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Engaging Community Networks to Improve Depression Services: A Cluster-Randomized Trial of a Community Engagement and Planning Intervention

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Abstract

This paper explores the effects of a group-randomized controlled trial, Community Partners in Care (CPIC), on the development of interagency networks for collaborative depression care improvement between a community engagement and planning (CEP) intervention and a resources for services (RS) intervention that provided the same content solely via technical assistance to individual programs. Both interventions consisted of a diverse set of service agencies, including

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Conflict of Interest

No conflicts of interest to report.

health, mental health, substance abuse treatment, social services, and community-trusted organizations such as churches and parks and recreation centers. Participants in the community councils for the CEP intervention reflected a range of agency leaders, staff, and other stakeholders. Network analysis of partnerships among agencies in the CEP versus RS condition, and qualitative analysis of perspectives on interagency network changes from multiple sources, suggested that agencies in the CEP intervention exhibited greater growth in partnership capacity among themselves than did RS agencies. CEP participants also viewed the coalition development intervention both as promoting collaboration in depression services and as a meaningful community capacity building activity. These descriptive results help to identify plausible mechanisms of action for the CPIC interventions and can be used to guide development of future community engagement interventions and evaluations in under-resourced communities.

Keywords

depression care; quality improvement; community engagement; community-based participatory research; partnership networks; community of practice

Introduction

Depressive symptoms and disorders are prevalent and a major cause of disability in the general population.^{1, 2} While rates of depression are similar across racial and ethnic groups, minorities such as African Americans and Latinos tend to have significantly worse access to, use of, retention in, and outcomes for depression treatment.³⁻⁵ Low-income communities of color are affected even more disproportionately, as neighborhood poverty has been shown to be predictive of depression onset,⁶ and availability of mental health providers tends to be lacking for members of these communities, who may seek support for depression from alternative service settings such as faith-based or substance abuse programs.^{7, 8} Some minority groups also tend to prefer psychotherapy,⁹ which is relatively less accessible compared to medication treatment in under-resourced areas.¹⁰

Collaborative care models that integrate care managers, clinician training, client education, and system improvements for depression treatment in primary care can improve depression outcomes, including for minority individuals.¹⁰⁻¹³ These models are similar to behavioral health homes that combine care management, coordination of services, and explicit responsibility for care by a specific provider or team.¹⁴ However, service agencies in low-income minority communities often do not have the resources to provide all components of such comprehensive care models.¹⁵⁻¹⁷

Previous studies have confirmed the importance of faith-based, social-service, and other community-based agencies as partners in addressing depression.¹⁸⁻²⁰ Encouraging safety-net healthcare providers to collaborate with such agencies using community engagement may support successful implementation of collaborative care and other models across under-resourced communities.²¹⁻²³ Yet the literature highlights the many challenges of sustaining coalitions, collaborations, and networks, including bringing agencies together, maintaining a focus on specific goals, and the time and effort required, given competing needs and limited resources.²⁴⁻²⁶ There also can be considerable uncertainty over the degree to which efforts

expended on community partnerships will yield improvements for individual agencies, clients, or the community as a whole.²⁷⁻²⁹ These challenges may be exacerbated with greater diversity of agencies.^{30, 31}

Community Partners in Care (CPIC), a study supported by the National Institute of Mental Health and other funders (see Acknowledgements), was designed to test whether a community engagement approach to multi-sector coalition building, compared to individual program technical assistance, is more effective for implementing evidence-based improvement for depression care and promoting access, quality of care, and positive outcomes for depressed clients.²¹ Both intervention approaches in CPIC intentionally consisted of a diverse set of community-based agencies that could contribute to implementing the different elements of collaborative depression care, including health, mental health, substance abuse treatment, social services, and community-trusted organizations such as churches, exercise clubs, and parks and recreation centers. CPIC's Community Engagement and Planning (CEP) intervention was designed to "build a village"—a sense of collective efficacy and a dynamic learning and collaborative network. Similar to the concept of a community-of-practice, the CEP model supports sharing of resources, adaptation of evidence-based care, and improvements in local system capacity to leverage diverse agency strengths.³² The comparison intervention, Resources for Services (RS), sought to promote capacity-building for depression services among varied agencies through technical assistance to programs, but without specific support for interagency collaboration or networks.³³

Prior reported outcomes for CPIC clients found that the CEP intervention, described in more detail below, was more effective than the RS intervention in reducing poor mental health quality of life, behavioral health hospitalizations, and risk factors for chronic homelessness for depressed individuals at 6-month follow-up. Further, CEP relative to RS shifted outpatient depression services away from mental health specialty medication visits and toward faith-based and park programs.³⁴ Analyses at 12-month follow-up suggested sustained reductions under CEP relative to RS in poor mental health quality of life and behavioral health hospitalizations, although statistical significance was sensitive to modeling assumptions.³⁵ For providers, CEP relative to RS led to greater participation in training for depression care improvement and, among largely non-licensed case managers, increased time delivering community services and use of problem-solving skills for depressed clients.^{33, 36}

However, we have not previously reported intervention differences in promoting collaboration and interorganizational relationships, a key implementation goal of the CEP model and expected intermediary mechanism for its effects on providers and clients. In this study, we use social network and qualitative thematic methods to conduct exploratory descriptive analyses of:

1. differences over time in networks among agencies participating in the CEP versus RS interventions
2. differences over time in the roles of agencies from various service sectors in these interventions

3. examples and perspectives on networks and networking activity within the CEP intervention.

Data and Methods

CPIC study design

Community Partners in Care (CPIC) randomized participating agency programs into two implementation interventions to support collaborative care for depression. The collaborative care model, initially developed for primary care, promotes team management; clinician assessment and evidence-based treatment using medication and/or psychotherapy; case management for patient education, activation, and care coordination; and infrastructure changes such as enhanced information systems. The CPIC model also included an expansion of case management to support community health workers and other non-licensed staff.^{21, 34}

RS provided standardized toolkits on each collaborative care component through online, printed, and flashdrive resources, and invited participating programs to designate one or more liaisons to attend 12 training webinars. In addition, each primary care program in RS was offered an onsite training on medication management and clinical assessment for depression. All resources and trainings were offered for free.^{21, 37}

CEP provided the same toolkits and training resources plus support for agency sites to collectively adapt and collaborate in implementing depression care improvement in their local communities.²¹ CEP programs in each study community formed a CEP council tasked with devising a plan to adapt and share responsibility for different components of collaborative depression care across a network of agencies in ways that utilized their varying strengths and attended to local community assets, culture, and priorities. Participants in the CEP councils reflected a range of agency leaders, staff and other stakeholders, including medical professionals, local department of mental health officials, mental health and substance abuse counselors, social workers, clergy and members of religious congregations, and representatives of parks and other community programs. The CEP councils met biweekly for 2 hours over 4 months (8-10 meetings) with workgroups and follow-up activity in-between to review goals, modify collaborative care resources, receive training in community engagement co-led by community and academic experts, and finalize a brief written start-up plan. CEP councils met monthly or bimonthly during the following year to train staff, initiate service improvements, and review progress and make course corrections. The study provided each CEP council with \$15,000 in discretionary funds to support these activities. The CEP councils were also supported by the study's Steering Council through administrative resources, group facilitation, toolkits, and training and consultation in evidence-based depression care and community engagement.^{29, 33}

In both RS and CEP, participating programs, providers, and clients retained their authority over whether to use study resources and how to provide treatment. Within CEP, the particular strategies and types of training for implementation were left to the discretion of CEP participants to decide collectively. For example, adaptations made to the collaborative care model by CEP participants included adding information resources on alternative and

complementary therapies for depression, and support for provider self-care during training sessions.³⁴

The CPIC Steering Council hypothesized that the CEP intervention, relative to RS, would lead to greater development and density of network partnerships among participating agencies, owing to the focus on community engagement and collaborative planning. The Steering Council also hypothesized that CEP, relative to RS, would lead to greater involvement and centrality of social service and community-based sectors in these networks, given the emphasis on adapting and sharing components of collaborative care with community-trusted locations. These were central pathways through which CEP was expected to result in greater improvements in service use and outcomes for depressed clients compared to RS.^{32, 34}

CPIC was fundamentally designed and infused with a community-partnered participatory research (CPPR) approach, a variant of community-based participatory research (CPBR) that emphasizes equal community-academic power sharing through two-way knowledge exchange.³⁸⁻⁴⁰ Community members had a voice in all stages of research development and execution—co-identification of study priorities; jointly led workgroups in which partners co-developed, executed, and evaluated strategy and plans; and data analysis, interpretation, and dissemination. CPPR guided both the CPIC Steering Council and the CEP intervention.^{21, 31} Institutional review boards at RAND and participating organizations approved the study.

Community setting and sampling

CPIC was fielded in two racially and ethnically diverse, underserved communities in Los Angeles County – South Los Angeles and the Hollywood/Metro area. Both communities have large populations (a half-million in Hollywood-Metro and 1.5 million in South LA), relatively low rates of education and access to care, and some history of academic-community health partnerships.⁸ Based on community input, CPIC recruited programs from agencies in several service sectors: 1) primary care and public health clinics; 2) mental health; 3) substance abuse; 4) homeless services; 5) other social services (prisoner re-entry and family preservation); 6) religious or spiritual places; and 7) community trusted locations, such as hair salons and park and recreation facilities. Based on additional input from stakeholders, we oversampled African-American neighborhoods, substance abuse agencies and agencies serving homeless individuals and seniors. Programs, or groups of smaller programs, were paired and then randomized to CEP or RS, based on geographic location, service sector, size, population served, services provided, and funding streams. Programs with strong existing relationships were also grouped into the same unit to minimize cross-intervention contamination.⁴¹ Of the 194 program sites in 60 agencies that were initially approached and screened, 95 eligible program sites in 50 agencies were consented and enrolled in the study, with 46 assigned to RS and 49 to CEP. Ten agencies contributed sites to both the CEP and RS arms. In these cases, procedures were put in place to minimize premature spread or contamination of interventions between conditions, such as identifying separate administrative contacts for each program and prohibiting the sharing of staff between programs in different arms.⁴²

Data collection and measures

The CPIC study collected comparable data between the CEP and RS conditions through surveys conducted with participating administrators, providers, and clients at periodic intervals.²¹ The study also collected qualitative data on the CEP implementation process through observations and interviews with CEP participants and Steering Council partners.²⁹ Additional data on agency characteristics and site participation were collected through study recruitment and event activity records.³³ The data on agency networks and partnering issues presented here were primarily derived from administrator surveys (described next), supplemented by agency and program information from study records.

One administrator per participating program was identified to complete the administrator survey. Baseline administrator surveys were fielded over a 17-month period (June 2009 to November 2010) due to late finalization of participating programs from some agencies and changes in administrator contacts at the beginning of the project. Follow-up administrator surveys were fielded over a 6-month period (December 2010 to June 2011). The follow-up surveys were completed between six months to a year after completion of the baseline surveys, depending on when a program completed its baseline administrative survey.

The administrator survey included items about program health priorities, services directly provided and referred for, depression and quality improvement activities, partnerships with other agency programs, and partnering challenges. The partnership items asked respondents to list up to 10 of the main organizations with which the respondent's program refers or collaborates for any depression, other mental health, substance abuse, or co-occurring (mental health and substance abuse) services. Then, for each other "partner organization" identified, respondents were asked to select up to four types of services (from those listed previously) and five types of interactions (referrals sent, referrals received, joint client case management, program administration/funding, or public education/advocacy) that characterized their partnership.

Respondents also were asked to specify the program name and location, as well as agency, of each partner organization. However, in many cases, insufficient information was provided to match partner organizations to specific programs within agencies having multiple programs. Thus, the network analyses were conducted at the agency level (i.e., aggregating partnership responses for programs within the same agency and intervention condition). In addition, as shown in Figure 1, twelve of the 50 participating agencies were excluded from the network sample due to not receiving an administrator survey (two hair salons for which the instrument was deemed inappropriate), not responding to surveys at one or both time-points (four agencies), or having the survey completed by an invalid respondent or providing incomplete network data for program surveys at one or both time-points (six agencies). This yielded a final sample of 38 agencies for the network analyses—15 unique agencies in each arm, and 8 agencies with sites in both arms – resulting in 23 agencies for the CEP condition (15+8), and 23 for the RS condition (15+8). Attrition did not appear related to study condition, and the samples remained well-balanced across service sectors compared to the overall study agency sample, as shown in Table 1, although no homeless service or community-trusted agencies were included in the final network sample for the RS condition.

For qualitative analyses of perspectives on interagency network changes, we coded goal statements from CPIC study team and CEP council participants utilizing three sources: formal study documents (including the grant proposal, recruitment brochures, training toolkits and guides, meeting slide presentations, and project website); Steering Council participant interviews and focus groups; and CEP council member interviews, meeting minutes, and post-meeting reflection sheets. We analyzed the subset of sources that mentioned any network-related goal (study documents, n=9; Steering Council participants, n=10; CEP council members, n=18) to identify different types of network-related goals and the relative emphasis placed on each across the three sources.

Analytic methods

To explore differences in changes over time in partnership networks among agencies in CEP versus RS, we used a “socio-metric” approach to social network analysis.^{43, 44} We constructed separate networks for CEP and RS agencies at baseline and follow-up time points, with agencies as the nodes and any type of reported interaction as a linkage between nodes. Since we did not have comparable partnership data on non-CPIC programs and our research questions focused primarily on effects on interactions among participating agencies, the networks were bounded only to include partners that also participated in CPIC.⁴³ Ucinet 6 for Windows was used to transform the data for network analysis and provide statistics on network characteristics.⁴⁵ The network data for each intervention condition at each time-point were graphed visually in NetDraw 2.1, with the layout of nodes and linkages derived using a “spring embedding” algorithm.⁴⁶

We generated three network-level measures to explore differences over time in changes in the structure of the partnership networks—mean degree, density, and network centralization.^{44, 47} Mean degree is a measure of simple connectedness, calculated as the average number of partnerships per agency. Density indicates general cohesion and the extent of entanglement among agencies, calculated as the ratio of observed ties among nodes to the total number that could possibly exist in the network. Higher density is often associated with greater awareness of others and faster rates of diffusion within a community. Network centralization indicates the degree to which a network as a whole has a highly connected node at its core to which other nodes are attached, versus a more diffuse, decentralized structure. It is calculated as the sum of the differences between each node’s degree centrality and the centrality of the most central node, divided by the maximum centrality possible.

We relied on two common network measures—degree centrality and betweenness centrality—to characterize the roles of agencies within the partnership networks.⁴³ Degree centrality is the sheer number of ties that an organization has with other organizations in the network. Betweenness centrality refers to the extent to which an agency serves as a link or bridge across different parts of the network that would otherwise not be connected. We normalized both these measures by the number of possible ties among agencies in order to compare changes in the metrics across networks. To explore differences over time in the roles of service sectors that typically provide depression care (e.g., mental health, primary care) versus alternative sectors (e.g., substance abuse, social services) in these networks, we calculated the average centrality scores of agencies within each sector, as well as an adjusted

“group centrality” score available in Ucinet.^{33, 48} The network analyses we present are limited to descriptive results, since assumptions of independence among observations for standard statistical tests are not met in network samples, and the size of the agency samples in this study are relatively small. Thus, results are considered exploratory for purposes of understanding the plausible mechanisms of action of the CPIC interventions and helping guide development of future community engagement interventions and evaluations.

Results

Differences over time in networks among agencies participating in the CEP versus RS interventions

Table 2 compares the change between CEP and RS agencies in the three main network characteristics. On all the measures, the CEP network increased substantially while the RS network demonstrated little change. The mean degree (average number of ties) and density of the CEP network increased 83% and 85%, respectively, between baseline and follow-up, compared to only 14% and 15% for the RS network. Network centralization also increased between baseline and follow-up for the CEP network (54%) but decreased slightly for the RS network (−7%).

These findings are illustrated in the general changes in the configuration of the visual network graphs shown in Figure 2. Each agency is represented by a node labeled with a unique agency ID number and whose shape indicates the primary service sector of the agency, as listed in the key next to the graphs. Lines between nodes indicate that at least one of the five types of interaction was reported between two agencies. The CEP baseline graph consists of 2 connected components and 10 isolates (i.e., agencies that did not report any partnership to other CPIC participating agencies at this time point, which are listed on the left side of the graph). By time of follow-up, the CEP network consisted of one connected component with visibly denser ties among the agency nodes, more nodes in the center connecting to other nodes, and only 6 isolates not connected to any other agencies. In RS, while the agency network graph consolidates from 4 disconnected components at baseline to 2 at follow-up, the follow-up graph is much more sparsely connected, with visibly fewer ties among agency nodes, fewer nodes in the center connecting to other nodes, and an increase (rather than decrease) in isolates not connected to any other agencies.

As indicated in Table 3, these overall patterns of results between CEP and RS networks also hold when examining networks by type of interagency interaction, i.e., joint activities (including joint client case management, joint program administration and funding, and/or joint public education and advocacy) or referrals (including sending or receiving). For both the joint activities and referrals, the CEP network increased substantially on all three measures, while the RS network increased much less on the first two measures (mean degree and density) and decreased slightly on the third (network centralization). The increases in measures for the referral networks were similar in magnitude to those shown in the networks based on any type of interaction. However, the increases for the joint activities networks were notably greater (more than double) those exhibited in the networks based on any type of interaction.

Differences over time in the roles of agencies from various service sectors in the CEP versus RS interventions

To understand the roles of service sectors in the CEP versus RP interventions, we examined changes in the centrality of agencies from different sectors in the networks for each condition. Table 4 reports the point change in degree centrality averaged across agencies in each service sector. In the CEP network, mean degree centrality increased for two sectors that traditionally provided depression services—mental health and primary care—but also for three of the alternate sectors that traditionally do not—substance abuse treatment, social services, and homeless services. In the RS network, mean degree centrality increased only for mental health and substance abuse treatment, but stayed the same or decreased for all others.

These patterns are illustrated by the positions of agencies in different service sectors (depicted by shapes) in the visual graphs in Figure 2. In the CEP baseline network, all social service agencies (white squares) are either pendants (connected to only one other agency at the periphery of a connected component) or isolates. By follow-up, only 2 social service agencies remain isolates, and 3 out of the 5 in the connected component have more than one tie to another agency and help connect other agencies to the network. Similarly, substance abuse treatment agencies (white diamonds) in the CEP baseline network are either isolates or pendants, with the exception of one agency (Agency ID 2023); and by follow-up, none of the substance abuse treatment agencies are isolates and 3 out of the 5 in the connected component have multiple ties. In contrast, in the RS network, all the social service agencies become isolates by follow-up, thus decreasing average centrality for this sector. The substance abuse treatment agencies tend to be pendants in the RS baseline network and become more connected over time, thus increasing their average centrality, despite one becoming an isolate in the RS follow-up network.

The results for mean betweenness centrality were similar to those for mean degree centrality (see Appendix Table A1). The results for the group centrality measure (shown in the two right-hand columns of Table 4), which adjusts for ties among agencies in the same sector, also were similar—except for the substance abuse treatment sector in the RS condition, which exhibited a decrease (rather than increase) in centrality. As illustrated in Figure 2, many of the ties of the substance abuse agencies at the center of the RS follow-up network (Agency IDs 2023, 2037, 1006) are with other substance abuse treatment agencies rather than with agencies in other sectors.

Examples and perspectives on networks and networking activity within the CEP intervention

CEP agencies collectively adapted and conducted over 140 training sessions on depression treatment and other components of collaborative depression care.³³ However, despite the clustered sampling which assigned a mix of agencies from different sectors to each study arm, participants in the CEP condition reported it challenging to form regularized collaborative care networks that could jointly serve particular sets of clients. CEP participants discussed reasons for this difficulty, including the size of the study areas and the varied service niches and client eligibility criteria across agencies and service sectors.²⁹

To address these challenges, the CEP councils from both study areas collaborated to develop and implement two service-related cross-agency innovations. The first initiative, termed the “Village Clinic,” consisted of several CEP agencies from each community who volunteered to jointly conduct outreach, case management, and referral to treatment for CPIC-enrolled clients. Outreach was difficult, leading to hiring of an independent survey firm to help contact clients paid for through the CEP councils’ discretionary funds. The second initiative created and offered a series of group-based resiliency education classes that teach coping strategies based on cognitive behavioral theory. These classes were led by lay staff of CEP agencies, with professional supervision.³⁴

While the Village Clinic was intended as a brief pilot, the concept was used as a basis for the design of a multi-health-agency collaboration for care coordination under expanded Medicaid in Los Angeles County, called the Health Neighborhood Initiative. The resiliency class model stimulated a subsequent dissemination effort and randomized trial (B-RICH; Building Resiliency and Increasing Community Hope).⁴⁹ Both the Village Clinic and the resiliency education course emerged from CEP coalition discussions on how best to collaborate to address access and coordination gaps among agencies, and ultimately expanded the study team’s initial notions of what a “collaborative care network” would look like.

Similarly, our analysis of statements on CPIC goals from multiple perspectives indicated that Steering Council and CEP participants viewed the networking objective of the project to comprise a broader set of activities than solely the establishment of a collaborative care network. Figure 3 shows the relative emphasis placed on different network-related goals from three CPIC project perspectives—formal study documents, Steering Council participants, and CEP participants.

The study documents primarily emphasized networks for collaborative care (i.e., cross-agency arrangements for case-finding, referrals, and depression treatment and support) and community planning and development (which was the focus of the initial phase of the CEP process).

To create a network among different types of agencies to provide patient education, CBT, antidepressants, and case/care management for depression.

CEP “Storybook” brochure

To develop a multi-agency Community Plan to increase capacity for depression services in the community by training providers from diverse disciplines in evidence-based and innovative practices to help people living with depression.

CEP manual workbook.

In contrast, Steering Council and CEP participants additionally emphasized informal “networking” (sharing of information and contacts) and networks for collaboration generally.

To meet others. It’s a network building thing.

CEP Council minutes, Hollywood/Metro

To have a dialogue with other agencies that might help your patients get treatment, help. *CEP Council minutes, Hollywood/Metro*

To share with the other CEP agencies what they are going to have to do to get their clients help.

CEP Council minutes, South Los Angeles

To facilitate partnerships and collaboratives.

CEP Council meeting reflection sheet, South Los Angeles

Discussion

This paper explored the effects of a randomized controlled trial of a community engagement and planning (CEP) intervention compared to an intervention providing the same content solely via technical assistance to individual programs (RS) on the development of interagency networks for collaborative depression care and improvement. These network effects were a key implementation goal of the CEP model and an expected intermediary mechanism for outcomes of the intervention on providers and clients.

The first set of analyses examined the degree to which partnership networks changed among agencies within the CEP compared to RS condition. Results suggested that agencies in CEP exhibited greater growth in partnership capacity than did RS agencies over the active intervention period. For both conditions, the number of partnerships among agencies increased over time, likely reflecting the fact that the RS condition was, in itself, an intervention that provided resources and models for collaborative depression care, even if not direct support for interagency engagement and planning. CPIC participants also reported general pressures from county policy and funding initiatives during the study period for interservice partnerships across safety-net agencies in Los Angeles.²⁹ However, indicators on all three network measures showed greater growth in partnership capacity in CEP compared to RS, as evidenced in increased numbers of partnerships with other participating agencies and increased density and centralization of partnerships. This pattern of greater partnership growth in CEP than RS was particularly notable in the area of joint activities—consistent with the CEP intervention's direct support for engagement and planning across the network. Although less striking, a similar pattern of growth held for referral networks as well.

The second set of analyses examined changes in the roles of agencies from different sectors within the CEP compared to RS condition. Results indicated that three sectors not traditionally involved in depression care—substance abuse, social services, and homeless services—played increasingly central roles in the CEP network over the course of the intervention period. Of these sectors in the RS network, only the substance abuse agencies played an increasingly central role over the period. In addition, supplementary analyses of the RS network showed the increase in centrality of the substance abuse agencies to be largely associated with additional linkages forged among themselves rather than with other types of agencies as intended by the community-distributed collaborative care model promoted in both arms of the CPIC study.

The last set of analyses described perspectives and examples of networks and networking activity within the CEP intervention. Both Steering Council and CEP participants emphasized networking to share information and contacts and to facilitate collaboration more generally. These findings are consistent with the building of “communities of practice” in under-resourced communities that through a history of interchange, trust, and solving problems together cultivate a common identity and purpose to sustain sharing and dissemination of innovations and best practices.⁵⁰⁻⁵² This CEP model of fostering a cross-sector “village” to adapt and share responsibility for collaborative approaches to address conditions such as depression coincided with a need for innovative models for developing partnerships across services to address community health needs (e.g., accountable care communities, behavioral health homes)¹⁴ and has influenced other community-based mental health improvement initiatives, such as the Health Neighborhood Initiative in Los Angeles⁵³ and ThriveNYC in New York.⁵⁴

Limitations.

The analyses have important limitations. First is the absence of network data for a quarter of participating agencies in CPIC. However, attrition was balanced between CEP and RS and did not appear biased on other agency characteristics. Second, the analyses focused on linkages only among CPIC participating agencies (i.e., excluding reported linkages to non-CPIC agencies). To analyze the full network of partnerships within which the CPIC-agency networks were embedded would have required survey of non-CPIC agencies, which was outside study resources. Third, analyses are mostly descriptive without tests of statistical significance of differences. Although CPIC included a relatively large number of agencies, the agency samples are small for statistical procedures. Lastly, some CPIC agencies contributed sites to both intervention conditions, which may have resulted in contamination between CEP and RS conditions. Even so, potential contamination would be expected to affect reported network results for both arms of the study similarly and would likely not affect or would tend to lead to under-estimating differences in network growth for one arm relative to the other—a conservative bias. The study was also limited to two urban communities in Los Angeles. Replication in other areas is needed.

Conclusion

This descriptive analysis suggests a pattern of increases in network connectedness and more central roles for non-traditional depression providers within CEP—the multi-sector coalition intervention—but more modest growth in network development within RS, the individual-program, technical assistance arm. This pattern is consistent with the main difference in goals and procedures of the two interventions, suggesting that CEP effectively implemented a coalition development approach at least for the diverse programs participating in that study arm. In addition, qualitative data from CEP leaders suggest that coalition development among CEP participants was viewed both as promoting collaboration in depression services, as well as building meaningful community capacity. Future research should focus on how such changes in interagency networks affect client use of services and how these models can be sustained and can continue to leverage community capacity for continued improvement in the services needed by under-resourced communities.

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Appendix Table

Table A1.

Point change in centrality by service sector, including betweenness centrality

Service Sector	Mean Degree Centrality Point Change ^a		Adjusted Group Centrality Point Change ^b		Mean Betweenness Centrality Point Change ^c	
	CEP	RS	CEP	RS	CEP	RS
Mental Health	+0.05	+0.06	+0.05	+0.10	+0.10	+0.05
Primary Care	+0.03	0.00	+0.05	-0.05	+0.04	-0.01
Substance Abuse	+0.06	+0.02	+0.11	-0.13	+0.03	+0.05
Social Services	+0.03	-0.02	+0.25	-0.11	+0.02	0.00
Homeless Services	+0.05	0.00	+0.05	0.00	0.00	0.00
Religious	0.00	-0.02	0.00	-0.05	+0.01	0.00
Community Trusted	0.00	0.00	0.00	0.00	0.00	0.00
Public Health	0.00	-0.05	0.00	-0.05	0.00	-0.04

^aMean degree centrality scores were normalized and ranged from 0.00 to 0.23.

^bAdjusted group degree centrality measure (Everett and Borgatti 1999). Group degree centrality scores ranged from 0.00 to 0.50.

^cMean betweenness centrality scores were normalized and ranged from 0.00 to 0.16.

References

1. Kessler RC, Berglund P, Demler O, et al. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005;62(6):593–602. [PubMed: 15939837]
2. Lopez AD, Mathers CD, Ezzati M, et al. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *The Lancet*. 2006;367(9524):1747–57.
3. Alegría M, Chatterji P, Wells KB, et al. Disparity in depression treatment among racial and ethnic minority populations in the United States. *Psychiatr Serv*. 2008;59(11):1264–72. [PubMed: 18971402]
4. González HM, Vega WA, Williams DR, et al. Depression care in the United States: too little for too few. *Arch Gen Psychiatry*. 2010;67(1):37–46. [PubMed: 20048221]
5. Neighbors HW, Caldwell C, Williams DR, et al. Race, ethnicity, and the use of services for mental disorders: results from the National Survey of American Life. *Arch Gen Psychiatry*. 2007;64(4):485–94. [PubMed: 17404125]

6. Galea S, Ahern J, Nandi A, et al. Urban neighborhood poverty and the incidence of depression in a population-based cohort study. *Ann Epidemiol.* 2007;17(3):171–9. [PubMed: 17320784]
7. Wang PS, Demler O, Olfson M, et al. Changing profiles of service sectors used for mental health care in the United States. *Am J Psychiatry.* 2006;163(7):1187–98. [PubMed: 16816223]
8. Miranda J, Ong MK, Jones L, et al. Community-partnered evaluation of depression services for clients of community-based agencies in under-resourced communities in Los Angeles. *J Gen Intern Med.* 2013;28(10):1279–87. [PubMed: 23670566]
9. Dwight-Johnson M, Sherbourne CD, Liao D, et al. Treatment preferences among depressed primary care patients. *J Gen Intern Med.* 2000;15(8):527–34. [PubMed: 10940143]
10. Miranda J, Chung JY, Green BL, et al. Treating depression in predominantly low-income young minority women: a randomized controlled trial. *JAMA.* 2003;290(1):57–65. [PubMed: 12837712]
11. Asarnow JR, Jaycox LH, Duan N, et al. Effectiveness of a quality improvement intervention for adolescent depression in primary care clinics: a randomized controlled trial. *JAMA.* 2005;293(3):311–9. [PubMed: 15657324]
12. Unützer J, Katon W, Callahan CM, et al. Collaborative care management of late-life depression in the primary care setting: A randomized controlled trial. *JAMA.* 2002;288(22):2836–45. [PubMed: 12472325]
13. Wells K, Sherbourne C, Schoenbaum M, et al. Five-year impact of quality improvement for depression: results of a group-level randomized controlled trial. *Arch Gen Psychiatry.* 2004;61(4):378–86. [PubMed: 15066896]
14. Substance Abuse and Mental Health Services. Behavioral health homes for people with mental health and substance use conditions: core clinical features. Rockville, MD: SAMHSA, 2012. Available at: www.integration.samhsa.gov/integrated-care-models/health-homes.
15. Miranda J, Duan N, Sherbourne C, et al. Improving care for minorities: can quality improvement interventions improve care and outcomes for depressed minorities? Results of a randomized, controlled trial. *Health Serv Res.* 2003;38(2):613–30. [PubMed: 12785564]
16. Patel KK, Butler B, Wells KB. What is necessary to transform the quality of mental health care. *Health Aff (Millwood).* 2006;25(3):681–93. [PubMed: 16684732]
17. Quinn MT, Gunter KE, Nocon RS, et al. Undergoing transformation to the patient centered medical home in safety net health centers: perspectives from the front lines. *Ethn Dis.* 2013;23(3):356–62. [PubMed: 23914423]
18. Thomas SB, Quinn SC, Butler J, et al. Toward a fourth generation of disparities research to achieve health equity. *Annu Rev Public Health.* 2011;32:399–416. [PubMed: 21219164]
19. Institute of Medicine. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. Washington, D.C.: National Academies Press, 2003.
20. Institute of Medicine. The CTSA Program at NIH: Opportunities for Advancing Clinical and Translational Research Washington, D.C.: National Academies Press, 2013.
21. Chung B, Jones L, Dixon EL, et al. Using a Community Partnered Participatory Research Approach to Implement a Randomized Controlled Trial: Planning the Design of Community Partners in Care. *J Health Care Poor Underserved.* 2010;21(3):780–95. [PubMed: 20693725]
22. Dobransky-Fasiska D, Nowalk MP, Pincus HA, et al. Public-academic partnerships: improving depression care for disadvantaged adults by partnering with non-mental health agencies. *Psychiatr Serv.* 2010;61(2):110–2. [PubMed: 20123813]
23. Patel V, Weiss HA, Chowdhary N, et al. Effectiveness of an intervention led by lay health counsellors for depressive and anxiety disorders in primary care in Goa, India (MANAS): A cluster randomised controlled trial. *The Lancet.* 2010;376(9758):2086–95.
24. Zukoski AP, Shortell SM. Keys to building effective community partnerships. *Health Forum J.* 2001;44(5):22–5.
25. Alexander JA, Weiner BJ, Metzger ME, et al. Sustainability of collaborative capacity in community health partnerships. *Med Care Res Rev.* 2003;60(4_suppl):130S–60S. [PubMed: 14687432]
26. Foster-Fishman PG, Berkowitz SL, Lounsbury DW, et al. Building collaborative capacity in community coalitions: A review and integrative framework. *Am J Community Psychol.* 2001;29(2):241–61. [PubMed: 11446279]

27. Lasker RD, Weiss ES, Miller R. Partnership synergy: a practical framework for studying and strengthening the collaborative advantage. *The Milbank Quarterly*. 2001;79(2):179–205. [PubMed: 11439464]
28. Mendel P, Fuentes S. Partnering for Mental Health and Substance Abuse Needs in Los Angeles: A Community Feedback Report. Los Angeles, 7 2006: UCLA/RAND NIMH Center for Research on Quality in Managed Care.
29. Khodyakov D, Shariff MZ, Dixon EL, et al. An implementation evaluation of the community engagement and planning intervention in the CPIC depression care improvement trial. *Community Ment Health J*. 2014;50(3):312–24. [PubMed: 23625140]
30. Mendel P, Meredith LS, Schoenbaum M, et al. Interventions in organizational and community context: a framework for building evidence on dissemination and implementation in health services research. *Administration and Policy in Mental Health and Mental Health Services Research*. 2008;35(1-2):21–37. [PubMed: 17990095]
31. Khodyakov D, Mendel P, Dixon E, et al. Community Partners in Care: Leveraging community diversity to improve depression care for underserved populations. *The international journal of diversity in organizations, communities and nations*. 2009;9(2):167–82.
32. Mendel P, Ngo VK, Dixon E, et al. Partnered Evaluation of a Community Engagement Intervention: Use of a “Kickoff” Conference in a Randomized Trial for Depression Care Improvement in Underserved Communities. *Ethn Dis*. 2011;21(3 Suppl 1):S1-78–88.
33. Chung B, Ngo VK, Ong MK, et al. Participation in Training for Depression Care Quality Improvement: A Randomized Trial of Community Engagement or Technical Support. *Psychiatric Services*. 2015;66(8):831–9.
34. Wells KB, Jones L, Chung B, et al. Community-partnered cluster-randomized comparative effectiveness trial of community engagement and planning or resources for services to address depression disparities. *J Gen Intern Med*. 2013;28(10):1268–78. [PubMed: 23649787]
35. Chung B, Ong M, Ettner SL, et al. 12-Month outcomes of community engagement versus technical assistance to implement depression collaborative care: a partnered, cluster, randomized, comparative effectiveness trial. *Ann Intern Med*. 2014;161(10_Supplement):S23–S34. [PubMed: 25402400]
36. Landry CM, Jackson AP, Tang L, et al. The Effects of Collaborative Care Training on Case Managers’ Perceived Depression-Related Services Delivery. *Psychiatr Serv*. 2016;68(2):123–30. [PubMed: 27629796]
37. Ngo VK, Sherbourne C, Chung B, et al. Community engagement compared with technical assistance to disseminate depression care among low-income, minority women: A randomized controlled effectiveness study. *Am J Public Health*. 2016;106(10):1833–41. [PubMed: 27552274]
38. Jones L, Wells KB. Strategies for academic and clinician engagement in community-participatory partnered research. *JAMA*. 2007;297(4):407–10. [PubMed: 17244838]
39. Jones L, Wells KB, Norris K, et al. The vision, valley, and victory of community engagement. *Ethn Dis*. 2009;19(4 Suppl 6):S6.
40. Wells KB, Jones L. “Research” in community-partnered, participatory research. *JAMA*. 2009;302(3):320–1. [PubMed: 19602693]
41. Belin TR, Jones A, Tang L, et al. Maintaining internal validity in community partnered participatory research: experience from the Community Partners in Care Study. *Ethn Dis*. 2018;28(Supp):357–64. [PubMed: 30202188]
42. Stockdale SE, Tang L, Pudilo E, et al. Sampling and recruiting community-based programs using community-partnered participation research. *Health promotion practice*. 2016;17(2):254–64. [PubMed: 26384926]
43. Scott J. *Social network analysis: a handbook*. 2nd ed. London: Sage; 2000.
44. Borgatti SP, Everett MG, Johnson JC. *Analyzing social networks*. 1st ed. Los Angeles, CA: Sage; 2013.
45. Borgatti SP, Everett MG, Freeman LC. *UCINET 6 for Windows: Software for Social Network Analysis*. 6.620 ed: Harvard: Analytic Technologies; 2016.
46. Borgatti SP. *NetDraw: Graph visualization software* 2.159 ed: Harvard: Analytic Technologies; 2005.

47. Valente TW. *Social Networks and Health: Models, Methods, and Applications*. New York, NY: Oxford University Press; 2010.
48. Everett MG, Borgatti SP. The centrality of groups and classes. *Journal of Mathematical Sociology*. 1999;23(3):181–201.
49. Chung B. Building Resiliency and Increasing Community Hope (BRICH). [ClinicalTrials.gov](https://clinicaltrials.gov): U.S. National Library of Medicine 2017. Available at: <https://clinicaltrials.gov/ct2/show/NCT01698047>.
50. Wenger E. *Communities of practice: Learning, meaning, and identity*: Cambridge University Press; 1999.
51. Mendel P. Organizational learning and sustained improvement: The quality journey at Cedars-Sinai Medical Center. In: *Organizing for Quality: The Improvement Journeys of Leading Hospitals in Europe and the United States*. London Oxford: Radcliffe Publishers 2008. p. 57–82.
52. Castañeda H, Nichter M, Nichter M, et al. Enabling and sustaining the activities of lay health influencers: lessons from a community-based tobacco cessation intervention study. *Health Promotion Practice*. 2010;11(4):483–92. [PubMed: 18540006]
53. Health Neighborhoods. Los Angeles Department of Mental Health. Available at: <https://dmh.lacounty.gov/about/health-neighborhoods/>
54. ThriveNYC: An unprecedented commitment by the City of New York to create a mental health system that works for everyone. New York City Department of Health and Mental Hygiene. Available at: <https://thrivenyc.cityofnewyork.us/>

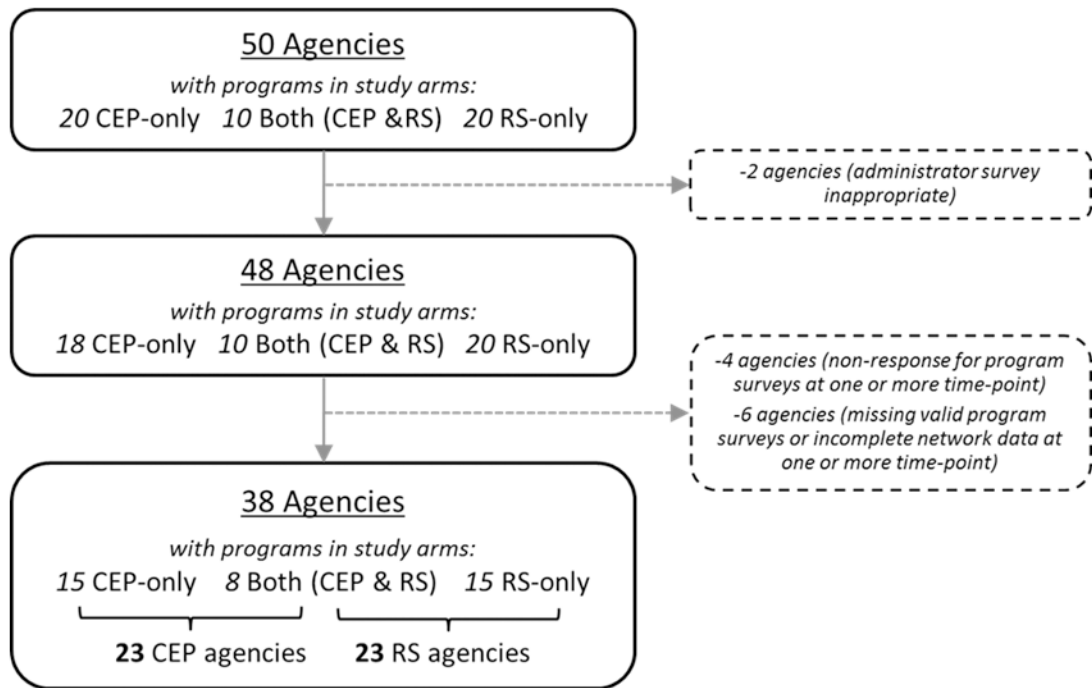


Figure 1. Sampling flow diagram for CPIC agency network analysis

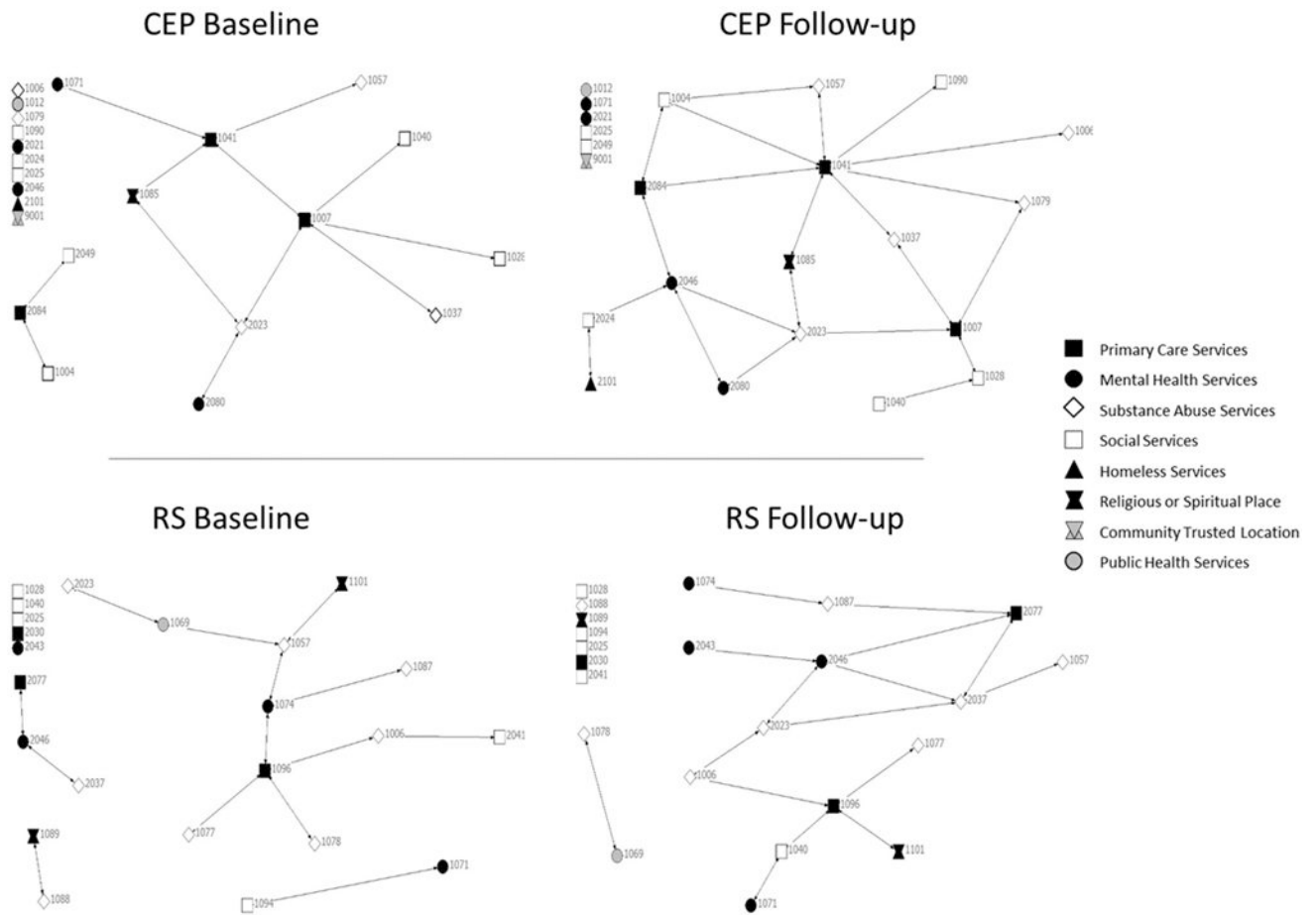


Figure 2. Agency network graphs at baseline and follow-up, CEP vs RS condition (any type of partnership interaction)^a

^a Includes any of five types of interactions (referrals sent, referrals received, joint client case management, program administration/funding, or public education/advocacy).

Note: Each node represents an agency labeled with a unique study-assigned ID number.

Node shape indicates the primary service sector of an agency as listed in the key.

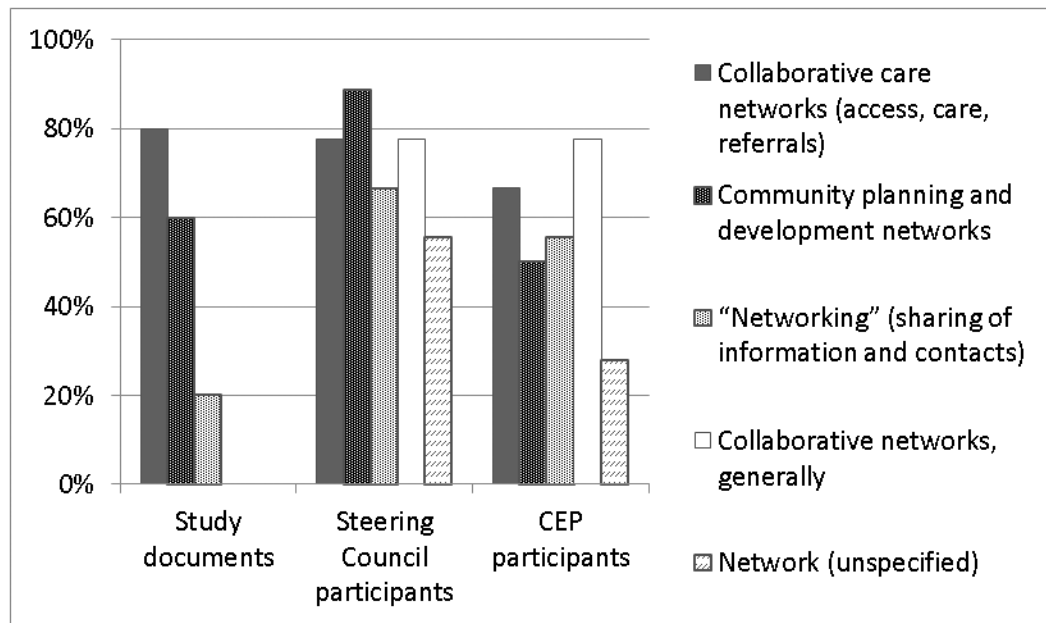


Figure 3. Emphasis on network-related goals from 3 CPIC project perspectives
 Percentages are based on n=9 study documents, n=10 Steering Council participant interviews, and n=18 CEP participant interviews and focus groups that mentioned any network-related goal statements.

Table 1.

CPIC total agency and network agency samples by service sector

Service Sector	Total Agency Sample (<i>n</i> =50)	Agency Network Sample (<i>n</i> =38) ^a	
		CEP (<i>n</i> =23) ^a	RS (<i>n</i> =23) ^a
Mental Health	8	3	4
Primary Care	6	4	4
Substance Abuse	9	5	8
Social Services	15	7	4
Homeless Services	4	1	0
Religious	3	1	2
Community Trusted	3	1	0
Public Health	2	1	1

^aThe total sample for the network analyses included 38 agencies—15 unique agencies in each arm, and 8 agencies that had sites in both arms—resulting in 23 agencies for the CEP condition (15+8), and 23 for the RS condition (15+8).

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Table 2.Change in agency network characteristics, CEP vs RS condition (any type of interaction)^a

Network-level measure	CEP (n=23)		RS (n=23)		CEP % Change	RS % Change
	Baseline	Follow-up	Baseline	Follow-up		
Mean Degree	1.043	1.913	1.217	1.391	+83%	+14%
Density	0.047	0.087	0.055	0.063	+85%	+15%
Centralization	0.197	0.303	0.139	0.130	+54%	-7%

^aIncludes any of five types of interactions (referrals sent, referrals received, joint client case management, joint program administration/funding, or joint public education/advocacy).

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Table 3.

Change in agency network characteristics, CEP vs RS condition (by types of interactions)

Network-level measure	Joint Activities ^b		Referrals ^c	
	CEP % change	RS % change	CEP % change	RS % change
Mean Degree	+233%	+33%	+91%	+14%
Density	+233%	+33%	+93%	+15%
Centralization	+193%	-6%	+53%	-7%

^aIncludes any of five types of interactions (referrals sent, referrals received, joint client case management, program administration/funding, or public education/advocacy).

^bIncludes three types of joint activities (joint client case management, joint program administration/funding, or joint public education/advocacy).

^cIncludes referrals sent and/or referrals received between agencies.

Table 4.

Point change in centrality by service sector

Service Sector	Mean Degree Centrality Point Change ^a		Adjusted Group Centrality Point Change ^b	
	CEP	RS	CEP	RS
Mental Health	+0.05	+0.06	+0.05	+0.10
Primary Care	+0.03	0.00	+0.05	-0.05
Substance Abuse	+0.06	+0.02	+0.11	-0.13
Social Services	+0.03	-0.02	+0.25	-0.11
Homeless Services	+0.05	0.00	+0.05	0.00
Religious	0.00	-0.02	0.00	-0.05
Community Trusted	0.00	0.00	0.00	0.00
Public Health	0.00	-0.05	0.00	-0.05

^aMean degree centrality scores were normalized and ranged from 0.00 to 0.23.

^bAdjusted group degree centrality measure (Everett and Borgatti 1999). Group degree centrality scores ranged from 0.00 to 0.50.

^cMean betweenness centrality scores were normalized and ranged from 0.00 to 0.16.