Social network analysis of public health programs to measure partnership

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ABSTRACT

In order to prevent chronic diseases, community-based programs are encouraged to take an ecological approach to public health promotion and involve many diverse partners. Little is known about measuring partnership in implementing public health strategies. We collected data from 23 Missouri communities in early 2012 that received funding from three separate programs to prevent obesity and/or reduce tobacco use. While all of these funding programs encourage partnership, only the Social Innovation for Missouri (SIM) program included a focus on building community capacity and enhancing collaboration.

Social network analysis techniques were used to understand contact and collaboration networks in community organizations. Measurements of average degree, density, degree centralization, and betweenness centralization were calculated for each network. Because of the various sizes of the networks, we conducted comparative analyses with and without adjustment for network size. SIM programs had increased measurements of average degree for partner collaboration and larger networks. When controlling for network size, SIM groups had higher measures of network density and lower measures of degree centralization and betweenness centralization.

SIM collaboration networks were more dense and less centralized, indicating increased partnership. The methods described in this paper can be used to compare partnership in community networks of various sizes. Further research is necessary to define causal mechanisms of partnership development and their relationship to public health outcomes.

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1. Introduction

Collaborative efforts among organizations with multiple programming and skill sets can result in higher levels of community impact (Kania and Kramer, 2011). An increasing number of public health initiatives use community-based approaches involving cross-sector partnerships (Roussos and Fawcett, 2000). Integrated efforts to address public health issues by involving multiple stakeholders are expected to result in better health outcomes than programs not using a network approach (Kwait et al., 2001). The rationale behind this is that no single organization has full control over all of the determinants of population health (Woulfe et al., 2010). By pooling resources, talents, and strategies, multiple sectors can more effectively carry out the responsibilities that affect the health of the targeted population (Martin et al., 2009).

While community-based health initiatives or collective action approaches are quite popular, there is a lack of substantive research on their effectiveness and impact (Roussos and Fawcett, 2000). A key reason for the shortage of evidence is that evaluating the structure and collaboration of coalitions or community partnerships is challenging (de Silva-Sanigorski et al., 2010a). These difficulties must be considered when evaluating collaborative efforts and further highlight the need for continued research on partnership formation using designs that measure activities, organizations, and social network development (Provan et al., 2003). Network analysis can measure partnership characteristics and can be used to predict collaboration and effectiveness in organizations (Honeycutt and Strong, 2011). Network metrics such as degree, density, and centralization can be used describe relationships among people and organizations and can reveal differences in communication and collaboration among coalitions (Scholz et al., 2008) and determine community capacity (Singer and Kegler, 2004).

Social network methods are frequently performed on single networks at one time (Leischow et al., 2010) or over a period of time (Luque et al., 2011) to examine network characteristics. There are few examples of using whole networks as the unit of analysis

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(Fujimoto et al., 2009; Luke et al., 2010; Provan et al., 2007). When comparing multiple whole networks, network size has an inverse relationship with density and can have an effect on network characteristics such as average degree and centralization (Valente, 2010; Wasserman and Faust, 1994). Therefore, adjustment for network size can reveal additional relationships at the whole-network level. The purpose of this paper is to use social network analyses to measure partnership development and compare community networks of various sizes among different public health funding programs (Provan et al., 2004).

2. Methods

The Missouri Foundation for Health (MFH) created the Social Innovation for Missouri (SIM) program in 2010 to address the public health goals of tobacco cessation and obesity prevention through the development of partnerships with key stakeholders in local municipalities, rural, and urban neighborhoods across Missouri (Goodman et al., 1998; Kendall et al., 2012). MFH funds several other community public health programs. Two of these programs, the Tobacco Prevention and Cessation Initiative (TPCI) and the Healthy and Active Communities Initiative (H&AC), focus on tobacco control and obesity prevention, respectively. SIM was distinct from these initiatives because of its goals of collaboration and the integration of tobacco and obesity strategies. It is not known

whether grant design can influence social structure and network characteristics in coalitions. These three funding programs by the same funder in similar communities across Missouri provide an opportunity to assess differences in partnership and community capacity in public health programs using network analysis (Provan et al., 2004).

All seven Missouri organizations selected by MFH to receive funding as a part of the SIM Program were included, and TPCI and H&AC (two other MFH funded programs) were chosen as comparison programs. The comparison programs had singular aims of either tobacco control or obesity prevention, and did not include the specific goal of community capacity building and partnership development that was part of SIM. These organizations were geographically distributed around the state and included both rural and urban areas. The lead agencies for all 7 SIM, 12 TPCI and 11 H&AC programs were contacted; seven SIM, eight TPCI and eight H&AC networks elected to participate in the study. A map of Missouri counties and program locations is displayed in Fig. 1.

To define the members of each network, we asked the lead agency in for each network in November 2011 to complete a partner identification form to identify individuals with whom they collaborate as a part of their public health program. Each lead agency was then contacted by telephone to review the partner form selections and verify the contact information of each individual partner. The lead agency was notified when each partner survey
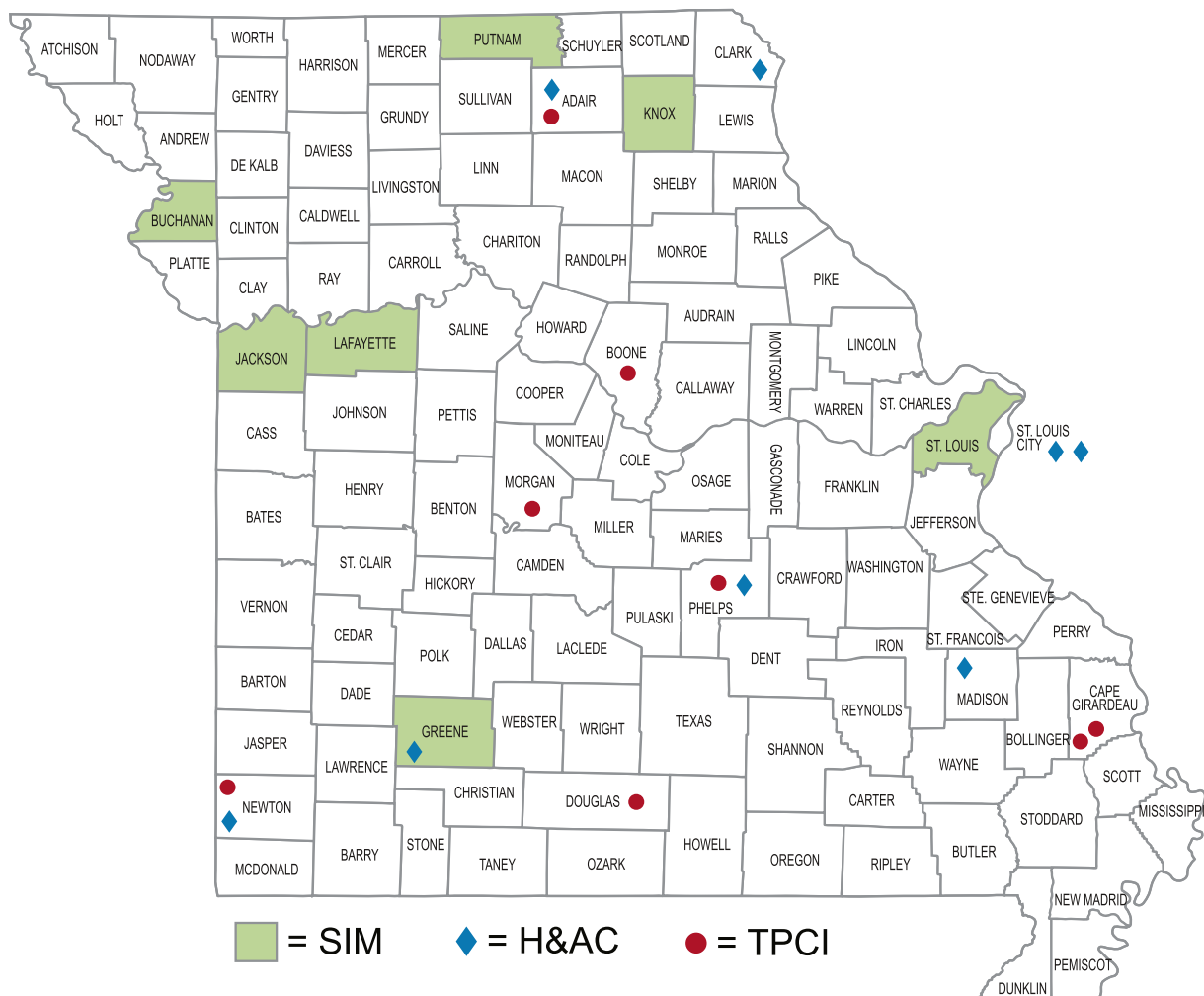

Fig. 1. Partnership evaluation location of grantees.