care than For-Profits (Valdovinos et al 2015).
  - Apart charity-care costs, NFPs spend ~ 7.5% of operating budget on community benefit expenditures: of which, >85% goes to patient recipients/clinical services, ~ 8% towards community benefits such *community-building (CBA)* & *health improvement (CHI)* activities (e.g. immunization campaigns, breast cancer screening, etc.), ~7% to support health research, education activities (Singh et al 2016; IRS data).
  - Singh et al 2016 estimates that these community benefit expenditures represent an additional 9 percent in financial resources made available to the PH System.

# General Trends: Total Uncompensated Care Costs



Source: American Hospital Association (AHA) 2016

# General Trends: Uncompensated Care Costs as a percentage of Hospital Operating Expenses



- Past studies have examined impact on hospital UCC from policies related to hospital specific factors (e.g. payment, reimbursement policies, management processes, etc.) and patient and population insurance status (e.g. Healthcare Financial Management Association; Dranove et al 2016; Nikpay et al 2015).
- Issues with defining, measuring, & reporting uncompensated care especially dealing with bad debt and charity care.
  - e.g. Changes made to CMS 2552-10 Worksheet S-10 to identify and distinguish between bad debt and charity care, and also distinguishes charity care provided to insured and uninsured patients.
- NFP charity care policies including community benefits as a source of investing in improving population health outcomes (e.g. Singh et al 2016; Valdovino et al 2015).

- ❑ Evidence of positive relationship between public health spending and improved population health outcomes (e.g. Mays and Smith 2010, McCullough and Lieder 2016)
- ❑ Beyond public health spending levels, characterize the degree of public health system capital as a function of the extent and effectiveness of multi-organizational alliances and cross-sectoral engagement in providing and supporting population health activities.
  - High system capital (i.e. comprehensive public health systems) associated with a decline in community mortality rates over time (Mays et al 2016).
- ❑ Could more public health system capital offset hospital uncompensated care? Would we see lower UCC for hospitals in communities with comprehensive public health systems?

- ❑ Comprehensive Public Health Systems (CPHS) derived from the **National Longitudinal Survey of Public Health Systems (NLSPHS)**
- ❑ The NLSPHS has followed a cohort of some 360 communities with at least 100,000 residents
- ❑ Followed over time: 1998, 2006, 2012, 2014\*\*, 2016\*\*

Note: \*\* Expanded sample of 500 communities <100,000 added in 2014 wave & continued in succeeding waves

- ❑ Local public health officials report:
  - ❖ **Scope:** availability of 20 recommended population health activities based on Institute of Medicine's core functions of assessment, policy development, and assurance.
  - ❖ **Network:** organizations contributing to each activity
  - ❖ **Centrality of effort:** contributed by governmental public health agency
  - ❖ **Quality:** perceived effectiveness of each activity

# Implementation of population health activities, 1998-2016

	<b>Activity</b>	<b>1998</b>	<b>2016</b>	<b>% Change</b>
<b>Assessment</b>	1. Conduct periodic assessment of community health status and needs	71.5%	89.2%	24.8%
	2. Survey community for behavioral risk factors	45.8%	70.2%	53.3%
	3. Investigate adverse health events, outbreaks and hazards	98.6%	99.7%	1.1%
	4. Conduct laboratory testing to identify health hazards and risks	96.3%	96.4%	0.1%
	5. Analyze data on community health status and health determinants	61.3%	75.8%	23.7%
	6. Analyze data on preventive services use	28.4%	36.7%	29.2%
<b>Policy/Planning</b>	7. Routinely provide community health information to elected officials	80.9%	86.6%	7.0%
	8. Routinely provide community health information to the public	75.4%	83.7%	11.0%
	9. Routinely provide community health information to the media	75.2%	86.5%	15.0%
	10. Prioritize community health needs	66.1%	83.4%	26.2%
	11. Engage community stakeholders in health improvement planning	41.5%	65.8%	58.6%
	12. Develop a community-wide health improvement plan	81.9%	84.9%	3.7%
	13. Identify and allocate resources based on community health plan	26.2%	47.1%	79.8%
	14. Develop policies to address priorities in community health plan	48.6%	65.6%	35.0%
	15. Maintain a communication network among health-related organizations	78.8%	84.0%	6.6%
<b>Assurance</b>	16. Link people to needed health and social services	75.6%	50.0%	-33.9%
	17. Implement legally mandated public health activities	91.4%	92.7%	1.4%
	18. Evaluate health programs and services in the community	34.7%	41.7%	20.2%
	19. Evaluate local public health agency capacity and performance	56.3%	53.0%	-5.9%
	20. Monitor and improve implementation of health programs and policies	47.3%	52.9%	11.8%
	Mean performance of assessment activities (#1-6)	67.0%	78.0%	16.4%
	Mean performance of policy and planning activities (#7-15)	63.8%	76.4%	19.7%
	Mean performance of implementation and assurance activities (#16-20)	61.1%	58.1%	-4.9%
	Mean performance of all activities	64.1%	72.3%	12.8%

**Area Health Resource File:** health resources, demographics, socioeconomic status, insurance coverage

**NACCHO Profile data:** public health agency institutional and financial characteristics

**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

**CMS Impact File & Cost Report:** hospital ownership, market share, uncompensated care

# Comprehensive Public Health Systems

One of RWJF's Culture of Health National Metrics

- ❖ **Broad scope** of population health activities
- ❖ **Dense network** of multi-sector relationships of contributing organizations
- ❖ **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%

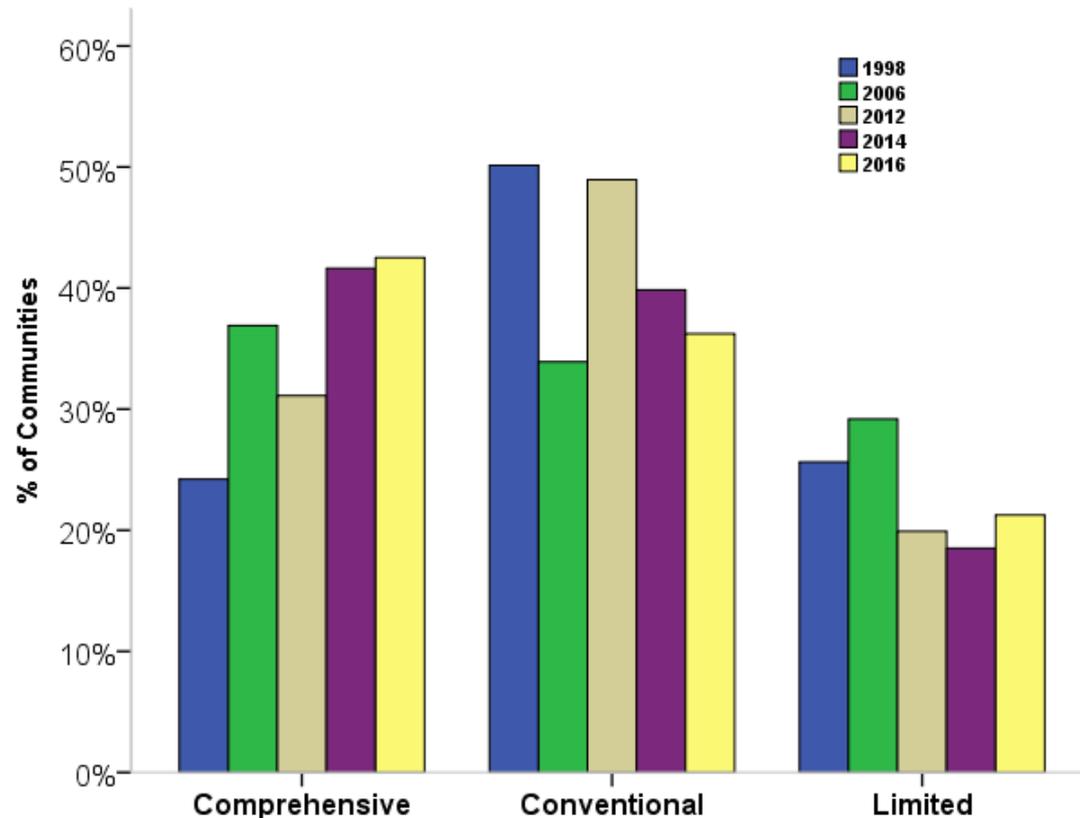
of population served by a  
comprehensive public  
health system

## Type of system

- **Comprehensive system capital**
  - A broad scope of recommended population health activities (>75%) supported through dense networks of contributing organizations and sectors
- **Conventional system capital**
  - A moderate scope of recommended population health activities (50%-75%) implemented through lower-density networks of contributing organizations and sectors
- **Limited system capital**
  - A narrow scope of recommended population health activities (<50%) implemented through lower-density networks of contributing organizations and sectors

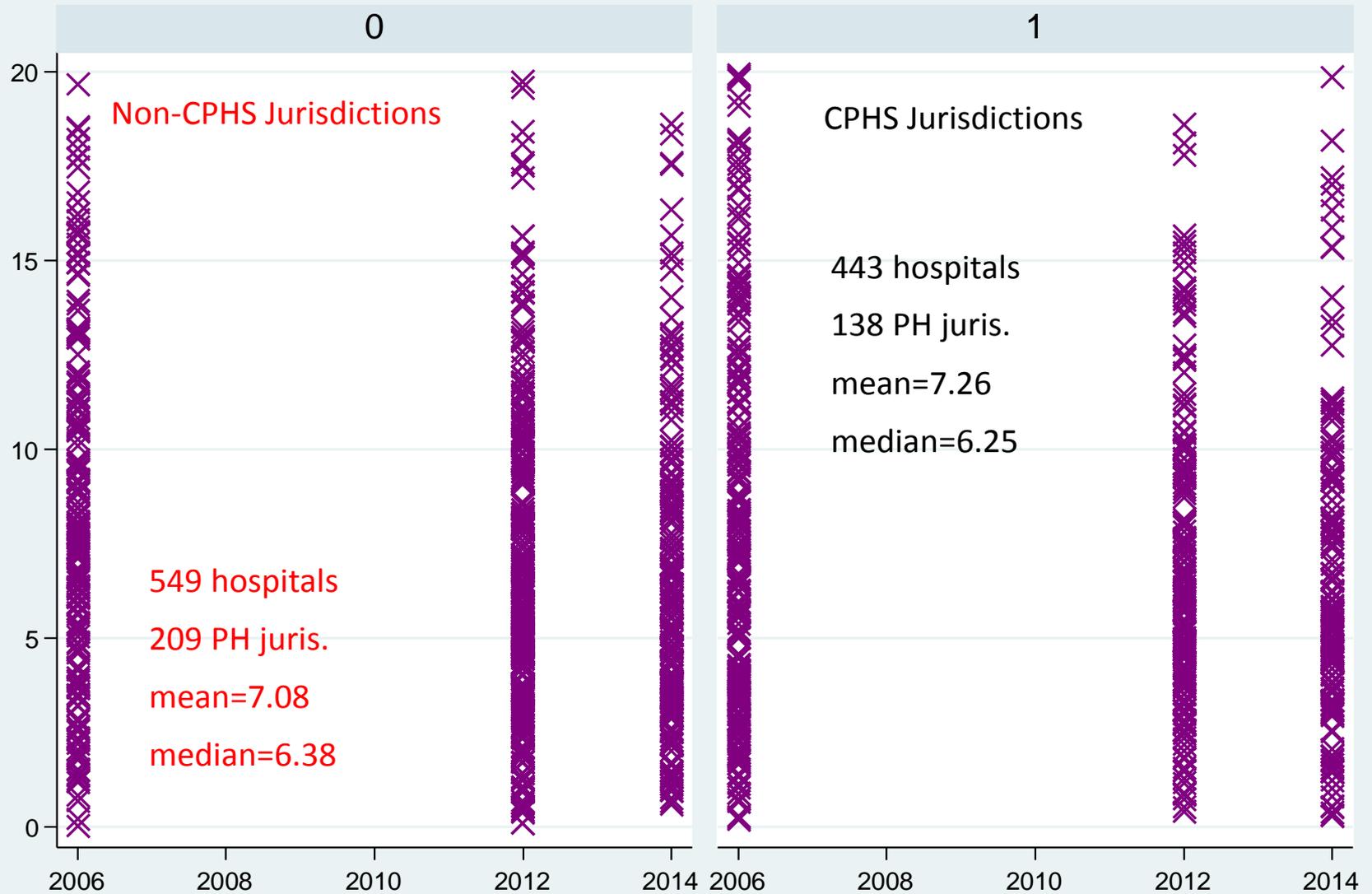
# Variation in Public Health System Configurations Over Time

Systems frequently migrated from one configuration to another over time, with an overall trend toward offering a broader scope of services and engaging a wider range of organizations (Mays et al. 2016).



- ❑ Link NLSPHS with CMS Cost Reports and Impact files (2006, 2012, & 2014)
  - Healthcare Cost Report Information System (HCRIS) Hospital Cost Report (CMS-2552-96 and CMS- 2552-10), IPPS Final Rule Data Files
- ❑ Dependent variable: uncompensated care costs (Worksheet S-10) as a percentage of total operating costs (Worksheet G3)
- ❑ Explanatory variable of interest: whether PH jurisdiction where hospital is located in is characterized as having a Comprehensive Population Health System (cphs=1).
  - Hospital related controls: operating margin, disproportionate share payments, case-mix index, bed-days available.
  - Control for PH jurisdiction characteristics: population size and density, income per capita, unemployment, poverty rate, racial composition, age distribution, and percent uninsured.
- ❑ Panel regression estimation with fixed effects to account for repeated measures and clustering of public health jurisdictions and hospitals within states; year fixed effects.

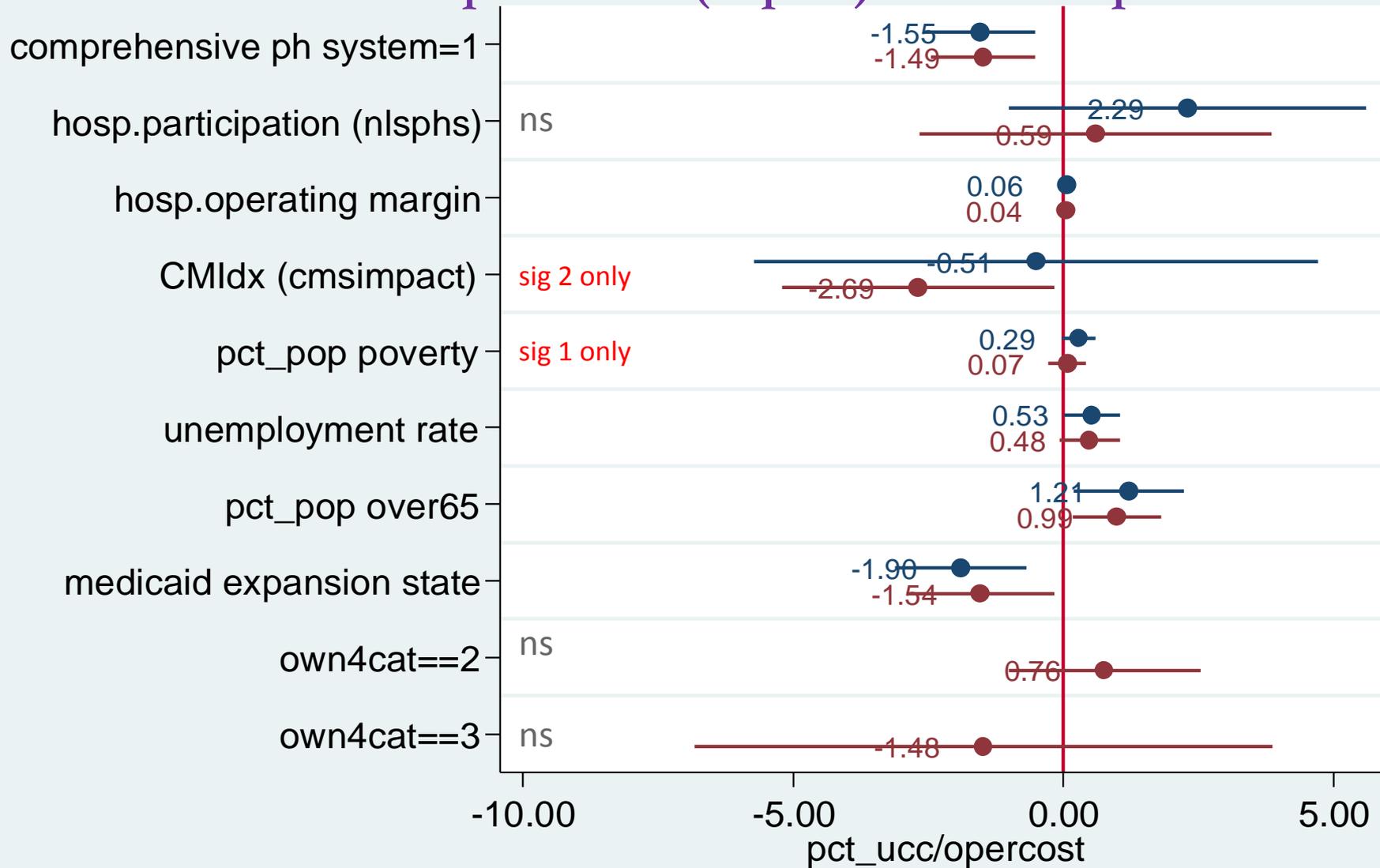
# Study Sample: Hospitals in Non-CPHS vs. CPHS Jurisdictions



Study sample comprised of 871 unique GAC/CAH & 284 PH Jurisdictions

Note: Comprehensive PH System=1

# Prelim. Results: Hospital UCC (depvar) relationship with CPHS



Plot of FE coefficients Model 1 (nfp only; n=609) & Model 2 (all ownership types; n=871)

● NFP only ● all ownership types

- ❑ On average, holding all other variables constant, results suggest UCC (% total operating costs) for NFP hospitals in jurisdictions w/ CPHS (i.e.  $cphs=1$ ) was around **1.6 percentage points** lower than for NFPs in non-CPHS communities (i.e.  $cphs=0$ ). Holding operating costs constant, this roughly translates to a difference of at least \$3 million in uncompensated care costs in our sample.
  - Other significant variables associated with UCC include Medicaid expansion (neg.) & PH Jurisdiction characteristics (pos.) for rate of poverty, unemployment & uninsured)
- ❑ Results lend evidence for continued support of hospital involvement in population health activities (e.g. hospital community benefits via CBAs and CHIs) as an indirect mechanism for managing UCCs.
- ❑ Policy implications for considering population health system capital within continuing ACA context:
  - E.g., future reductions & redistribution of allotted Medicare DSH dollars available for hospitals due to lower rates of uninsured, and CMS using data from Worksheet S-10 (Mulvany 2016). DSH dollars are a critical source of funding for charity care cases.

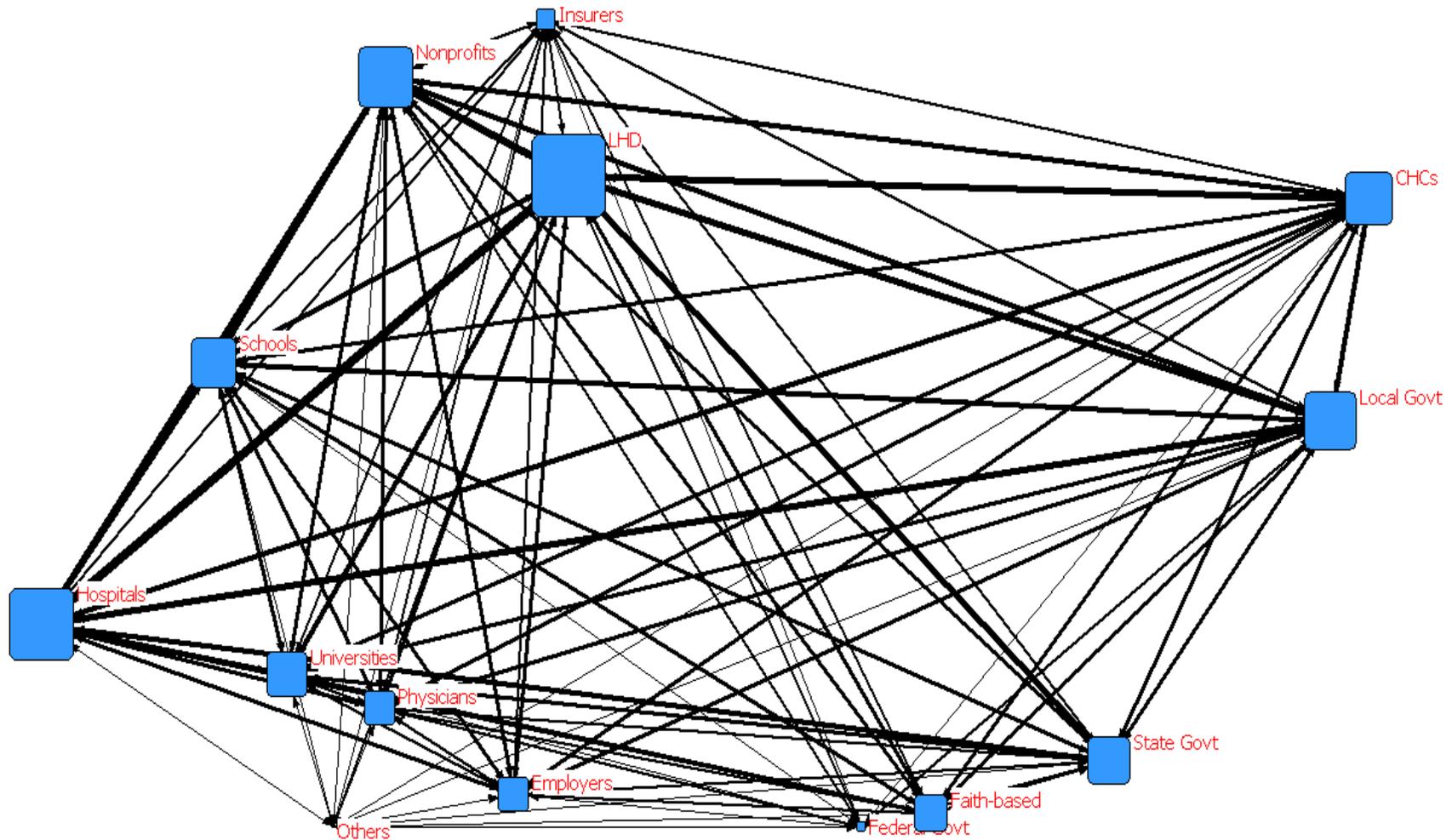
- ❑ Preliminary analytical sample limited to public health jurisdictions in metropolitan areas with a population >100,000. Expand to include Rural/Non-Metro jurisdictions.
- ❑ Robustness to alternative specifications.
- ❑ Further examination of other relevant hospital related variables such as ownership type (NFPs vs. private vs. government), rural hospitals, teaching hospitals, hospital market share.
- ❑ Delineate analysis between hospital bad debt and charity care costs.

# Organizational Contribution to Population Health Activities

% of Recommended Activities Implemented

TYPE OF ORGANIZATION	1998	2016	Percent Change
Local health department	37.6%	41.2%	9.6%
Other local government agencies	31.8%	34.0%	6.9%
State public health agencies	46.0%	32.6%	-29.1%
Other state government agencies	17.2%	11.3%	-34.3%
Federal government agencies	7.0%	6.9%	-0.9%
<b>HOSPITALS</b>	<b>37.3%</b>	<b>47.1%</b>	<b>26.2%</b>
Physician practices	20.2%	18.1%	-10.2%
Community health centers	12.4%	31.1%	151.9%
Health insurers	8.6%	12.0%	39.9%
Employers/business groups	25.5%	15.2%	-40.7%
Schools (K-12)	30.7%	24.7%	-19.5%
Colleges / universities	15.6%	23.0%	47.3%
Faith-based organizations	24.0%	16.2%	-32.5%
Other nonprofits	36.4%	34.3%	-5.7%
Other	8.5%	6.1%	-28.8%

# 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. For more on hospital contributions to the PH System, see also Hogg et. al (2015)

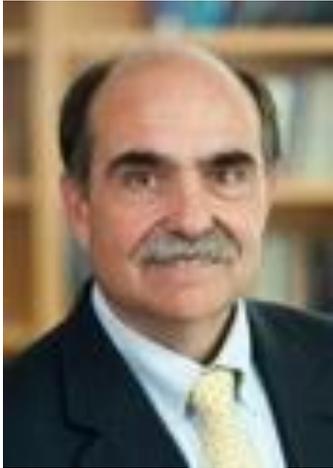
# Hospital Participation in 19 Core Population Health Activities

S4A

BY ACTIVITY		1998	2016	Percent Change
<b>Assessment activities</b>				
1	Conduct periodic assessment of community health status and needs	58.2%	84.0%	44.2%
2	Survey community for behavioral risk factors	22.1%	28.4%	28.3%
3	Investigate adverse health events, outbreaks and hazards	56.3%	63.6%	13.0%
4	Conduct laboratory testing to identify health hazards and risks	49.0%	49.5%	1.1%
5	Analyze data on community health status and health determinants	46.7%	62.1%	33.0%
6	Analyze data on preventive services use	13.5%	23.9%	77.2%
<b>Policy and planning activities</b>				
7	Routinely provide community health information to elected officials	26.8%	39.8%	48.4%
8	Routinely provide community health information to the public	48.9%	58.9%	20.6%
9	Routinely provide community health information to the media	33.0%	57.2%	73.2%
10	Prioritize community health needs	49.6%	75.2%	51.8%
11	Engage community stakeholders in health improvement planning	60.7%	71.9%	18.4%
12	Develop a community-wide health improvement plan	34.7%	59.0%	70.3%
13	Identify and allocate resources based on community health plan	16.2%	32.4%	99.7%
14	Develop policies to address priorities in community health plan	35.3%	47.6%	34.6%
15	Maintain a communication network among health-related organizations	66.5%	70.9%	6.7%
<b>Implementation and Assurance activities</b>				
16	Link people to needed health and social services	57.8%	35.5%	-38.6%
17	Implement legally mandated public health activities	13.8%	17.3%	25.6%
18	Evaluate health programs and services in the community	3.4%	13.0%	276.7%
19	Evaluate local public health agency capacity and performance	11.5%	14.1%	22.4%
Mean participation in <b>Assessment</b> activities (#1-6)		40.8%	51.9%	27.1%
Mean participation in <b>Policy and planning</b> activities (#7-15)		42.1%	56.8%	34.7%
Mean participation in <b>Implementation and Assurance</b> activities (#16-20)		28.9%	32.7%	13.1%
<b>HOSPITAL Mean participation in all activities</b>		<b>37.3%</b>	<b>47.1%</b>	<b>26.2%</b>

- Does uncompensated care cost “crowd out” hospital contributions to the population health system?
  - Past studies have examined relationship between changes in charity care costs or savings and hospital community benefit expenditures (as listed by NFPs in their IRS Form 990 Schedule H).
  - NLSPHS measures of hospital participation from the perspective of PH System
- For this part of the analysis focused at the PH system level, we linked 2006, 2012, 2014, & 2016 NLSPHS with data from CMS Cost Reports and Impact file and aggregated up to the hospital service area (HSA). Analytical datafile contains 825 PH jurisdictions matched with 1,025 HSAs.
  - Some of the outcomes variables of interest, include: Total hospital contributions to the PH System; Degree Centrality of hospitals (SNA); Betweenness (SNA), and Total availability of Core PH activities.
  - Exposure variable: Aggregate measures of uncompensated care costs that account for overlapping PH jurisdictions with multiple HSAs.
- Preliminary empirical evidence suggest higher uncompensated care costs are associated with lower hospital participation in the PH system.

# Commentary



## **Michael A. Stoto, PhD**

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# Questions and Discussion

# Webinar Archives

<http://systemsforaction.org/research-progress-webinars>

## Upcoming Webinars

Wednesday, September 6, 12-1pm ET/ 9-10am PT

### **INTERORGANIZATIONAL RELATIONSHIPS AND PUBLIC HEALTH SYSTEM EFFORTS TO ADDRESS PRESCRIPTION DRUG ABUSE**

*Lainie Rutkow, JD, PhD MPH and Katherine Smith, PhD, Johns Hopkins Bloomberg School of Public Health*

Thursday, September 14, 12-1pm ET/ 10-11am MT

### **AFIX: A MULTI-STATE RANDOMIZED CONTROL TRIAL TO INCREASE ADOLESCENT HPV IMMUNIZATION THROUGH PROVIDER BEST PRACTICES**

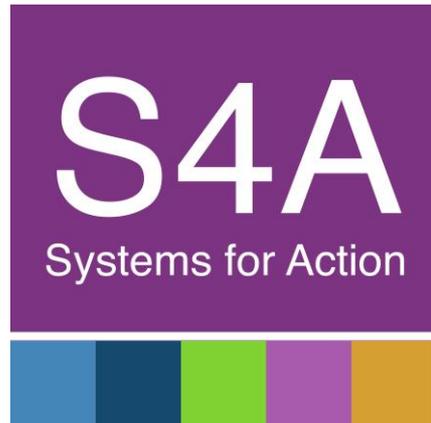
*Melissa B. Gilkey, PhD, MPH, Harvard College of Medicine, and Jennifer MacKinnon, University of North Carolina Gillings School of Global Public Health*

Wednesday, October 18, 12-1pm ET/ 9-10am PT

### **FINANCING AND SERVICE DELIVERY INTEGRATION FOR MENTAL ILLNESS & SUBSTANCE ABUSE**

*William Riley, PhD, College of Health Solutions, and Michael Shafer, PhD, College of Public Service and Community Solutions, Arizona State University*

Thank you for participating in today's webinar!



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*For more information about the webinars, contact:*

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# Speaker Bios

**C.B. Mamaril, PhD**, is a research scientist at the RWJF Systems for Action National Coordinating Center and a research faculty member at the University of Kentucky College of Public Health. His research focuses on public health systems financing and economics. Dr. Mamaril received his PhD in Public Policy and Administration from the University of Kentucky Martin School, and holds an MS degree in Agricultural and Applied Economics from VirginiaTech.

**Michael A. Stoto, PhD**, a Professor of Health Systems Administration and Population Health at Georgetown University, is a statistician, epidemiologist, and health services researcher. He also holds adjunct faculty appointments in the Department of Family Medicine, the Georgetown University Law Center, and the McCourt School of Public Policy. Dr. Stoto's research includes methodological topics in epidemiology and statistics including systematic reviews/meta-analysis and other analytical methods for comparative effectiveness research, community health assessment, evaluation methods, and performance measurement. His substantive research interests include public health practice, especially with regard to emergency preparedness; drug and vaccine safety; infectious disease policy; and ethical issues in research and public health practice.

Dr. Stoto is an expert on population health and public health assessment, and the associate director of the population health scholars program in the Georgetown University School of Medicine. His work in this area has included systems-oriented evaluations of public health surveillance systems at the local to global level, addressing both statistical methods and public health practice issues. Dr. Stoto currently leads a project to evaluate the impact of new federal requirements that non-profit hospitals conduct CHNAs. Dr. Stoto is also an expert in public health systems research (PHSR), focusing on applying and developing rigorous mixed-methods approaches to studying and evaluating federal, state, and local public health systems. Much of his PHSR focused on public health emergency preparedness, and he was the co-Principal Investigator of the CDC-funded Preparedness and Emergency Response Research Center based at the Harvard School of Public Health.