PUBLIC HEALTH SYSTEM PARTNERSHIPS ASSOCIATION WITH INFANT MORTALITY

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Acknowledgements

- RWJF, National Coordinating Center for Public Health Services and System Research Junior Investigator Award

- Southern Regional Education Board Scholar Dissertation Award
Presentation Outline

• Background and Significance
• Approach
• Conceptual Framework
• Data
• Analysis
• Results
• Conclusions/Implications
BACKGROUND

A

• Infant Mortality

B

• Public Health System Partnerships
LHDs are charged with addressing IMRs

The economic recession has forced state budget cuts.

LHDs have been forced to cut or eliminate services and programs.

Maternal and child services and programs were most often cut.

Thus LHDs will have to find a way to address IMR with restricted funding.
Infant mortality is a critical public health measure. The Infant Mortality Rate (IMR) is the number of deaths of children less than one year of age per 1,000 live births. The US IMR is among the highest in 40 industrialized countries. The infant mortality rate in the United States is more than twice that of countries like Japan and Sweden.
INFANT MORTALITY

Figure 1. Infant, neonatal, and postneonatal mortality rates: United States, 2000 and 2005–2011

NOTE: Data for 2011 are preliminary.
INFANT MORTALITY DECLINES FROM 2005-2010
PUBLIC HEALTH SYSTEM PARTNERSHIPS

- Defined as: “Collaborative, synergistic alliances that include the LHD and one or more other public health system partners, which work to improve health and/or health care services in an identified need or problem area and in an identified geographic area.” Zahner S, 2012

- Partnership is defined in this study as a formal long or short term relationship between two organizations that pools funds, skills and/or resources together to achieve a public health goal.
SIGNIFICANCE

- Economic constraints are likely to continue to impact LHDs budget, staff, and programs.
- Healthy People 2020 recommend LHDs and COs develop partnerships to jointly engage in programs to improve population health.
- Partnerships may allow for sharing of information and expertise and more effective use of limited resources to address public health problems.
RESEARCH GAPS

- The association between public health system partnerships and population outcomes
This research will apply Wholey et al conceptual framework which explains service delivery, public health system partnerships density and organizational centrality impact on health status.
THE RESEARCH APPROACH

Structure
- Public Health Systems Partnerships

Process
- Provision of services and activities

Outcome
- Infant Mortality
Specific Aim:
- Evaluate whether public health system partnerships are associated with changes in MCH outcomes

Hypothesis:
- PHSPs that are dense and centralized are more likely to decrease infant mortality than PHSPs that are sparse and decentralized PHSPs
DATA

VARIABLES OF INTEREST

**Dependent Variables:** Infant mortality rate

**Variables of Interest:** Organizational Centrality and PHSPs Density

**Agency characteristics:** board of health

**Community characteristics:** population size, race (non-white), income per capita, college graduate, unemployment rate, insurance status, and poverty
A multivariate panel analysis were conducted to test the association between PHSPs density and centrality and infant mortality.

Methods
- Fixed and Random Effect Model
- Hausman Test
- Instrumental Variable Analysis (2SLS)
HOW DID WE MEASURE PARTNERSHIPS?

- Social Network Analysis
  - Density
  - Centrality
DENSITY AND CENTRALITY

- **Density**
  - density is simply the number of connections divided by the number of possible connections in PHSPs.

- **Organizational Centrality**
  - Centralization is the degree to which a LHD is centrally located within the PHSPs.
  - Centralization measures the position of an organization in a partnership.

- Wholey et al, 2009
## PARTNERSHIPS

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<tr>
<th>Types of Organization</th>
<th>1998 (351)</th>
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<td>0.45</td>
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<td>0.17</td>
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<td>0.14</td>
<td>0.14</td>
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<td>2006</td>
<td>0.12</td>
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<td>0.11</td>
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<tr>
<td>2012</td>
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<td></td>
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<td>--------------------------</td>
<td>------------</td>
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<td>7.78</td>
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<td>7.31 (.14)**</td>
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<td>.17 (.11)</td>
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<td>0.14</td>
<td>0</td>
<td>.14 (.05)*</td>
<td>0</td>
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<td>LHD characteristics</td>
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<tr>
<td>Board of Health (%)</td>
<td>0.36</td>
<td>+12</td>
<td>.48 (.03)**</td>
<td>+13</td>
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<td>Community Characteristics</td>
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<td>Population</td>
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<td>+88,664</td>
<td>493,853</td>
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<td>22.81</td>
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<td>27.14 (.16)**</td>
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<td>30690.5***</td>
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<td>13.17 (.26)</td>
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<tr>
<td>Poverty (%)</td>
<td>12.47</td>
<td>0.31</td>
<td>10.69 (.27)**</td>
<td>+5</td>
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</table>
- 2 SLS IV Random Effect Model
  - PHSPs Density

**IV**(regulatory and environmental services and BOH)

PHSPs Density

Infant Mortality

Other control variables
# FACTORS ASSOCIATED WITH INFANT MORTALITY

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<thead>
<tr>
<th></th>
<th>RE</th>
<th>RE-IV</th>
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<tr>
<td><strong>Coefficient (SE)</strong></td>
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<td>PHSPs Density (log)</td>
<td>0.0583 [0.0148]**</td>
<td>0.1200 [0.1418]</td>
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<td>Non-Whites ( % )</td>
<td>0.0043 [0.0006]***</td>
<td>-0.0048 [0.0022]**</td>
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<tr>
<td>College Graduates ( % )</td>
<td>-0.0066 [0.0016]***</td>
<td>-0.0058 [0.022]***</td>
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* **p<0.05  
  ***p<0.01*
MODEL

- 2 SLS IV Random Effect Model
  - Organizational Centrality

IV (regulatory and environmental services and BOH) → Organizational Centrality

Infant Mortality

Other control variables
## FACTORS ASSOCIATED WITH INFANT MORTALITY

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<tr>
<th>Factor</th>
<th>RE</th>
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<tbody>
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<td></td>
<td>Coefficient (SE)</td>
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<td>Organizational Centrality (log)</td>
<td>0.0291 [0.0148]**</td>
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<td>Non-Whites ( % )</td>
<td>0.0032 [0.0006]***</td>
<td>0.0053 [0.0008]***</td>
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<td>Uninsured ( % )</td>
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<td>Unemployment</td>
<td>-0.0213 [0.0049]***</td>
<td>-0.0245[0.0059]***</td>
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**p<0.05  
***p<0.01
CONCLUSIONS

- PHSPs density and organizational centrality is associated with an increase in infant mortality rate
  - How can I explain these findings:
    - Public Health Practitioners
    - Future research
Policy Implications
- Policies should be flexible at the local level and not create additional barriers to establish and maintain PHSPs.
- Policies should be directed at linking families to needed resources in the community that foster reducing IMR.

Practice Implications
- Plans to evaluate the impact of partnership efforts early and often
- Realigning the goals and practices concerning addressing IMR
STRENGTHS AND LIMITATIONS

Strengths

- Three waves of NLSPHA data
- Econometric methods: two stage least square random effect IV models
- Results were discussed with local health practitioners in Arkansas

Limitations

- Ego network
- Instrumental variable methods
- Additional instruments are needed to estimate the association between infant mortality and public health system partnership density and centrality
THANK YOU!
QUESTION SLIDES
NEXT STEPS

- Identifying additional dataset that may have good instruments
- Examine the relationship between stable PHSPs and infant mortality
PUBLIC HEALTH SYSTEMS

- The public health system is comprised of public-sector agencies (such as schools, Medicaid and environmental protection agencies, and land-use agencies) and private-sector organizations whose actions have significant consequences for the health of the public.

- HHS, 2010
Categorizing Public Health System Partnerships

<table>
<thead>
<tr>
<th>DENSITY</th>
<th>CENTRALITY</th>
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<tbody>
<tr>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>+</td>
<td>+</td>
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| Diffuse/Contracting | Centralizing/Contracting |
| Expanding/Diffuse  | Centralizing/Expanding  |
PUBLIC HEALTH SYSTEMS NETWORKS
ORGANIZATIONAL DENSITY BY ORGANIZATIONAL CENTRALITY FROM 1998-2006
PUBLIC HEALTH SYSTEMS NETWORKS
ORGANIZATIONAL DENSITY BY
ORGANIZATIONAL CENTRALITY FROM
2006-2012

79%

11%

9%

1%

- Diffuse/Contracting
- Expanding/Diffuse
- Centralizing/Contracting
- Centralizing/Expanding