

Zero to Five
Lincoln County
Collaborative

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SOCIAL NETWORK ANALYSIS

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Table of Contents

Executive Summary	3
What is Social Network Analysis?	4
Background	5
Methods	5
Results	6
Network Composition	6
Quantity and Quality of Connections Between Members	8
Degree Centrality	10
Density	10
Value	10
Levels of Collaboration	11
Resource Contribution	13
Facilitators and Barriers to Network Participation	13
Outcomes of the Network	15
Discussion	16
Conclusion	17
References	18
Appendix A	19
Appendix B	20

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Executive Summary

Background

The Zero to Five Lincoln 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 39 organizations and 6 parents/community members in the Zero to Five Lincoln County Collaborative to participate in the survey. Of the 39 organizations in the network, 27 (69%) respondents completed the survey and 6 partially completed the survey, totaling 33 respondents (85%).

Network Composition

The Zero to Five Lincoln County Collaborative includes organizations from five sectors, with Social Services (31%) as the sector with the highest representation. The network members are from across the county, including Yaak, Troy, Eureka, Trego, Fortine, Libby, and Kalispell in Flathead County.

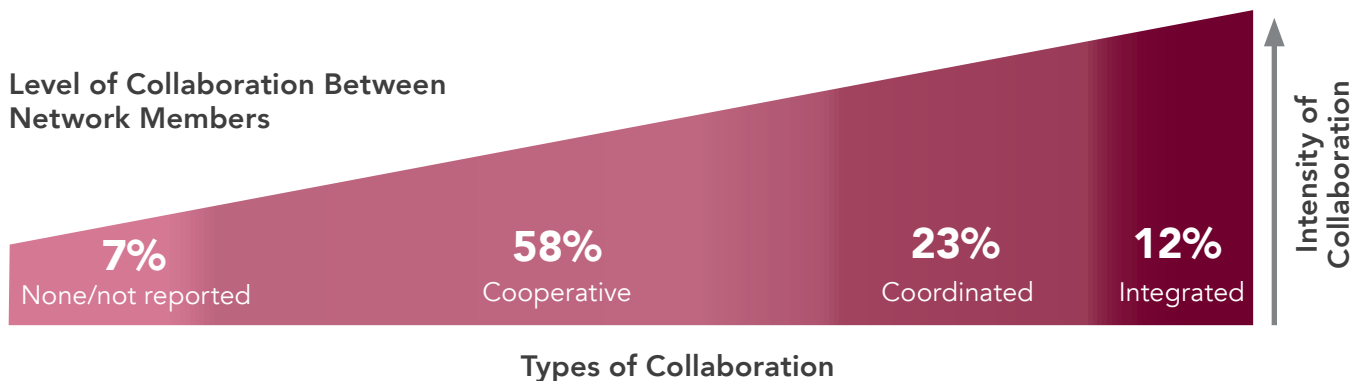
Partnerships

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. Twenty-four organizations reported 134 partnerships across the Zero to Five Lincoln County Collaborative.

Close to half (43%) of respondents credited relationships to the Zero to Five Lincoln 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).



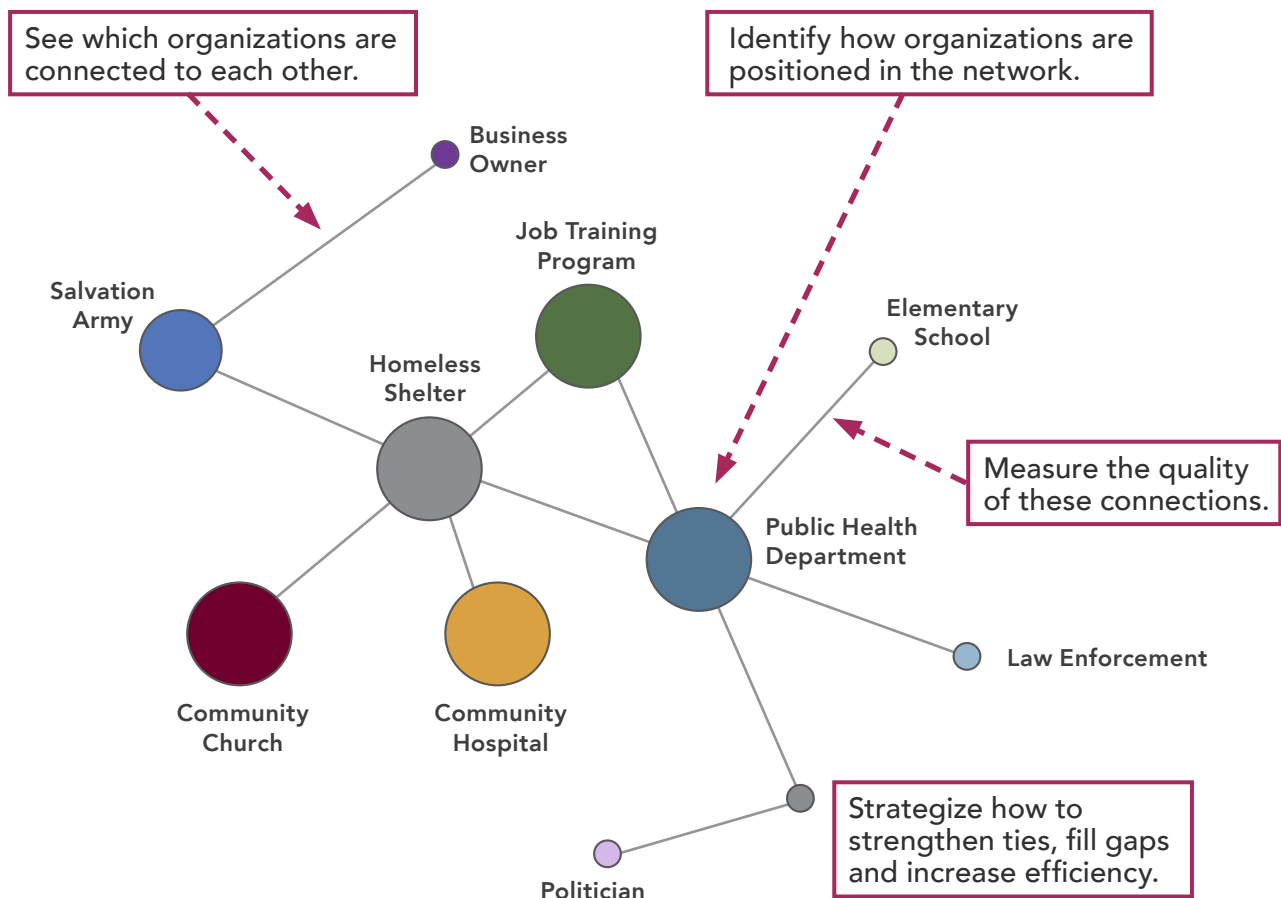
Network Impact on Members

Network members reported that participation in the Collaborative helped their organization make meaningful connections with other organizations (70%), positively impact children and families (61%), and share information with other organizations (55%).

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 Lincoln County Collaborative Social Network Analysis

Background

The Zero to Five Initiative has local early childhood initiatives across western Montana, including the Zero to Five Lincoln County Collaborative [5]. A core strategy of the Zero to Five Initiative is the development of 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 Lincoln County Collaborative was established in June 2018. In the Fall of 2020, the Collaborative participated in an 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 39 organizations and 6 parents/community members in the Zero to Five Lincoln County Collaborative to participate in the survey. Of the 39 organizations in the network, 27 (69%) respondents completed the survey and 6 partially completed the survey, totaling 33 respondents (85%).

Additional information on the methodology is in Appendix A.

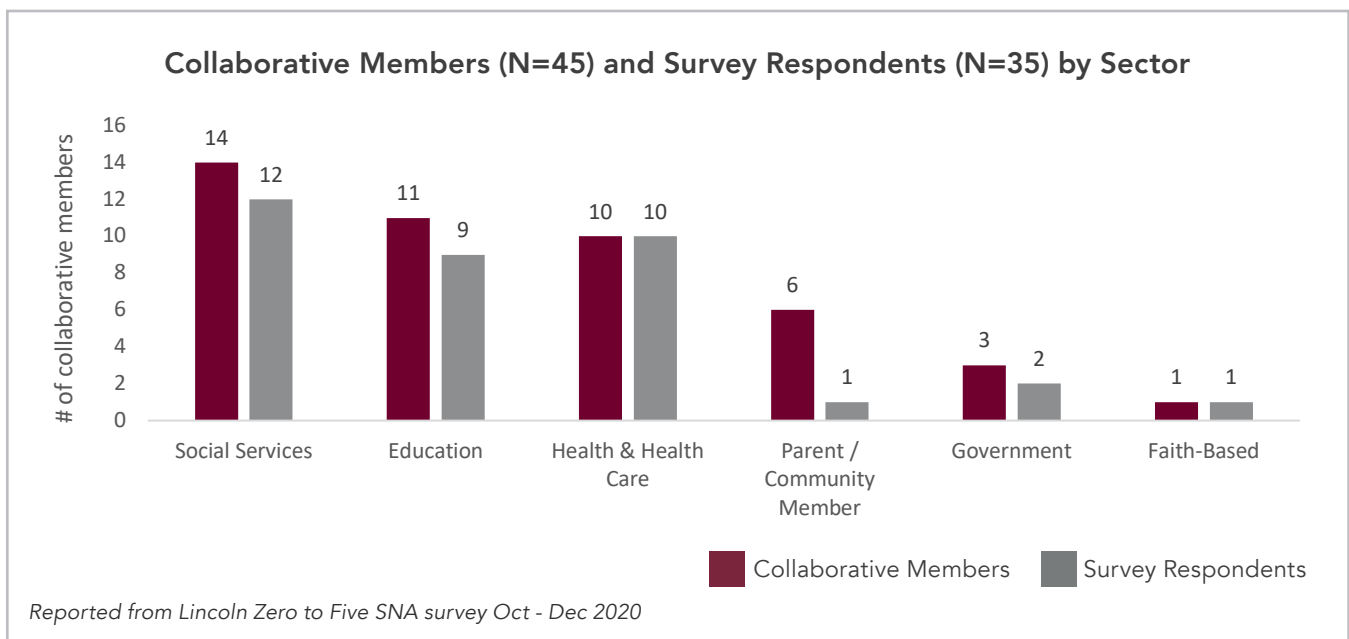


Results

Network Composition

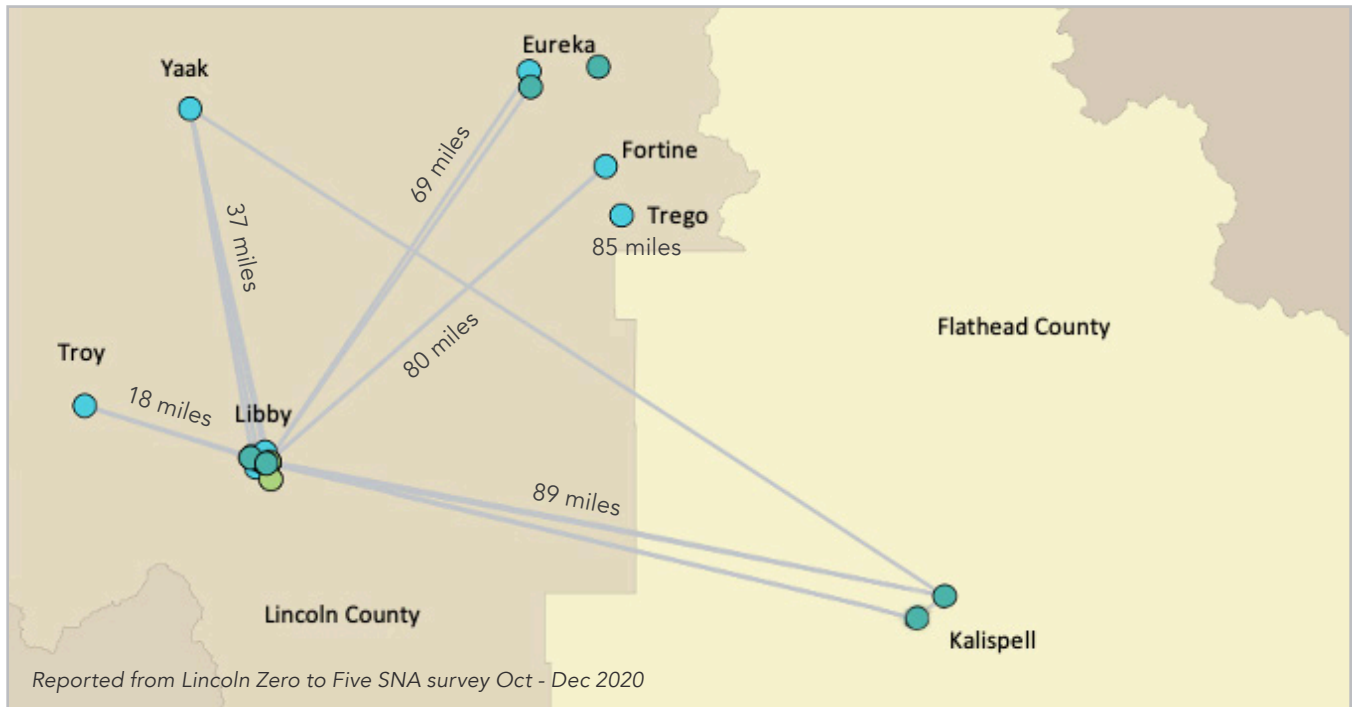
The Zero to Five Lincoln County Collaborative includes organizations from five sectors, Social Services, Education, Health & Health Care, Government, and Business. Parents and community members not affiliated with an organization also participate in the Collaborative. In Figure 1, the maroon bars show 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, followed by Education (Figure 1).

Figure 1. Collaborative Members and Survey Respondents by Sector



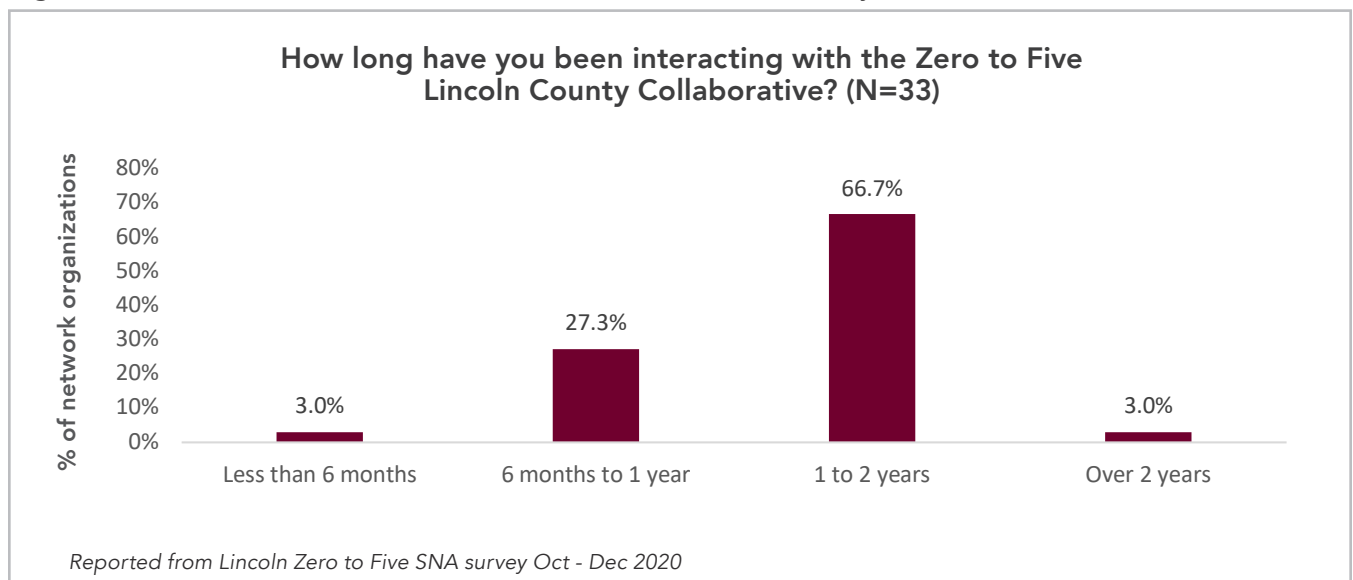
The Zero to Five Lincoln County Collaborative includes members from across the county, with representatives from Yaak, Troy, Eureka, Trego, Fortine, Libby, and Kalispell in Flathead County. The county has a total area of 3,675 square miles. In the GIS network map in Figure 2, the circles represent organizations that participate in the Zero to Five Lincoln County Collaborative. The lines show relationships between organizations and the mileage shows the distance between Libby and the communities where partners reside. The majority of network members are from Libby. The other members are from rural communities across Lincoln County and neighboring Flathead County.

Figure 2. Geographic Location of the Lincoln County Zero to Five Collaborative Members



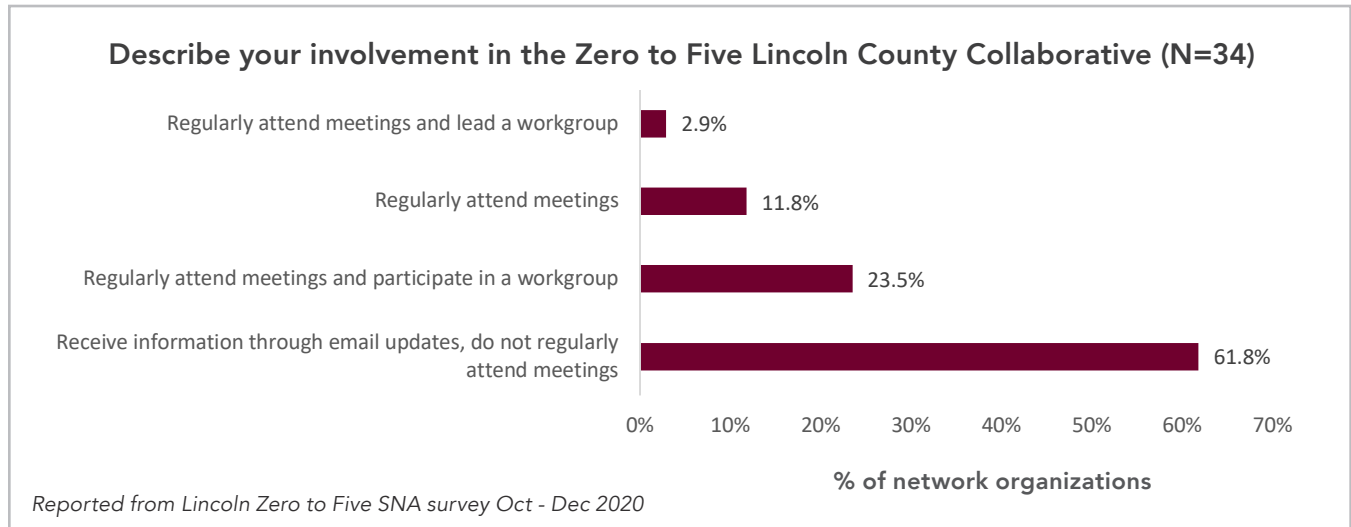
Network members reported how long they have been interacting with the Zero to Five Lincoln County Collaborative. Most respondents (67%) have been involved in the Collaborative for 1 to 2 years (Figure 3).

Figure 3. Levels of Involvement in the Zero to Five Lincoln County Collaborative



Network members can participate in a variety of ways in the Zero to Five Lincoln 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 Lincoln County Collaborative, most members (62%) receive information through email updates and do not regularly attend meetings (Figure 4).

Figure 4. Levels of Participation in Zero to Five Lincoln 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. Twenty-four organizations reported 134 partnerships across the Zero to Five Lincoln County Collaborative. In the image below, each arrow represents a reported partnership.



Close to half (43%) of respondents credited relationships to the Zero to Five Lincoln County Collaborative, and 37% of respondents credited the Collaborative for strengthening pre-existing relationships (Table 1).

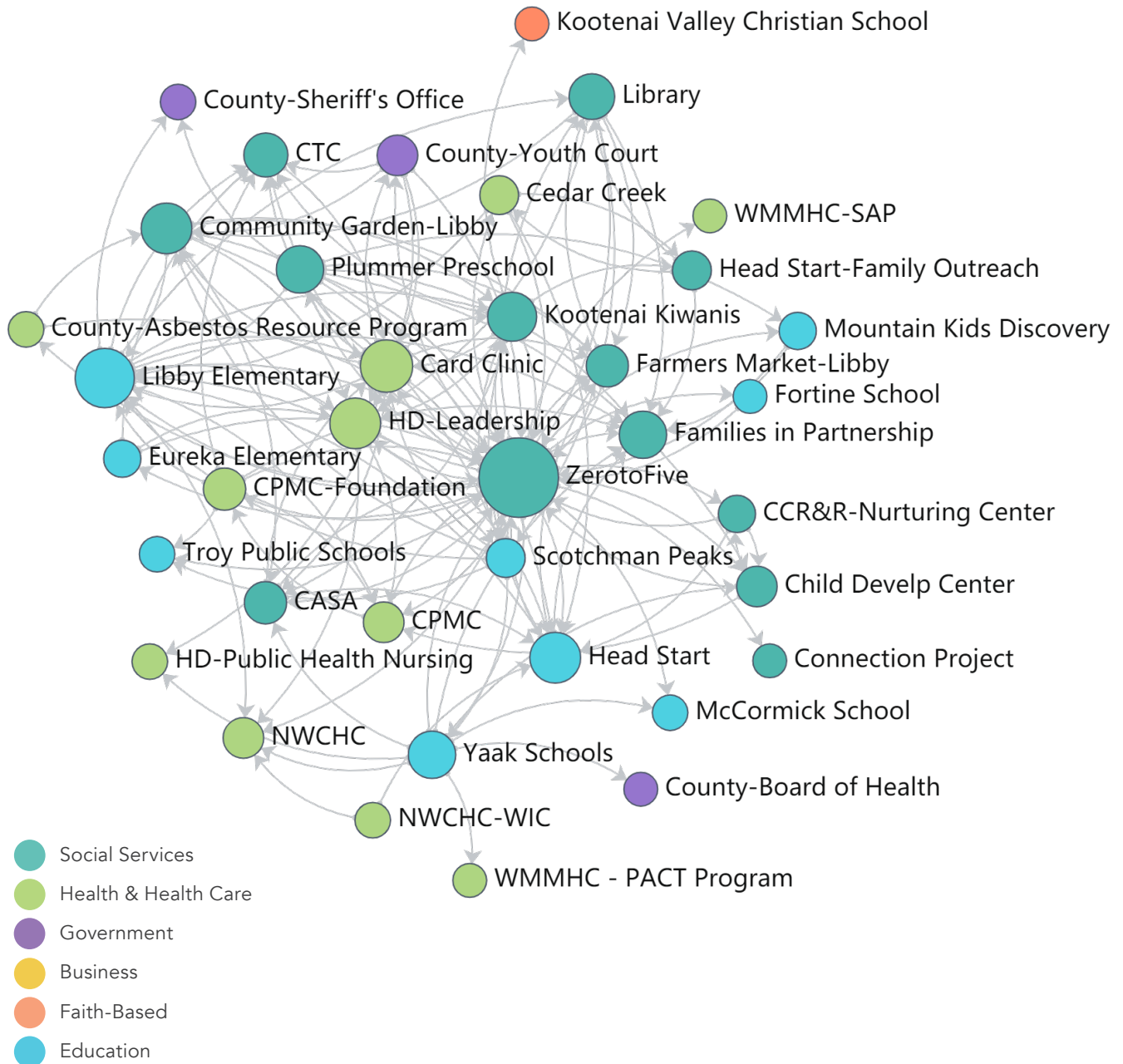
Close to half (43%) of respondents credited relationships to the Zero to Five Lincoln County Collaborative.

Table 1. Relationship Development

Describe how your relationships with each of these partners started (N=134)	n (%)
Through the Collaborative meetings, trainings, or other activities	58 (43.2)
Our relationship was not initiated through the Collaborative but the Collaborative made our relationship stronger	50 (37.3)
Other	18 (13.4)
No response	8 (6.0)

The network map (Figure 5) 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 5. Zero to Five Lincoln County Network Map



Reported from Lincoln 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].

The Lincoln County Zero to Five program has the highest degree of centrality at 74%, with connections to most organizations in the network. The program's central role means it is critical to initiating connections across the network among members that might not otherwise interact.

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 9.6%. The low-density score reflects a sparsely connected network, meaning not all organizations in the network are closely connected to all others [8]. This result likely reflects the network's geographic distance, the level of involvement of network members, and the early phase of the network development. A third of network members have been involved for one year or less and are likely still building relationships with other organizations.

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 Lincoln 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.	130	3.4
Level of Involvement	This partner is strongly committed and active in the partnership and gets things done.	120	3.5
Resource Contribution	This partner brings resources to the relationship like funding, information, or other resources.	120	3.2



Levels of Collaboration

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

Cooperative

Involve exchanging information, attending meetings together, and offering resources to partners.

Coordinated

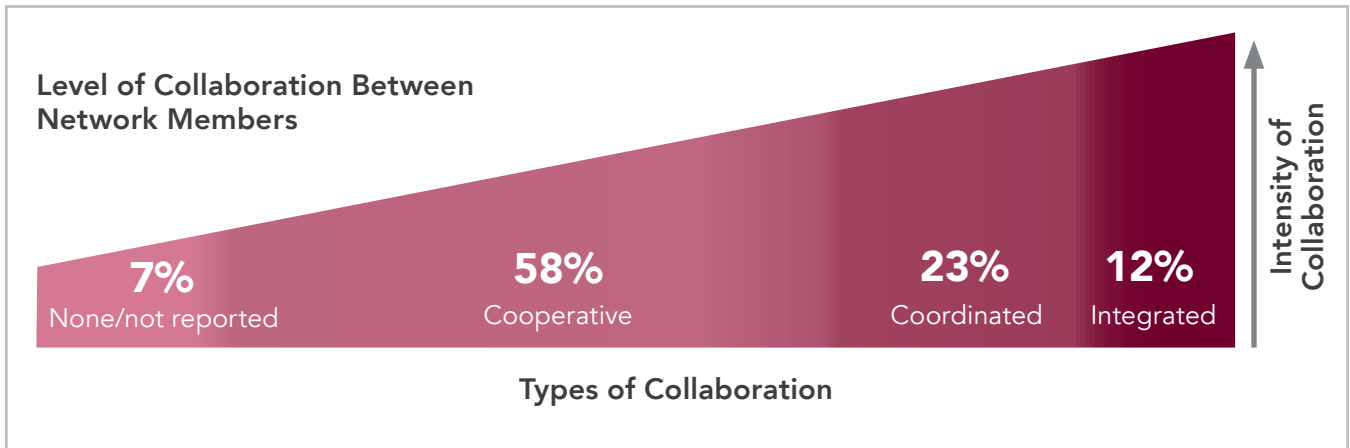
Include cooperative activities in addition to intentional efforts to enhance each other's capacity for the mutual benefit of programs.

Integrated

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.

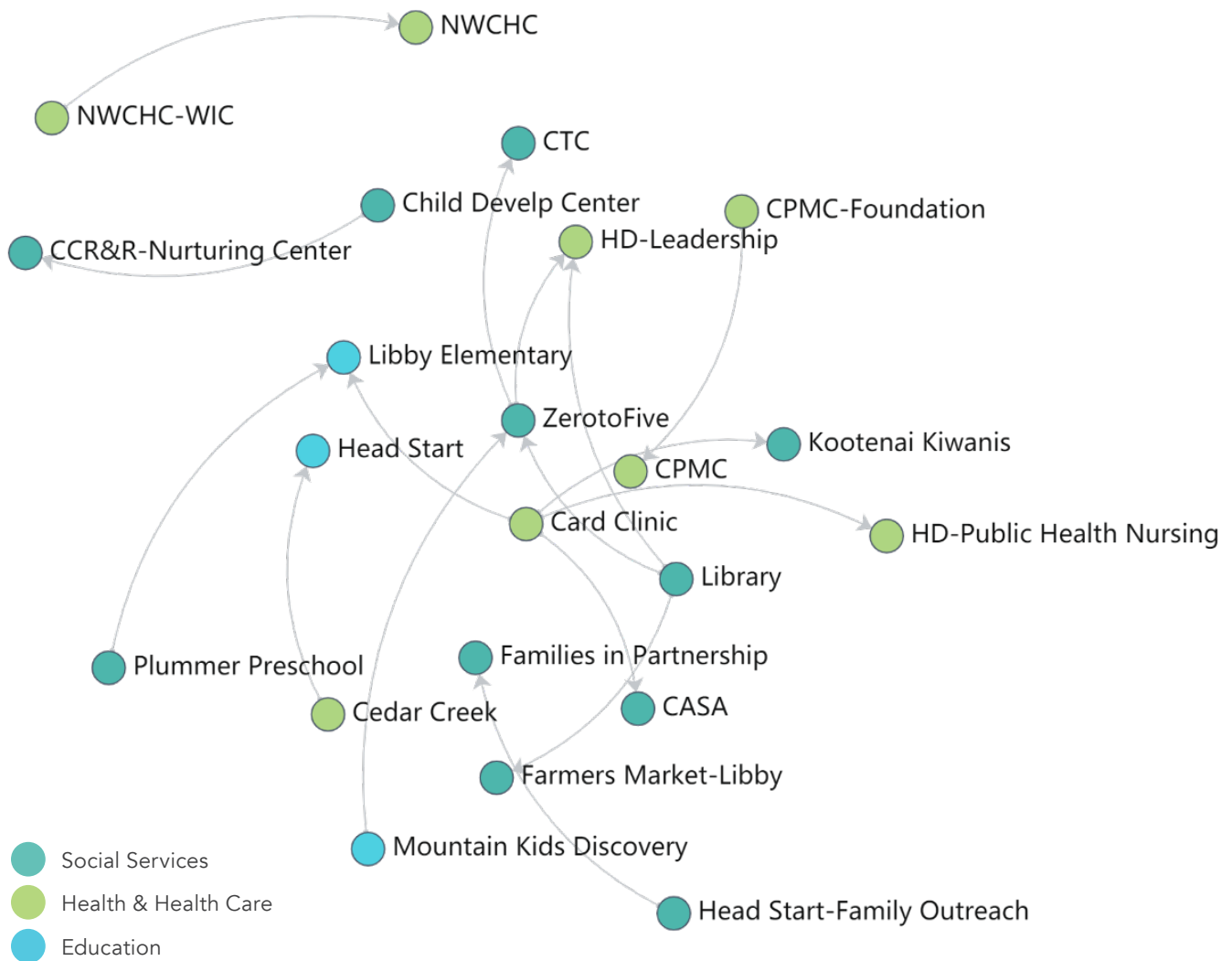
Network members classified most relationship activities as cooperative (58%), followed by coordinated (23%), and integrated (12%) (Figure 6). As a relatively new network, the Zero to Five Lincoln County Collaborative continues to engage new partners and build relationships. Over time, we expect the proportion of cooperative relationships to decrease while the proportion of coordinated and integrated relationships increase.

Figure 6. Level of Collaboration Between Network Members



The network map below shows the partners with integrated relationship activities (12%), the most intensive type of collaboration (Figure 7).

Figure 7. Integrated Relationship Activities between Network Members



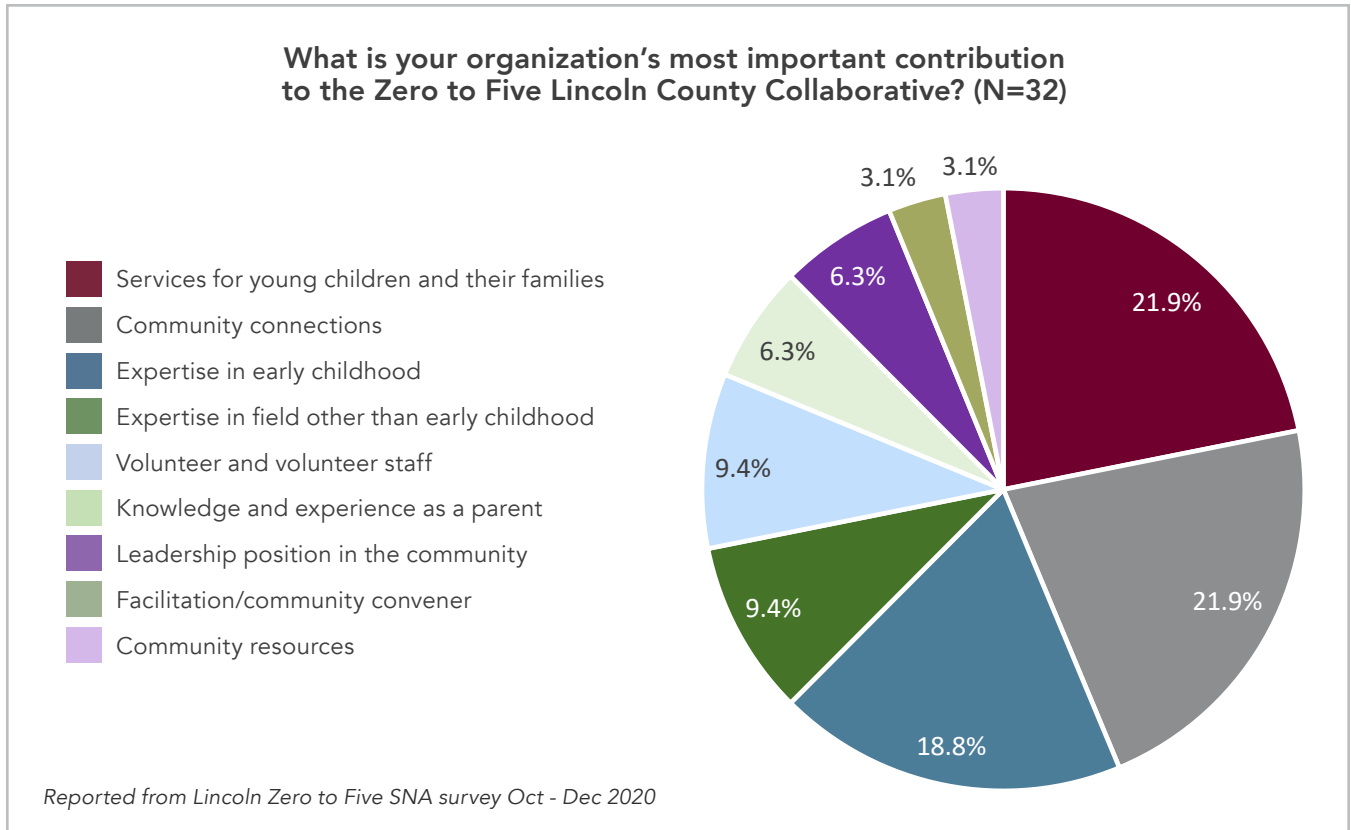
Reported from Lincoln Zero to Five SNA survey Oct - Dec 2020

Resource Contribution

Network members reported the resources their organization contributes to the Collaborative. Respondents most frequently named community connections (76%), knowledge of resources (64%), and services for children and their families (55%). The resources the fewest organizations can contribute to the Collaborative include funding (6%) and public policy advocacy (6%).

Figure 8 illustrates the contributions that organizations reported to be the most important for the Collaborative; respondents named services for young children and families (22%), community connections (22%), and expertise in early childhood (19%) (Figure 8).

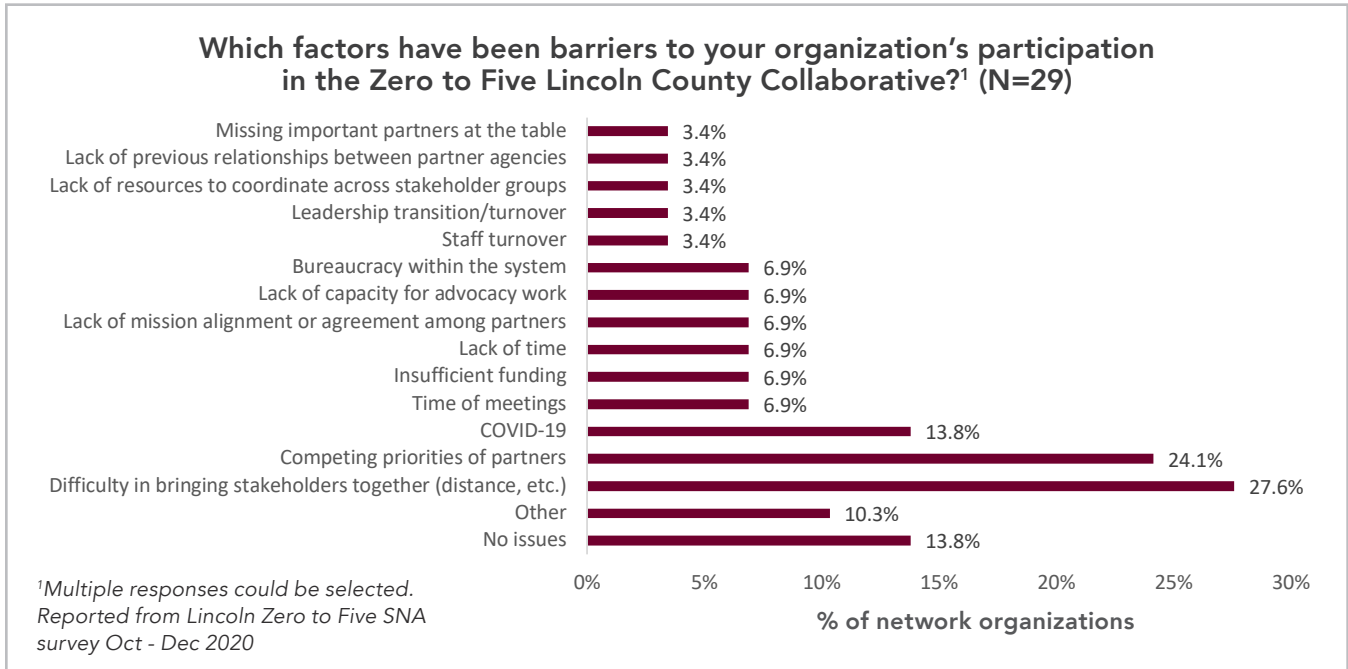
Figure 8. Most Important Contribution to the Zero to Five Lincoln County Collaborative



Barriers and Facilitators to Network Participation

Network members reported barriers to their organization's participation in the Collaborative; a third of respondents (28%) reported that bringing stakeholders together presents the greatest barrier. Network members also reported competing priorities of partners (24%) and the COVID-19 pandemic (14%) as barriers to participation (Figure 9). The geographic distance between communities in Lincoln County likely contributes to the difficulty in bringing partners together.

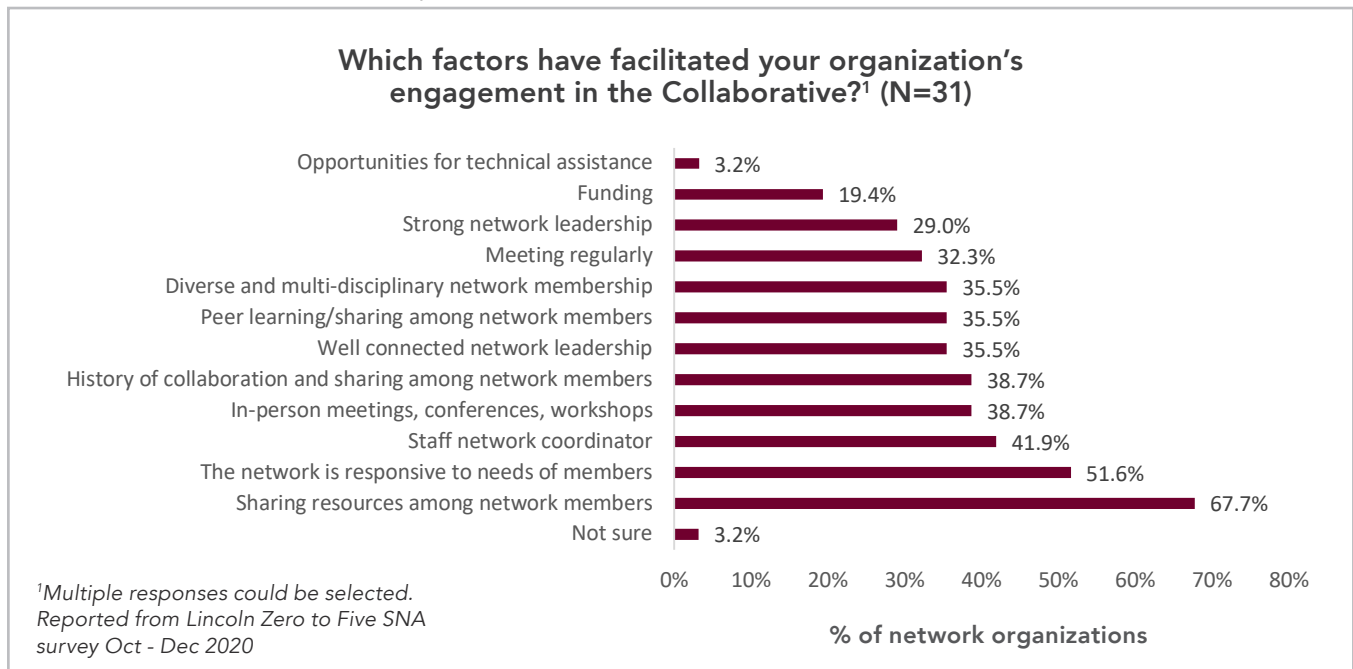
Figure 9. Barriers to Participation in Zero to Five Lincoln County Collaborative



Network members reported factors that facilitate their organization’s participation in the Collaborative. Respondents named sharing resources among network members (68%), the network is responsive to the needs of members (52%), and the role of the staff network coordinator (42%) as the top three facilitators (Figure 10).

The Collaborative has brought together organizations that would not normally work together. By doing this we have combined many resources to reach the families in Lincoln County and assess the needs of the community as a whole.” — Network Member

Figure 10. Facilitators to Participation in Zero to Five Lincoln County Collaborative

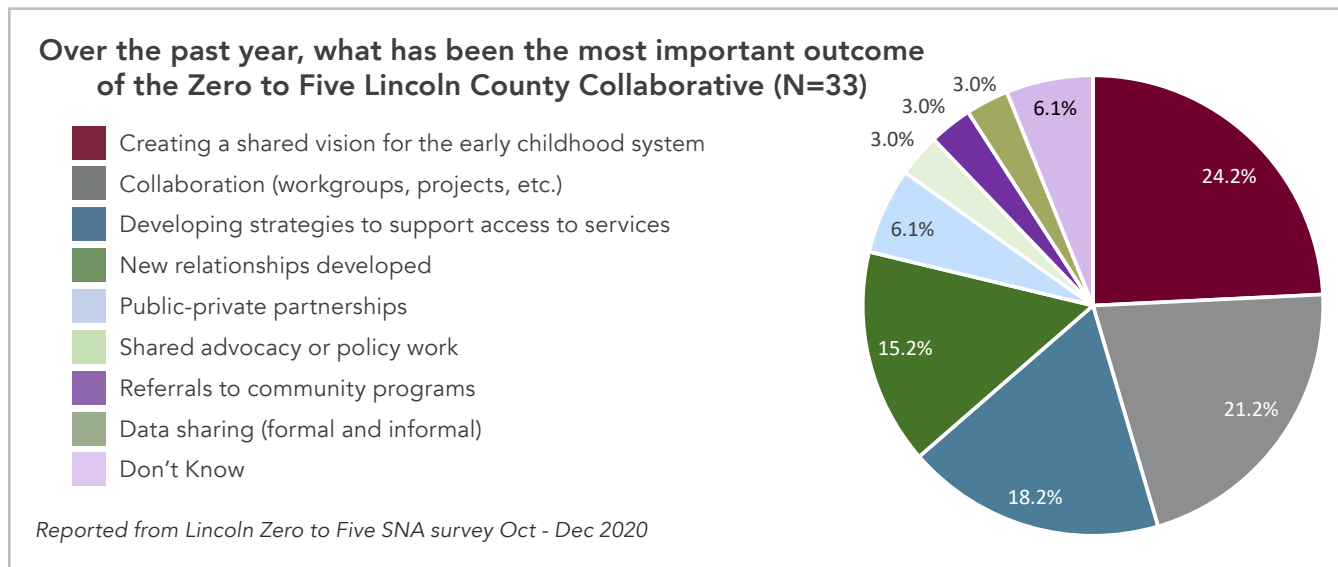


Outcomes of the Network

Network members reported the most important outcome from the Zero to Five Lincoln County Collaborative in the past year. Respondents most frequently (24%) named creating a shared vision for the early childhood system, followed by collaboration (21%), and developing strategies to support access to services (18%) (Figure 11).

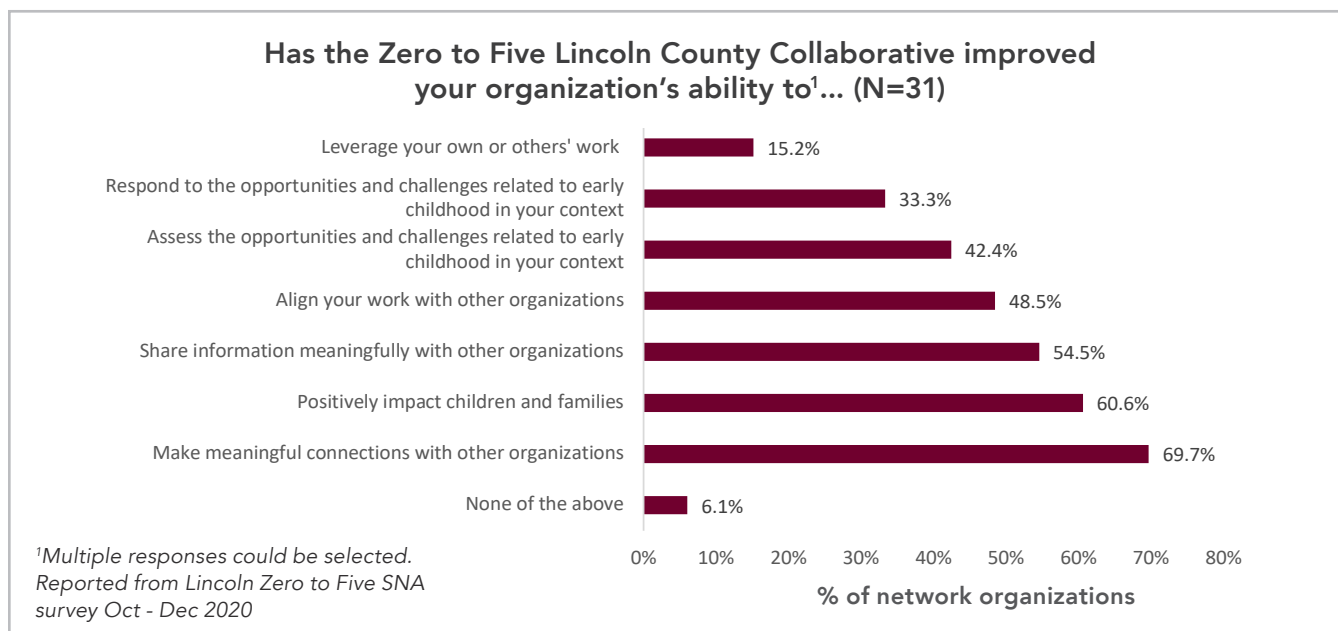
“We love to work with any organizations that strive to make the lives of children within our communities better. I think we can accomplish more as organizations by stepping out of our silos and working together to complete a common goal for all.” — Network Member

Figure 11. Outcomes of the Zero to Five Lincoln County Collaborative



Network members reported that participation in the Collaborative helped their organization make meaningful connections with other organizations (70%), positively impact children and families (61%), and share information with other organizations (55%) (Figure 12).

Figure 12. Network Impact on Zero to Five Lincoln County Collaborative Members



Discussion

The results of the Zero to Five Lincoln County SNA show a network with high centrality, low density, and high perceived value among network members. The Zero to Five Lincoln County program has a high degree of centrality and plays a critical role in keeping the network connected – especially across the large geographic area. The overall network density is low, which means members have few ties to others in the network. The low density likely reflects the early phase of network development and the diverse composition of partner organizations. Increasing density can support the network in several ways. High density contributes to greater perceptions of value among partners and agreement on outcomes [7]. A more cohesive network can more efficiently coordinate activities and share resources between partners [9]. Most members (62%) of the Zero to Five Lincoln County Collaborative do not regularly attend meetings and receive updates on the Collaborative via email. Without convening with other members, creating new connections becomes challenging. We recommend that network leadership implement strategies to enhance engagement in the Collaborative, such as increasing meeting attendance and connecting members with fewer ties to those integrated in the network. The network spans a vast geographic area making in-person attendance difficult for some partners. Online platforms such as Zoom build opportunities for connectivity without meeting in-person. While virtual meetings are helpful, they do not provide the same type of connection as in-person. One strategy to increase online engagement involves utilizing breakout rooms. Breakout rooms offer an effective way to engage small groups of members to discuss project activities. The network leader can organize breakout rooms with partners that might not have interacted before, creating new relationship opportunities.

As the density of connections across the network increases, they often become decentralized. Decentralized networks rely less on a few key members to keep the group connected, making them more resilient and sustainable [10]. It is common for networks to be centralized in their early phases of development and move to a more decentralized structure over time [4]. As the Collaborative determines focus areas for year 2, we recommend network leadership further engage partners in developing and implementing the projects. For example, a project focused on parent engagement might benefit from the leadership of a network member that works directly with parents and families. Creating workgroups led by different partner organizations helps disperse leadership and coordination across partners [4].

Several organizations on the periphery of the network come from rural communities across the county. These partners hold an essential role in leveraging the work of the Collaborative in rural areas. Most of these organizations have few connections to others in the network. We recommend network leadership implement strategies to strengthen their role in the network. For example, the Collaborative could work with these organizations to develop small projects specifically for their community. In a county that spans such a large geographic area, engaging the rural partners in community projects enhances Zero to Five's presence across the county and provides these network members with a purposeful way to participate.

Conclusion

The Zero to Five Lincoln County program has successfully brought together a diverse group of community organizations from across the large county. Visible Network Labs outlines four phases in the Lifecycle of a Sustainable Network [11]. 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 [11]. The results of this SNA suggest that the Zero to Five Lincoln County Collaborative is in Phase 1-2 of network growth. The Collaborative continues to grow and engage new partners. As the work continues, strengthening relationships and further engaging the rural partners will contribute to greater network density and more intensive forms of collaboration. The dynamics of a network impact its overall effectiveness and ability to achieve desired outcomes [12]. The SNA has provided a baseline assessment of network characteristics for the Zero to Five Lincoln County Collaborative. We recommend the continued collection of network data to understand the evolution and impact of these connections on the early childhood system in Lincoln County.

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. <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. Petrescu-Prahova M, Belza B, Leith K, Allen P, Coe NB, Anderson LA. Using Social Network Analysis to Assess Mentorship and Collaboration in a Public Health Network. *Prev Chronic Dis* 2015;**12**:E130 doi: 10.5888/pcd12.150103.
9. 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.
10. 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.
11. Visible Network Labs. The Lifecycle of a Sustainable Network. <https://visiblenetworklabs.com/2019/10/25/the-lifecycle-of-a-sustainable-network/>.
12. 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 85%, 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").