KEY SYSTEM DESIGN CONSIDERATIONS FOR ACCOUNTABLE COMMUNITIES FOR HEALTH

An investigation of Eastern Washington’s Population and Social Determinants of Health System

Stephanie Bulterma, MAAL,
NICE TO MEET YOU!

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Research Consultant | Spokane Regional Health District Data Center/Better Health Together; Visible Network Labs, LLC; National Alliance for Health
INTRODUCTIONS: WHO’S ON THE CALL?
AGENDA

1. Background
2. Network analysis review
3. Case study overview
4. System design considerations
5. Discussion
BACKGROUND
PROBLEM

Transforming the US health system as required by the Patient Protection and Affordable Care Act of 2010
WHAT IS A HEALTH SYSTEM?
WHAT IS A HEALTH SYSTEM?

“A health system consists of all organizations, people, and actions whose primary interest is to promote, restore, or maintain health.”

(World Health Organization 2017)
PUBLIC HEALTH 3.0

TIMELINE

Public Health 1.0
- Tremendous growth of knowledge and tools for both medicine and public health
- Uneven access to care and public health

Public Health 2.0
- Systematic development of PH (public health) governmental agency capacity across the U.S.
- Focus limited to traditional PH agency programs

Public Health 3.0
- Engage multiple sectors & community partners to generate collective impact
- Improve social determinants of health

Late 1800s
1988 IOM Future of Public Health Report
Recession
Affordable Care Act
2012 IOM For the Public’s Health Reports

Source: www.healthypeople2020.ph3
THE NEED FOR CROSS-SECTOR COLLABORATION

“Cross-sector collaborations and partnerships are an essential component of the strategy to improve health and well-being in the United States.”

(Towe et al. 2016)
HOW DO YOU CURRENTLY MEASURE COLLABORATION?
MEASURING COLLABORATION USING NETWORK ANALYSIS
WHAT IS A NETWORK?

• A collection of entities that are interconnected with links. For example:
  • Web pages that link to one another
  • People who are friends
  • Organizations that undertake collaborative projects
SYSTEMS VS. NETWORKS

**System**
- A set of connected things or parts forming a complex whole, in particular.

**Network**
- A group or system of interconnected people or things.
NETWORK SCIENCE

What is it?
• The study of network representations of physical, biological, and social phenomena leading to descriptive and predictive models of these phenomena (United States National Research Council)

Where does it come from?
• Graph theory from mathematics
• Statistical mechanics from physics
• Data mining and information visualization from computer science
• Inferential modeling from statistics
• Social structure from sociology
NETWORK ANALYSIS

**Structural Metrics (entire network)**
- Graph density
- Diameter
- Clustering

**Individual Metrics (node-specific)**
- Degree
- Hub
- Centrality

<table>
<thead>
<tr>
<th>Year</th>
<th>#</th>
<th>Density</th>
<th>Avg # ties</th>
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</thead>
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<td>55</td>
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<td>1.2</td>
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<tr>
<td>2010</td>
<td>90</td>
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<td>2012</td>
<td>82</td>
<td>8%</td>
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NETWORK ANALYSIS FOR CONTINUOUS IMPROVEMENT

Identify:
• Working siloes (cliques)
• Influential, bridging, and periphery organizations
• Needed connections

Plan for:
• Strategic relationship improvement, creation, and consolidation
• Network building or restructuring

Evaluate:
• Change in network structure over time
• Change in quality and type of connections over time
# Ways to Map Your Network

## Systems Thinking
- Actor maps
- Mind maps
- Issue maps
- Causal-loop diagrams

## Network Mapping Tools
- PARTNER
- Polinode
- Kumu
- Keynetiq

## Network Study
- Research design
- Relational data collection
- Network analysis and visualization

<table>
<thead>
<tr>
<th>Systems Thinking</th>
<th>Network Mapping Tools</th>
<th>Network Study</th>
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<tr>
<td>Actor maps</td>
<td>PARTNER</td>
<td>Research design</td>
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<td>Mind maps</td>
<td>Polinode</td>
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<tr>
<td>Issue maps</td>
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<tr>
<td>Causal-loop diagrams</td>
<td>Keynetiq</td>
<td></td>
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</tbody>
</table>
HOW HAVE YOU USED NETWORK MAPPING AND/OR ANALYSIS IN YOUR WORK (OR SEEN IT USED)?
STUDY OVERVIEW
BETTER HEALTH TOGETHER

- **Alison Carl White**, BHT, Executive Director (Executive Sponsor)
- **Hadley Morrow**, BHT, Director of Community Engagement (BHT content expert, survey implementation, and BHT management oversite)
- **Justin Botejue**, BHT, ACH Program Manager (BHT content expert, survey implementation)
- **Devon Wilson**, BHT, Project Manager (BHT content expert)
- **Omar Sawyer**, BHT, Associate Director (BHT content expert)

SPOKANE REGIONAL HEALTH DISTRICT

- **Stephanie Bultema**, SRHD, Epidemiologist 2 (project lead: study design, implementation, analysis, and reporting)
- **Amy Riffe**, SRHD, Epidemiologist 2 (development of CLMs in ArcGIS Online, data transformation, technical review of reports)
- **Stacy Wenzl**, SRHD, Data Center Program Manager (SRHD management oversite and review of reports)
- **Boyd Foster**, SRHD, Epidemiologist 1 (final edit of reports)
- **Ashley Beck**, SRHD, Senior Research Scientist (project planning guidance)
• Better Health Together (BHT)
  • 6 counties, 3 tribal nations
  • ~600,000 people
  • Urban and rural
RESEARCH QUESTIONS

What does Eastern Washington’s health system look like?

Where is the health system focusing its efforts?

Which organizations are key participants in Eastern Washington’s health system?

How do these participants interact with one another?

How do subsystems differ by sector, geographic service area, and linkage type?
METHODS

Survey
- Electronic and paper survey
- Relational, categorical, and open-ended questions

Sample
- 3-phase snowball sampling method to network bounding
  - Organization n=564
  - Unique Partnerships n=9,039
  - All Linkages n=17,417
  - 34% survey response rate

Tools
- Snap Survey
- Gephi
- Stata
- ArcGIS Online
- Piktochart
RESULTS
WHAT DOES EASTERN WASHINGTON’S HEALTH SYSTEM LOOK LIKE?
HOW DO ORGANIZATIONS INTERACT WITH ONE ANOTHER?

- **COLLABORATION**: Collaboration could include exchanging information, attending meetings together, sharing resources, completing joint projects, etc.

- **REFERRAL**: Client/patient referrals could include referring an individual to a healthcare provider, specialist, community support group, social service, etc.

- **DATA EXCHANGE**: Client/patient data exchange includes the transfer of any personally identifying information.

- **EDUCATION**: Education could include trainings, presentations, seminars, workshops, etc.

- **FINANCIAL SUPPORT**: Financial support could take the form of grants, contracts, or other financial contributions, etc.
### HOW DO SUBSYSTEMS DIFFER BY LINKAGE TYPE?

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<th># Orgs</th>
<th># Linkages</th>
<th>Graph Density</th>
<th>Avg. Degree</th>
<th>A.W. Degree</th>
<th>Network Diameter</th>
<th>Avg. Path Length</th>
<th>Avg. Clustering Coefficient</th>
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<td>1.3</td>
<td>4</td>
<td>1.5</td>
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HOW DO SUBSYSTEMS DIFFER BY GEOGRAPHIC SERVICE AREA?

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<th>Region</th>
<th># Orgs</th>
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<th>Graph Density</th>
<th>Avg. Degree</th>
<th>A.W. Degree</th>
<th>Network Diameter</th>
<th>Avg. Path Length</th>
<th>Avg. Clustering Coefficient</th>
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<td>16</td>
<td>30.9</td>
<td>4</td>
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<td>0.39</td>
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<tr>
<td>Adams &amp; Lincoln County</td>
<td>57</td>
<td>93</td>
<td>0.03</td>
<td>1.6</td>
<td>3.2</td>
<td>4</td>
<td>2</td>
<td>0.13</td>
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<td>Northeast Tri-County</td>
<td>119</td>
<td>401</td>
<td>0.03</td>
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<td>3,555</td>
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<td>4</td>
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<td>4.74</td>
<td>11</td>
<td>3</td>
<td>2.2</td>
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HOW DO SECTORS INTERACT WITH ONE ANOTHER?
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<th># Orgs</th>
<th># Linkages</th>
<th>Graph Density</th>
<th>Avg. Degree</th>
<th>A.W. Degree</th>
<th>Network Diameter</th>
<th>Avg. Path Length</th>
<th>Avg. Clustering Coefficient</th>
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<tr>
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<td>564</td>
<td>9,039</td>
<td>0.06</td>
<td>16</td>
<td>30.9</td>
<td>4</td>
<td>2.3</td>
<td>0.39</td>
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<td>Social Sector</td>
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<td>2.2</td>
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<td>0.09</td>
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<td>4</td>
<td>2.1</td>
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<td>Public Sector</td>
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<td>5</td>
<td>2.3</td>
<td>0.12</td>
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<td>0.4</td>
<td>5</td>
<td>2.3</td>
<td>0</td>
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</table>

**How Do Subsystems Differ by Sector?**
3 CONSIDERATIONS WHEN TRANSFORMING A HEALTH SYSTEM
Community

- Diversity of participants
- Centrality of coordinating entity
- Equity in representation and governance

context, engagement, and participation
Collaborative networks addressing a broad problem set should have diverse member representation.

(Mitchell and Shortell 2000; Towe et al. 2016; Emerson and Nabatchi 2015)
SURVEY PARTICIPATION VS. NETWORK REPRESENTATION

Organization Participation and Representation by Sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Survey Participation</th>
<th>CLM Representation</th>
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<tr>
<td>Social</td>
<td>41%</td>
<td>5%</td>
</tr>
<tr>
<td>Health</td>
<td>21%</td>
<td>14%</td>
</tr>
<tr>
<td>Public</td>
<td>8%</td>
<td>18%</td>
</tr>
<tr>
<td>Education</td>
<td>27%</td>
<td>19%</td>
</tr>
<tr>
<td>Business</td>
<td>41%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Organization Participation and Representation by Geographic Service Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Survey Participation</th>
<th>CLM Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams &amp; Lincoln Counties</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Northeast Tri-County</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Spokane County</td>
<td>67%</td>
<td>48%</td>
</tr>
<tr>
<td>Tribal</td>
<td>2%</td>
<td>17%</td>
</tr>
<tr>
<td>Regional</td>
<td>20%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Ensuring equitable representation of historically underrepresented groups is a vital component of successful health systems.

(Towe et al. 2016; Emerson and Nabatchi 2015)
SAMPLE VS. BOARD REPRESENTATION

Geographic Service Area Representation

- Adams & Lincoln
- Northeast Tri-County
- Spokane
- Tribal
- Regional

Sector Representation

- Business
- Education
- Public
- Health
- Social

CLM Representation
2017 Board Representation
2018 Board Representation
Health systems with a coordinating entity that have high centrality are associated with better outcomes.

(Burt 1982; Provan and Milward 1995; Mitchell and Shortell 2000)
COLLABORATION NETWORK

Nodes sized by in-degree.

BHT = orange node
RECAP

Considerations when working to improve your ACH at the systems level:

Understand your community and involve them throughout the entire process!

1. Diversity
   - Strive for representative participation
     ➢ Engage underrepresented groups

2. Equity
   - Ensure equitable distribution of power
     ➢ Invite marginalized counties/sectors to decision-making tables and ensure resources are equitably distributed

3. Centrality
   - Work to increase coordinating entity’s centrality
     ➢ Connect with diverse organizations
WHAT’S NEXT?

Repeat study in 2019
• What’s changed?
• Where are opportunities for improving care coordination?
• How have network interventions changed Eastern Washington’s health system?

ACH-focused dissertation!
REFLECTING ON THE 3 CONSIDERATIONS

- How have you seen communities be effectively engaged in ACHs?
- How is diversity and equity honored in your ACH’s work?
- What has your experience been like with centralized vs. decentralized health systems?
How does the system context shape your ability to effectively collaborate?

The system context includes things like:
• Existing community strengths
• External initiatives
• Funding
• Public service or resource conditions
• Policy & legal frameworks
• Socioeconomic & cultural characteristics
• Network characteristics
• Political dynamics & power relations
• History of conflict
How do collaboration dynamics in your ACH contribute to the achievement of outcomes?

Collaboration dynamics include things like:
• Developing a shared vision and common agenda
• Levels of trust and commitment among participants
• Governance structure
• Leadership capacity
• Distribution of power

Outcomes include things like:
• Engaged leaders and community
• Systems change
• Improved health equity
• Lower health care costs
What kinds of questions do you have about how ACHs operate?
What kind of research would you like to see done?
Stephanie Bultema
CU Denver School of Public Affairs – PhD Student Research Consultant – Bultema Consulting LLC Center on Network Science – Senior Researcher Email: stephanie.bultema@ucdenver.edu LinkedIn: https://www.linkedin.com/in/sbultema

THANK YOU!

KEY REFERENCES


9. Next to each organization below, mark the box for each type of work you did with that organization in the last year. You may select more than one type of work done with each organization. Blank boxes indicate no work of that type was done with the listed organization in the last year. If you notice an organization is missing from the organization lists, you will have the opportunity to add it in manually at the end of this section.

Organizations have been divided into the following sectors:
- **BUSINESS**: Private sector, businesses, and economic development.
- **PUBLIC**: Government, libraries, fire, police, etc.
- **SOCIAL**: Non-profit, faith-based, social services, community centers, etc.
- **HEALTH**: Hospitals, clinics, health care providers, public health, etc.
- **EDUCATION**: School districts, higher education, early learning, education centers.

### ADAMS COUNTY & LINCOLN COUNTY ORGANIZATIONS BY SECTOR

#### ADAMS & LINCOLN COUNTIES: BUSINESS

<table>
<thead>
<tr>
<th>Organization</th>
<th>Collaborate</th>
<th>Send Referrals</th>
<th>Receive Referrals</th>
<th>Send Data</th>
<th>Receive Data</th>
<th>Provide Education</th>
<th>Receive Education</th>
<th>Send Financial Support</th>
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#### ADAMS & LINCOLN COUNTIES: PUBLIC

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<th>Organization</th>
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<th>Receive Referrals</th>
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*Continue on the next page*
**APPENDIX B**

Survey example - snowball

### REGIONAL, continued...

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<th>Send Data</th>
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<th>Provide Education</th>
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9.b. Please list other organizations with which your organization has (or would like to have) worked in the last year that are not listed above:

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