

Social Network Analysis: Alliance for the Determinants of Health

The network of community-based services in Weber and Washington Counties and the impact of the Alliance on interorganizational relationships in 2020 - 2022

Introduction

The Alliance for Determinants of Health's goal of improving health outcomes for patients by addressing their social needs is made possible by collaboration with the partner organizations in Washington and Weber Counties that provide vital social services. By convening service providers, providing them with a digital platform to seamlessly communicate, and deploying a team of community health workers tasked with connecting patients to these services, the Alliance aimed to support relationships between organizations and strengthen the local network of community services.

To measure the community improvement associated with the Alliance's demonstration project, PolicyLab conducted a social network analysis (SNA), a survey method used to understand how organizations communicate and collaborate. This SNA examines the ways in which connections between community organizations change over time in response to the tools and structure provided by the Alliance. The COVID-19 pandemic placed unprecedented strain on community-based service agencies and limited organizational operations during periods of virus mitigation policies. While we were not able to fully distinguish the pandemic's impact on the system from the outcomes of the Alliance, we believe our Year 3 results provide a valuable understanding of the current landscape of the local network of community services.

By systematically documenting different types of collaboration between organizations, the SNA serves two functions:

1. As an **evaluation tool**, the SNA provides insights into:
 - Relationships and collaborations between different kinds of organizations
 - The role that the Alliance played in supporting the network of community organizations and how that network changed during the Alliance's implementation
2. As a **quality improvement tool**:
 - At the individual organization level, SNA can identify an organization's close collaborators, while also illustrating potential for future collaborations
 - SNA results can be used to allow individual agencies to visualize and assess their role within the network and to increase their buy-in for future system intervention efforts that promotes inter-organization cohesion.
 - The SNA can also highlight community-level patterns of collaboration between agencies that provide different types of services

This report provides a summary of the work conducted during a series of three annual surveys sent to community organizations in Washington and Weber Counties. The results measure of three different types of connections between community-based organizations: 1) formal relationships; 2) care coordination relationships; and 3) referral relationships.

For further information about the findings explored in this report or the methodology used, please contact Doug Strane (straned@chop.edu).

EXECUTIVE SUMMARY

Understanding Collaboration Between Social Service Organizations

Between January 2020 and May 2022, PolicyLab conducted a survey of community organizations and clinical service providers from the ConnectUs Networks in Washington and Weber Counties, receiving a total of **225 survey responses from 54 community organizations**.

Year 1	Year 2	Year 3
January – July 2020	February – June 2021	February – May 2022

Weber County findings

- Formal collaborations (such as data sharing agreements) and care coordination occurred most often between organizations providing similar services.
- Informal relationships (such as client referrals) were common between organizations providing different types of services.
- Critical partners such as the AUCH and Weber Human Services bridged relationships between organizations that otherwise would not have been in touch.
- During the three years of the Alliance demonstration, clinical service providers and agencies that address SDOH increased the number of referrals they sent and received.

What does it mean?

Organizations in Weber County saw the value in providing referrals to other organizations when clients had needs that their own organization could not address. The number of these cross-sector referrals increased over time, which may provide a foundation for further development of formal collaborations between organizations that provide differing service types.

Washington County findings

- The number of formal and referral relationships between organizations increased over time.
- Organizations sent and received referrals to a wide variety of organizations, not only those providing services similar to their own.
- Though referral relationships declined slightly between Years 1 and 3, they peaked in Year 2 during the height of the COVID-19 pandemic. This suggests that the network of service organizations was responsive to increased community need.
- By 2022, Southwest Behavioral Health, Root for Kids, the Washington County School District, and Family Support Center all reported numerous close relationships with other community organizations, including with those that had few connections.

What does it mean?

Organizations in Washington County increased the number of formal and referral-based relationships over time. By 2022, the network showed that organizations were eager to have formal relationships not just with those providing similar services, but with organizations in other sectors. Several large organizations played a critical role in building relationships with smaller, but vital organizations.

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INTERPRETING SOCIAL NETWORK ANALYSIS

Interpreting SNA figures

- Each circle represents an organization that responded to the SNA survey.
- Circles positioned near the center of the network have the most connections; those on the perimeter have the fewest connections. The size of the circles is also proportional to the number of connects each organization has, such that larger circles represent organizations with more connections while smaller circles represent those with fewer connections.
- Network density reflects the number of connections that were reported relative to the number of possible connections that could exist in the network. A network density of 50%, for example, means that half of all possible connections between community-based organizations existed in the community [per the reporting of survey respondents].

SNA terminology

- **Node** – a circle representing each distinct organization
- **Tie** – the line connecting two organizations in a SNA diagram
- **Degree** – the number of connections that an organization has to other organizations
- **Density** – the number of connections that exist in the network, divided by the number of possible connections that could exist in the network

Guiding questions for interpreting SNA results

SNA results present a large amount of information simultaneously, but it's helpful to keep in mind that there is no single "correct" interpretation of SNA networks. Instead, it can be helpful to apply a guiding question as you learn from the figures. For example:

- Are there connections between the organizations you would expect to be collaborators?
- Which organizations are closest to the center of the network (and therefore have the most connections)? Which organizations are on the edges of the network (and therefore have the fewest connections)?
- Does a particular organization differ in its number of connections depending on the type of connection (i.e. formal, care coordination, or referral-based)?
- Are there organizations that serve as a link between two other organizations and could be used to facilitate a direct connection?
- Is an organization primarily connected to organizations in the same service category, or do they have connections to organizations in other service categories?

Limitations of SNA

- Organizations are only represented in the SNA figures if they responded to the survey. There are almost certainly organizations that play an important role in the community, but who either were not included in the survey sample, or who did not respond to the survey.
- Local knowledge and context are essential to interpreting SNA results. While we aimed to enroll multiple representatives serving various roles per agency to participate in the survey, the responding individuals may not be fully aware of their agency's external collaborations, resulting in under-reporting in the SNA data. Just because a particular organization has few connections

does not mean that they have a less important role in the community. Similarly, it is likely that organizations have important relationships that were not captured by the survey and are therefore not depicted in the figures.

TYPES OF RELATIONSHIPS

The report defines three types of possible relationships between organizations: 1) formal, 2) care coordination, and 3) referral relationships. These relationships are not mutually exclusive; that is, two organizations may have a formal relationship as well as a referral relationship. These three types of relationships were selected because they represent different levels of commitment to the collaboration between two organizations. None of these relationships are more valuable than the others, but they reflect different capacities in which organizations may work together.

1. **Formal Relationships** – These relationships represent sustained commitment to a shared goal or mission. They require effort to establish and maintain and are only present when two organizations feel they can mutually benefit from that investment. The relationship between two organizations is considered “formal” if either organization responded ‘Yes’ to any of the following questions:
 - ‘Does [your organization] have a formal administrative relationship with [this partner organization]?’ or
 - ‘Does [your organization] have a data sharing agreement with [this partner organization]?’
 - ‘Does [your organization] engage in shared decision-making with [this partner organization]?’

2. **Care coordination** – These relationships occur when organizations collaborate to provide care or services to individual patients. This indicates that the two organizations are very familiar with each other’s services and recognize the value of collaboration in achieving optimal outcomes for the clients they serve. Two organizations have a “care coordination” relationship if either organization responded ‘Yes’ to either of the following questions:
 - “Has [your organization] provided any follow-up to [this partner organization] in the past 6 months?”
 - “Has [your organization] participated in consultation or coordination for individual clients/patients with [this partner organization] in the past 6 months?”

3. **Referral relationship** – These relationships indicate recognition between two organizations that one can provide a service to a client/patient that the other cannot. A referral relationship may be formal or informal, and may be the result of personal connection between representatives of the two organizations. Two organizations have a “referral” relationship if either organization responded ‘Yes’ to either of the following questions:
 - “Has [your organization] made any referral to [this partner organization] in the past 6 months?”
 - Has [your organization] received any referral from [this partner organization] in the past 6 months?”

SECTION 1: WEBER COUNTY – YEAR 3

Table 1.1 - Summary of organizational relationships in Weber County in 2022 (Year 3)

The following table describes the degree (or, the number) of connections that each organization reported with other organizations in Weber County.

Organization	Service Category	Number of Formal Relationships	Number of Care Coordination Relationships	Number of Referral Relationship
The Alliance Community Health Workers (Association for Utah Community Health)	SDOH Assistance	6	7	9
Catholic Community Services	SDOH Assistance	3	5	11
Help Me Grow	Family/Social Support	1	1	0
Housing Authority of The City of Ogden	SDOH Assistance	7	6	8
Castell House Calls - North (formerly Intermountain Community Care Team or ICCT)	Clinical Services	6	8	9
Layton Clinic	Clinical Services	12	2	9
McKay-Dee Porter Family Practice	Clinical Services	4	3	6
Midtown Community Health Center	Clinical Services	6	4	9
Northern Utah Pediatrics (McKay-Dee)	Clinical Services	4	1	5
Ogden City	SDOH Assistance	8	4	2
Ogden School District	Family/Social Support	6	7	5
Prevent Child Abuse Utah (PCAU)	Family/Social Support	0	0	2
SelectHealth Care Management	Clinical Services	9	9	9
South Ogden Clinic	Clinical Services	1	3	4
Wasatch OB/GYN - McKay Dee Hospital	Clinical Services	3	1	3
Weber Human Services	Clinical Services	8	9	14
Weber-Morgan Health Department	SDOH Assistance	9	5	9
Youth Impact	Family/Social Support	7	5	4
Ogden City Police Department	SDOH Assistance	7	8	6
Weber County Sheriff's Department	Family/Social Support	7	4	8

Figure 1 – Formal relationship network in Weber County (*see appendix*)

- Clinical Service organizations most often have formal relationships with other clinical service organizations. Similarly, SDOH Assistance and Family/Social Support organizations are most likely to have formal relationships with other organizations in these categories.
- AUCH had formal connections with a diversity of organizations. Similarly, Weber Human Services and Layton Clinic had numerous formal connections with non-clinical organizations.

Figure 2 – Care relationship connections in Weber County (*see appendix*)

- Like the network of formal relationships, care coordination relationships generally occur in two clusters: 1) clinical service, and 2) SDOH Assistance and Family/Social Support organizations. This means that the organizations in each of these cluster have few or no care coordination relationships with organizations in the other cluster.
- Notable exceptions to this are Weber Human Services and AUCH, who each had multiple care coordination relationships with organizations that provided a service different from their own.

Figure 3 – Referral relationship network in Weber County (*see appendix*)

- Referral relationships were the most common type of relationships, indicating that referrals between agencies likely occurred in an informal context.
- Organizations sent and received referrals to a wide variety of organizations, not just those providing services similar to their own.

SECTION 2: WEBER COUNTY - LONGITUDINAL (YEARS 1-3)

Table 2.1 - The overall level of interconnectedness between the in Year 1 and Year 3

Type of relationship	Density of network*	
	Year 1	Year 3
Formal relationship	40%	29%
Care coordination relationship	42%	33%
Referral relationship	49%	44%

*Density represents, of all possible connections between organizations, the proportion that were in fact reported by survey respondents

- In each year of the Alliance, formal relationships were the least common, while referral relationships were the most common.
- Between Years 1 and 3, formal connections decreased by the greatest amount, while the decline in referral relationships was comparatively modest.

Table 2.2a – Formal relationships reported in Years 1-3, by service category in Weber County

Group	Year 1		Year 2		Year 3	
	Number of agencies in the group	Median (min-max) number of connections	Number of agencies in the group	Median (min-max) number of connections	Number of agencies in the group	Median (min-max) number of connections
Clinical Services	4	5 (4-9)	11	4 (2-12)	9	6 (1-12)
Family/Social Support	5	4 (3-9)	5	6 (2-8)	5	6 (0-7)
SDOH Assistance	4	3 (3-10)	5	9 (7-13)	6	7 (3-9)

- The median number of formal relationships per organization increased over time for each type of organization.
- The largest increase in formal relationships occurred among SDOH Assistance organizations.
- Clinical Service and Family/Social Support organizations reported large variation in their number of formal relationships; as few as zero or as many as 12 formal relationships.

Table 2.2b – Care coordination relationships reported in Years 1-3, by service category in Weber County

Group	Year 1		Year 2		Year 3	
	Number of agencies in the group	Median (min-max) number of connections	Number of agencies in the group	Median (min-max) number of connections	Number of agencies in the group	Median (min-max) number of connections
Clinical Services	4	6 (4-9)	11	6 (3-11)	9	3 (1-9)
Family/Social Support	5	4 (2-10)	5	3 (1-5)	5	4 (0-7)
SDOH Assistance	4	5 (3-10)	5	5 (1-8)	6	6 (4-8)

- The median number of care coordination relationships increased slightly at SDOH Assistance organizations, while decreasing at Clinical Service Organizations and remaining largely consistent at Family/Social Support organizations.
- The median number of care coordination relationships at Clinical Service organizations varied substantially; as few as one and as many as nine relationships.

Table 2.2c – Referral relationships reported in Years 1-3, by service category in Weber County

Group	Year 1		Year 2		Year 3	
	Number of agencies in the group	Median (min-max) number of connections	Number of agencies in the group	Median (min-max) number of connections	Number of agencies in the group	Median (min-max) number of connections
Clinical Services	4	6 (4-9)	11	8 (3-14)	9	9 (3-14)
Family/Social Support	5	4 (3-9)	5	6 (5-8)	5	4 (0-8)
SDOH Assistance	4	6 (5-10)	5	9 (7-18)	6	9 (2-11)

- The median number of referral relationships increased over time for Clinical Services and SDOH Assistance organizations.
- By Year 3, Clinical Service and SDOH Assistance organizations reported more referral relationships than Family/Social Support organizations.
- Referral relationships were more common than formal or care coordination relationships.

Table 2.3 – Weber County organizations with the greatest number of connections to other organizations (i.e. the organizations most central to the network)

Type of relationship	Agencies with the greatest number of connections		
	Year 1	Year 2	Year 3
Formal connection	<ul style="list-style-type: none"> •AUCH (10) •Midtown Community Health Center (9) •Ogden-Weber Community Action Partnership (9) 	<ul style="list-style-type: none"> •AUCH (13) •SelectHealth Care Management (12) •Catholic Community Services (11) 	<ul style="list-style-type: none"> •Layton Clinic (12) •Weber-Morgan Health Department (9) •SelectHealth Care Management (9)
Care coordination connection	<ul style="list-style-type: none"> •Ogden-Weber Community Action Partnership (10) •AUCH (10) •Midtown Community Health Center (9) 	<ul style="list-style-type: none"> •SelectHealth Care Management (11) •Weber Human Services (10) •AUCH (8) 	<ul style="list-style-type: none"> •SelectHealth Care Management (9) •Weber Human Services (9) •Ogden City Police Department (8) •Castell House Calls (8)
Referral relationship	<ul style="list-style-type: none"> •AUCH (10) •Midtown Community Health Center (9) •Ogden-Weber Community Action Partnership (9) 	<ul style="list-style-type: none"> •AUCH (18) •Weber Human Services (14) •Wasatch OB/GYN - McKay Dee Hospital (14) 	<ul style="list-style-type: none"> •Weber Human Services (14) •Catholic Community Services (14)

Table 2.4 – Emerging agencies: organizations that increased connections between Years 1 and 3

Weber - Castell House Calls (formerly Intermountain Community Care Team)

Year	Degree of Formal relationship	Degree of Care coordination relationship	Degree of Referral relationship
1	4	6	7
3	6	8	9

Weber Human Services

Year	Degree of Formal relationship	Degree of Care coordination relationship	Degree of Referral relationship
1	6	6	5
3	8	9	14

Table 2.5 –Organizations’ self-reported ability to navigate referrals or assist with clients’ immediate needs in Weber County

One of the Alliance’s goals is to cultivate the network of community organizations so that community members can be directed to resources that address their specific needs. We asked community organizations whether they felt equipped to address particular social needs that are commonly reported among the Alliance’s target population.

Social need	<i>If your client reported one of the following needs, are you confident that you could either address it yourself or direct the client to another specific community organization that could address it?</i>		
	Yes	No	I Don’t Know
Housing instability	81%	9%	10%
Food insecurity	100%	0%	0%
Transportation barriers	76%	19%	5%
Dental care needs	76%	14%	10%

- All survey respondents reported that they would know where to refer a client with food insecurity.
- Most respondents reported knowing of appropriate resources to address housing instability, transportation barriers, or dental care needs; however, about 1 in 4 respondents was unsure where they would refer a client with these needs.

Table 2.6 – Involvement of places of worship in addressing clients’ social needs in Weber County

<i>Based on your experience, how often are churches or other places of worship involved in addressing your clients' social needs?</i>	
Never	0%
Rarely	16%
Sometimes	84%
Always	0%

- Though churches and places of worship are not officially part of the ConnectUs network, the large majority of respondents felt that such organizations commonly played a role in addressing social needs among their clients.

SECTION 3: WASHINGTON COUNTY – YEAR 3

Table 3.1 - Summary of organizational relationships in Washington County in Year 3

The following table describes the degree (or, the number) of connections that each organization reported with other organizations in Washington County.

Organization	Service Category	Degree of Formal Relationship	Degree of Care Coordination Relationship	Degree of Referral Relationship
The Alliance Community Health Workers (Association for Utah Community Health)	SDOH Assistance	8	9	12
Cherish Families	Family/Social Support	2	4	4
Department of Workforce Services	SDOH Assistance	8	6	11
Family Healthcare (St. George, Hurricane)	Clinical Services	9	8	11
Family Support Center of Washington County	Family/Social Support	3	11	15
Help Me Grow	Family/Social Support	2	3	5
Castell House Calls (formerly Intermountain Community Care Team or ICCT)	Clinical Services	5	3	5
Red Rock Center for Independence (RRCI) (St. George, Hurricane)	Family/Social Support	0	4	9
Redrock Pediatrics	Clinical Services	4	4	5
River Road Internal Medicine	Clinical Services	2	1	3
Root for Kids	Family/Social Support	10	13	14
SelectHealth Care Management	Clinical Services	8	7	8
Southwest Behavioral Health Center	Clinical Services	13	15	15
Southwest Utah Public Health Department - St. George	SDOH Assistance	6	6	11
St. George Housing Authority	SDOH Assistance	3	5	8
Switchpoint Community Resource Center	SDOH Assistance	6	9	10
Utah Support Advocates for Recovery Awareness (USARA)	Family/Social Support	1	4	6
Washington County School District	Family/Social Support	10	12	10

Figure 4 – Formal relationship network in Washington County (*see appendix*)

- In Washington County, Southwest Behavioral Health was the most central to the network on formal relationships, followed closely by the Department of Workforce Services. Each of these organizations reported formal relationships with a wide variety of organizations, suggesting high demand for their services.
- For several Clinical Service organizations, AUCH was the only SDOH Assistance organization with which they had a formal connection.

Figure 5 – Care relationship network in Washington County (*see appendix*)

- Southwest Behavioral Health was the organization most central to the network of care coordination, meaning that it had many connections with many different types of service providers.
- Root for Kids, Washington County School District, and Family Support Center also reported many care coordination relationships, including with organizations that had very few care coordination relationships.
- AUCH conducted care coordination with several Clinical Service providers.

Figure 6 – Referral relationship in Washington County (*see appendix*)

- Referrals were the most common type of relationship in Washington County.
- Several organizations reported numerous referral relationships, even though they had relatively few formal or care coordination relationships.
- The network shows that most organizations sent or received referrals from organizations that offered a type of service that their own organization did not. (For example, AUCH reported connections with Castell, Family Healthcare, Root for Kids, and Washington County School District, to name only a few). This was also the case in Weber County but was seen to a greater extent in Washington County.

SECTION 4: WASHINGTON COUNTY – LONGITUDINAL (YEARS 1-3)

Table 4.1 – Changes in the overall level of interconnectedness between organizations in Years 1 and 3

Type of relationship	Density of network*	
	Year 1	Year 3
Formal relationship	57%	43%
Care coordination relationship	56%	53%
Referral relationship	69%	67%

*Density represents, of all possible connections between organizations, the proportion that were in fact reported by survey respondents

- The density of each type of relationship was greater in all years than in Weber County.
- The density of formal relationships declined between Years 1 and 3.
- Care coordination relationships and referral declined only slightly.
- Referral relationships were the most common type of relationship.

Table 4.2a – Formal relationships reported in Years 1-3, by service category in Washington County

Group	Year 1		Year 2		Year 3	
	Number of agencies in the group	Median (min-max) number of relationships	Number of agencies in the group	Median (min-max) number of relationships	Number of agencies in the group	Median (min-max) number of relationships
Clinical Services	4	9 (4-13)	3	7 (3-12)	6	7 (2-13)
Family/Social Support	7	6 (5-12)	7	3 (0-10)	7	2 (0-10)
SDOH Assistance	5	10 (10-11)	7	3 (2-6)	5	6 (3-8)

- The median number of formal relationships decreased across each type of service provider between Years 1 and 3.
- Year 2 coincided with some of the most demanding months of the COVID-19 pandemic for service organizations. The increased demands for services may have caused organizations to deprioritize formal relationships.

Table 4.2b – Care coordination relationships reported in Years 1-3, by service category in Washington County

Group	Year 1		Year 2		Year 3	
	Number of agencies in the group	Median (min-max) number of connections	Number of agencies in the group	Median (min-max) number of connections	Number of agencies in the group	Median (min-max) number of connections
Clinical Services	4	8 (5-12)	3	11 (6-13)	6	6 (1-15)
Family/Social Support	7	4 (3-13)	7	3 (3-14)	7	4 (3-13)
SDOH Assistance	5	9 (7-11)	7	6 (2-9)	5	6 (5-9)

- Care coordination relationships declined or remained the same between Years 1 and 3 across each type of service category.

Table 4.2c – Referral relationships reported in Years 1-3, by service category in Washington County

Group	Year 1		Year 2		Year 3	
	Number of agencies in the group	Median (min-max) number of relationships	Number of agencies in the group	Median (min-max) number of relationships	Number of agencies in the group	Median (min-max) number of relationships
Clinical Services	4	10 (5-13)	3	13 (8-14)	6	7 (3-15)
Family/Social Support	7	10 (6-13)	7	9 (6-15)	7	9 (4-15)
SDOH Assistance	5	11 (10-13)	7	13 (7-15)	5	11 (8-12)

- Across all types of services, organizations reported more referral relationships than formal or care coordination relationships.
- SDOH Assistance organizations generally reported the most referral relationships.
- Though referral relationships declined somewhat between Years 1 and 3, they peaked in Year 2, during the height of the COVID-19 pandemic. This suggests that even though organizations weren't maintaining formal ties, the network of service organizations was responsive to increased community need and directed clients to organizations that could assist them.

Table 4.3 – Washington County organizations with the greatest number of relationships to other organizations (i.e. the organizations most central to the network)

Type of relationship	Agencies with the greatest number of connections		
	Year 1	Year 2	Year 3
Formal connection	<ul style="list-style-type: none"> • Southwest Behavioral Health Center (13) • Family Healthcare (12) • Washington County School District (12) 	<ul style="list-style-type: none"> • Family Healthcare (12) • Washington County School District (10) • Washington County Children's Justice Center (7) • Southwest Behavioral Health Center (7) 	<ul style="list-style-type: none"> • Southwest Behavioral Health Center (13) • Root for Kids (10) • Washington County School District (10)
Care coordination connection	<ul style="list-style-type: none"> • Washington County School District (13) • Southwest Behavioral Health Center (12) • Root for Kids (12) 	<ul style="list-style-type: none"> • Washington County School District (14) • Southwest Behavioral Health Center (13) • Family Healthcare (11) 	<ul style="list-style-type: none"> • Southwest Behavioral Health Center (15) • Root for Kids (13) • Washington County School District (12)
Referral relationship	<ul style="list-style-type: none"> • Washington County School District (13) • Southwest Behavioral Health Center (13) • Family Healthcare (13) • Department of Workforce Services (13) 	<ul style="list-style-type: none"> • Root for Kids (15) • Switchpoint Community Resource Center (15) • Family Support Center of Washington County (15) 	<ul style="list-style-type: none"> • Southwest Behavioral Health Center (15) • Family Support Center of Washington County (15) • Root for Kids (14)

Table 4.4 – Emerging Agency: organizations that increased its number of reported relationships between Years 1 and 3

Family Support Center of Washington County

Year	Degree of Formal connection	Degree of Care coordination connection	Degree of Referral relationship
1	5	4	12
3	3	11	15

Table 4.5 – Organizations’ self-reported ability to navigate referrals or assist with clients’ immediate needs in Washington County

Social need	<i>If your client reported one of the following needs, are you confident that you could either address it yourself or direct the client to another specific community organization that could address it?</i>		
	Yes	No	I Don’t Know
Housing instability	95%	0%	5%
Food insecurity	100%	0%	0%
Transportation barriers	79%	16%	5%
Dental care	90%	5%	5%

- All respondents from Washington County felt they would be able to assist a client dealing with food insecurity. Most also felt that they would be able to identify resources to assist with housing instability or dental care.
- About 1 in 5 respondents felt that they were unable to assist clients in overcoming transportation barriers.

Table 4.6 – The role of places of worship in addressing social need in Washington County

Based on your experience, how often are churches or other places of worship involved in addressing your clients' social needs?	
Never	0%
Rarely	14%
Sometimes	81%
Always	5%

- A large majority of respondents reported that places of worship were “sometimes” or “always” involved in addressing social needs for their clients.
- Though churches and places of worship are not included in the ConnectUs network, they are nevertheless an important part of the social support ecosystem of Washington County.

METHODS

Data collection

Data for the SNA was collected by sending an email survey to community organizations in Washington and Weber Counties. Respondents to the survey were prompted to select from a list of local community organizations to identify those with which they have any relationship. For each organization selected, the respondent was then prompted to answer a series of questions about the nature of their relationship with that organization.

Survey sample

Organizations in Weber and Washington County were eligible to receive the survey if they met one of the following criteria:

1. Registered organization in UniteUs
2. Served on the local steering committee
3. Were identified as a close collaborator providing social services in the community by an organization meeting criterion #1 or #2

Survey questions

The following questions were included in the survey sent to each organization. Respondents were prompted to answer each question for each organization with which they reported having a relationship.

1. Does your organization have a formal administrative relationship with _____? (e.g. a shared financial agreement, shared leadership, a board relationship, etc.)
2. Does your organization have a data sharing agreement with _____?
3. Does your organization engage in shared decision-making with _____? (e.g. participation in community meetings or joint working groups)
4. Has your organization made any referral to _____ in the past 6 months?
5. Has your organization received any referral from _____ in the past 6 months?
6. Has your organization requested any follow-up from _____ in the past 6 months?
7. Has your organization provided any follow-up to _____ in the past 6 months?
8. Has your organization participated in consultation or coordination for individual clients/patients with _____ in the past 6 months?

Timeline of data collection

Year 1	Year 2	Year 3
January – July 2020	February – June 2021	February – May 2022

Data Management

We used SNA to analyze patterns of relationships (ties) among community-based organizations (nodes). The SNA analytic dataset is in the form of an adjacency matrix, where each node is assigned both a column and a row in the matrix. There are two key data management steps to transform the original survey responses into an adjacency matrix: 1) The first step was to resolve disagreement between multiple participants within the same agency. When multiple participants completed the survey from the same agency, we collapsed their responses by using the max of the responses. That is, if any of the participants from Agency A indicated that Agency A had a connection with Agency B, we documented in the agency-level analytic dataset that A reported to be connected B. 2) The next step was to resolve disagreement between pairs of agencies. In the agency-level analytic dataset, there might be disagreement between pairs of agencies on the same collaboration question. In the primary analysis, we used undirected adjacency matrix and assumed the collaboration to be reciprocal. That is, if either agency reported a collaboration, the undirected matrix considered the pair of agencies to be connected. We chose the approach in both steps 1) and 2) to collapse participant' and agencies' responses, with two considerations: first, some participants may understandably lack knowledge of the full picture of their agency's external collaborations because of their specific working roles and experience within the agency and therefore might "under-report" certain types of collaborative activities in the survey; second, because the nature of the survey was an independent research instead of a performance evaluation and survey participants have been guaranteed that their answers will be kept anonymous, there is unlikely to be any motivation for participants to "over-report" their external collaboration in the survey. ***Data Analysis***

We used R Package Igraph (<https://igraph.org/r/>) for network visualization and statistical analyses. For network statistics, we focused on the interconnectedness (density) and prominence (centrality) of network members. Previous literature has identified density and centrality as potentially the most informative network measures when examining public health systems (Valente, Chou, & Pentz, 2007). For instance, networks with high density are more interconnected than networks with low density, providing more paths for communication or dissemination of information. In our study, density is calculated as the number of actual connections in a network divided by the maximum possible number of connections. Network density ranges from 0 to 1.0, with 1.0 indicating the most dense network. We used density to measure the centrality of network members. Density was used to measure of the centrality of agencies and calculated as the number of ties a node has. We also used graphs for network visualization. In the graphs, each node represents an agency that responded to the SNA survey, and each line connecting a pair of nodes represents the agency-level connections. The size of the nodes is proportional to the "degree" of each agency in the network, such that larger nodes represent organizations with more connections while smaller nodes represent those with fewer connections.

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