A Network View of Population Health Delivery Systems

Research In Progress Webinar
Thursday, December 15, 2016 1:00-2:00pm ET/ 10:00-11:00am PT

Funded by the Robert Wood Johnson Foundation
Agenda

Welcome: C.B. Mamaril, PhD, RWJF Systems for Action National Coordinating Center, Research Assistant Professor, University of Kentucky College of Public Health

A Network View of Population Health Delivery Systems

Presenter: Rachel Hogg Graham, DrPH, MA, Assistant Professor of Health Sciences, Education, and Research, University of Kentucky College of Health Sciences Rachel.hogg@uky.edu

Commentary: Anna G. Hoover, PhD, MA, Co-Director, RWJF Systems for Action National Coordinating Center, Assistant Professor, U. of Kentucky College of Public Health

Questions and Discussion
Presenter

Rachel Hogg Graham, DrPH, MA
Affiliated Faculty, Center for Public Health Services and Systems Research, College of Public Health
Assistant Professor of Health Sciences, Education, and Research, College of Health Sciences
University of Kentucky  Rachel.hogg@uky.edu
A Network View of Population Health Systems

Rachel Hogg Graham, DrPH, MA
Assistant Professor
University of Kentucky, College of Health Sciences
Push for Cross-Sector Collaboration

- Growing number of national initiatives that call for greater integration of public health, social service, and health care systems
  - IRS requirements for nonprofit hospitals
  - Public Health Accreditation
  - Accountable Care Organizations
  - Patient-Centered Medical Homes
  - CMS Accountable Health Communities
Population Health Network
How do we examine cross-sector partnerships and their evolution?

- Social Network Analysis (SNA)
- Combine SNA with traditional regression modeling
Questions of Interest

1. How have population health systems changed over time?
2. What characteristics of the community influence network structure?

Community Characteristics
- Population size
- Board of Health
- Income
- Number of insured individuals
- Portion of the population over 65
- Number of MDs
- Number of hospitals
- Community Health Center

Network Structure
- Degree Centrality
- Betweenness Centrality
- Density
- Degree Centralization

Provision of Population Health Activities

Population Health Outcomes
Data Used

- National Longitudinal Survey of Public Health Systems (NLSPHS)
- Cohort of 360 communities with at least 100,000 residents
- Local public health officials report:
  - **Scope**: availability of 20 recommended core population health activities
  - **Network**: organization contribution to each activity
  - **Centrality of effort**: contributed by the governmental public health agency
  - **Quality**: perceived effectiveness of each activity
Data Used

• Linked with:
  ➢ Information on local public health agency and system (National Association of County and City Health Officials)
  ➢ Community characteristics (Census and Area Health Resource File)
Analytical Strategy

• Longitudinal observations of cross-sector participation in population health activities

• Multivariate regression for panel data to estimate the associations between network structure and socioeconomic, demographic, and health care delivery system characteristics
Network Variables: Whole Network

• **Density**
  - Measured by taking the proportion of relationships that exist in the network to the total possible relationships that can exist between organizations

• **Degree Centralization**
  - Measures the connectedness of organizations in the network as a whole
  - High level of degree centralization would indicate that the bulk of population health activities are provided by a select number of organizations
Network Variables: Organization

• **Degree Centrality**
  - Counts the number of connections an organization has with the other organizations in the network
  - A high level of degree centrality may be an indicator of organizations that actively seek or are sought out to be involved in population health systems

• **Betweenness Centrality**
  - Captures the extent an organization lies between other organizations in the network
  - Organizations with high betweenness centrality may hold important “gate-keeper” and information sharing roles
Analytical Strategy

• **Dependent Variables:**
  1. Network Density
  2. Degree Centralization

• **Independent Variables:**
  • Population size
  • BOH exists
  • Income per capita
  • % with a college degree
  • % non white
  • # uninsured
  • % over 65
  • MDs per capita
  • Hospital beds per capita
  • Federally Qualified Health Center yes/no
## Regression Results

<table>
<thead>
<tr>
<th></th>
<th>Density</th>
<th>Degree Centralization</th>
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<tbody>
<tr>
<td>Population</td>
<td>0.258**</td>
<td>0.122**</td>
</tr>
<tr>
<td>BOH</td>
<td>0.215**</td>
<td>0.118**</td>
</tr>
<tr>
<td>Income pcap</td>
<td>0.000</td>
<td>‑0.000 †</td>
</tr>
<tr>
<td>% with college degree</td>
<td>0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>% non-white</td>
<td>‑0.005**</td>
<td>‑0.003*</td>
</tr>
<tr>
<td>Number uninsured</td>
<td>‑0.006</td>
<td>‑0.008*</td>
</tr>
<tr>
<td>% over 65</td>
<td>0.008</td>
<td>0.008*</td>
</tr>
<tr>
<td>MDs pcap</td>
<td>0.000**</td>
<td>‑0.000**</td>
</tr>
<tr>
<td>FQHC (yes/no)</td>
<td>0.112 †</td>
<td>‑0.014</td>
</tr>
<tr>
<td>Hospital Beds pcap</td>
<td>0.000**</td>
<td>0.000**</td>
</tr>
</tbody>
</table>

**p<0.01, *p<0.05, † p<0.1
What does this tell us?

- Associations between network structure with socioeconomic, demographic, and health care delivery system characteristics
- BOH as the convener and coordinator?
- Negative associations with characteristics that typically indicate populations faced with greater health disparities
  - Network constriction
Leads to more questions…

• What are the costs and benefits to working across sectors?

• How can communities that are trying to meet the complex needs of individuals with unmet social and medical needs be incentivized to work collaboratively?
  – Organizational and financial

• PARTNER Social Network Analysis Tool
  – http://partnertool.net/
Next Steps

• Examine rural communities with the expanded sample
• Adding in more SNA variables
• Exploring the relationship between density and degree centralization
Next Steps

• Deeper look at the networks to understand what strategies for aligning medical, social, and population health services have the largest effect on health and well-being
  ➢ Understanding of what works where and in which population groups

• Mixed-methods approach
  ➢ Examine the cost vs. benefit of collaboration
Project Updates

go to: http://systemsforaction.org/projects/network-view-population-health-delivery-systems
Commentary

Anna. G. Hoover, PhD, MA
Co-Director, RWJF Systems for Action National Program Office
Assistant Professor, Preventive Medicine and Environmental Health
College of Public Health
Communications Director & Co-lead for Research Translation, Superfund Research Program
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Questions and Discussion
**Webinar Archives**

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

**Upcoming Webinars**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>Wednesday, January 11</td>
<td>12-1pm ET/ 9-10am PT</td>
<td><strong>ESTIMATING THE COSTS OF FOUNDATIONAL CAPABILITIES FOR THE NATION’S PUBLIC HEALTH SYSTEM</strong></td>
<td>C. B. Mamaril, PhD, Senior Scientist, Systems for Action National Coordinating Center, University of Kentucky College of Public Health</td>
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<td>Thursday, January 19</td>
<td>1-2 pm ET/ 10-11am PT</td>
<td><strong>INTER-ORGANIZATIONAL COLLABORATION IN LOCAL PUBLIC HEALTH SYSTEMS</strong></td>
<td>Justin Marlowe, PhD, MPA, and Betty Bekemeier, PhD, MPH, RN, University of Washington</td>
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<td>Wednesday, February 8</td>
<td>12-1pm ET/ 9-10am PT</td>
<td><strong>UNDERSTANDING RURAL-URBAN DIFFERENCES IN THE IMPLEMENTATION OF POPULATION HEALTH ACTIVITIES</strong></td>
<td>Lava Timsina, PhD, MPH, Systems for Action National Coordinating Center, University of Kentucky College of Public Health</td>
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Thank you for participating in today’s webinar!

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#Sys4Act

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For more information about the webinars, contact:
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Speaker Bios

Dr. Rachel Hogg Graham is an Assistant Professor in the University of Kentucky, College of Health Sciences, Department of Human Health Sciences. Her research focuses on public health system organization and composition and the integration of public health and health care delivery systems. She has published several peer reviewed articles, and is currently funded by AcademyHealth and the Robert Wood Johnson Foundation. Before joining the faculty in 2015, Dr. Hogg Graham completed a postdoctoral fellowship at the University of Colorado Denver School of Public Affairs. She earned her doctorate of public health (DrPH) in Health Services Management and her MA in History, specializing in the history of health and medicine, at the University of Kentucky.

Dr. Anna Goodman Hoover is co-director of the Systems for Action National Program Office where she helps organize cross-cutting and multi-network research studies designed to evaluate and compare public health strategies implemented across diverse settings. Dr. Hoover, a communication scientist and assistant professor in the Department of Preventive Medicine and Environmental Health, conducts research in such areas as participatory communication, dissemination and implementation science, and stakeholder engagement in support of evidence-based decision making. She also serves as communications director and co-leader of research translation for the University of Kentucky Superfund Research Program, supporting the use of research outcomes at the community, provider, and policy levels.
Acknowledgements

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