Published in final edited form as:
J Subst Abuse Treat. 2010 June ; 38S1: S44–S52. doi:10.1016/j.jsat.2009.12.008.

A longitudinal study of organizational formation, innovation adoption, and dissemination activities within the National Drug Abuse Treatment Clinical Trials Network

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Abstract

The National Institute on Drug Abuse (NIDA) established the National Drug Abuse Treatment Clinical Trials Network (CTN) to conduct trials of promising substance abuse treatment interventions in diverse clinical settings and to disseminate results of these trials. This paper focuses on three dimensions of the CTN's organizational functioning. First, a longitudinal dataset is used to examine the CTN's formation as a network of inter-organizational interaction among treatment practitioners and researchers. Data indicate strong relationships of interaction and trust, but a decline in problem-centered inter-organizational interaction over time. Second, adoption of buprenorphine and motivational incentives among the CTN's affiliated CTPs is identified over three waves of data. While adoption is found to increase with CTPs' CTN participation, there is only modest evidence of widespread penetration and implementation. Third, CTPs' pursuit of the CTN's dissemination goals are examined, indicating that such organizational outreach activities are underway and likely to increase innovation diffusion in the future.

Keywords

Clinical Trials Network; innovation adoption; dissemination research; inter-organizational relationships; evidence-based practice

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1. Introduction: The National Drug Abuse Treatment Clinical Trials Network as an organizational network for research and dissemination

Over the past decade, a major presence in treatment research about substance use disorders (SUDs) has been the National Drug Abuse Treatment Clinical Trials Network (CTN) of the National Institute on Drug Abuse (NIDA). This government-sponsored network of researchers and practitioners is oriented toward enhancing the quality of SUD treatment. At this 10-year juncture, this paper examines three dimensions of organizational functioning within that structure —organizational formation, innovation adoption, and dissemination activities.

The CTN originated through increased awareness in the 1990s that SUD treatment in the U.S. consistently used the same treatment strategies and lacked innovation (Brown, 1995; Naranjo & Bremmer, 1996), despite researchers' development and testing of novel techniques (McLellan & McKay, 1998). Thus, science flowed poorly into practice. At the initiative of the Substance Abuse and Mental Health Services Administration (SAMHSA) and NIDA, the Institute of Medicine (IOM) was commissioned in 1997 to convene an expert panel to recommend how to close the "gap" between dominant treatment techniques and extant "evidence-based practices" (EBPs) generated by replicated scientific studies.

The IOM panel produced a comprehensive and widely circulated report that documented the treatment-practice gap and, among other recommendations, suggested a new direction that was novel for substance abuse treatment research (Lamb, Greenlick & McCarty, 1998). Based on the Community Clinical Oncology Program (CCOP), supported since 1983 by the National Cancer Institute (NCI) and regarded as a spectacular success (Division of Cancer Prevention, NCI, 2004), the IOM panel suggested the establishment of a CTN as a NIDA initiative (Lamb et al., 1998). Anecdotally, this recommendation was greeted with strong enthusiasm by the then-Director of NIDA and other leaders, and rapid action led to a competitive request for applications and grant awards that brought the CTN into existence in 1999 (Zickler, 1999).

The CTN has been described as having two basic goals (Hanson, Leshner, & Tai, 2002). First, with its "nodes" of university-based researchers and collaborating community treatment programs (CTPs), the CTN is a system for conducting multi-site clinical trials to test the effectiveness of promising SUD treatment interventions in diverse clinical settings. Second, the CTN is a mechanism designed to disseminate results of these trials to increase the adoption of EBPs, thus improving the quality of treatment inside and outside the CTN. Part of the logic of locating these clinical trials in multiple community treatment programs instead of academic medical centers is that "real world" barriers to implementation can be readily identified and that trial results will generalize to a greater extent because of the inclusion of the diverse clients served by these organizations (Guydish, Tajima, Manser, & Jessup, 2007). Despite this second goal of increasing adoption and implementation of EBPs, there was no stated requirement that CTPs adopt the interventions tested through the CTN's protocols.

The CTN was specifically designed as a critical experiment about bi-directionality, or the mutual influence and collaboration among researchers and treatment practitioners in selecting and implementing trials, while integrating practicality and sound science. The content of such collaboration could increase scientific understanding of the research-practice gap. While modeled after NCI's CCOP in terms of establishing nodes of treatment programs that center around a core of researchers developing new treatments, the CTN has several unique challenges generally not faced by the CCOP. First, SUD treatment addresses medical issues that are substantively different than cancer. Cancer incidence is viewed in a context of extreme urgency and cancer fatalities are very prominent. These features motivate the treatment clientele to demand state-of-the-art treatment, although the clientele is not necessarily equipped to evaluate this feature of the proffered care (Barnato et al., 2007; Gaston & Mitchell, 2005). Further,

oncology treatment is often judged by its innovativeness and promise for successful treatment; programs making little change in their practices for decades are unlikely to thrive or even exist. None of these features characterize SUD treatment, which is reflected in incomplete diffusion of practices supported by scientific evidence, a topic addressed in this paper.

Two other features distinguish the challenges faced by the CTN from those of CCOP. Research has established that clients with SUDs bring a diversity of ancillary personal, social, and medical issues when they present for treatment, which, if not addressed, will undermine overall treatment success (McLellan et al., 1998). Often these issues are correlated with demographic and socioeconomic status (Marsh, Cao, Guerrero, & Shin, 2009). In response, clinical trials of SUD treatment regimens must be designed to adapt to and address a diversity of client circumstances. EBPs that have shown promise in trials with limited representation must be subject to repeated tests that include sub-populations with specialized needs. Thus, rather than researcher-practitioner interaction being centered within relatively convenient geographic nodes, a CTN for SUD treatments must be a "total network." In other words, most trials require that treatment settings are selected across the entire network to assure appropriate representation of important client characteristics.

Finally, faced often with looming deterioration and possible fatality, cancer patients and their significant others aggressively seek treatment and make heavy personal investments to find the most promising cures (Agrawal et al., 2006; Hubbard et al., 2007). By contrast, many candidates for SUD treatment need to be pressured or coerced to accept treatment (Perron & Bright, 2007). Both those pressured into and those actively seeking care are often faced by sharply constricted personal resources, with only limited available public subsidies. This affects the design of treatment interventions in that they must be acceptable and affordable to a reasonably large percentage of treatment programs and clients. This challenge adds special demands to the design of effective dissemination, the topic of our third research question.

Given these necessary adaptations, a simple technology transfer from the implementation experience of the NCI CCOP to the CTN was not possible. Instead, the CTN required a formative process in which the internal network was constructed and allowed to evolve over time in order to develop fully shared goals and procedural norms. First, a system needed to be formed in which there was effective inter-organizational interaction and trust to assure bi-directional participation of both researchers and treatment practitioners, and to assure access to appropriately diverse sites within which to test the viability of promising EBPs.

Second, as the CTN completed trials and published research results, it would be expected that the first evidence of effective diffusion would be within the CTN itself. The research activities of the CTN provided certain community treatment programs (CTPs) with resources, including training and financial support, to try innovative treatment techniques for a limited time. Such "trialability" has been repeatedly identified as a key facilitator of innovation adoption (Rogers, 2003). Even for CTPs not directly involved as sites for a particular research protocol, the network likely provides opportunities for communication between CTPs that can inform organizational decision-making about innovation adoption.

Third, the CTN mission of disseminating research findings that support the adoption of EBPs has come into prominence as the CTN completes it first decade. Some dissemination activities are highly visible, such as the NIDA-sponsored *Blending Conferences* and the web-based *Blending Products* that guide implementation of specific EBPs (http://www.nida.nih.gov/Blending/). However, other dissemination activities, such as those that occur at the state-level and within local communities by CTPs, are less publicly visible yet still important in terms of the CTN's impact on the broader treatment field. To date, there

is little information about the extent to which CTPs are drawing upon their experiences in the CTN to influence policy stakeholders and other treatment providers.

In 2000, NIDA initiated support for health services research projects that used the CTN as a platform. The University of Georgia was funded to measure the impact of the CTN on participating community treatment programs (CTPs) and the broader treatment field, the source of data in this paper. Our research about the CTN has progressed along two related but distinct streams of inquiry. The first theme has focused on the adoption of evidence-based treatment practices (EBPs) in CTN-affiliated treatment programs over time and in comparison to treatment organizations outside the CTN. For example, analyses of CTN programs revealed a greater adoption in CTPs participating in the buprenorphine protocols relative to non-CTN treatment programs (Ducharme, Knudsen, Roman, & Johnson, 2007). Comparative data on buprenorphine adoption among opioid treatment programs (OTPs) revealed that CTN-affiliated OTPs were more likely than non-CTN OTPs to adopt buprenorphine (Ducharme & Roman, 2009). We have also examined buprenorphine adoption over a two-year period within the CTN and found greater adoption based on protocol participation and considerable expansion in the number of CTPs offering this medication (Knudsen, Abraham, Johnson, & Roman, 2009). Recent analyses have demonstrated that the value of research network involvement may extend beyond interventions tested in the CTN protocols. For example, CTN programs have been more likely to adopt pharmacotherapies for alcohol abuse treatment than non-CTN programs (Abraham et al., under review), even though these medications have not been the focus of any CTN protocols.

The second major theme of our CTN-related research agenda has focused on the counseling workforce. Our comparison of CTN counselors to clinicians in non-CTN settings revealed differences in perceived acceptability of buprenorphine, which were explained by the greater training and adoption of buprenorphine within CTN-affiliated programs (Knudsen, Ducharme, & Roman, 2007a). Recent analyses have shown that CTN-affiliated counselors view motivational incentives/contingency management (MI/CM), or the use of tangible incentives to reward treatment progress, more favorably than non-CTN counselors (Ducharme, Knudsen, Abraham, & Roman, under review). Other analyses have considered counselors' reports of turnover intention and emotional exhaustion as a function of involvement in research (Knudsen, Ducharme, & Roman, 2007b) and quality of clinical supervision (Knudsen, Ducharme, & Roman, 2008).

In examining the CTN's functioning after its first decade, the current paper extends our prior work on innovation adoption while addressing two other themes. Drawing on baseline and follow-up data collected two years later, we consider the processes of organizational formation within the CTN in terms of relationships between university researchers and the CTPs, as well as inter-organizational relationships between CTPs within the network. We then consider whether this inter-organizational network yielded measurable change in the adoption of innovations. Specifically, we extend our work on buprenorphine adoption to include data from a panel of CTPs collected over a four-year period. For the first time, we report on the adoption of MI/CM over this same period. Finally, we examine the role of CTPs in disseminating information about innovations to the larger treatment field.

2. Methods

2.1. Sample and data collection

These analyses include data from three waves of a study of the CTN. All research procedures were approved by the University of Georgia's Institutional Review Board. The first wave of data was collected between late 2002 and mid 2004 when all of the CTPs affiliated with the CTN were contacted by telephone about participating in a longitudinal study of the CTN's

development and operation. At this first data collection, the CTN consisted of 17 research "nodes," each of which involved a collection of CTPs linked to a Regional Research and Training Center (RRTC), usually based in a university medical school. There were 109 treatment organizations in the CTN, within which 262 treatment centers were identified as eligible for participation in a CTN-sponsored clinical trial. "Treatment center" was defined as an organizational unit with an autonomous administrator with discretionary control over the unit's budget. To be eligible, CTPs were required to provide a minimum level of care at least equivalent to ASAM-defined outpatient services (Mee-Lee, Gartner, Miller, Shulman, & Wilford, 1996) or to be a methadone maintenance treatment program (MMT). Face-to-face interviews were conducted with 241 administrators (91.6% response rate). Participating CTPs received an honorarium of $100. Interviews lasted an average of 2.5 hours and included diverse sets of measures such as organizational structure, management, service delivery, caseload characteristics, human resources, and use of various pharmacological and behavioral therapies.

Follow-up face-to-face interviews with CTN-affiliated administrators occurred approximately 24 and 48 months later. At the 24-month follow-up, administrators of the 241 CTPs interviewed at baseline were re-contacted by telephone and invited to participate in a second interview. Of these 241 CTPs, 2.9% had ceased operations (n = 7) and 5.8% were ineligible because they were no longer affiliated with the CTN mainly due to lack of renewed funding (n = 14;), leaving a cohort of 220 programs eligible for follow-up. About 3.2% (n = 7) of programs refused to participate and 3.2% (n = 7) were unable to be contacted after repeated attempts. Further, 9 CTPs were new to the CTN at the 24-month follow-up due to changes in the membership of the network, resulting in a final sample of 215 CTPs. These programs received an honorarium of $100. Of the 220 baseline CTPs, 206 (93.6%) participated in the 24-month follow-up. Again, interviews included diverse measures and lasted an average of 2.5 hours.

At the 48-month follow-up, administrators were again invited to participate in a face-to-face interview. Of the 215 CTPs that participated at 24-months, 6 had ceased operations and 35 were ineligible because they were no longer affiliated with the CTN due to lack of CTN funding, and 4 became ineligible to participate in our study because they did not meet our inclusion criteria (e.g., provide alcohol and drug dependence treatment at an intensity at least equivalent to structured outpatient programming), leaving a cohort of 170 programs eligible for the 48-month follow-up. Nineteen programs refused to participate in this latter round and 7 were unable to be contacted after repeated attempts; 54 CTPs were new to the CTN at the 48-month follow-up due to changes in the membership of the network, resulting in a final sample of 198 CTPs (84.7% response rate). Interviews again lasted an average of 2.5 hours and included diverse measures.

The CTN has an unusual form of attrition through the constantly changing CTP membership in the CTN. This complicates data analyses. Sources of membership change include the addition of complete new nodes that include multiple new CTPs, the termination of nodes that have led to the departure of multiple CTPs, and the addition or removal of specific CTPs within each individual node.

2.2. Measures

Differences in patterns of inter-organizational interaction within the CTN between the Wave 1 and Wave 2 panel data were assessed with three domains. First, quality of relationships with RRTC was measured by calculating the mean across seven items (e.g., "In this relationship [CTP and RRTC] it is expected that any information that might help the other party will be provided to them."). Responses ranged from 0 (no extent) to 5 (very great extent) (Cronbach's $\alpha = .84$ at Wave 1; $\alpha = .86$ at Wave 2). Second, the mean across eight items was used to measure trust in relationships with RRTC (e.g., "We trust that our RRTC will act in ways that promote the interests of our CTP."). Responses ranged from 0 (no extent) to 5 (very great extent) ($\alpha = .$

94 at Wave 1; α = .92 at Wave 2). Third, four separate continuous variables and eight binary variables examined inter-organizational relationships between CTPs (see Table 1).

Analyses of adoption and implementation are focused on two interventions tested in the CTN's protocols: buprenorphine and motivational incentives/contingency management (MI/CM; see Table 2). Consistent with our prior research, we define adoption as any current use of an intervention within a given CTP. For buprenorphine, CTPs were coded as having adopted this medication if a physician on staff or contract prescribed buprenorphine to any patients or if it was dispensed within that CTP's opioid treatment program (OTP). Adoption of MI/CM was indicated by any current use of tangible rewards to reinforce positive treatment progress at a given CTP. Adoption of buprenorphine and MI/CM was asked at each wave of data collection, which allows data to be analyzed for each cross-sectional sample as well as longitudinally in the panel of CTPs that have been members of the CTN for all three waves. For CTPs that reported adoption of buprenorphine at the 48-month interview, additional questions were asked about how the medication was being implemented in terms of its use for detoxification, maintenance, and pain management as well as whether it was offered as a treatment option for all opioid-dependent clients. Non-adopters were asked to describe some of the barriers to buprenorphine adoption.

Additional details about implementation of MI/CM was also gathered at the 48-month interview, including the type of behaviors that were rewarded, use of the fishbowl method for distributing rewards, and use of escalating reward schedules. Among CTPs that had not adopted MI/CM, an open-ended question was asked about their CTP's primary reason for non-adoption. CTP participation in activities that fulfilled the CTN's goal of dissemination was measured at 48-month follow-up by a series of dichotomous measures. CTPs were asked if they participated in 11 activities related to the dissemination of information about EBPs and the CTN's activities in the past year. For each of the 11 items, programs were coded '1' if they participated in the dissemination activity (yes) and '0' if they did not participate in the dissemination activity (no). Dissemination activities included providing information to the state legislature, interacting with the Single State Authority, organizing or leading training sessions for other treatment providers about EBPs, and contributing to the development of journal articles related to the CTN's activities (see Table 3 for a complete description of the 11 items).

3. Results

3.1. Patterns of inter-organizational interaction within the CTN

As indicated in the first panel of Table 1, the CTN accomplished a major step in organizational development through CTPs' reported quality of the relationships with their respective RRTCs, and the trust that they reported were embedded in those relationships. Given the goal of the CTN to create bi-directional influence relationships between researchers and practitioners, the CTP-RRTC relationship is a definite key, with these data indicating that average scores on both scales fell just short of "perfect" scores of 5. Given these high averages, it is not surprising that these scores did not significantly increase between Wave 1 and Wave 2, and notably, the scores did not deteriorate. The other two panels of data in Table 1 address inter-organizational relationships among CTPs, processes vital in the formation of this particular organization. The first item focuses specifically on this matter, and indicates that the amount of communication among CTPs about CTN-specific issues declined from Wave 1 to Wave 2, although this change was not statistically significant. This would indicate that organizational formation issues were being resolved at the first wave, and were less acute by the second wave. This observation is confirmed by the significant drop in the number of contacts between Wave 1 and Wave 2 and by the nonsignificant declines in phone and e-mail contact between the two waves. This change may have been partially in response to the widespread "lore" within the CTN that the initial highly demanding volume of phone calls and e-mails eventually came under control.

The third panel of Table 1 addresses the issue of interactions among the CTPs that were not directly centered on CTN matters. In other words, the questions indicate the extent to which CTN membership facilitated a broad level of interaction among CTPs within and outside their respective nodes. The data show that these relationships indeed developed and involved a majority of the CTPs. However, this interaction is fairly stable between Wave 1 and 2 of the data collection. Close to three-quarters of the CTPs interacted with other CTPs in their node over cross-referral of clients, about collaboration on joint projects other than CTN activities, and for sharing information about emergent funding opportunities.

There were, however, statistically significant changes in interactions regarding SUD treatment techniques. Sharing of information about new techniques among CTPs in a node increased from Wave 1 to Wave 2, involving 75% and 84% of the CTPs, respectively. Actual technology transfer of treatment techniques among node CTPs involved over half of the CTPs at Wave 1, but dropped to about a quarter at Wave 2. A similar pattern, with lesser but still significant decline, was marked by technology transfers from CTPs outside their respective nodes. One interpretation of changes in rates of technology transfer among CTPs may rest on the fact that there are relatively few such treatment techniques about which to exchange information. Thus, the relatively high rate of inter-CTP influence at Wave 1 versus Wave 2 may reflect a saturation effect wherein one or two techniques are adopted and there are no others to choose from.

3.2. Adoption of buprenorphine in the CTN over time and barriers to adoption

In prior research, we have addressed several dimensions of innovation adoption in the CTN (Ducharme et al., 2007; Ducharme & Roman, 2009; Knudsen et al., 2009; Knudsen et al., 2007). The adoption of buprenorphine within the CTN can be considered in at least two ways. A first method is to treat each wave of data as a cross-section that includes all programs at each point in time. From this point of view, there is evidence of the expansion of buprenorphine over the 48-months of the study. At the first wave, just 15.5% of CTPs that treated opioid dependence reported current use of buprenorphine. Overall adoption increased to 31.8% at the 24-month follow-up and 34.5% at the 48-month follow-up interview within this subgroup.

A more complicated picture emerges when the cohort of CTPs that were in the CTN for all 48-months (n=129) are analyzed (Table 2). About 58.1% of CTPs did not report any use of buprenorphine over the course of the study. About 8.5% of CTPs reported use of buprenorphine at all three time points and another 19.4% shifted from non-use to use. A few CTPs (4.7%) appear to have discontinued use of buprenorphine, shifting from use at first wave to non-use later in the study. An additional 7.0% appeared to adopt buprenorphine at the 24-month follow-up but then later discontinued its use by the 48-month interview.

At the 48-month follow-up, we asked adopting CTPs a series of questions about how buprenorphine is implemented in their programs. We asked whether they use buprenorphine for opioid detoxification, as a maintenance medication, and for pain management. About half (48.5%) of adopting programs exclusively offered buprenorphine as a maintenance medication; these programs did not use buprenorphine for opioid detoxification. The remaining programs were nearly evenly split between offering only opioid detoxification (23.2%) and using buprenorphine for both detoxification and maintenance (25.0%). Two programs (2.9%) used buprenorphine only for pain management and did not use it to treat opioid dependence. Programs that offered buprenorphine for detoxification and/or maintenance were then asked whether this medication is offered as a treatment option for all opioid patients. Among programs that use buprenorphine for detoxification, a strong majority (78.1%) offered buprenorphine to all of their opioid detoxification patients. In the case of buprenorphine for maintenance, fewer programs (48.9%) offered buprenorphine to all opioid patients as a treatment option.

Barriers to adoption of buprenorphine were identified in a variety of ways at the 48-month follow-up interview. In the 42 opioid treatment programs (OTPs) that offered methadone maintenance, physician resources were available, which reduces a significant barrier often experienced by non-OTPs. When directors of OTPs were asked about the primary reason for non-adoption of buprenorphine (n=21), the most commonly cited reason was the cost associated with buprenorphine (23.8%). Physicians who intend to prescribe buprenorphine are required to apply for a special waiver (Fiellin, 2007), and 19.0% of OTP directors indicated that they lacked access to a waivered physician. However, 19.0% of OTPs indicated that they were actively planning to implement buprenorphine treatment in the future.

At the 48-month follow-up interview, there were 156 non-OTPs in the CTN and barriers to adopting buprenorphine were more complex than in the OTPs. First, 38 programs had no access to medical personnel, so adoption was not feasible in these programs. Of the 118 programs with access to prescribers, about 22.9% did not prescribe any medications for addiction treatment. When asked about the reasons for not using any medications, 25.9% cited regulatory barriers as highly significant. About 18.5% reported that medications were highly inconsistent with the treatment philosophy of the program and that better alternatives were available. Concerns about liability issues were also significant barriers for 18.5% of these programs.

The final group of non-adopters represent those non-OTP programs that use other addiction treatment medications but not buprenorphine specifically (n=40). Directors of these programs were asked to identify the primary reason for not using buprenorphine to treat opioid dependence. The most commonly cited reasons were the cost of buprenorphine treatment (17.5%), their current prescriber did not have a buprenorphine waiver (17.5%), and their current medical personnel simply did not prefer to use buprenorphine (10.0%). Three programs noted that they offer buprenorphine at another location, and three other programs reported not using buprenorphine because they did not offer detoxification services.

3.3. Adoption of motivational incentives/contingency management (MI/MC) over time and barriers to adoption

Initial analysis of the data on adoption of MI/CM treated each wave of data collection as a cross-section so that data from all CTPs could be considered. The rate of adoption of MI/CM was remarkably flat (see Table 2). At first wave, about 35.6% of CTPs reported using MI/CM and there was little to no change in the 24-month follow-up (35.6%) or the 48-month follow-up (34.0%).

As seen in Table 2, a more dynamic picture emerges when the cohort of CTPs who were part of the CTN at all three waves are analyzed (n=124). About 38.7% of CTPs have no experience with MI/CM at any of the waves. About 12.1% reported sustained adoption, meaning that they used MI/CM at all three waves. Another 18.6% of programs were “new adopters” over the course of the study in that they shifted from non-use to use. However, there was also some evidence of discontinuation and inconsistent adoption. About 17.8% of programs reported use of MI/CM at the time of the first wave interview, but later discontinued using this intervention, and another 7.3% reported use only at the 24-month follow-up interview.

Among adopters at the 48-month interview, we asked a variety of questions to understand the types of behaviors that programs were incentivizing as well as use of the “fishbowl” method and escalating reward schedules in the distribution of incentives. The most common targeted behavior was attendance at therapy sessions (83.0%); another 54.0% provided incentives for clean urine tests. Fewer programs (30.6%) used incentives for being on-time to treatment appointments. About 34.8% of adopting CTPs used both fishbowl and escalating reward schedules in their implementation of MI/CM. One CTP used the fishbowl without escalating rewards while four CTPs used escalating rewards schedules but not the fishbowl method. The

majority (57.6%) of adopting programs used neither element in their implementation of MI/CM.

Non-adopting CTPs were asked an open-ended question to identify the primary reason that their treatment program did not use MI/CM. These responses were coded into thematic categories. The most commonly cited barrier to adoption was related to the costs associated with implementing this intervention (32.5%). Other barriers were lack of compatibility with the program's philosophy (15.4%), logistical issues in terms of competing demands, short length of stay, and lack of a developed protocol for implementing MI/CM (11.4%), and perceived ineffectiveness of MI/CM with the program's population (10.6%). When asked about the likelihood of adopting MI/CM in the next two years, about 21.9% expressed that the likelihood of adoption was high.

3.4. CTPs and the dissemination of research: Organizational outreach and interorganizational interaction

At 48-month follow-up, CTN programs were asked questions to assess their participation in a variety of dissemination activities during the past year (see Table 3). A majority of CTPs participated in at least one dissemination activity (86.3%), while only 13.7% participated in no activities. On average, CTPs participated in four dissemination activities. Most commonly, CTPs provided information about EBPs to county and/or local governments, participated in a state/local taskforce or workgroup addressing issues related to EBPs, and/or interacted with the Single State Authority (SSA) or State Methadone Authority (SMA) on an EBP related issue.

Overall, CTPs reported the highest levels of participation in dissemination activities at the state-level. More than one-third of programs provided information about EBPs for substance abuse treatment to state legislatures/legislative committees (36%) and county/local governments (44%). Programs also reported high levels of participation in state/local taskforces or workgroups on issues related to EBPs (45%) and interaction with their SSA or SMA on issues related to EBPs (41%). CTPs disseminated information about EBPs to other treatment providers as well. Roughly 40% of CTPs organized or led a training session for other providers, 29% disseminated information about the CTN's activities to other providers, and roughly 19% provided technical assistance to an organization that was trying to adopt an EBP. Finally, about one fourth of CTPs participated in the development of publications.

4. Discussion

The current findings may be seen as an interim external observation of several accomplishments of the CTN at the time of its 10th anniversary. We addressed three topics: organizational formation, innovation adoption, and outreach/dissemination. Data on the reported relationships between the CTPs and their parent RRTCs offer a firm foundation for the CTN's continued activities. In terms of an established network, the CTN is not a total institution however, and interactions among its constituent CTPs are not their primary preoccupation. Intensified interaction over time might indeed have described mounting organizational problems and challenges rather than the early institutionalization of relationships.

Our findings indicate that the CTN is fulfilling its goal of increasing the quality of treatment within its constituent CTPs as indicated by the adoption of two representative EBPs. However, the level of diffusion falls short of what would be expected if these two treatment practices are regarded as "state of the art" and a treatment program is defined as providing the best quality treatment possible. As the findings describe, there are multiple barriers to the use of these innovations that apparently overwhelm the scientific evidence that they are superior to other

approaches. Included among these barriers are beliefs that either medications or reward-based motivators are inconsistent with the treatment ideologies of both individuals and programs. Also, there is a notable element of non-acceptance of the scientific evidence supporting these EBPs, or a belief that the evidence is inadequate. These challenges faced by the CTN contrast sharply with the operation of the NCI-sponsored CCOP.

It is also clear from this profile that innovation implementation remains a strong challenge. While discontinuation of the use of buprenorphine only approached 5%, discontinuation of MI/CM in this population approached 20%. Considerable effort has been directed toward the understanding of adoption, but much more effort is needed to fully understand implementation in the organizational settings of SUD treatment. Data on the overall adoption of two very different EBPs within the CTN may be more of a cause for concern. It would appear that successful dissemination by CTP constituents of the CTN rests upon their own adoption and implementation of critical EBPs. These data indicate that much more adoption remains to occur, and there are strong needs for improved leadership on implementation strategies that counteract apparently high rates of discontinuation of use following adoption.

Anecdotally, SUD treatment programs have historically been very insular, particularly in relationship to other treatment programs. The evidence presented in the first section of these results confirms that the CTN has influenced inter-organizational interaction among CTPs in a substantial way, leading to shorter-term interactions over the CTN's organizational formation, and to a high degree of interaction over issues that are outside the purview of CTN activity, but relevant to the successful operation of SUD treatment programs.

In this context, the evidence of outreach and dissemination activities shown in this most recent wave of data collection may be regarded as impressive. Only 14% of the CTPs have participated in none of the outreach/dissemination activities, and many have participated in several activities. Another dimension of these data that deserves attention is the reported interaction with the agencies responsible for funding and purchasing services. Such interactions were practically unknown in some quarters in the past. It appears that CTN membership has indeed contributed to increased recognition of the importance of the external organizational environment. These activities can contribute positively to improvements in boundary-spanning, partnering, and environmental scanning as SUD treatment continues to cope with turbulent and uncertain resource dependence in ever-changing environments. This movement from insularity into the external environment can only enhance the other goals of diffusion and implementation. Likewise, the data on both the first and third research questions describe that the CTN itself has not grown into an insular system or closed organization.

Some limitations of this research need to be noted. First, participating CTPs do not reflect a nationally representative sample and findings may not generalize to other organizations (Ducharme et al., 2007; Ducharme & Roman, 2009; McCarty et al., 2008). Second, all measures relied on self-reports by administrators; thus, it is possible that descriptions of their programs may be biased. However, we do note that our reliance on self-reports is similar to the federal N-SSATS methodology. Third, although our study addressed the adoption (i.e., any current use of the intervention) of buprenorphine and motivational incentives/contingency management, we do not examine the implementation (i.e., routine use) of these innovations. Future research should examine the extent to which programs use these interventions in everyday treatment practice and fidelity with which these practices are implemented.

Acknowledgments

The authors gratefully acknowledge the research support of the National Institute on Drug Abuse (Grant No. R01DA14482) and the participation of the community-based treatment programs affiliated with the National Drug Abuse Treatment Clinical Trials Network in this research.

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J Subst Abuse Treat. Author manuscript; available in PMC 2011 June 1.

Table 1

Differences in patterns of inter-organizational interaction within the CTN between wave 1 and wave 2 panel data

	Wave 1		Wave 2			
	M	***SD (n)***	***M***	***SD (n)***		t^a, z^b, χ^{2c}
CTPs' relationships with Regional Research and Training Centers						
Quality of relationships with RRTC	4.35	.66 (100)	4.40	.68 (72)		$-.45^a$
Trust in relationships with RRTC	4.50	.72 (100)	4.52	.57 (72)	$-.23^a$	
Inter-organizational relationships between CTPs						
Staff hours/wk communicating with CTPs in node re general CTN matters	2.58	4.79 (96)	1.72	3.59 (71)	$-1.34\ ^b$	
Staff hours/wk communicating with CTPs in node re general matters via phone	2.42	12.35 (95)	1.29	4.32 (71)	$-1.86\ ^b$	
Staff hours p/wk communicating with CTPs in node re general matters via email	1.57	4.87 (95)	1.33	3.88 (71)	$-.71\ ^b$	
Number of contact with other CTPs	5.34	2.52 (93)	3.46	1.74 (50)		$4.71^{a, ***}$
Communication among CTPs about non-CTN issues (N, %)						
Regular contact with CTPs in node about non-CTN issues[d]	59	59	51	71	2.54^c	
Contacts about referring clients to other node CTPs[d]	44	76	39	76		$.01^c$
Contacts about referred clients from other node CTPs[d]	42	72	35	69	$.19^c$	
Collaborating on joint projects[d]	44	75	36	71	$.22^c$	
Sharing information about funding opportunities[d]	44	75	34	67		$.83^c$
Sharing information about new treatment modalities[d]	44	75	43	84	9.87^{c**}	
Adopting treatment techniques from other CTPs within node[d]	59	59	20	27	16.98^{c***}	
Adopting treatment techniques fromother CTPs outside of node[d]	59	59	25	35		9.87^{c**}

[a] *Note*. t-test;

[b] Wilcoxon-Mann-Whitney test;

[c] only "yes" responses are shown;

** $p < .01$;

*** $p < .001$;

Table 2

Typology of adoption of buprenorphine and motivational incentives/contingency management in the CTN over 48 months

	Buprenorphine (n=129)	Motivational Incentives/ Contingency Management (n=124)
Non-use over 48 months	58.1% (75)	38.7% (48)
Sustained adoption over 48 months	8.5% (11)	12.1% (15)
New adoption at 24-month follow-up	14.0% (18)	9.7% (12)
New adoption at 48-month follow-up	5.4% (7)	8.9% (11)
Discontinuation at 24-month follow-up	3.1% (4)	10.5% (13)
Discontinuation at 48-month follow-up	1.6% (2)	7.3% (9)
Use at first wave and 48-month follow-up	2.3% (3)	5.6% (7)
Use at 24-month follow-up only	7.0% (9)	7.3% (9)

Table 3

Participation in dissemination activities

Variable	% (N)
In the past year, have you and your staff …	
provided information to the state legislature or legislative committees about evidence-based treatment	35.9% (71)
practices (EBPs) for substance abuse treatment?	
provided information to county and/or local governments related to EBPs?	44.4% (88)
participated in state/local taskforces or workgroups working on issues related to EBPs?	45.5% (90)
interacted with the SSA or State Methadone Authority on issues related to EBPs?	40.9% (81)
engaged in discussions with third-party payers and other purchasers of SA treatment services about EBPs?	31.3% (62)
Thinking about the past year…	
has this CTP organized or led training sessions for other treatment providers about EBPs?	39.9% (79)
provided technical assistance to treatment organization that was trying to adopt an EBP?	18.7% (37)
disseminated information specifically about the CTN's activities to other providers?	29.3% (58)
presented information about EBPs to professional associations?	27.3% (54)
contributed to the development of journal articles related to the CTN's activities?	21.7% (43)
participated in the development of articles about addiction treatment for lay publications?	22.7% (45)

Note. *All variables are dichotomous. CTPs were coded '1'for yes and '0' for no.