A Framework and Analysis of Hospital Investment and Interaction in Public Health Systems

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

Presenter Disclosures

- There are no relationships to disclose

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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
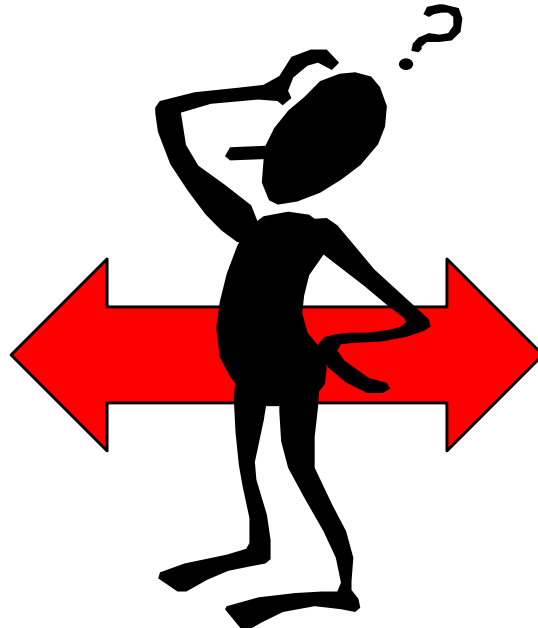
Background

- 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
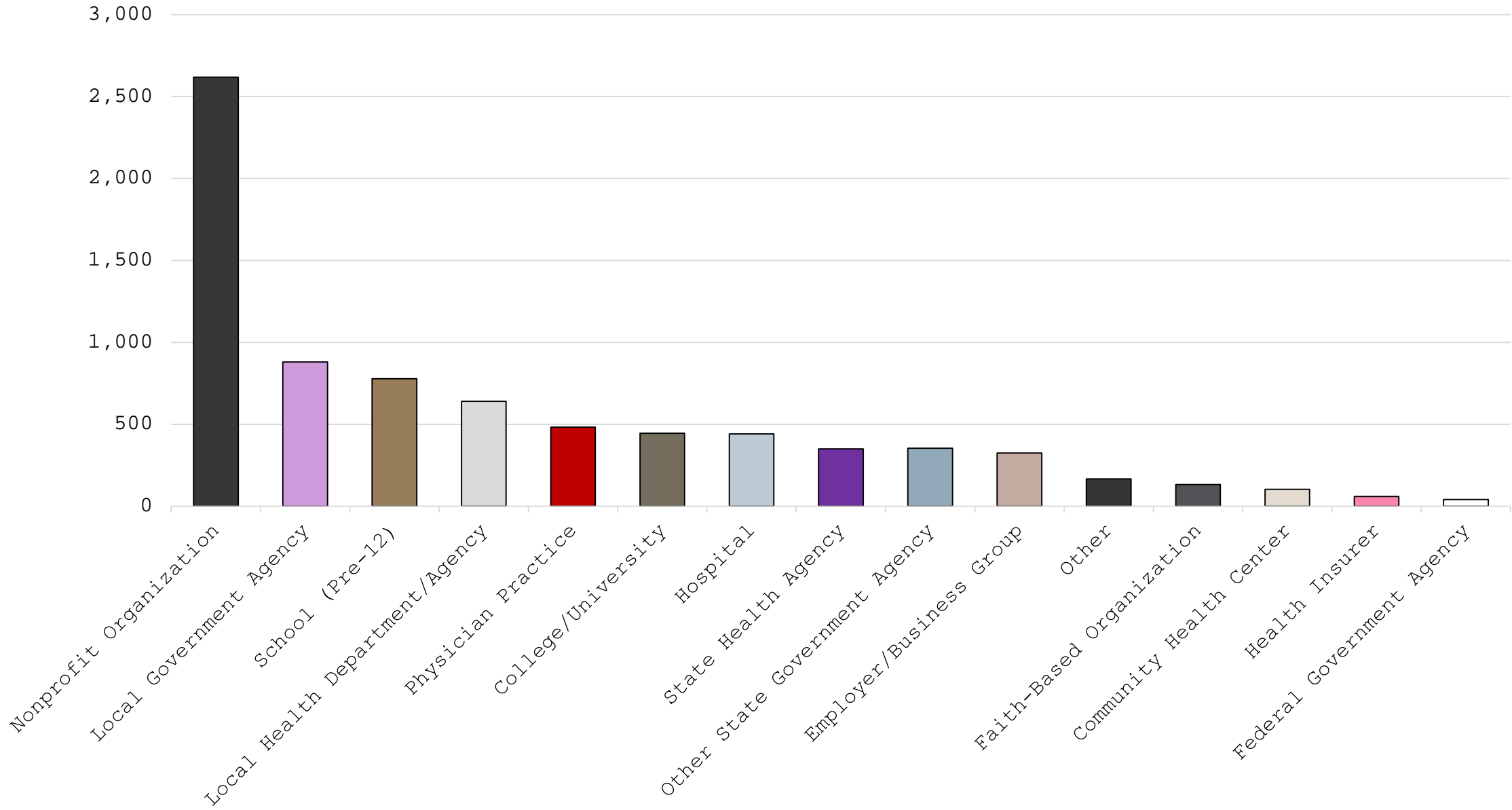
Questions Driving the Study

1. What indicators inform successful Hospital-PH partnerships (interactions)?

2. What indicators inform increased Hospital contributions to "Community Benefit" (investments)?

Analytical Strategy

1. Develop a conceptual framework that identifies hypothesized indicators of increased hospital interaction and investment in public health systems

2. Create a database of available indicator data for hospitals represented in the data

3. Analyze relationships between the indicators and data on 2 outcomes: hospital interaction with PH systems and hospital investment in PH systems

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

Conceptual Framework
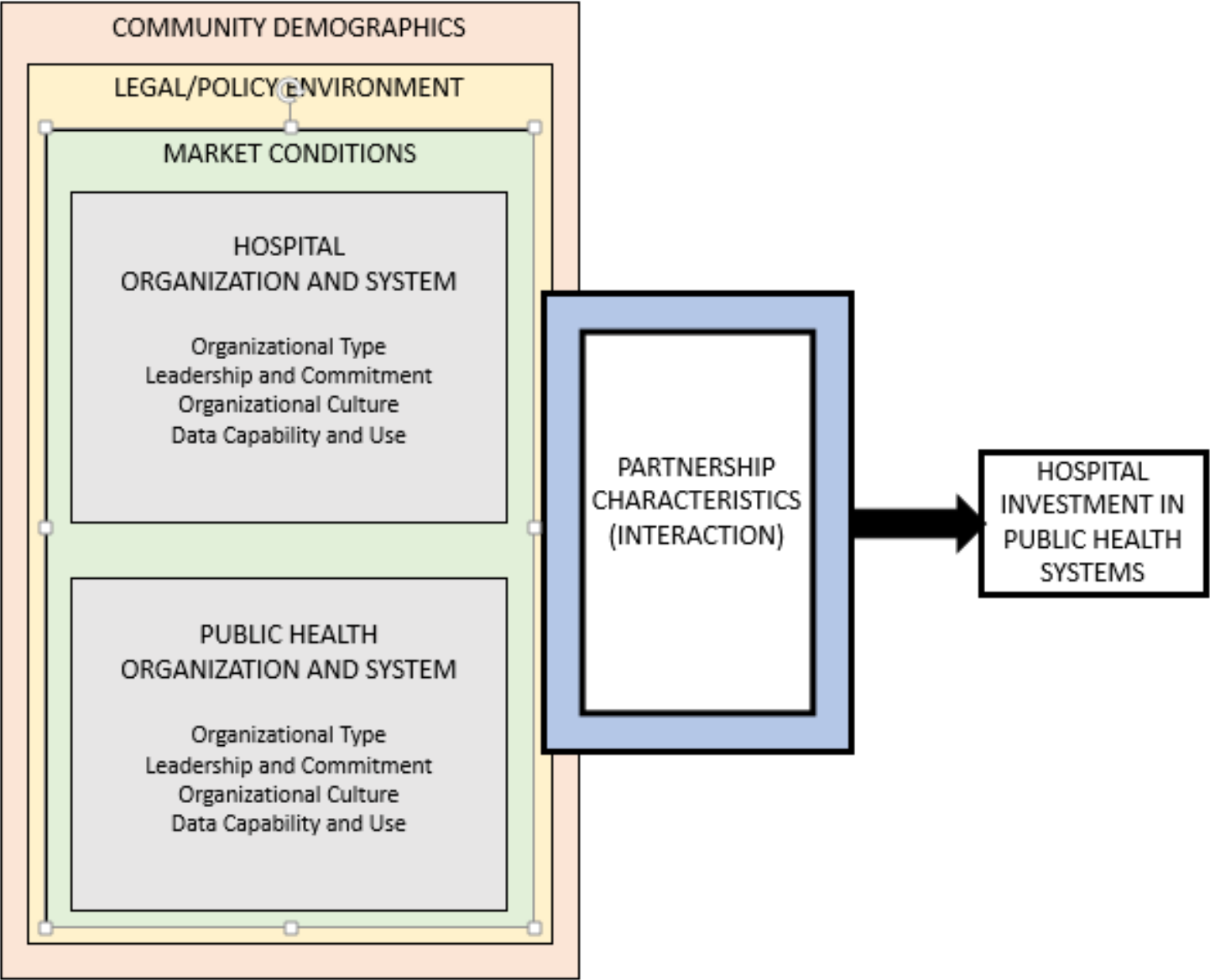
Database

- 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

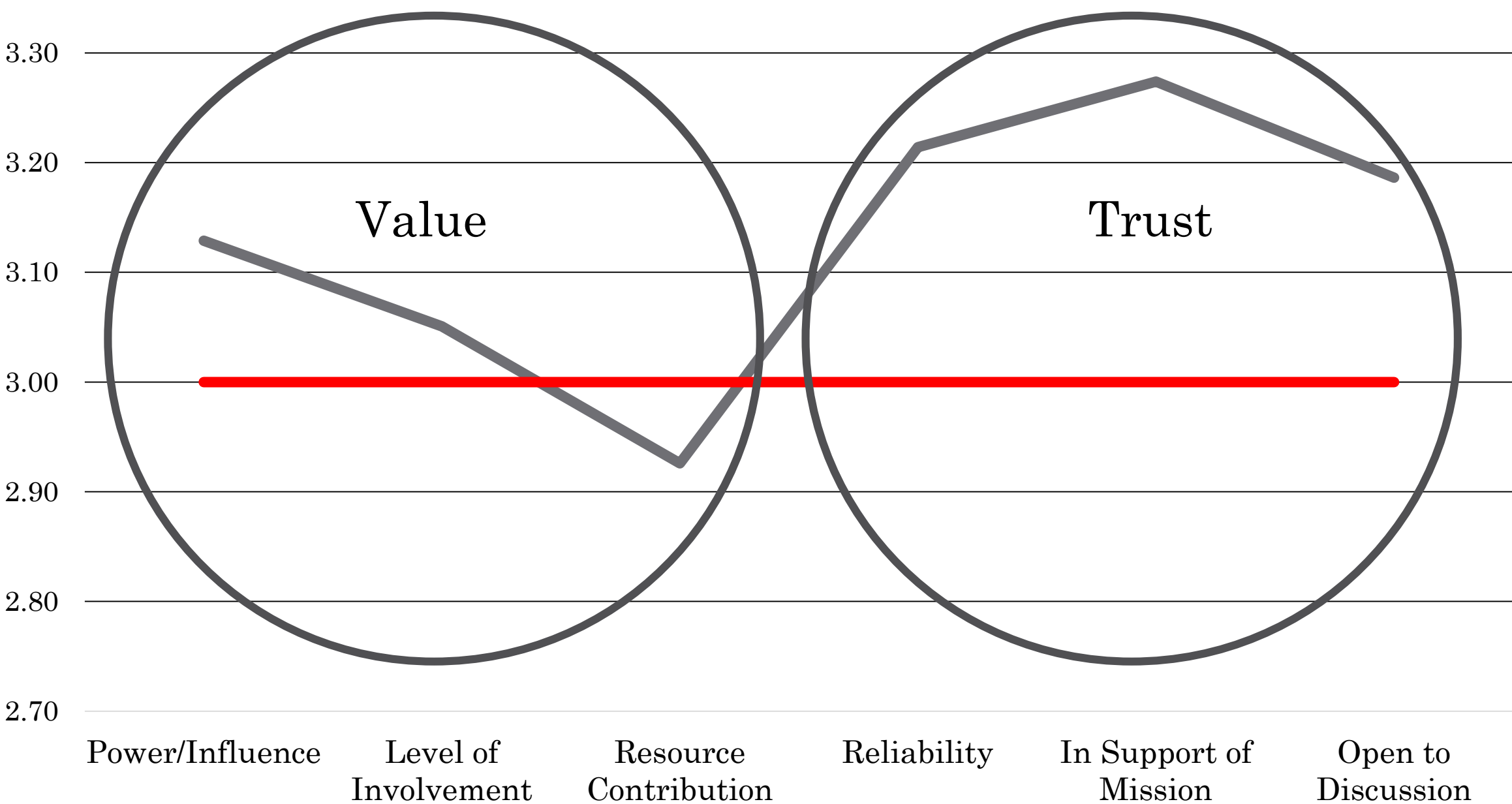# Analysis Lens: Two Perspectives

- Hospital – Public Health <u>System</u>: Cross-Sector Interorganizational Partnerships

- Hospital – Public Health <u>Agencies</u>: Partnerships with <u>only</u> PH Agencies

Nonprofit Hospitals in Dataset

- 134 unique hospitals

- 200 observations, some repeated within and across years

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

Cross-Sector Partner Perceptions of Hospitals

Value

Trust

Power/Influence | Level of Involvement | Resource Contribution | Reliability | In Support of Mission | Open to Discussion

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
  - Dependent variable: Percentage of Revenue spent on Community Benefits
  - Key control variables: Measures of network engagement
  - Control for hospital size (Nurse FTE) and Payment Arrangements (Capitation)
  - Fixed effects for system membership

Analytic Approach

- <u>Dependent Variable</u>
  - Measure of Community-Engaged Activities:
    - ➢ Sum of 990 Community Benefit categories
      - ➢ Total Spending (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

Results: Descriptive Statistics

Variable	Mean	SD	Min	Max
Sum Total	0.95%	1.508	0	10.484
Community Building Total (% of total operating expenses)	0.12%	0.288	0	1.878
Community Health Improvement Services and Community Benefit Operations	0.56%	1.209	0	9.601
Cash and in-kind contributions for community benefit	0.26%	0.821	0	8.205
Degree Centrality	9.67	7.891	0	55
Overall Value	3.02	0.563	1	4
Total Trust	3.16	0.724	0.33	4
Relative Connectivity	0.41	0.306	-0.07	1
Breadth	2.54	0.609	1	3

- Total Sample size: 184

Early Results: Regression Models

	Total	Cash and in-kind contributions	Community Building	Community Health Improvement Services and Community Benefit Operations
Centrality	0.068 *	n/s	0.013†	0.025**
Value	1.019 **	1.158*	n/s	n/s
Trust	n/s	n/s	n/s	n/s
Relative Connectivity	-3.70**	-3.33**	n/s	n/s
Breadth Medium	1.99†	n/s	n/s	n/s
Breadth High	n/s	n/s	n/s	n/s

Controlling for System Membership, Nurse FTE, Capitation

** p<.01 * p<.05 † p<.1

Early Findings

- Association between lower spending and being well-connected to valued partners that report trusted relationships

- It is possible that hospitals that spend <u>less</u> on community benefits (in dollars) spend <u>more</u> 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?)

  - Should we account for relationship building as a "contribution" to the public health system? Are we weighing that effort sufficiently?

  - Do hospitals that spend less in the community compensate for that by investing greater time/effort in relationship building?

Limitations and Next Steps

- Working with noisy data

- Small sample size

- Need to analyze variables in more detail

- Likely will merge in more data-NACCHO and ARF