



Hospital Investment and Interaction in Public Health Systems

Research In Progress Webinar

Thursday, August 10, 2017

1:00-2:00pm ET/ 11:00am-12:00pm

Funded by the Robert Wood Johnson Foundation



**College of
Public Health**

*Center for Public Health Systems
and Services Research*

Agenda

Hospital Investment and Interaction in Public Health Systems

Welcome: **Anna G. Hoover, PhD**, S4A National Coordinating Center, Assistant Professor, U. of Kentucky College of Public Health

Presenters: **Danielle Varda, PhD**, Associate Professor, and [Center on Network Science](#) Director, School of Public Affairs danielle.varda@ucdenver.edu and **Adam J. Atherly, PhD**, Professor, Colorado School of Public Health adam.atherly@ucdenver.edu, University of Colorado Denver

Commentary: **Simone Rauscher Singh, PhD**, Assistant Professor, University of Michigan School of Public Health singhsim@umich.edu; and **Kevin Barnett, DrPH, MCP**, Senior Investigator, [Public Health Institute](#), California kevinpb@pacbell.net

Questions and Discussion

Presenters



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Hospital Investment and Interactions in Public Health Systems

Adam Atherly, Colorado School of Public Health
Danielle Varda, University of Colorado Denver
Rachel Hogg Graham, University of Kentucky
Lisa VanRaemdonck, Colorado Association of Local Public Health Officials
Gregory Tung, Colorado School of Public Health

Colorado School of
PUBLIC HEALTH

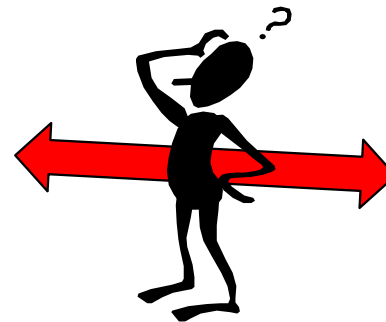


Acknowledgements

- Research support provided by:
 - Robert Wood Johnson Foundation Public Health Services and Systems Research PHS₄ Award

Background:

- Growing number of national initiatives that call for greater integration of public health and hospital systems
 - IRS requirements for nonprofit hospitals
 - Public Health Accreditation
 - Accountable Care Organizations, Patient-Centered Medical Homes



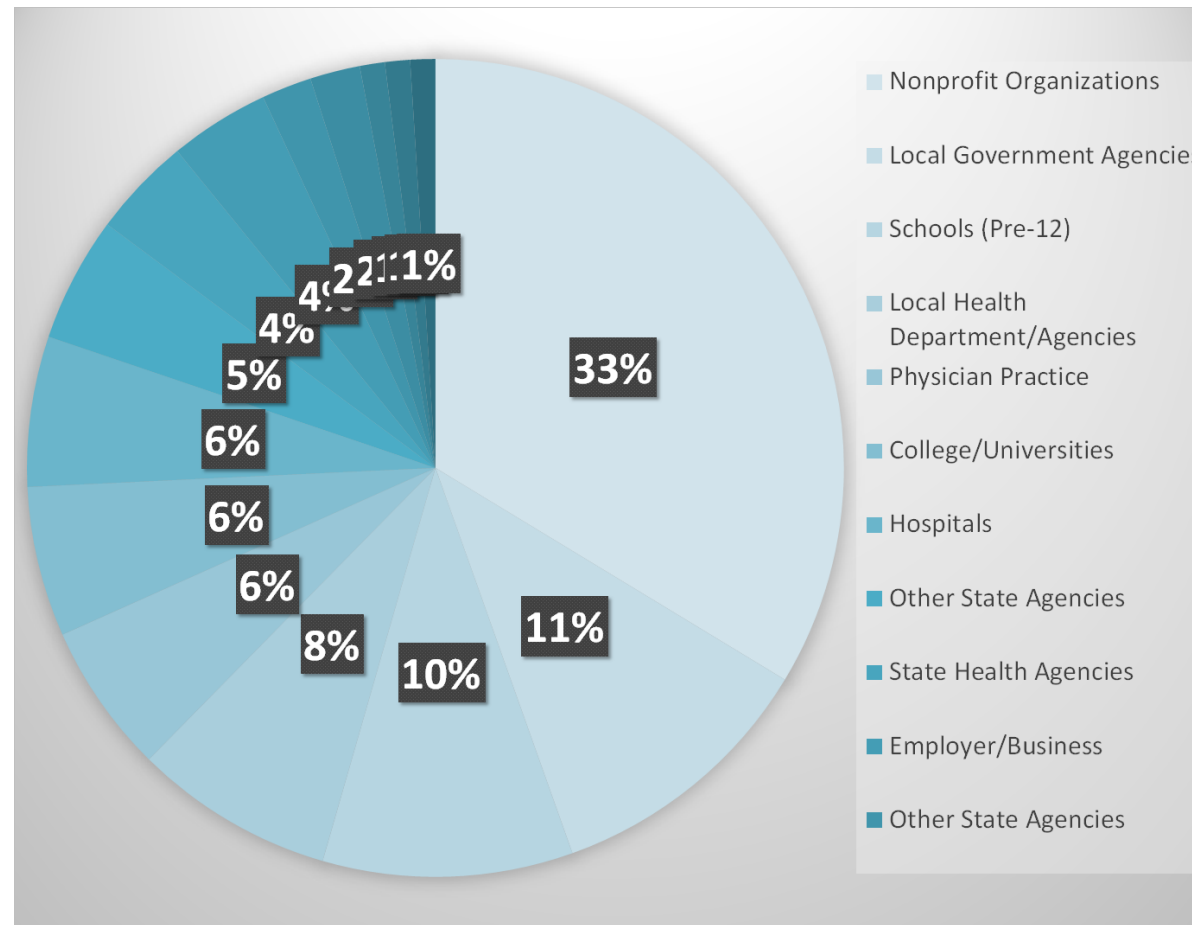
Background

We expect that these changes have resulted in:

- ↑ Increased Investment by Hospitals in PH Systems (e.g. Community Benefits Spending)
- ↑ Increased Involvement/Interaction by Hospitals in PH Systems (e.g. Community Health Needs Assessments and Improvement Plan)

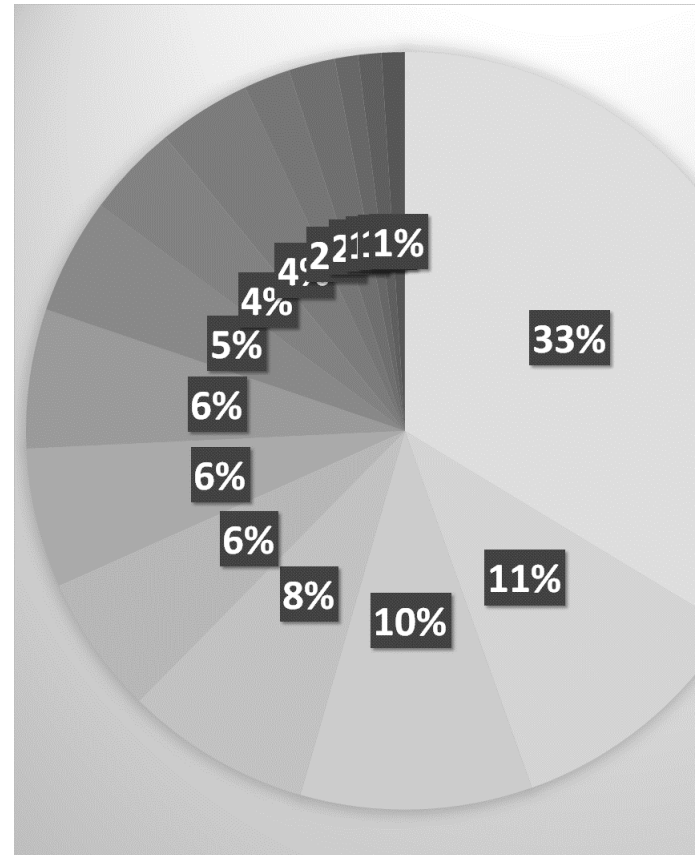
What We Mean by Public Health System

- # of Organizations from 10 sectors
N=7,816; NPOs = 2,618

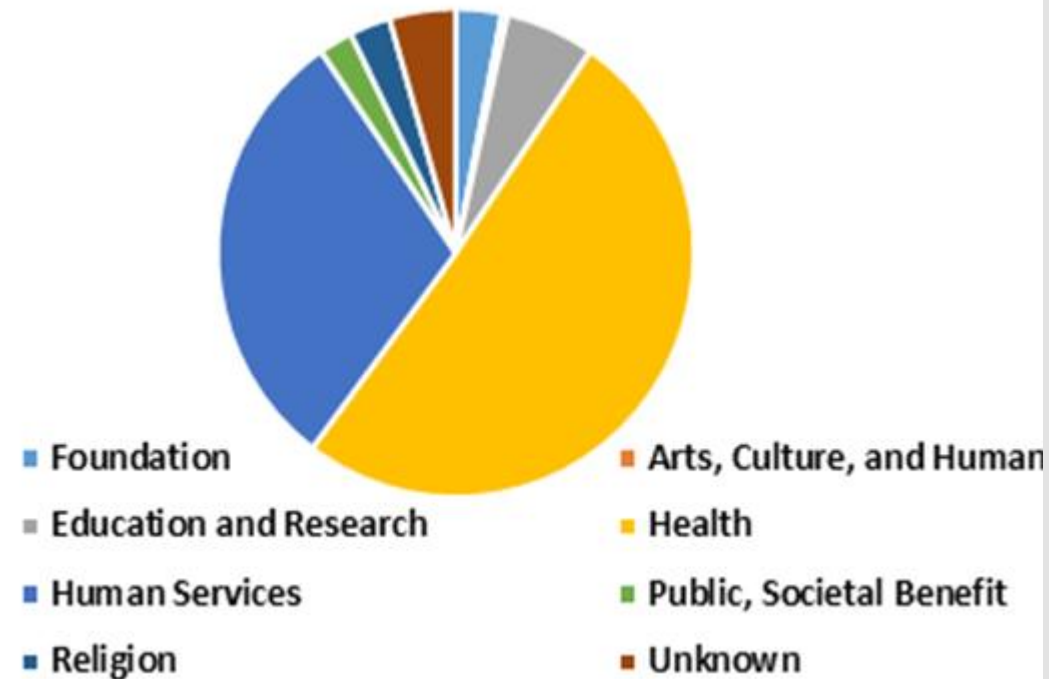


What We Mean by Public Health System

- # of Organizations from 10 sectors
N=7,816; NPOs = 2,618



Frequency of Nonprofit Types



Questions Driving the Study

1. What indicators inform successful Hospital-PH partnerships (interactions)?
2. What indicators inform increased Hospital contributions to “Community Benefit” (investments)?

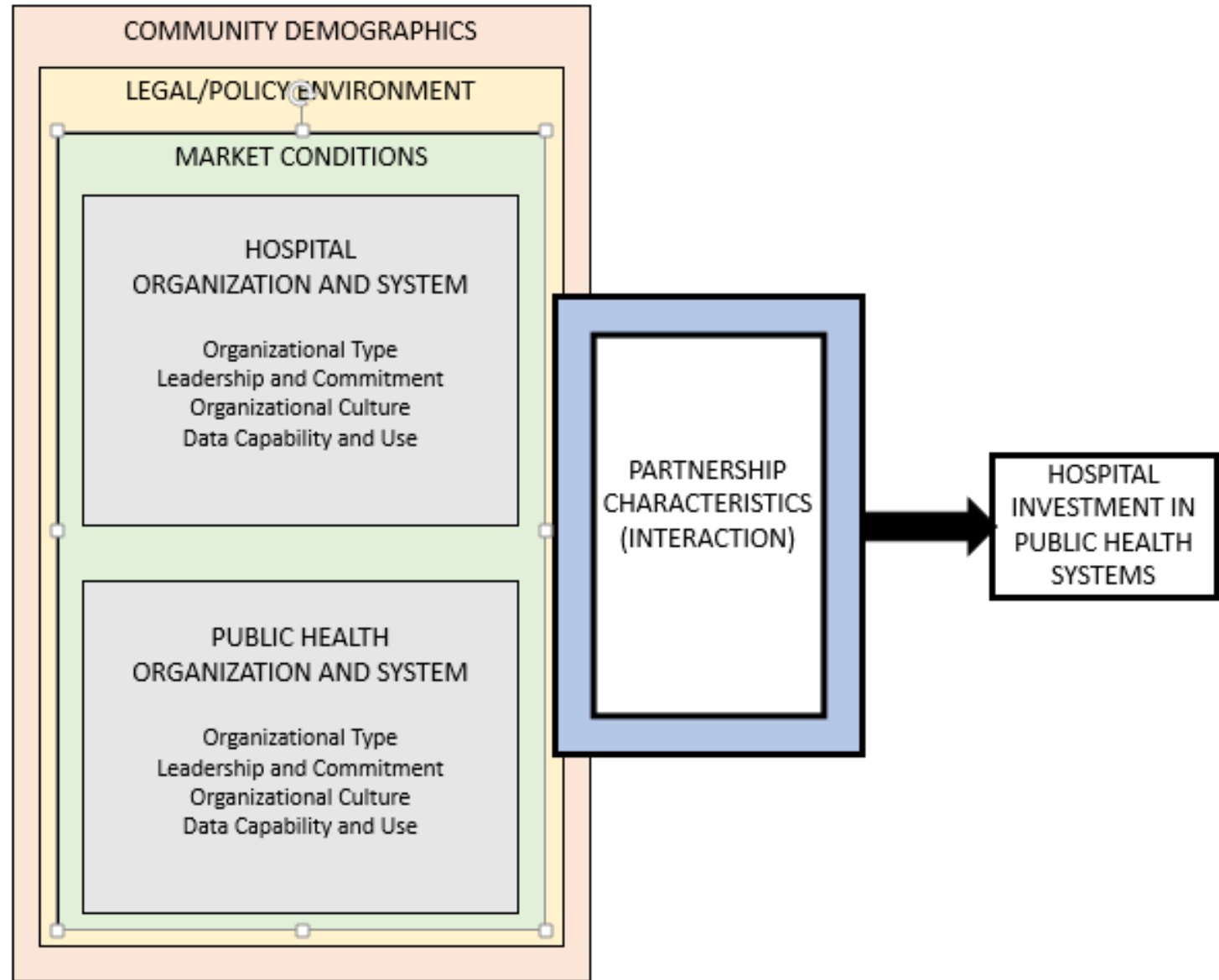
Analytic Strategy

- a) Develop a conceptual framework that identifies hypothesized indicators of increased hospital interaction and investment in public health systems
- b) Create a database of available indicator data for hospitals represented in the data
- c) Analyze relationships between the indicators and data on 2 outcomes: hospital interaction with PH systems and hospital investment in PH systems

Developing the Conceptual Framework

- Review of the peer reviewed and grey literature
- Drafted conceptual model
- Convened expert panel to review, further narrow, and refine the conceptual model
 - Expert panel consisted of 9 people representing hospitals (N=4), public health (N=2), and other national expertise (N=3)
- Revised the framework based on panel feedback

Final Conceptual Framework



Database

- Three secondary datasets
 1. IRS 990 Schedule H Community Benefit Data
 2. Program to Analyze Record and Track Networks to Enhance Relationships (PARTNER) PH-Hospital Data
 3. American Hospital Association (AHA) Annual Survey Data
- Datasets were merged using Medicare ID

Database: Challenges

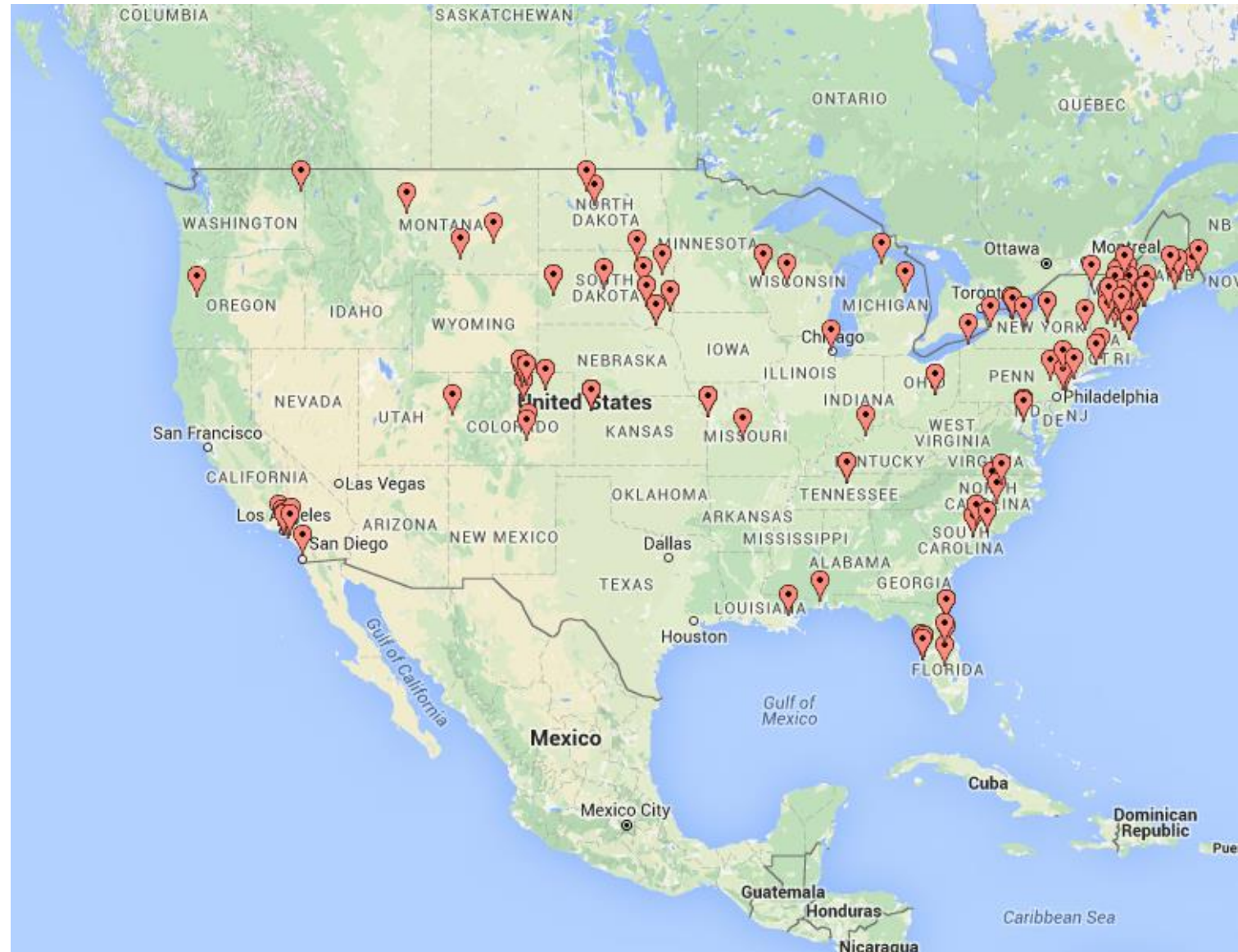
- Multiple matching points to pull Medicare IDs for hospitals in PARTNER
 - Name
 - Location
- Iterative process with lots of data quality checking
- Bounding public health systems

Nonprofit Hospitals in the Dataset

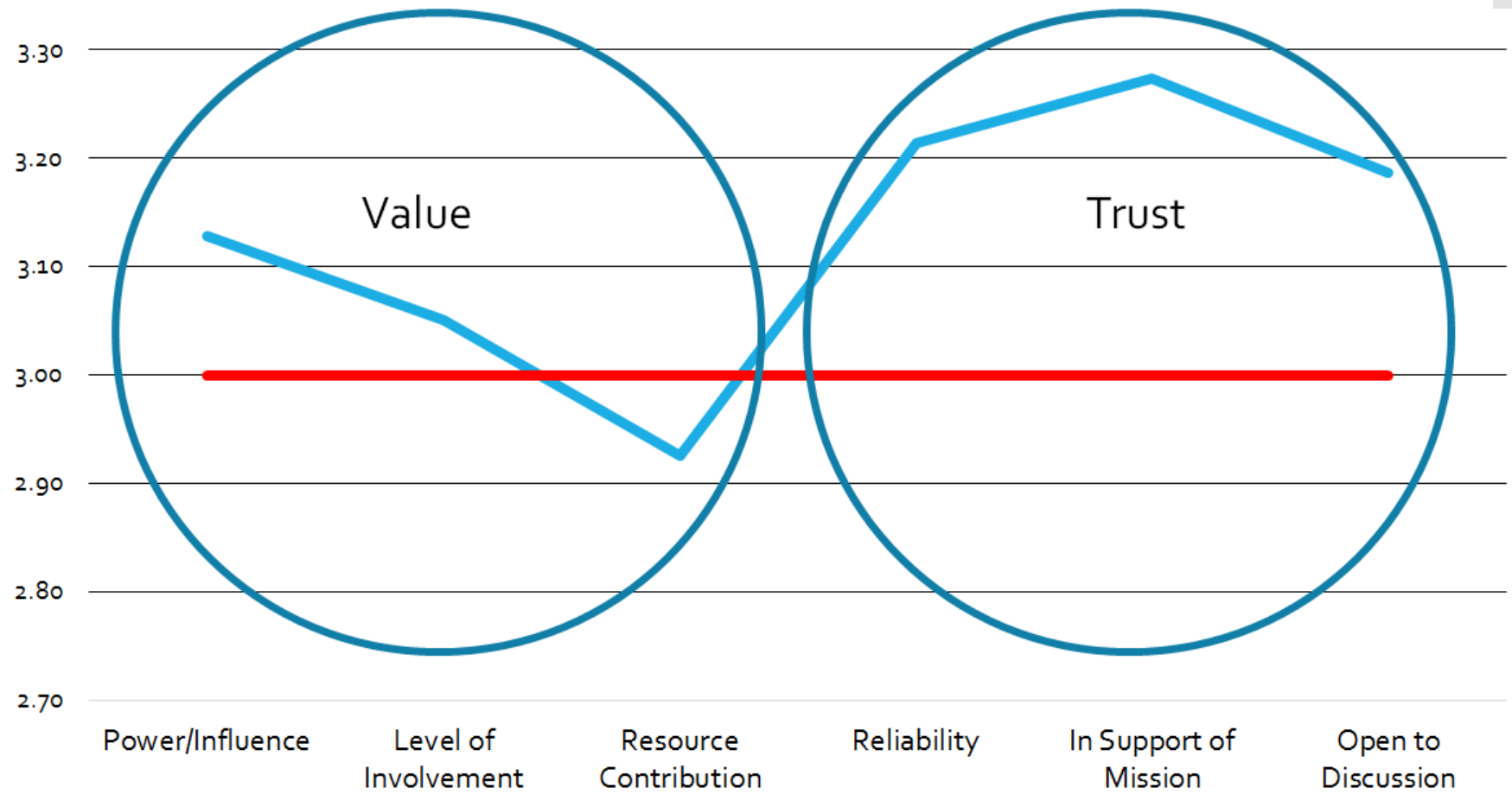
134 unique
hospitals

200 observations,
some repeated
within and across
years

Size ranges from
16-2083 best,
average = 284 beds



Cross Sector Partner Perception of Hospitals



Analytic Approach

- Multivariate regression
 - Goal: examine the relationship between the *level of hospital engagement* in the public health network and their *investment* in the system
- Multivariate Analysis: GLM with log link, Poisson family
 - Dependent variable: Percentage of revenue spent on Community Benefits
 - Key control variables: Measures of network engagement
 - Control for other factors suggested by conceptual model: Size, Payer Mix (Public / Private), Net Revenue, Teaching Hospital, HMO contracts, Rural / Urban, Catholic, Other Factors

Analytic Approach

- Dependent Variable
 - Measure of Community-Engaged Community Benefit Activities:
 - Subset of Schedule H Community Benefit categories (Percentage of total operating expenses)
 - Community Health Improvement / Benefit Operations
 - Cash and in-kind contributions
 - Community building

Analytic Approach

- Key Independent Variables
 - Measures of hospital participation in public health systems
 - Degree Centrality: number of connections a network member has with other members of the network
 - Overall Value: average of the three dimensions of value as ranked by the other members of the network.
 - Overall Trust: average of the three dimensions of trust as ranked by the other members of the network.
 - Breadth: proportion of different organizations existing in the network by low, moderate, and high diversity categories
 - Relative Connectivity: Benefit to the hospital from the network relative to the most trusted / connected member of network

Analytic Approach

- Other Independent Variables
 - Control for other factors suggested by conceptual model:
 - Hospital Size; Hypothesized relationship: *positive*
 - Payer Mix (Public / Private), Payer Mix Squared; Hypothesized relationship: *negative*
 - Net Revenue; Hypothesized relationship: *positive*
 - Teaching Hospital; Hypothesized relationship: *positive*
 - Number of HMO contracts; Hypothesized relationship: *negative*
 - Rural; Hypothesized relationship: *unclear*
 - Catholic; Hypothesized relationship: *positive*
 - Sole Community Provider; Hypothesized relationship: *positive*

Analytic Approach

- Interaction Terms
 - Relationship between Measures of hospital participation in public health systems may *vary* depending on the hospital's net revenue
 - We hypothesized interactions should have a positive coefficient
 - Indicates that the effects of participation are magnified as the hospital has more flexible revenue available

Results

If the hospital was trusted in the public health network ($p < .01$) and perceived benefit from participating ($p < .0.05$), community benefits spending was increased.

Spending was unaffected by the size of the network, the diversity of organizations in the network and the value of the network as perceived by other members.

Results

The relationship between **community benefit spending** and **network** *varies* with the *interaction* between hospital's **net revenue** and **payer mix**.

Both network effects are ***larger*** in hospitals with:

- Higher net revenue ($p < .01$)
- More private payers ($p < .05$)

Other control variables were largely insignificant individually but were statistically significant jointly.

- Payer mix had a statistically significant non-linear relationship with community benefits spending
- Other variables generally had expected sign but were statistically insignificant

Discussion

- Community benefit spending by hospitals is affected by the hospital's trust and perception of benefit from the public health network *for the hospital itself*
- This effect is magnified for hospitals with greater and more flexible revenue
- Spending is *not* affected by other characteristics of the public health network, including size, breadth and overall network perceptions of value
- Other hospital factors are largely insignificant, suggesting network plays a key role

Implications

- It is possible that hospitals that spend less on community benefits (in dollars) spend more on relationship building in the community (in social capital)
- Leads to questions about:
 - What is the (dollar) value of building strategic, strong relationships between hospitals and public health systems? How does that compare with actual per-dollar investments? (What is the value of social capital in these settings?)
 - Can hospitals that spend less in the community compensate for that by investing greater time/effort in relationship building?

Commentary



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Questions and Discussion

Webinar Archives

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

Upcoming Webinars

Wednesday, August 23, 12-1pm ET/ 9-10am PT

COMPREHENSIVE POPULATION HEALTH SYSTEMS & HOSPITAL UNCOMPENSATED CARE COSTS

C. B. Mamaril, PhD, University of Kentucky College of Public Health

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

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

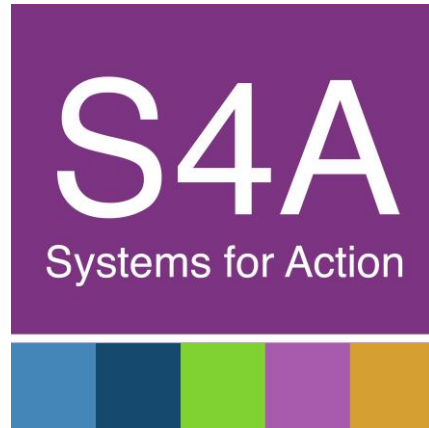
Lainie Rutkow, JD, PhD MPH and Katherine Smith, PhD, Johns Hopkins Bloomberg School of Public Health

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

Thank you for participating in today's webinar!



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For more information about the webinars, contact:

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Acknowledgements

Systems for Action is a National Program Office of the Robert Wood Johnson Foundation and a collaborative effort of the Center for Public Health Systems and Services Research in the College of Public Health, and the Center for Poverty Research in the Gatton College of Business and Economics, administered by the University of Kentucky, Lexington, Ky.



Speaker Bios

Danielle M. Varda, PhD, is an Associate Professor at the School of Public Affairs, University of Colorado Denver, and the Director of the CU Center on Network Science. Dr. Varda joined SPA from the RAND Corporation, where she worked as an Associate Policy Scientist from 2005-2008. She specializes in collaborative governance and network leadership, and her research focus is on evaluating the network structure of interorganizational collaborations between the public, private, and nonprofit sectors and the subsequent network effects of these recorded interactions. She has developed models and methods of network measurement, and with funding from the Robert Wood Johnson Foundation, is the developer of a software tool (PARTNER, www.partnerool.net) that uses Social Network Analysis to administer a survey and link to an analysis tool, to measure and monitor collaborative activity over time. Dr. Varda's PARTNER tool is used by over 600 communities in 30 countries and all over the U.S. Her research portfolio includes projects in the areas of maternal/child health, public health preparedness, nonprofit community networks, and systems evaluation.

Adam J. Atherly, PhD, is a Professor in the Department of Health Systems, Management and Policy in the Colorado School of Public Health. Dr. Atherly's main area of research is health economics, with an emphasis on the economics of aging and consumer decisions regarding health plan choice and health. Dr. Atherly has been working in public health services and systems research for several years, with an emphasis on measurement and economic issues. Dr. Atherly has also completed many cost effectiveness studies and has experience in health outcomes research including scale development and evaluations of efforts to improve quality of care and patient safety. Dr. Atherly received his Ph.D. in Health Services Research, Policy and Administration from the University of Minnesota.

Simone Rauscher Singh, PhD is an Assistant Professor of Health Management and Policy. Trained in accounting and finance, her research agenda focuses on improving our understanding of accounting practices and financial management strategies of both health care and public health organizations. For the past four years, she has been engaged in research related to legal and financial aspects of not-for-profit hospitals' provision of community benefit and how hospitals' community benefit activities can be used to improve population health outcomes. In addition, Dr. Singh conducts research on costing health care and public health services. Most recently, the focus of her work has been on examining differences in productivity and efficiency in service delivery across local health departments. Dr. Singh received her PhD in Health Services Organization and Policy in 2010 and her MA in Applied Economics in 2007, both from the University of Michigan.

Kevin Barnett, DrPH, MCP is a Senior Investigator at the Public Health Institute. He has led research and fieldwork in hospital community benefit and health workforce diversity at PHI for over two decades, working with hospitals, government agencies, and community stakeholders across the country. Current work includes a partnership with The Governance Institute and Stakeholder Health to build place-based population health knowledge among hospital board members and senior leadership, a national study of hospital interventions to address food insecurity and convene regional meetings of hospital and community teams with community development financial institutions to design intersectoral health improvement strategies.