# Mapping & Measuring Community Health Networks

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UNIVERSITY OF VERMONT COLLEGE OF MEDICINE

# 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:

| | | | |
|---|---|---|---|
| Primary care offices | Hospitals | Mental health and substance abuse providers | Health clubs |
| State health, social and economic services | Assisted living facilities | Community service organizations | Law enforcement and corrections |
| Legislators | Religious organizations | Home health providers | Pharmacists |
| Transportation | Advocacy groups | Schools | And more . . . |

- Relying on <u>people</u> for the data: leadership, direct service providers, others

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# 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

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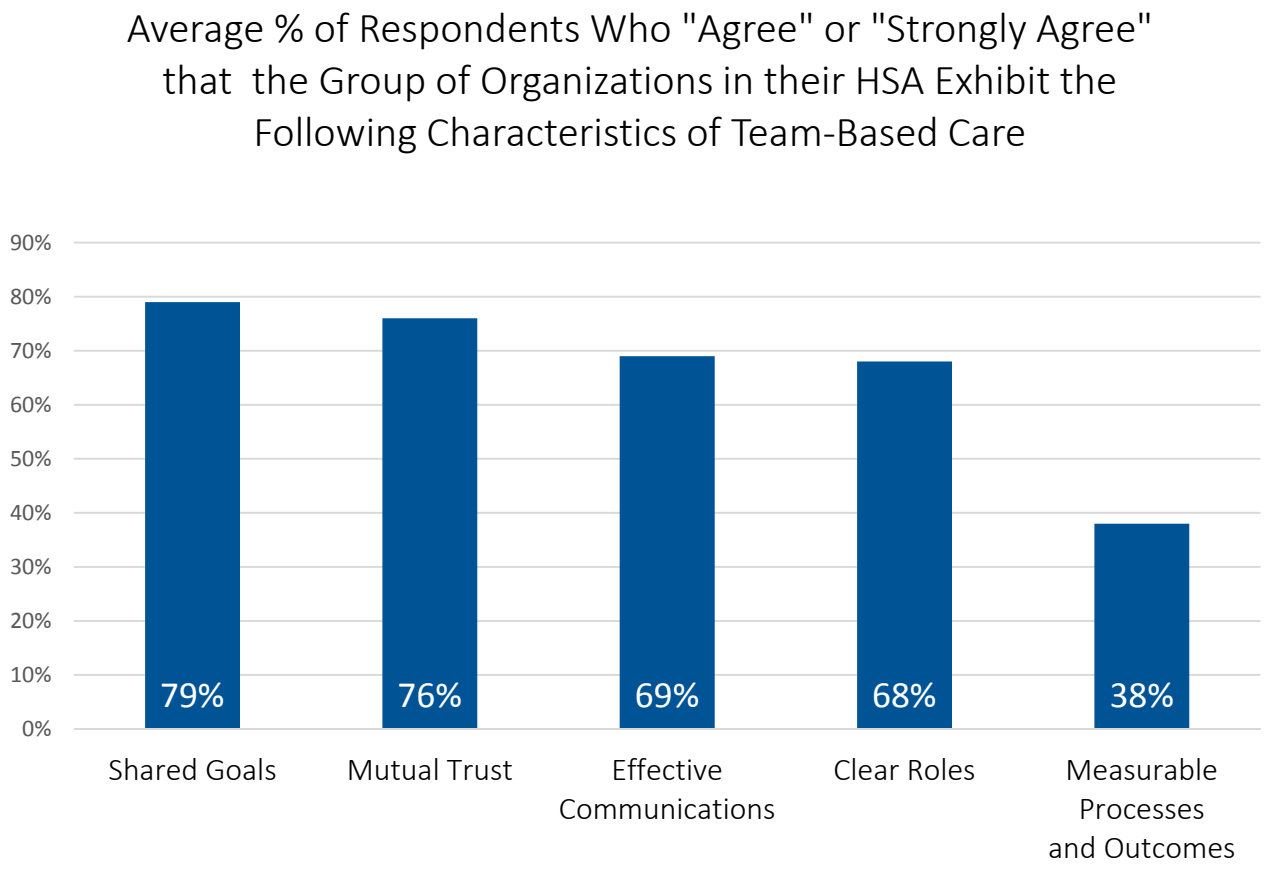
# Blueprint Communities are Teams

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# Why Work Together?

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

| | | | |
|---|---|---|---|
| ≥94% have experienced | Building new relationships | Ability to serve my clients better | Acquisition of new knowledge or skills |
| Heightened public awareness of my organization | Better use of my organization's resources | Greater capacity to serve the community | Enhanced influence in the community |

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

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# 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?

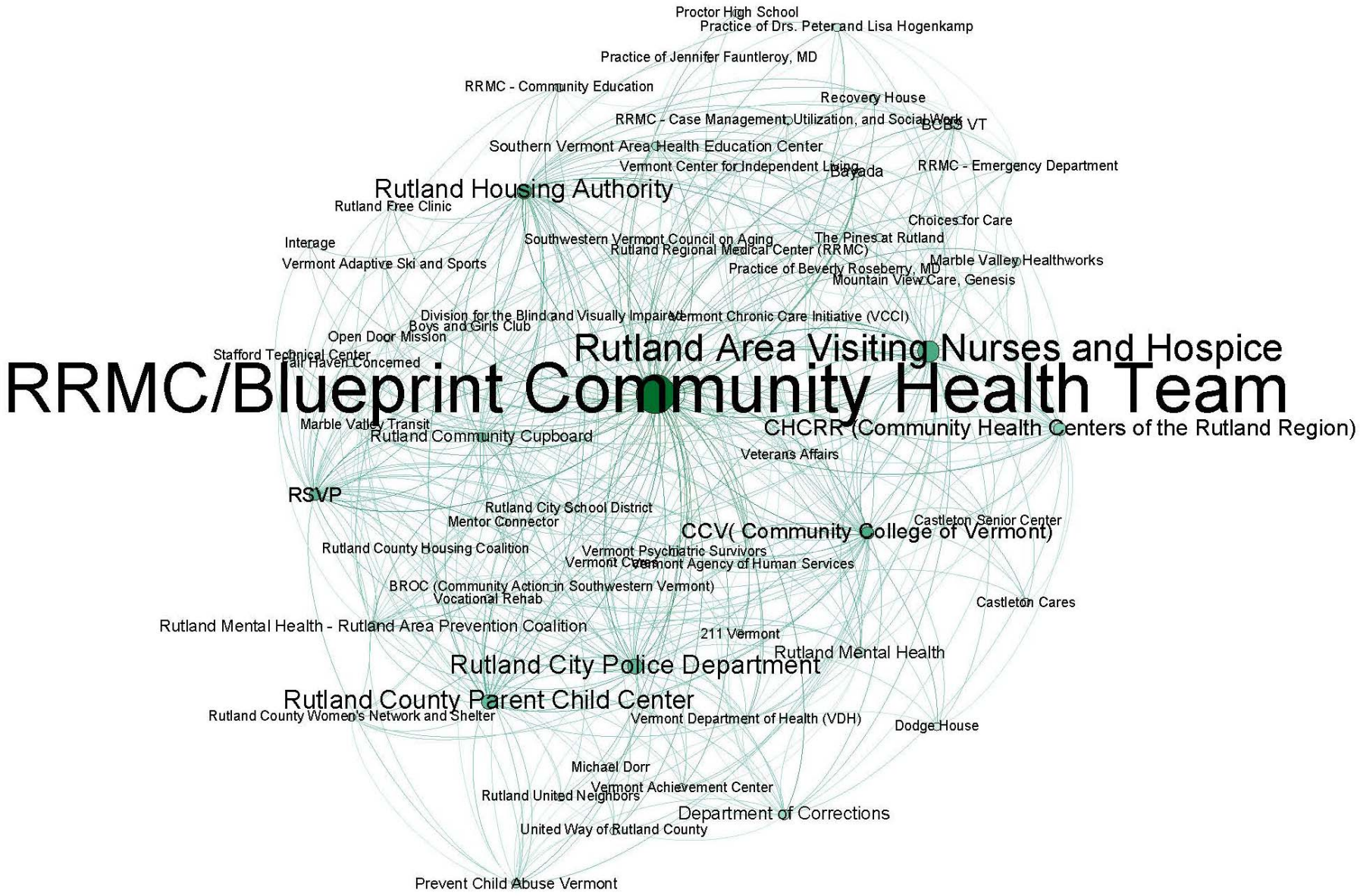
- Network Analysis is mapping and measuring relationships
- For the first time, we can <u>see</u> how organizations work together
- The analysis also quantifies these networks – how big, how connected, how cliquish, and more
- A few caveats
  - A partial picture
  - A single point in time
  - Shows how (but not why)

# Sample HSA

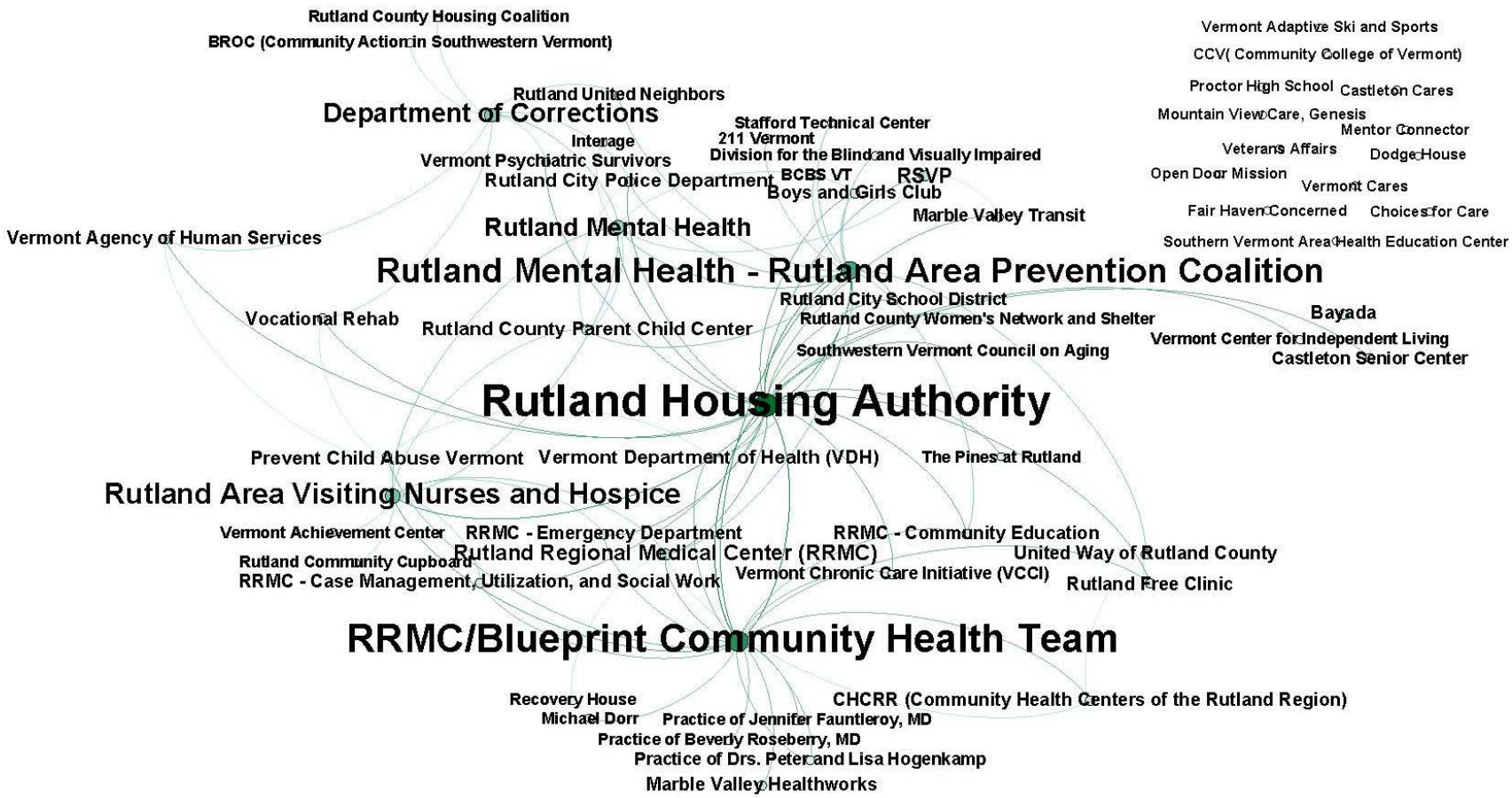
# What you're about to see

- 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

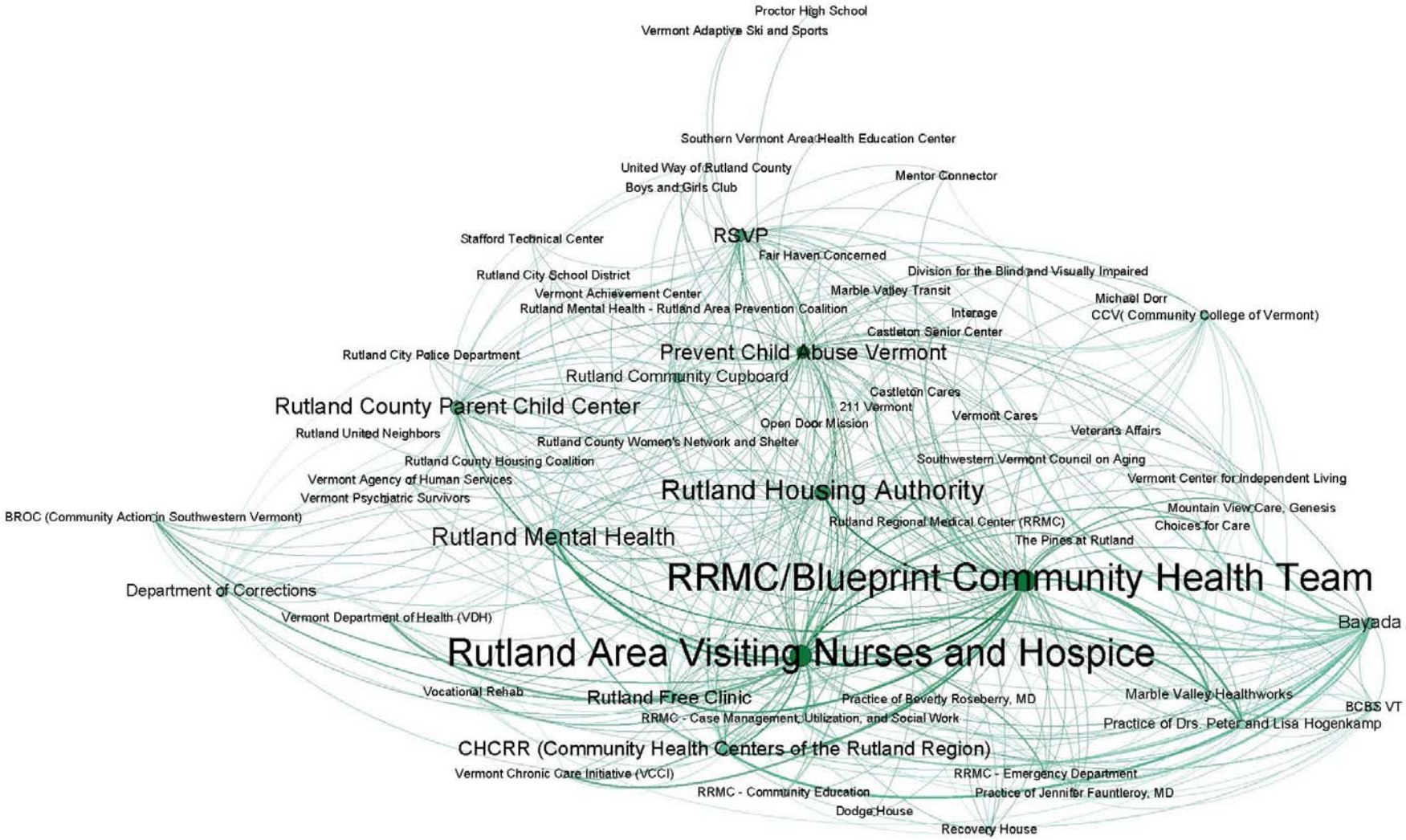
# Information Network



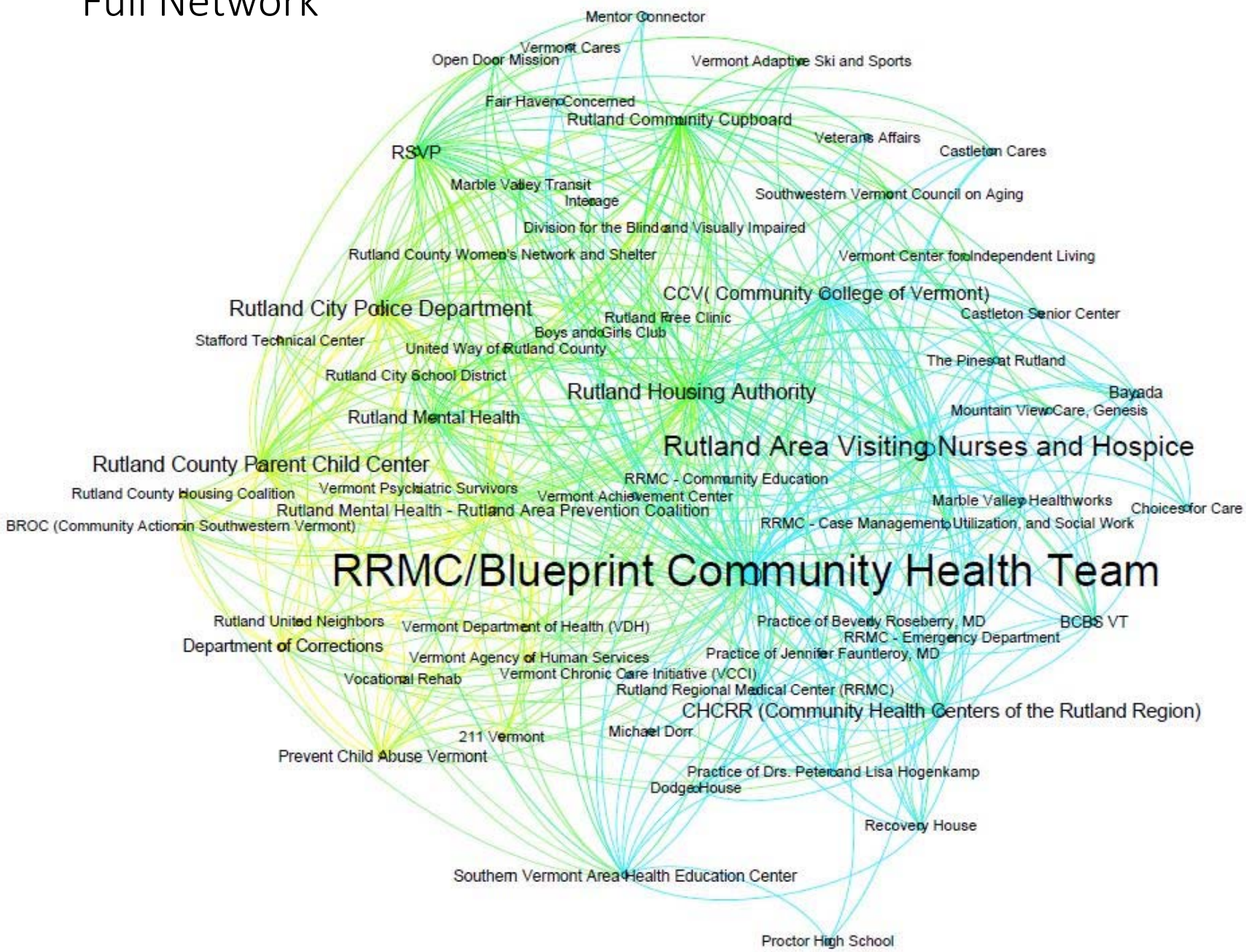
# Resource Network



# Referrals Network



# Full Network

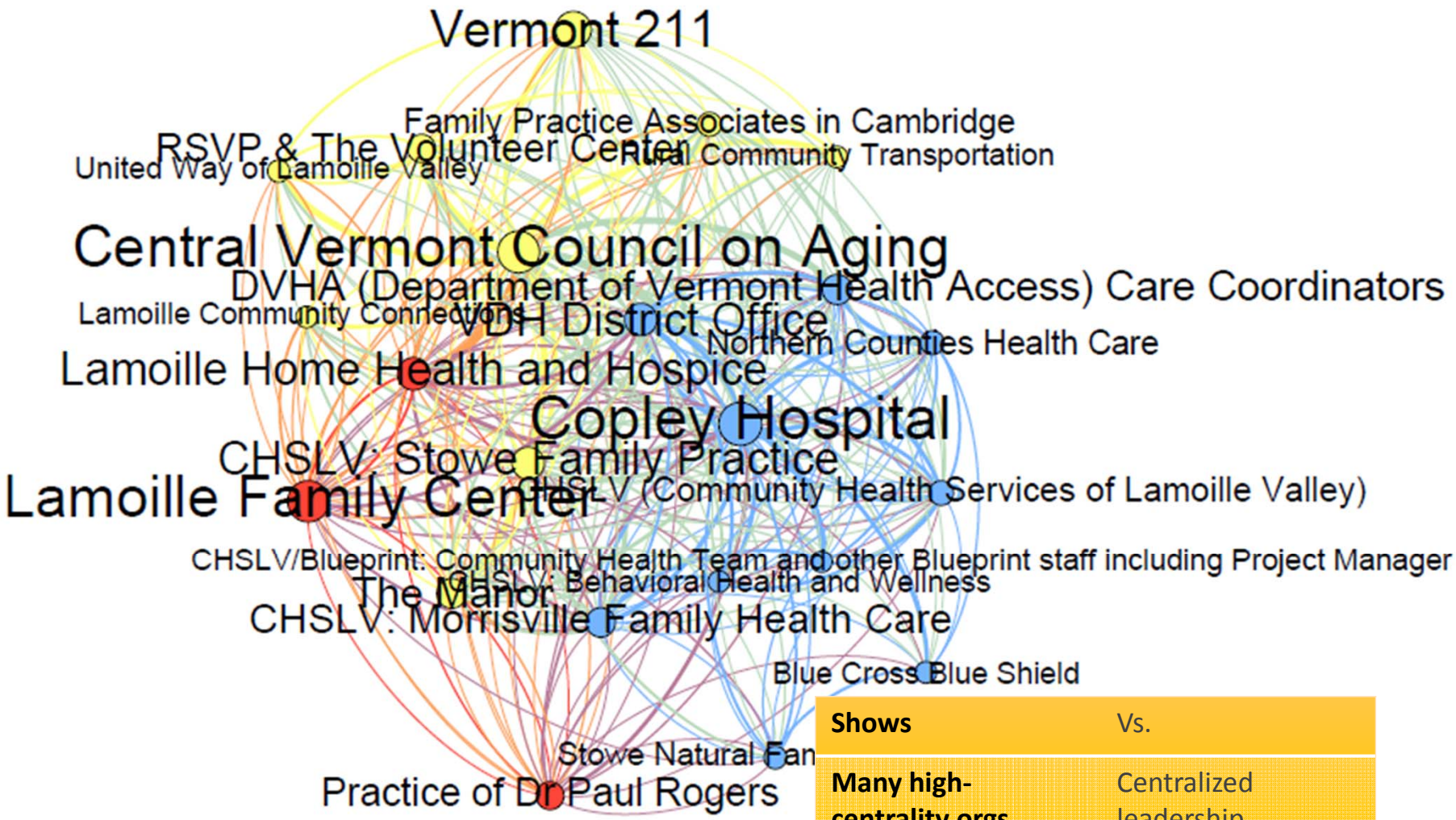


# Observations of the Rutland Network

- 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

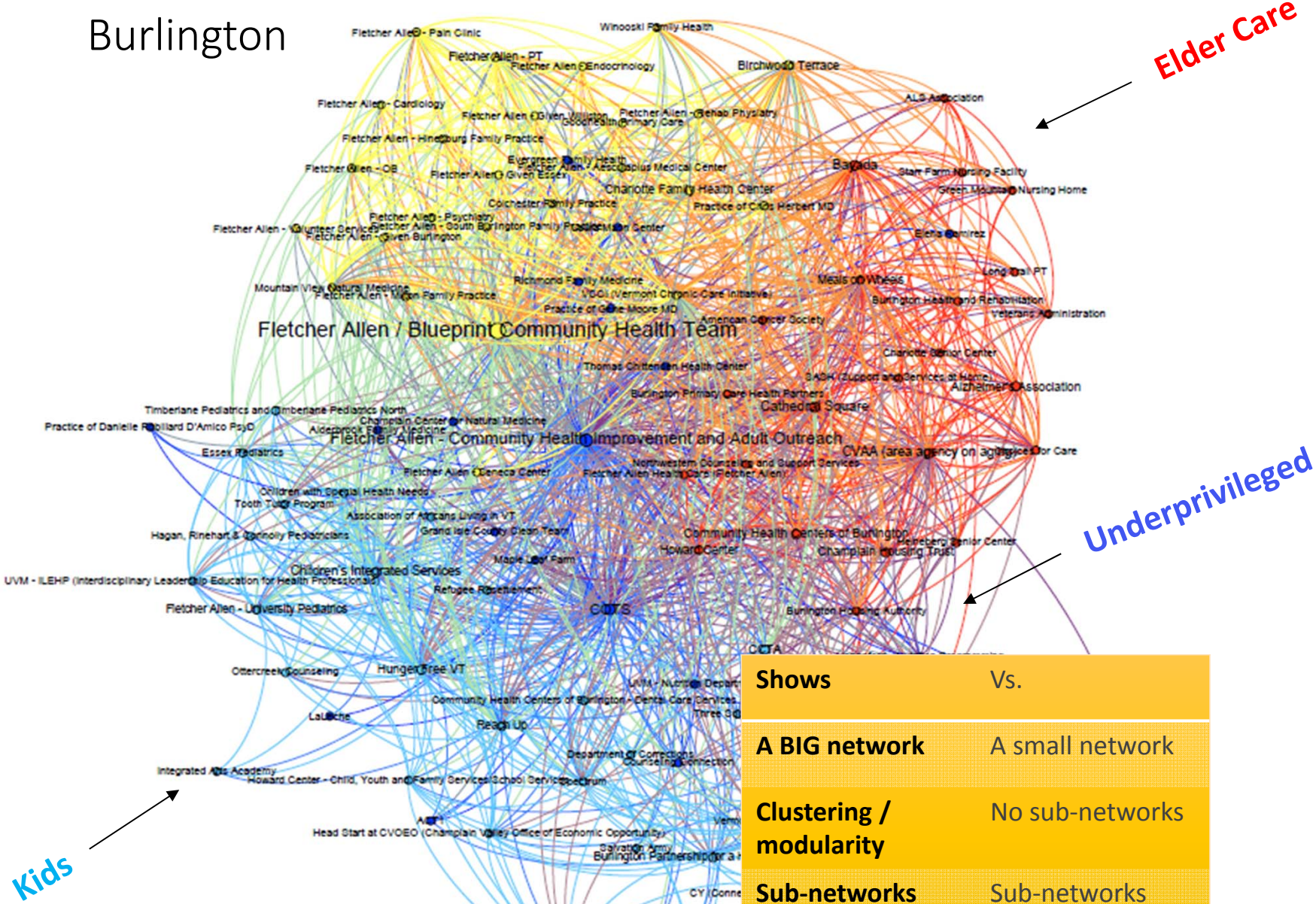
# Selected Additional Networks

# Morrisville




| Shows | Vs. |
|---|---|
| **Many high-centrality orgs** | Centralized leadership |
| **Full participation of primary care offices** | Primary care offices not represented |

# Burlington




| Shows | Vs. |
|---|---|
| **A BIG network** | A small network |
| **Clustering / modularity** | No sub-networks |
| **Sub-networks formed around populations served** | Sub-networks formed around geography or other factors |

# 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

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# 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?

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