The Challenge: Quantify Community Health Networks

● Our research objective:
  - Quantify and describe the network of organizations that has emerged in each Blueprint HSA to support population and individual health, focusing on modes of collaboration and relationships between organizations.

● A first step towards key questions about the Blueprint:
  - What role did investment in core Community Health Teams have in seeding these larger networks?
  - How are the relationships maintained and reinforced – how durable are they?
  - What characteristics do the most successful networks share?
  - What is the impact of these networks on population health?
Focus on Organization / Organization Relationships

- Relationships between organizations are the unit of analysis
- Which organizations? Project Managers id’ed:

<table>
<thead>
<tr>
<th></th>
<th>Hospitals</th>
<th>Mental health and substance abuse providers</th>
<th>Health clubs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary care offices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State health, social and economic services</td>
<td>Assisted living facilities</td>
<td>Community service organizations</td>
<td>Law enforcement and corrections</td>
</tr>
<tr>
<td>Legislators</td>
<td>Religious organizations</td>
<td>Home health providers</td>
<td>Pharmacists</td>
</tr>
<tr>
<td>Transportation</td>
<td>Advocacy groups</td>
<td>Schools</td>
<td>And more . . .</td>
</tr>
</tbody>
</table>

- Relying on **people** for the data: leadership, direct service providers, others
Observation Research
Meeting Observation

- The Blueprint mandates that a cross-disciplinary “Integrated Health Services Workgroup” meet in each HSA
  - Blueprint recommends services/functions to include, HSA picks invitees
  - HSAs choose the structure, frequency
  - Between 1 and 3 standing meetings per HSA
  - Usually monthly (a few are quarterly)

- VCHIP observed 15 of these meetings, in 11 HSAs
Observation Findings

- Attendance is high = meetings are valued
- Expertly run meetings, with defined goals and clear agendas
- 2 main meeting purposes
  - Steering / oversight of Blueprint activities in the community, including medical home implementation and CHT
  - Case-based service integration
- Unexpected but critical benefit - site for peer support and peer-to-peer communication during time of rapid change
- Consider problem/solution oriented sub-groups
Survey & Network Analysis
Network Survey

- 422 participants, representing organizations in 15* HSAs
- 54% response rate!
- We asked about:
  - Perceptions of “teamness”
  - Benefits and drawbacks of working together
  - How respondents’ organizations interact with each other (their network)

*Counting 1 sub-HSA network (White River Jct.)
Are Blueprint Communities Teams?

- Starting point: the Institute of Medicine’s (IOM) paper “Core Principles & Values of Effective Team-Based Health Care.”
- The Blueprint for Health embraces this paper’s model as a goal for both direct clinical care and multidisciplinary community health improvement.
- Survey asked about the IOM’s 5 Principles:
  - Shared goals
  - Mutual trust
  - Clear roles
  - Effective communication
  - Measurable processes and outcomes
Blueprint Communities are Teams

Average % of Respondents Who "Agree" or "Strongly Agree" that the Group of Organizations in their HSA Exhibit the Following Characteristics of Team-Based Care

- Shared Goals: 79%
- Mutual Trust: 76%
- Effective Communications: 69%
- Clear Roles: 68%
- Measurable Processes and Outcomes: 38%
Why Work Together?

- The benefits have to be big, and the drawbacks minor

<table>
<thead>
<tr>
<th>≥94% have experienced</th>
<th>Building new relationships</th>
<th>Ability to serve my clients better</th>
<th>Acquisition of new knowledge or skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heightened public awareness of my organization</td>
<td>Better use of my organization’s resources</td>
<td>Greater capacity to serve the community</td>
<td>Enhanced influence in the community</td>
</tr>
</tbody>
</table>

| 60% have experienced | Taking too much time and resources | 46% have experienced | Difficultly in dealing with partner organizations |

VCHIP
Vermont Child Health Improvement Program
UNIVERSITY OF VERMONT COLLEGE OF MEDICINE
Documenting Connections

- We asked respondents to indicate whether their organization has interacted with other organizations in these ways:
  - Sharing information
  - Sharing resources
  - Sending referrals
  - Receiving referrals

- This data, a simple list of connections between organizations, is the basis for our network analysis
What is Network Analysis?

- Network Analysis is mapping and measuring relationships.
- For the first time, we can see how organizations work together.
- The analysis also quantifies these networks – how big, how connected, how cliquish, and more.
- A few caveats
  - A partial picture
  - A single point in time
  - Shows how (but not why)
Sample HSA
What you’re about to see

- Nodes (dots) represent organizations and edges (lines) represent connections between them.
- The network analysis software (we used Gephi) maps organizations and their relationships using a force-based algorithm – nodes that are connected attract each other and nodes that are not connected are pushed further apart.
- We’ve chosen to:
  - Size the nodes based on betweenness centrality.
  - Color the full graphs based on sub-network/neighborhood membership.
Resource Network

Rutland County Housing Coalition
BROC (Community Action in Southwestern Vermont)
Rutland United Neighbors
Department of Corrections
Interage
Vermont Psychiatric Survivors
Rutland City Police Department
Stafford Technical Center
211 Vermont
Division for the Blind and Visually Impaired
BCBS VT
RSVP
Boys and Girls Club
Marble Valley Transit
Vermont Agency of Human Services
Vocational Rehab
Rutland County Parent Child Center
Rutland City School District
Rutland County Women's Network and Shelter
Southwestern Vermont Council on Aging
Rutland Mental Health
Rutland Mental Health - Rutland Area Prevention Coalition
Bayada
Vermont Center for Independent Living
Castleton Senior Center
Vermont Adaptive Ski and Sports
CCVI (Community College of Vermont)
Proctor High School
Castleton Cares
Mountain View Care, Genesis
Mentor Connector
Veterans Affairs
Open Door Mission
Dodge House
Fair Haven Concerned
Choices for Care
Southern Vermont Area Health Education Center
Rutland Housing Authority
Prevent Child Abuse Vermont
Vermont Department of Health (VDH)
The Pines at Rutland
Vermont Achievement Center
RRMC - Emergency Department
Rutland Regional Medical Center (RRMC)
RRMC - Community Education
RRMC - Case Management, Utilization, and Social Work
RRMC Chronic Care Initiative (VCCI)
United Way of Rutland County
Rutland Free Clinic
Rutland Area Visiting Nurses and Hospice
RRMC/Blueprint Community Health Team
Recovery House
CHCRR (Community Health Centers of the Rutland Region)
Practice of Jennifer Faustmeyer, MD
Practice of Beverly Roseberry, MD
Practice of Drs. Peter and Lisa Hogenkamp
Marble Valley Healthworks
Referrals Network
Observations of the Rutland Network

● Central Organizations
  ▪ The Blueprint Community Health Team has a prominent role across maps
  ▪ The Rutland Housing Authority is a go-to organization for resource sharing – Rutland Mental Health is also prominent in the resources network
  ▪ The Rutland Area Visiting Nurses and Hospice is active in sending and receiving referrals

● Network Characteristics
  ▪ 13% of all possible connections are present
  ▪ Rutland has an inclusive network, it’s not just the expected players – also adaptive ski and sports, a youth center, mentoring and volunteer services

● Unique Features
  ▪ The Police Department and Department of Corrections are well represented in this network
Selected Additional Networks
Morrisville

<table>
<thead>
<tr>
<th>Shows</th>
<th>Vs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many high-centrality orgs</td>
<td>Centralized leadership</td>
</tr>
<tr>
<td>Full participation of primary care offices</td>
<td>Primary care offices not represented</td>
</tr>
</tbody>
</table>
### Shows vs. A BIG network

<table>
<thead>
<tr>
<th>Shows</th>
<th>Vs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A BIG network</td>
<td>A small network</td>
</tr>
<tr>
<td>Clustering / modularity</td>
<td>No sub-networks</td>
</tr>
<tr>
<td>Sub-networks formed around populations</td>
<td>Sub-networks formed around geography or other factors</td>
</tr>
<tr>
<td>served</td>
<td></td>
</tr>
</tbody>
</table>
Similarities Across Networks – What We’ve Learned

- Network density varies with network size, but all Blueprint HSA networks appear relatively dense
- All sub-networks are well-integrated into their network
- Blueprint Community Health Teams are “Key Players” in most networks – instrumental in holding their networks together
- These networks are durable
Ongoing Investigations

- Possibility of additional analyses using existing data
  - Currently running analyses to find “key players” and “network backbones”
  - UVM MPA Systems Class using the data for a service-learning project, studying (among other things) how sector impacts relationships within the networks
  - Possibility of studying relationships between network characteristics and health outcomes . . . And other analyses yet to be imagined

- Plan to re-survey, study change in the networks over time

- Engaging communities to share findings, continue learning
Engaging Communities

- Results to be presented in each HSA
- Asking communities to help us make sense of the maps – provide the “Why”
- Creating an opportunity for each community to reflect on the network they have today and the network they envision for the future
Questions for Reflection & Evolution

1. Which community agencies are most central in the network? Are there certain responsibilities that come with centrality?

2. Are critical network ties based solely on personal relationships, or have they become formalized so that they are sustainable over time?

3. Are some network relationships strong while others are weak? Should those relationships that are weak be maintained as is, or should they be strengthened?

4. Which subgroups of network organizations have strong working relationships? How can these groups be mobilized to meet the broader objectives of the network?

5. What community organizations are not represented on this graph? Is this accidental (an oversight) or does it reflect a true disconnect from the network?

6. Which core network members have links to important resources through their involvement with organizations outside the network?

7. What have been the benefits and drawbacks of collaboration, have these changed over time, and how can benefits be enhanced and drawbacks minimized?