

Vermont Blueprint for Health

Windsor Area Community Network Report

Network Analysis and Team Based Care

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Objective

Describe the network of organizations that has emerged in each Blueprint Health Service Area (HSA) to support population and individual health, focusing on modes of collaboration and relationships between organizations.

Background and Key Questions

The Vermont Blueprint for Health is a state-led, nationally-recognized initiative transforming the way primary care and comprehensive health services are delivered and paid for. The Blueprint encourages the growth of regionally-based multi-disciplinary networks of health, social and economic service providers. These networks are intended to bring a diverse group of service providers closer together, to deliver more seamless and holistic care to the people of their regions. This study is the first step towards answering key questions about the networks that are active in Blueprint communities: *What role did investment in core Community Health Teams have in seeding these larger networks? How are the participating organizations connected to each other? How are these relationships maintained and reinforced – how durable are they? What characteristics do the most successful networks share? And, ultimately, what impact do they have on individual and population health?*

Approach

This study used a combination of network analysis, investigating connections between organizations, and traditional polling methodology, addressing the experience of working together as a team.

Network Analysis

Network analysis was the central methodology in this study, used for its ability to characterize and quantify relationships in a complex system. Network analysis creates graphs that show the connections between individuals or (as in this case) organizations. With these graphs and quantitative network data, researchers and community members can explore the relationships that make up the network and start to look for patterns as well as changes over time. Observations of network data and network graphs can lead to smarter, better questions about how community-based teams coalesce and how they create change.

The data used in this study are responses to a survey question that asked representatives of organizations to report whether their organization interacted with other organizations in their area in any (or all) of six ways, stated as follows:

1. “My organization sends referrals to this organization”
2. “My organization receives referrals from this organization”
3. “Our organizations have clients/patients in common”
4. “Our organizations share information about specific clients/patients”
5. “Our organizations share information about programs, services and/or policy”
6. “Our organizations share resources (e.g. joint funding, shared equipment, personnel or facilities)”

Additionally, several questions were included in the study that were not intended for network analysis. These included demographic questions and a set of questions about whether respondents perceived their communities to be acting as teams.

Team Based Care

In 2012 The Institute of Medicine (IOM) published the discussion paper [“Core Principles & Values of Effective Team-Based Health Care.”](#) The Vermont Blueprint for Health embraces this paper’s model, of how a team should function and feel, as a goal for both direct clinical care and multidisciplinary community health improvement. The five hallmarks of effective team based care given by the IOM are Shared Goals, Mutual Trust, Clear Roles, Effective Communication, and Measureable Processes and Outcomes. In the FY2015 survey, respondents were asked to think about how all of the organizations listed work together as group, and agree or disagree with statements about whether they exhibit each of those hallmarks of team-based care.

List Development

Over the course of the 2015 network survey, the list development methodology used for this study was adjusted twice in response to findings from the research, which was conducted in waves. Each adjustment pushed the network bounding towards greater consistency across HSAs and towards smaller network membership lists and shorter survey instruments.

This HSA was in the first wave of communities surveyed, using the Hybrid Network List Development approach. With this methodology, the network lists began with the lists used in a prior year's network analysis study. These lists were provided by the area's Project Manager. The previous survey instrument included an option for respondents to write-in organizations they believed were part of their area's network, but that weren't already listed. Some of these organizations were included in the latest network list, depending on the whether contact information was readily available for an appropriate potential respondent at the organization.

Additionally, the Blueprint team determined it would be helpful to have a core group of types of organizations consistently included in each HSA's network survey. The list of those types of organizations is given below.

Types of Organizations Included in Hybrid Network List Development	
Key	Organization
<i>Green means mandatory</i>	CHT
	Primary Care Practices
	Hospital
	Hospital - Emergency Department
	Hospital - Case Management/Social Work
<i>Yellow means optional</i>	Other Hospital Departments
	FQHC Dental
	Private or Hospital Dental
	Pharmacies
	Designated Mental Health Agency
	Designated Mental Health Agency - Developmental Services
	Designated Mental Health Agency - Emergency Services
	Designated Mental Health Agency - Adult Outpatient Services
	Designated Mental Health Agency - Community Rehabilitation and Treatment
	Designated Mental Health Agency - Children's Services
	"Hub" of Hub/Spoke Program
	Other mental health/substance abuse agencies/organizations
	VNA
	Area agency on aging
	Home care providers
	Nursing homes
	Designated Regional Housing Organizations / SASH Program
	Law enforcement

	Schools k-12
	Colleges
	Vocational programs
	Health/Medical Training programs
	AHEC
	Children's Integrated Services
	Parent child center(s)
	State of VT - Agency of Human Services (AHS)
	State of VT - AHS - Children with Special Health Needs (CSHN)
	State of VT - AHS - Department of Children and Families (DCF)
	State of VT - AHS - Department of Corrections
	State of VT - Department of Vermont Health Access (DVHA)
	State of VT - DVHA - Vermont Chronic Care Initiative (VCCI)
	State of VT - Vermont Department of Health (VDH)
	State of VT - VDH - Children with Special Health Needs (CSHN)
	Transit
	Food shelf
	Employment services
	United Way
	Vermont 2-1-1

Survey Participation

Invitations Sent	37
Surveys Started	27
Response Rate	73%
Completed Surveys	21
Completion Rate	78%

Organizations	Completed Survey
Aging in Hartland	Y
Bayada Home Health Care & Hospice	Y
Cedar Hill	
Change the World Kids	
Granite United Way	
Habit OPCO - West Lebanon	
Health Care & Rehabilitation Services of Vermont (HCRS)	Y
HCRS - Children's Integrated Services	
Historic Homes of Runnemedede	Y
Mt. Ascutney Hospital and Health Center (MAHHC)	Y
MAHHC - Case Management	Y
MAHHC - Emergency Department	
MAHHC - Blueprint Community Health Team	Y
MAHHC - Pediatrics	Y
MAHHC - Volunteers in Action	Y
MAHHC - Windsor Connection Resource Center	
MAHHC - Mt. Ascutney Physicians Practice	Y
MAHHC - Mount Ascutney Prevention Partnership (MAPP)	Y
MAHHC - Ottauquechee Health Center	Y
Neighbors Helping Neighbors	
Ottawaquechee Health Foundation	Y
Reading and Albert Bridge School	
Senior Solutions	Y
Southeastern Vermont Community Action (SEVCA)	
Southern Vermont Area Health Education Center (AHEC)	Y
Springfield Area Parent Child Center	
Springfield Housing Authority	
Springfield Housing Authority - SASH	Y
Springfield Supportive Housing	
State of VT - Agency of Human Services (AHS)	
State of VT - AHS - Department of Children and Families (DCF)	

State of VT - AHS - DCF - Economic Services Division	
State of VT - AHS - Department of Corrections (DOC)	
State of VT - AHS - Department of Disabilities, Aging and Independent Living (DAIL)	
State of VT - AHS - Department of Vermont Health Access (DVHA)	
State of VT - AHS - DVHA - Vermont Chronic Care Initiative (VCCI)	Y
State of VT - Vermont Department of Health (VDH)	Y
Thompson Senior Center	
Turning Point Recovery Center	Y
U.S. Department of Veterans Affairs (VA) - White River Junction VA Medical Center	Y
Vermont Adult Learning	Y
Vermont Psychiatric Survivors	
Visiting Nurse and Hospice for Vermont and New Hampshire (VNH)	Y
Windham & Windsor Housing Trust	
Windsor County Court Diversion	
Windsor Food Shelf	
Windsor Jr./Sr. High School	
Windsor Police Department	Y
Windsor School District	Y
Woodstock Union Middle School	
MAHHC – Spoke*	Y
SASH*	Y
Windsor Central Supervisory Union*	Y

*Respondent write-in

Data Analysis

Non-network data analysis was conducted in Survey Monkey and Excel.

Network analysis was conducted using Gephi. Data is input into Gephi in node lists and edge lists. Node lists are lists of the names/labels of the organizations included in the study and a corresponding number. Edge lists are lists of the connections between organizations. In this study each edge list represented all the instances of a single type of connection (sharing resources, for instance) in a single HSA. The edge lists began with an extract of data from Survey Monkey, a grid format recording each connection between organizations. The grids were transformed in a series of steps into the edge lists, which code connections in pairs of numbers giving the “Source” and “Target” of each connection. The edge lists used in this study have been de-duplicated – in cases where multiple respondents answered on behalf of a single organization the connection between that organization and any other organization will appear only once per list. This choice was made to prevent over representing the role in the network of organizations fielding multiple respondents.

Results

Network Analysis Glossary

The following are brief definitions of network terminology that will be used throughout the Results section.

Node

The “nodes” on these graphs are the dots that represent organizations

Edge

The “edges” on these graphs are the lines representing connections between organizations (connections of any sort, whether they represent sharing information, resources, or referrals)

Centrality

Importance or prominence of an actor in a network

Betweenness Centrality

A measure of how often a given node appears on the shortest paths between pairs of nodes in the network. Betweenness Centrality takes the entire network into consideration when calculating a score for an individual node, and is therefore considered one of the most powerful centrality measures.

Average Degree

The average number of edges connected to each node in the network

Average Shortest Path Length

The average number of edges on the shortest path between each pair of nodes in the network

Graph Density

The proportion of all possible connections (represented as edges) that are present

Modularity

A measure of how readily a network decomposes into modular communities or sub-networks. The modularity numbers given here are based on the modularity function used in the Gephi software program (there are many other “modularity” or “community detection” functions that may be used in network analysis).

Network Maps

See Appendix A for the Network Maps

Network Statistics

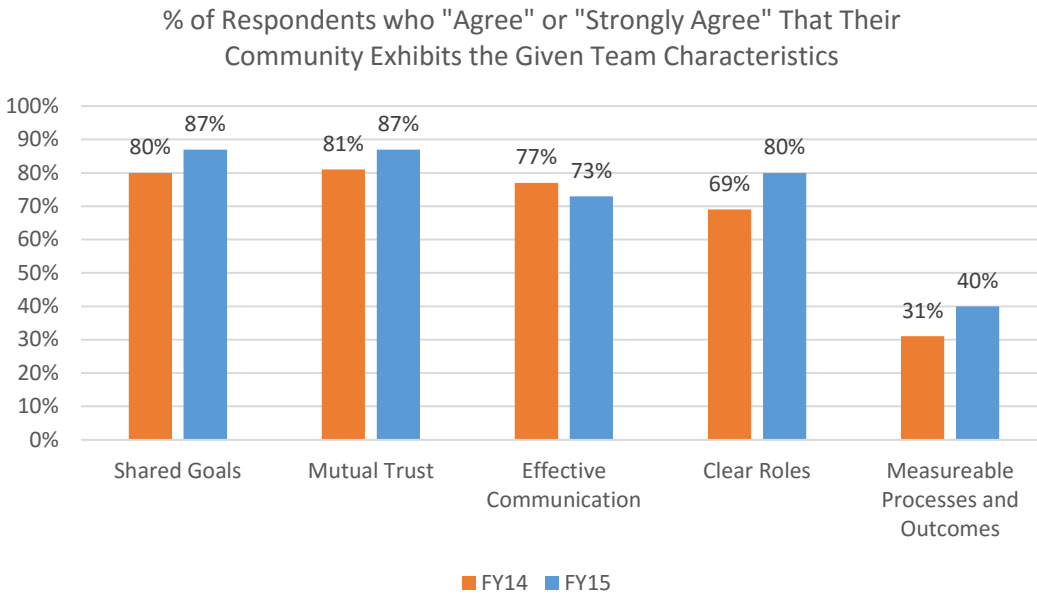
	Common Patients	Info – Patients	Info – Programs	Resources	Referrals	Full Network
Avg. Degree	7.796	5.296	6.426	2.426	8.389	13.852
Avg. Weighted Degree	7.796	5.296	6.426	2.426	12.685	34.63
Network Diameter	4	4	4	4	4	3
Graph Density	0.147	0.147	0.147	0.046	0.158	0.261
Modularity	0.216	0.216	0.158	0.373	0.176	0.169
Avg. Clustering Coefficient	0.492	0.492	0.556	0.274	0.456	0.586
Avg. Path Length	1.701	1.887	1.751	2.13	1.657	1.761

Organization Statistics

Organizations Ranked by Betweenness Centrality	
1	Mt. Ascutney Hospital and Health Center (MAHHC)
2	Springfield Housing Authority – SASH
3	Health Care & Rehabilitation Services of Vermont (HCRS)
4	State of VT – AHS – DVHA – Vermont Chronic Care Initiative (VCCI)
5	Senior Solutions

Organizations with Highest In-Degree	
Mt. Ascutney Hospital and Health Center (MAHHC)	14
Health Care & Rehabilitation Services of Vermont (HCRS)	8
MAHHC – Case Management	7
MAHHC – Ottauquechee Health Center	5
MAHHC – Blueprint Community Health Team	5

Team-Based Care



Observations and Opportunities

The following are the researcher's observations of the network graphs and team based care results, and related questions. Additional observations, questions, and ideas for improving network relationships and effectiveness will be solicited when these findings are presented in the community.

- Mt. Ascutney Hospital and Health Center is the most central organization in the full network, and is alone at the center to a degree not seen in most health service areas.
- Network neighborhoods appear to be formed around populations served. Elder care organizations and housing are clustered in the green network neighborhood. Child and family services, including schools, are clustered in the blue/teal network neighborhood. The purple network neighborhood is a mix of state services and substance abuse recovery services.
- Team-based care measures are more strongly positive than in last year's study. Agreement that the community demonstrated the given qualities of an effective team increased 6-10% across all areas except Effective Communication, where agreement decreased 4%.