

Zero to Five
Lewis & Clark County

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SOCIAL NETWORK ANALYSIS



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Executive Summary

Background

The Zero to Five Lewis & Clark County Collaborative was established in June 2018. The University of Montana Center for Children, Families, and Workforce Development partnered with local Zero to Five Collaboratives to conduct a social network analysis (SNA) October 19, 2020 – December 4, 2020, utilizing the PARTNER (Program to Analyze, Record, and Track Networks to Enhance Relationships) Tool [1]. The research team invited 25 organizations and 5 parents/community members in the Zero to Five Lewis & Clark County Collaborative to participate in the survey. Of the 25 organizations in the network, 19 (76%) respondents completed the survey and 2 partially completed the survey, totaling 21 respondents (84%).

Network Composition

The Zero to Five Lewis & Clark County Collaborative includes organizations from five sectors, with Social Services (37%) as the sector with the highest representation.

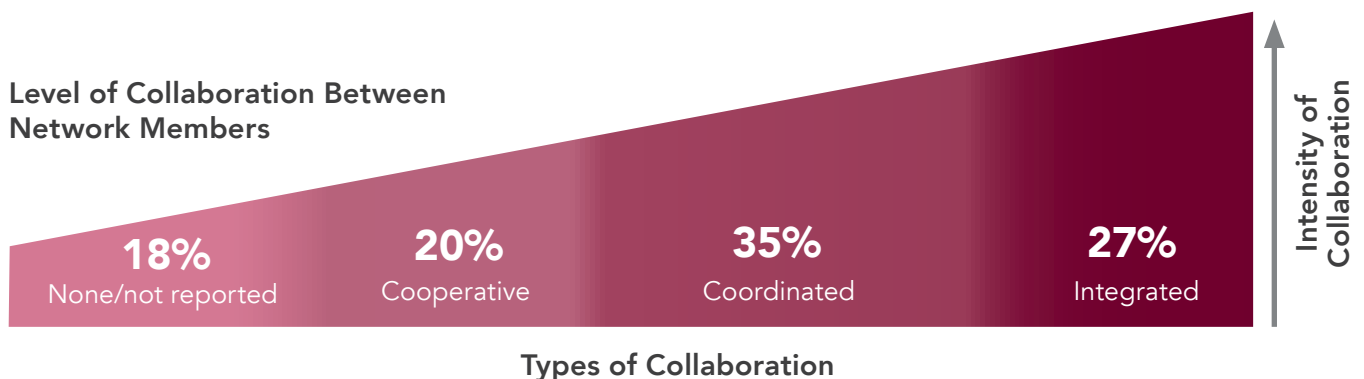
Partnerships

Network members reported the partnerships they have with other organizations in the network. For this social network analysis, “partnership” is defined as the relationship between member organizations that worked together on an early childhood project in the last year. Eighteen organizations reported 128 partnerships across the Zero to Five Lewis & Clark County Collaborative.

Over a quarter (27%) of respondents credited relationships to the Zero to Five Lewis & Clark County Collaborative.

Levels of Collaboration

Network members classified their relationships with other members as cooperative, coordinated, or integrated. Cooperative activities involve lower levels of collaboration (e.g., exchanging information), and integrated activities are the highest form of collaboration (e.g., shared programming, joint proposal).



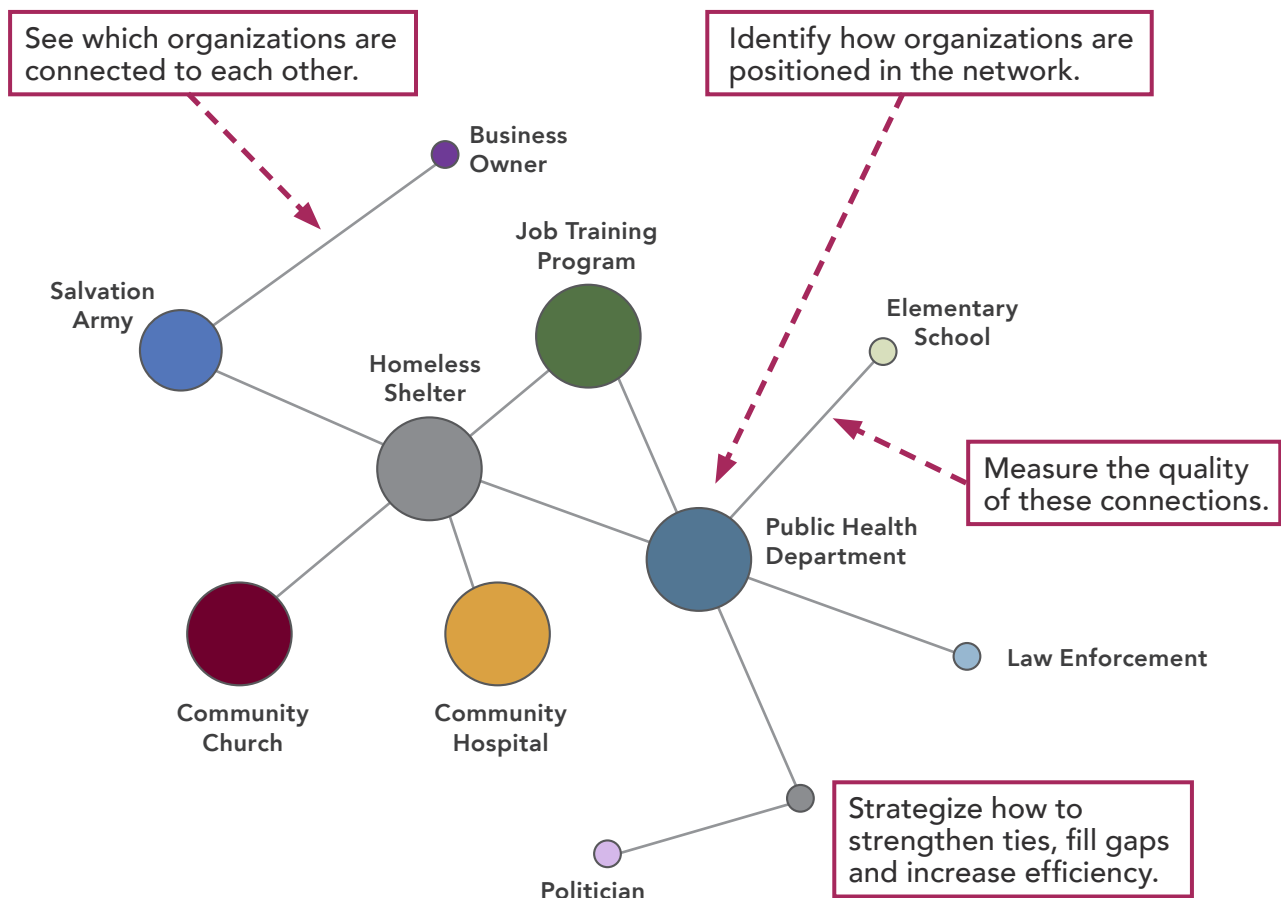
Network Impact on Members

Network members reported that participation in the Collaborative helped their organization share information with other organizations (58%), make meaningful connections with other organizations (58%), and positively impact children and families (50%).

What is Social Network Analysis?

Coalitions and collaboratives are frequently established to bring together partners from both the public and private sectors to address complex health and social issues [2]. Even though collaboration is key to improving community health, there is often little emphasis placed on measuring how collaborative networks build capacity and evolve [3].

Social network analysis (SNA) is a research methodology that measures how organizations participate in a network and the quantity and quality of relationships between partners [4]. SNA can help networks identify ways to improve how partners work together to achieve desired outcomes. SNA can inform strategies to strengthen relationships, leverage resources, and monitor change in networks over time.



KEY



Image adapted from Visible Network Labs
<https://visiblenetworklabs.com/>

Zero to Five Lewis & Clark County Collaborative Social Network Analysis

Background

The Zero to Five Initiative has local early childhood initiatives across western Montana, including the Zero to Five Lewis & Clark County Collaborative [5]. A core strategy of the Zero to Five Initiative is the development of local early childhood collaboratives to leverage resources and develop effective interventions to address early childhood issues. The Collaboratives bring together partners across sectors to increase community participation and engagement around early childhood.

The Lewis & Clark County Collaborative was established in December 2018. In the Fall of 2020, the Collaborative participated in a social network analysis (SNA) study.

Methods

The Center for Children, Families, and Workforce Development conducted the SNA survey from October 19, 2020 to December 4, 2020, utilizing the PARTNER (Program to Analyze, Record, and Track Networks to Enhance Relationships) Tool [1]. Network members reported when they had a partnership with another organization in the network. For this social network analysis, “partnership” is defined as the relationship between member organizations that worked together on an early childhood project in the last year. The network and organizational level measures included:

- **Density:** the number of relationships reported as a fraction of the total number of possible relationships across the entire network.
- **Value:** the average of all members’ ratings on their partners’ value to the network in three areas *level of power and influence, level of involvement, and resource contribution* (all items were rated on a scale of 1 “not at all” to 4 “a great deal”).
- **Level of Collaboration:** the proportion of all relationships reported as *cooperative, coordinated, and integrated*.
- **Attribution:** the proportion of all relationships attributed to the Zero to Five Collaborative.
- **Degree of Centrality:** the number of connections an organization has to others as a proportion of all possible connections.

Survey Respondents

The research team invited 25 organizations and 5 parents/community members in the Zero to Five Lewis & Clark County Collaborative to participate in the survey. Of the 25 organizations in the network, 19 (76%) respondents completed the survey and 2 partially completed the survey, totaling 21 respondents (84%).

Additional information on the methodology is in Appendix A.

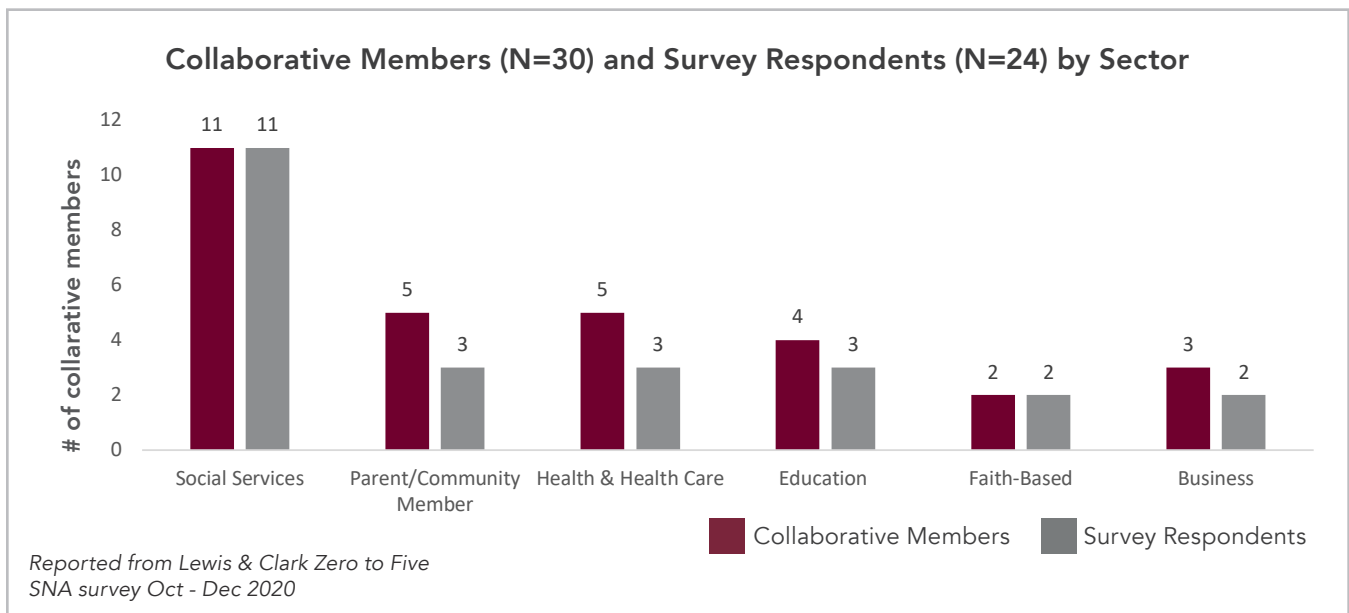


Results

Network Composition

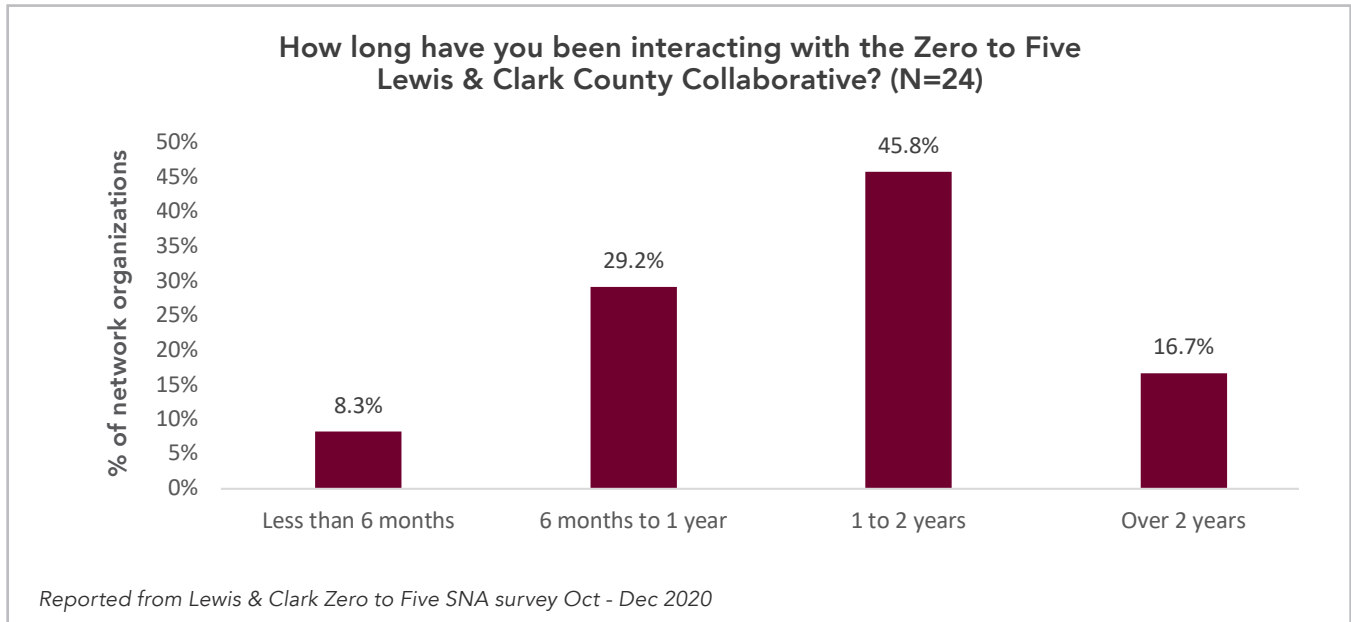
The Zero to Five Lewis & Clark County Collaborative includes organizations from five sectors, Social Services, Education, Health & Health Care, Government, and Business. Parents and community members not affiliated with an organization also participate in the Collaborative. In Figure 1, the maroon bars show the number of collaborative members by sector, and the grey bars show how many network members from each sector completed the survey. As illustrated in Figure 1, the distribution of survey respondents in our sample closely resembles the distribution of the sectors that comprise the collaborative. The sectors with the highest representation in the Collaborative include Social Services, Health & Health Care, and Education.

Figure 1. Collaborative Members and Survey Respondents by Sector



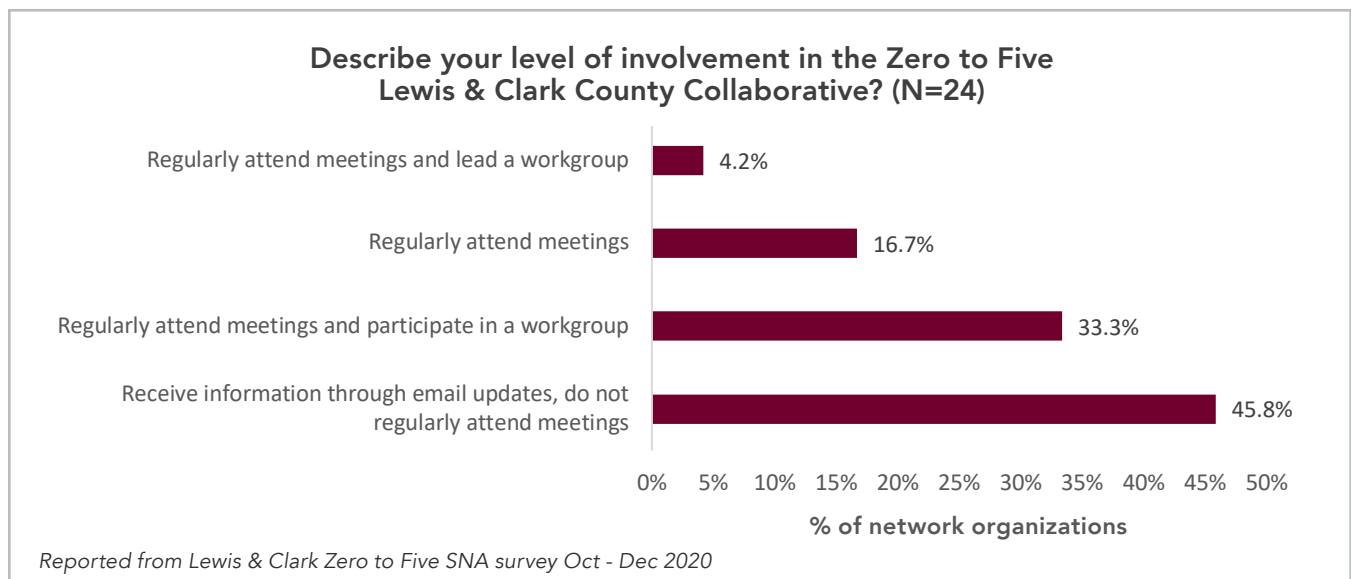
Network members reported how long they have been interacting with the Zero to Five Lewis & Clark County Collaborative. Nearly half of respondents (46%) have been involved in the Collaborative for 1 to 2 years (Figure 3).

Figure 2. Length of Involvement in the Zero to Five Lewis & Clark County Collaborative



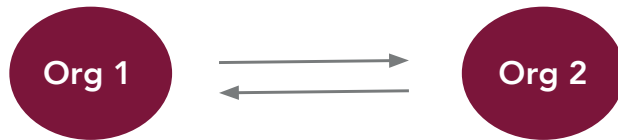
Network members can participate in a variety of ways in the Zero to Five Lewis & Clark County Collaborative. The least intensive form of participation involves staying connected through email updates from the Local Collaborative Coordinator. Other options to participate include attending meetings, participating in a workgroup, and leading a workgroup. In the Zero to Five Lewis & Clark County Collaborative, about half (46%) of members receive information through email updates and do not regularly attend meetings. Other members regularly attend meetings (17%), regularly attend meetings and participate in a workgroup (33%), and regularly attend meetings and lead a work group (4%) (Figure 3).

Figure 3. Levels of Involvement in the Zero to Five Lewis & Clark County Collaborative



Quantity and Quality of Connections Between Members

Network members reported the partnerships they have with other organizations in the network. For this social network analysis, “partnership” is defined as the relationship between member organizations that worked together on an early childhood project in the last year. The survey instrument asked respondents to select organizations with whom their organization has a partnership. Eighteen organizations reported 128 partnerships across the Zero to Five Lewis & Clark County Collaborative. In the image below, each arrow represents a reported partnership.



Over a quarter (27%) of respondents credited relationships to the Zero to Five Lewis & Clark County Collaborative, and 41% of respondents credit the Collaborative for strengthening pre-existing relationships (Table 1).

Over a quarter (27%) of respondents credited relationships to the Zero to Five Lewis & Clark County Collaborative.

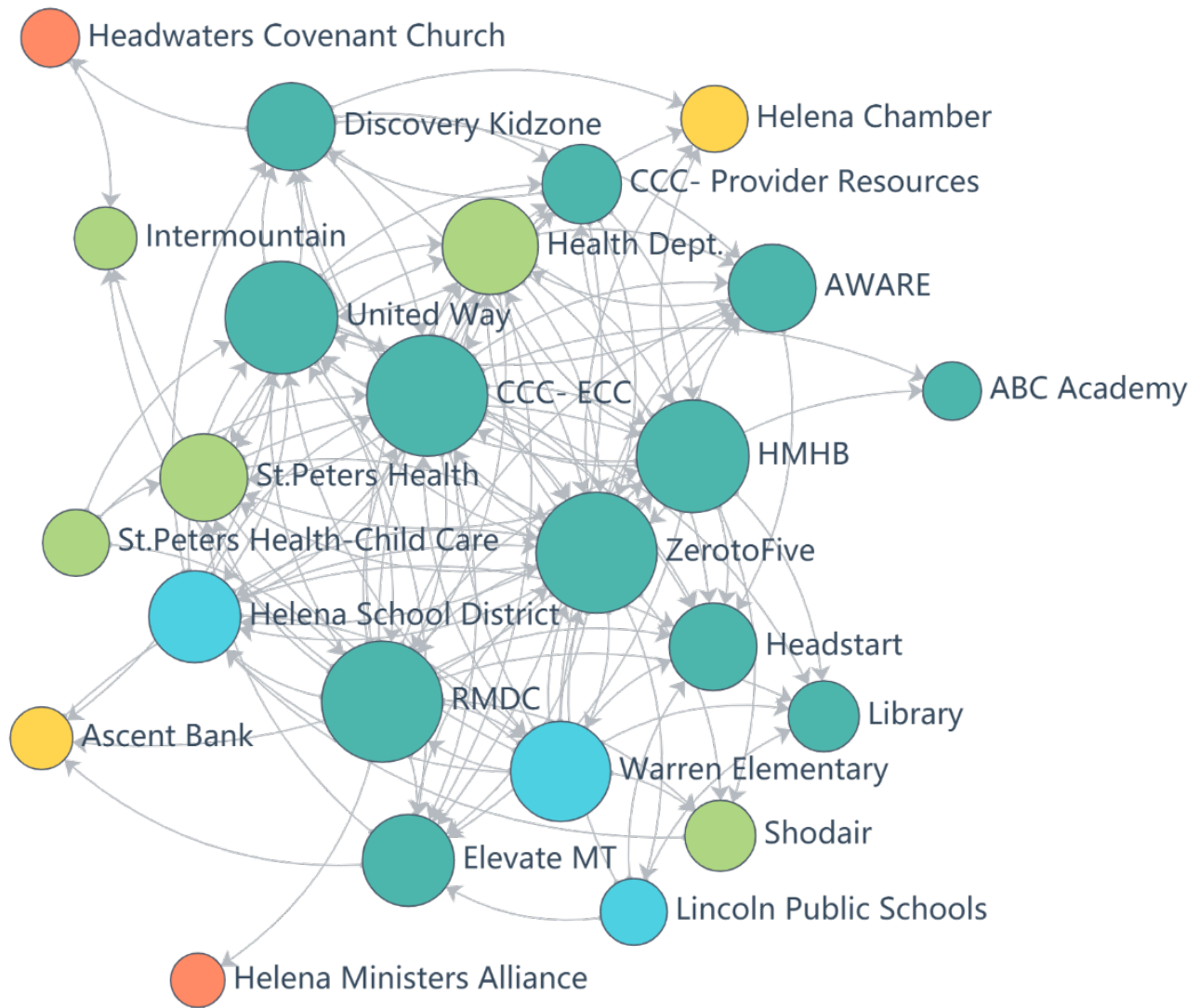
Table 1. Relationship Development

Describe how your relationships with each of these partners started (N=128)	n (%)
Through the collaborative meetings, trainings, or other activities	35 (27.3)
Our relationship was not initiated through the collaborative but the collaborative made our relationship stronger	53 (41.4)
Other	30 (23.4)
Don't know	5 (3.9)
No response	5 (3.9)



The network map (Figure 4) includes colored circles that each correspond to one member of the network. The lines show relationships between network members. Circle colors denote the organization's sector, and circle sizes denote the number of connections the organization has to other organizations in the network. Circle size increases to indicate increasing levels of organizational integration in the network.

Figure 4. Zero to Five Lewis & Clark County Network Map



- Social Services
- Health & Health Care
- Business
- Faith-Based
- Education

Reported from Lewis & Clark Zero to Five SNA survey Oct - Dec 2020

Organizations that are not connected to any other organizations are not included in the map.

Degree Centrality

The degree of centrality measures an organization's position in a network. It provides information on how many connections the organization has to other partners [6]. Organizations with high degrees of centrality maintain many ties across the network, and those with few ties have lower degrees of centrality [6]. Centrality provides information on each member's role in the functioning of the network. It shows if one or two organizations are the primary points of coordination or if most organizations hold similar positions [7].

Multiple social service agencies have high degrees of centrality, reporting a significant number of ties to other organizations in the network. Zero to Five, Child Care Connections (Early Childhood Coalition), and Rocky Mountain Development Council have the highest degree of centrality in the network each at 71%. Healthy Mothers Healthy Babies and United Way of Lewis & Clark County also have a high degree of centrality at 63%. These results suggest that multiple organizations in the network play a critical role in the coordination of early childhood efforts rather than being maintained by one partner [7].

Density

Density provides information about the overall cohesion of the network. It captures where connections are present between network members [3]. Network density compares the number of actual ties in a network with the total number of possible ties [7]. The network has a density score of 21%. Less than a quarter of the total possible connections were present between members. Networks with greater density can more easily coordinate and share resources between partners [8].

Value

Value measures include power/influence, level of involvement, and resource contribution. These represent different ways organizations bring value to the network. For this social network analysis, "partnership" is defined as the relationship between member organizations that worked together on an early childhood project in the last year. The survey instrument asked respondents to select organizations with whom their organization has a partnership, and to evaluate that partner on their power/influence, level of involvement and resource contribution. Network members rated partners' on their value to the network in these three areas from 1=not at all, 2=a small amount, 3=a fair amount, 4=a great deal. Table 2 shows the mean network value score across the three value measures.

Table 2. All Members' Perception of Value Zero to Five Lewis & Clark County Collaborative

Value Measures	Definition	Partnerships	Value Score
Power/Influence	This partner holds a prominent position in the community by being powerful, having influence, success as a change agent, and showing leadership.	114	3.1
Level of Involvement	This partner is strongly committed and active in the partnership and gets things done.	123	3.2
Resource Contribution	This partner brings resources to the relationship like funding, information, or other resources.	117	3.2



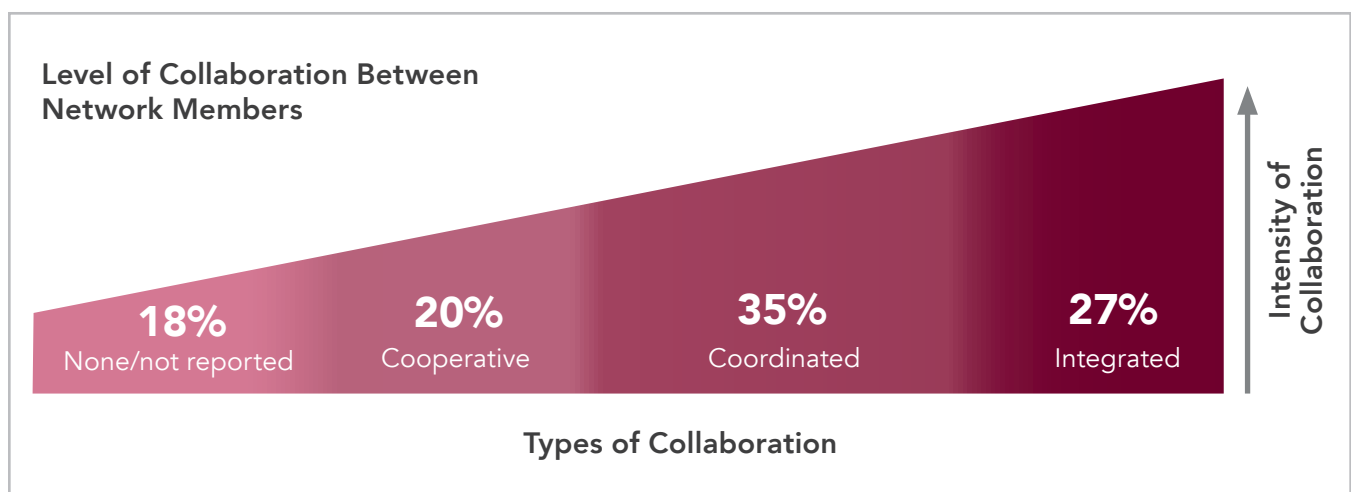
Levels of Collaboration

Network members classified their relationships with partners as cooperative, coordinated, or integrated [1].

Cooperative	Coordinated	Integrated
Involve exchanging information, attending meetings together, and offering resources to partners.	Include cooperative activities in addition to intentional efforts to enhance each other's capacity for the mutual benefit of programs.	In addition to cooperative and coordinated activities, this is the act of using commonalities to create a unified center of knowledge and programming that supports work in related content areas.

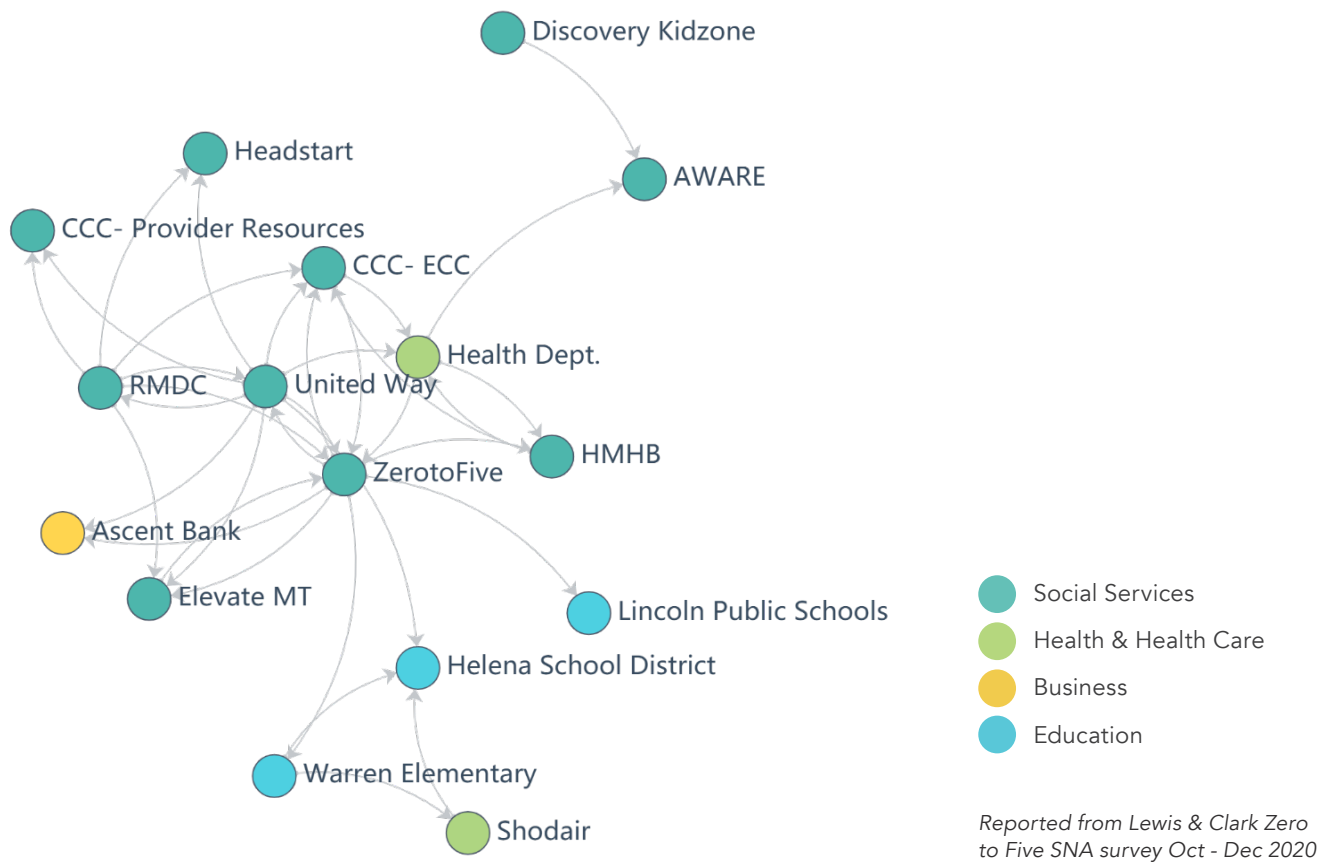
Network members classified most relationship activities as coordinated (35%), followed by integrated (27%) and cooperative (20%) (Figure 5).

Figure 5. Level of Collaboration Between Network Members



The network map below shows the partners with integrated relationship activities (27%), the most intensive type of collaboration (Figure 6).

Figure 6. Integrated Relationship Activities between Network Members

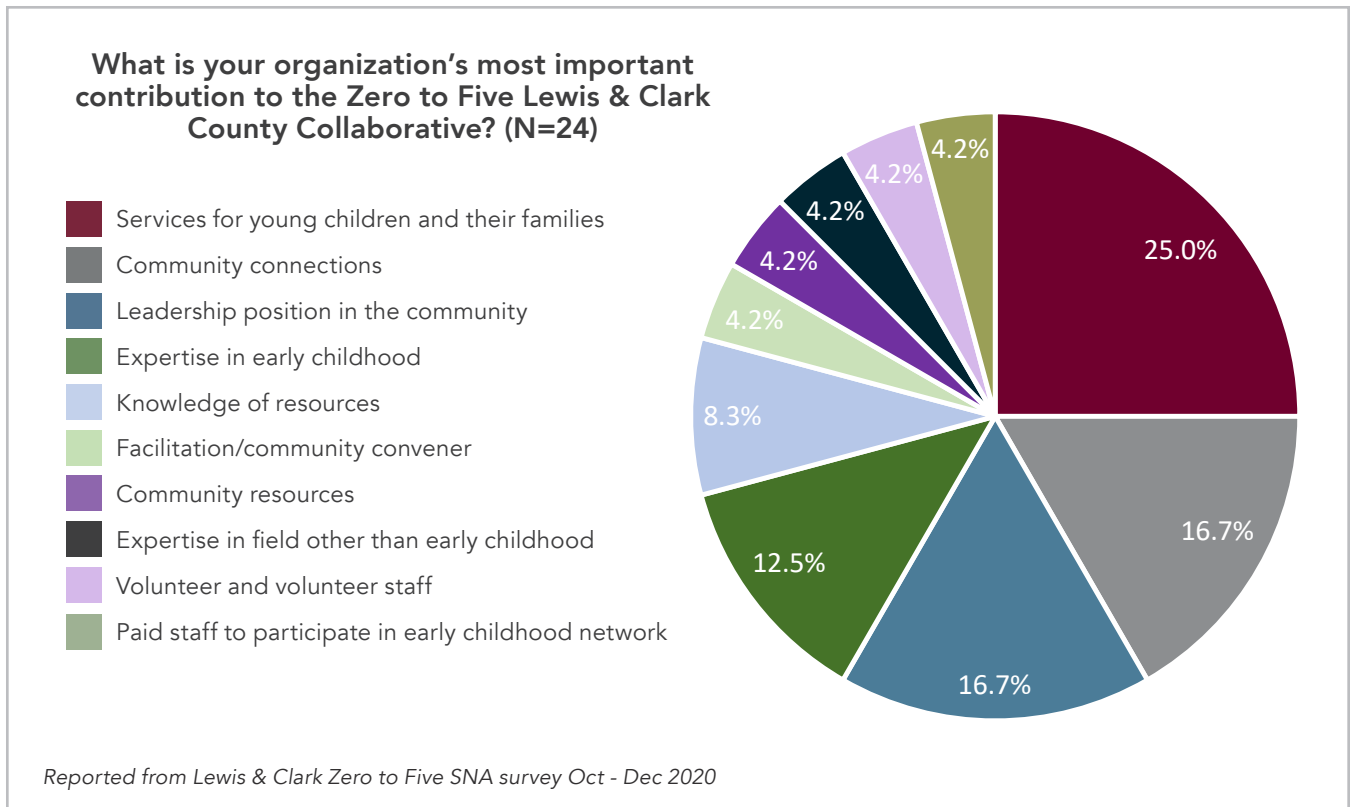


Resource Contribution

Network members reported the resources their organization contributes to the Collaborative. Respondents most frequently (78%) named community connections, services for children and their families (61%), and leadership position in the community (61%). The resources that the fewest organizations can contribute to the Collaborative include public policy advocacy (17%), volunteers and volunteer staff (17%), and funding (13%).

Figure 7 illustrates the contributions that organizations reported to be the most important for the Collaborative; respondents named services for young children and families (25%), community connections (17%), and leadership position in the community (17%) (Figure 7).

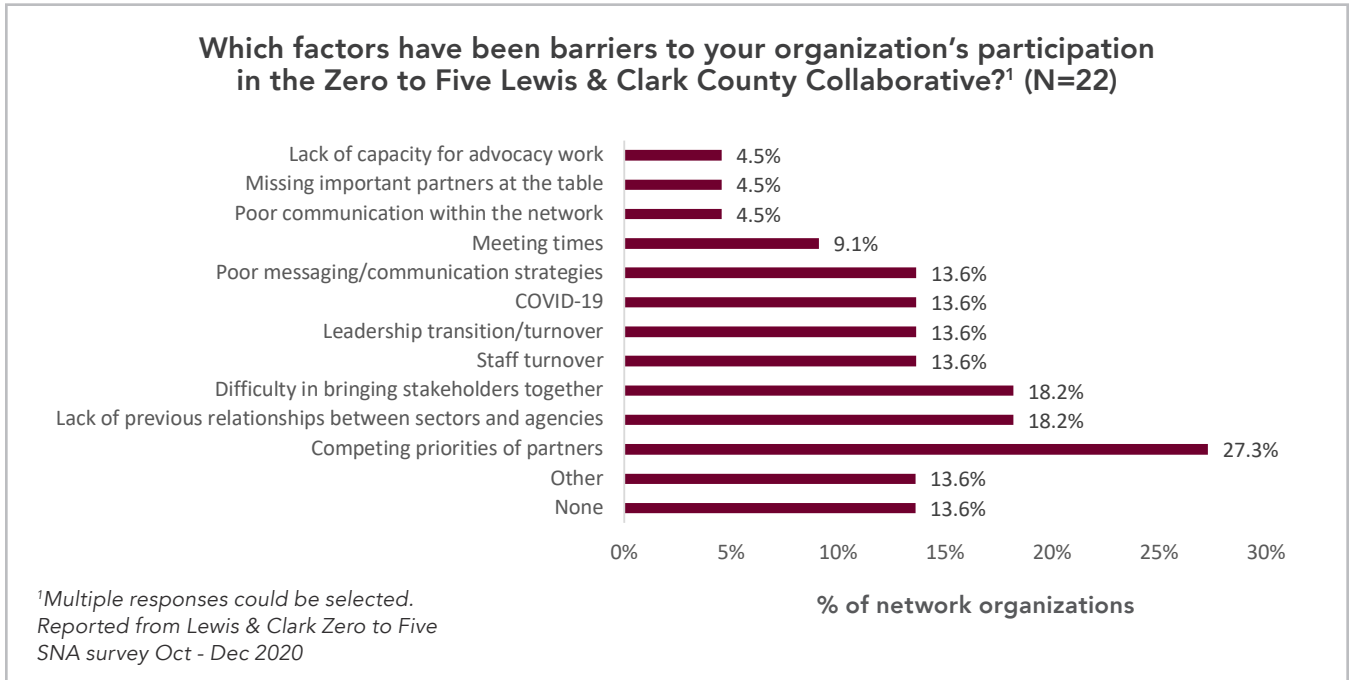
Figure 7. Most Important Contribution to the Zero to Five Lewis & Clark County Collaborative



Facilitators and Barriers to Network Participation

Network members reported barriers to their organization's participation in the Collaborative; about a third of respondents (27%) reported competing priorities of partners as the greatest barrier. Network members also reported lack of previous relationship between sectors and agencies (18%), and difficulty in bringing stakeholders together (18%) as barriers to participation (Figure 8).

Figure 8. Barriers to Participation in Zero to Five Lewis & Clark County Collaborative



Network members reported factors that facilitate their organization's participation in the Collaborative. Respondents named history of collaboration/sharing among network members (44%), sharing resources among network members (39%), and meeting regularly (30%) as the top three facilitators (Figure 9).

Figure 9. Facilitators to Participation in Zero to Five Lewis & Clark County Collaborative

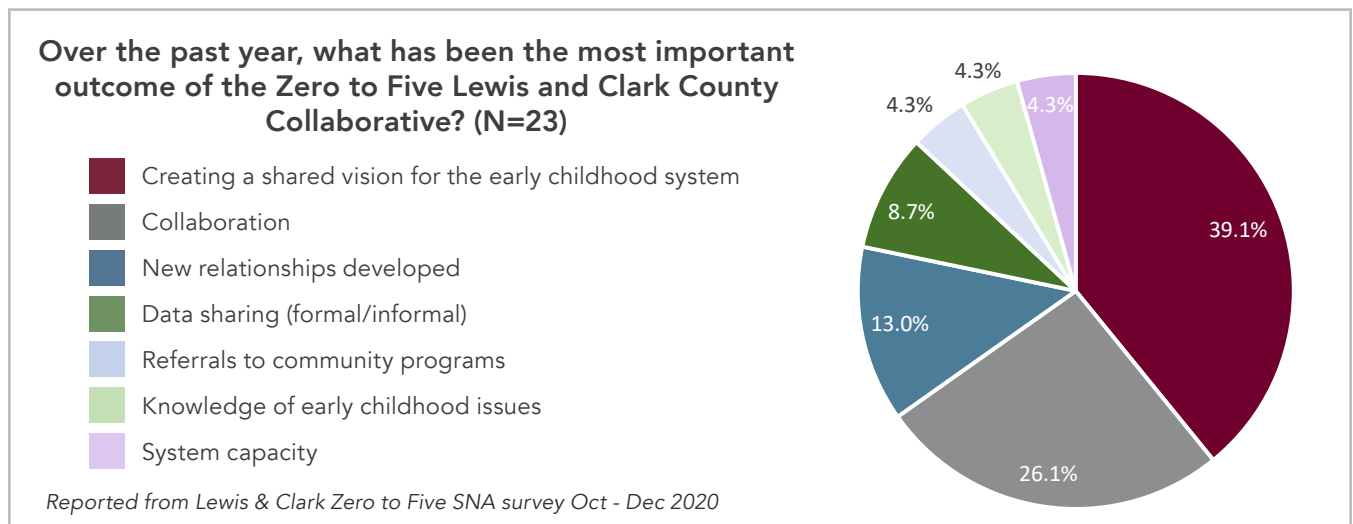


Outcomes of the Network

Network members reported the most important outcome from the Zero to Five Lewis & Clark County Collaborative in the past year. Respondents most frequently (39%) named creating a shared vision for the early childhood system, followed by collaboration (26%), and new relationships developed (13%) (Figure 10).

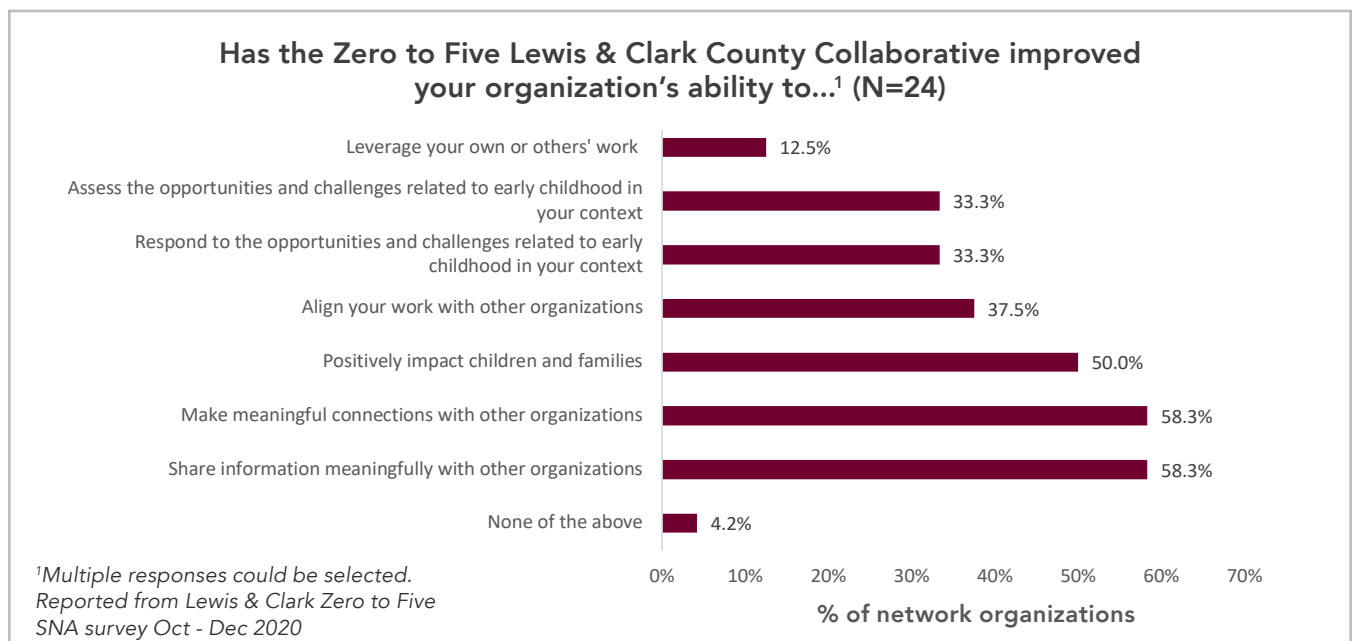
“One of the most valuable things 0-5 has done in the last year is build relationships with the ECC, local businesses, child care providers and the school district. This positive working relationship will help move projects forward unlike we have been able to do in the past. Having productive teams working toward common goals will help achieve more, on a bigger scale, helping more people in the community.” — Network Member

Figure 10. Outcomes of the Zero to Five Lewis & Clark County Collaborative



Network members reported that participation in the Collaborative helped their organization share information with other organizations (58%), make meaningful connections with other organizations (58%), and positively impact children and families (50%) (Figure 11).

Figure 11. Network Impact on Zero to Five Lewis & Clark County Collaborative Members





Discussion

The results of the Zero to Five Lewis & Clark County SNA show a network with a moderate density and low centralization. Both findings likely reflect the history of early childhood work in Lewis and Clark County. Network members named history of collaboration as the biggest facilitator to network engagement. The network has high levels of collaboration, with over a quarter (27%) of partnerships reported as integrated and 20% as coordinated.

An organization's centrality score provides information on its position in the network. It shows if the organization holds an integrated position (maintaining many ties to others) or resides on the network's periphery with only a few connections [6]. Multiple Social Service agencies have high degrees of centrality, reporting many connections to other organizations in the network. Organizations from Education and Health sectors have moderate centrality, and the Business and Faith-Based partners are on the periphery of the network with low centrality (fewer connections). These findings suggest that several Social Service agencies in the network play a crucial role in connecting members and coordinating early childhood initiatives. This network structure contributes to sustainability as it relies on many partners to keep the group connected instead of a limited few [9].

As the work moves forward, we recommend strengthening ties between the organizations on the periphery of the network with partners well integrated in network activities. In the Zero to Five Lewis & Clark County Collaborative, the members with the fewest ties are outside of the early childhood field. These members have diverse perspectives and resources that could benefit the Collaborative. Efforts to engage partners on the periphery of the network should be intentional and purpose driven. For example, the network coordinator could initiate a connection between a Social Service agency planning a family engagement event and a faith-based organization in the network. The faith-based organization might have unique resources such as volunteers or community space to be leveraged to meet the event's goals. We also recommend expanding network membership to include local government. Government officials shape policies that impact young children and families. Engaging government officials in the network creates an opportunity for the Collaborative to share information and advocate for early childhood.

Conclusion

Visible Network Labs outlines four phases in the Lifecycle of a Sustainable Network [10]. Phase 1 and Phase 2 involve creating relationships and connecting members on the network's periphery. In Phase 3, the network creates more ties to tighten connections. In Phase 4, the network breaks into subgroups to support sustainable engagement over time [10]. The results of this SNA suggest that the Zero to Five Lewis & Clark County Collaborative is in Phase 2-3 of their network growth. As the collaborative work continues, strengthening connections to the organizations on the periphery of the network and engaging new partners will build on the strong foundation of collaboration in the network. The dynamics of a network impact its overall effectiveness and ability to achieve desired outcomes [11]. The SNA has provided a baseline assessment of network characteristics for the Zero to Five Lewis & Clark County Collaborative. We recommend the continued collection of network data to understand the evolution and impact of these connections on Lewis & Clark County's early childhood system.

Collaboration is an important prerequisite to community-level social change and ensuring that social service, health, education, and other service providers coordinate prevention services and cooperatively work toward the same goals. Montana's state and local systems of care are at varying stages of collaboration with many still competing against one another for limited funding, personnel, volunteers, space, and similar resources. The Zero to Five initiative encourages collaboration among local early childhood providers to promote positive change and improve the identification and sharing of limited resources. By creating more collaborative and efficient local early childhood infrastructures with less competition and more collaboration, communities can improve their capacity to reduce many common social determinants of health.

References

1. Varda DM. PARTNER (Program to Analyze Record and Track Networks to Enhance Relationships) Tool. Visible Network Labs
2. Varda DM, Chandra A, Stern SA, Lurie N. Core dimensions of connectivity in public health collaboratives. *J Public Health Manag Pract* 2008;**14**(5):E1-7 doi: 10.1097/01.PHH.0000333889.60517.46.
3. Provan KG, Nakama L, Veazie MA, Teufel-Shone NI, Huddleston C. Building community capacity around chronic disease services through a collaborative interorganizational network. *Health Educ Behav* 2003;**30**(6):646-62 doi: 10.1177/1090198103255366.
4. Varda DM. Data-driven management strategies in public health collaboratives. *J Public Health Manag Pract* 2011;**17**(2):122-32 doi: 10.1097/PHH.0b013e3181ede995.
5. Headwaters Foundation. Zero to Five. Secondary Zero to Five. <https://www.headwatersmt.org/funding/strategic-initiative/zero-to-five/>.
6. Provan KG, Veazie MA, Staten LK, Teufel-Shone NI. The Use of Network Analysis to Strengthen Community Partnerships. *Public administration review* 2005;**65**(5):603-13 doi: 10.1111/j.1540-6210.2005.00487.x.
7. Retrum JH, Chapman CL, Varda DM. Implications of network structure on public health collaboratives. *Health Educ Behav* 2013;**40**(1 Suppl):13S-23S doi: 10.1177/1090198113492759.
8. Radcliff E, Hale N, Browder J, Cartledge C. Building Community Partnerships: Using Social Network Analysis to Strengthen Service Networks Supporting a South Carolina Program for Pregnant and Parenting Teens. *J Community Health* 2018;**43**(2):273-79 doi: 10.1007/s10900-017-0417-5.
9. Luque J, Tyson DM, Lee JH, et al. Using Social Network Analysis to Evaluate Community Capacity Building of a Regional Community Cancer Network. *J Community Psychol* 2010;**38**(5):656-68 doi: 10.1002/jcop.20386.
10. Visible Network Labs. The Lifecycle of a Sustainable Network. Secondary. <https://visiblenetworklabs.com/2019/10/25/the-lifecycle-of-a-sustainable-network/>.
11. Butterfoss F, Goodman R, Wandersman A. Community coalitions for prevention and health promotion: Factors predicting satisfaction, participation, and planning. *Health Education Quarterly* 1996;**23**(1):65 doi: 10.1177/109019819602300105.

Appendix A

Methodology

Instrument

The research team adapted the PARTNER validated tool for this study. The PARTNER tool is designed for public health Collaboratives and collects information on the quantity and quality of partnerships and non-relational questions about overall network functioning [2].

Participants

The research team conducted a whole network study that collected information from all members of the Zero to Five Collaborative. The Local Collaborative Coordinator provided the research team with a list of Collaborative members. Organizations with multiple Collaborative members chose one person to represent the organization, or the research team broke out the organization by programs. The representative answering the survey responded on behalf of their organization or program, not as an individual. The research team sent parents and community members a separate survey through Qualtrics that did not include the relational questions to maintain confidentiality.

Survey Administration

The research team distributed the survey from October 19, 2020 to December 4, 2020 through the PARTNER platform and Qualtrics. The first page of the survey obtained informed consent. The survey remained open for six weeks, and participants received email reminders weekly. Mid-way through the recruitment period, the research team mailed a letter and called participants that had not completed the survey. This study received approval from the University of Montana Institutional Review Board.

Data Analysis

The research team utilized the PARTNER platform to conduct descriptive analyses, including visual maps of the network. The research team considered a relationship to be present if one of the network members reported it as present. This allowed us to capture some data about network members who did not respond or provided incomplete data using other network members' answers.

Limitations

The surveys were completed by one person on behalf of an organization and might not represent the organization. The response rate was 84%, with some partial responses. SNA surveys are long, especially for organizations with many partners, which can contribute to survey fatigue. Missing data impacts the network measures and does not represent the complete network. The research team administered the survey during the COVID-19 pandemic and in the final months of the 2020 United States election. Agencies involved in public health collaboratives are often a part of the COVID-19 response in their communities. Elections bring an increase in email, mail, and phone calls to individuals. These two factors might have impacted the survey response rate.

Appendix B

Glossary

Attribution: the proportion of all relationships attributed to the Zero to Five Collaborative.

Breadth: the proportion of different types of organizations that are members of the network.

Business: organized efforts and activities to produce and sell goods and services for profit.

Cooperative Relationship Activities: involve exchanging information, attending meetings together, and offering resources to partners.

Coordinated Relationship Activities: include cooperative activities in addition to intentional efforts to enhance each other's capacity for the mutual benefit of programs.

Degree of Centrality: the number of connections an organization has to others as a proportion of all possible connections.

Density: the number of relationships reported as a fraction of the total number of possible relationships across the entire network.

Education: provide systematic instruction, including at a preschool, school, or university.

Faith-Based Organization: an organization that is based in a particular faith.

Government: governing body of a community or state.

Health & Health Care: promotes and protects the health of people and the communities and the organized provision of medical care (including mental health care) to individuals or a community.

Integrated Relationship Activities: in addition to cooperative and coordinated activities, this is the act of using commonalities to create a unified center of knowledge and programming that supports work in related content areas.

Level of Collaboration: the proportion of all relationships reported as cooperative, coordinated, and integrated.

Parent / Community Member: network members that are not affiliated with an organization.

Partnership: a member had worked with another organization on an early childhood project in the last year.

Social Network Analysis: a research methodology that measures how organizations participate in a network and the quantity and quality of relationships between partners.

Social Services: services to promote social well-being including financial support, job training, child care, and public assistance.

Value: the average of all members' ratings on their partners value to the network in three areas level of power and influence, level of involvement, and resource contribution (all items were rated on a scale of 1 "not at all" to 4 "a great deal").