Testing a Digitally Distributed Method to Recruit a Network of Community Organizations to

Fight the Consequences of the Drug Epidemic: A Study in Thirteen American States

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Abstract

Objective: To mitigate the opioid epidemic, a concerted effort to educate, prevent, diagnose, treat, and engage residents is required. In this paper, a digitally distributed method to form a large network of organizations was tested with 99 counties in regions with high vulnerability to HCV (Hepatitis C Virus). **Methods:** The method involved a cascade of contacts going from email to phone calls to videoconferencing and measuring the number of contacts required, amount of time taken, and the proportion of success at recruiting at least one community organization per county. **Results:** A recruitment period of five months and 2,118 contact attempts led to the recruitment of organizations from 73 out of our 99 target counties. Organizations belonging to health departments required more attempts and time to recruit but ultimately enrolled at higher rates than did other organizations such as coalitions and agencies. Organizations from counties more (vs. less) vulnerable to HCV outbreaks required more attempts to recruit, and using multiple recruitment methods (e.g., emails, phone calls, and Zoom meetings) improved enrollment success. **Conclusions:** Overall, this method proved to be successful at remotely engaging a large-scale network of communities with different levels of risk within a large geographic region.

Keywords: recruitment, community engagement, opioid use, HCV, rural health

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Over the past two decades, the rural regions of Appalachia, the Midwest, and the South in

the United States have had rates of opioid use exceeding the national average (Hoots et al., 2018)

and rates of overdose mortality that are 65% higher than in other regions (48.3 vs. 29.2 deaths

per 100,000; Meit et al., 2019). These regions have also had increasing rates of infectious disease

outbreaks (Zibbell et al., 2015), with rates of HCV associated deaths that are 32% higher than in

other regions (4.9 vs. 3.7 deaths per 100,000; Centers for Disease Control and Prevention [CDC],

2018). Although the origins of these crises are complex, social determinants of health,

misconceptions about opioids, and a culture of isolation and despair are among the most critical

causes.

One possible solution to address these problems is to mobilize communities, combining

the knowledge, skills, and resources of a network of organizations to develop effective and

locally feasible answers (Cunningham et al., 2015; Pratt et al., 2020; Richardson & Allegrante,

2000). Particularly, a network of community partners may be able to coordinate efforts and work

to improve local conditions, including proposing and testing solutions to reduce the harm of

opioid use and HCV infections. In fact, the CDC (Centers for Disease Control and Prevention)

has recognized the leading role community networks play in preventing drug use

(https://www.cdc.gov/drugoverdose/featured-topics/drug-free-communities.html) and hence,

scholars have increasingly engaged community partners to develop interventions addressing drug

use. For example, Zimmerman et al. (2020) established a partnership with community members,

patients, policymakers, and service providers in a rural community of Virginia to identify and

prioritize strategies for combating the opioid epidemic. Martinez et al. (2020) partnered with 16

counties across four states to implement practices that reduce opioid overdose deaths. Despite these efforts, community partnerships in these projects have stayed relatively localized and have primarily involved a small number of communities or states, although America's opioid epidemic impacts a wide region. Hence, in this paper, we describe our efforts to implement a systematic and digitally distributed method to remotely recruit communities from a sample of 99 at-risk counties across thirteen states surrounding the Appalachian region. We then compare our recruitment data against existing benchmarks, identify predictors of recruitment, and estimate the degree of bias in our recruitment as a function of the HCV risk of each county.

Digitally Distributed Community Recruitment

Principles of community engaged research have been employed worldwide to guide the work of researchers, organizations, and community members (Belone et al., 2016) in areas including mental health (e.g., Fortuna et al., 2019), cardiovascular health (e.g., Yingling et al., 2016), substance use (e.g., Windsor et al., 2018), and HIV (e.g., Rhodes et al., 2018), with the premise that community engagement not only increases participation from diverse sectors but also makes interventions more sustainable (Albert et al., 2011). The last few decades have shown high levels of interest in engaging communities, as well as increased success (Pinto et al., 2015; Viswanathan et al., 2004; Windsor et al., 2018).

Collaborative work with community partners has typically involved a small number of people and organizations working in geographic proximity to each other (National Institutes of Health [NIH], 2011). This approach is consistent with the need to develop deeper and trusting relationships on projects that require significant time and resource commitments (Lucero et al., 2018). However, many of the problems that affect the health and wellbeing of community members, including opioid use and HCV infections, are complex and span across large

geographical areas. These problems cannot be solved by any person or organization working alone (Mitchell & Shortell, 2000) but rather, require a geographically distributed network of communities whose organizations are mobilized to improve their community problems.

Moreover, recruitment efforts should not only reach communities with favorable pre-existing attitudes toward research partnerships but also those that are less favorable. For example, some communities may be reluctant to join a community network or a research partnership because they underestimate the severity of health issues in their community or fear exposing their vulnerability to outsiders. Such reluctant communities are often underrepresented in research partnerships. According to Festinger (1964), people often tend to seek information that confirm their points of view because they feel comfortable in these situations (see also Fetterman & Hart, 2020; Hart et al., 2009). Likewise, individuals who are already in compliance with the health recommendations of an intervention are the ones most likely to participate (Earl et al., 2009; Noguchi et al, 2007; Wilson & Albarracín, 2015). Similarly, organizations already involved in research are the ones most likely to participate in other research (Kaiser et al., 2017). Therefore, communities that are better equipped to address the problem may be the ones most willing to participate, whereas those that are less equipped may be less willing.

In recent years, researchers have turned to technology-based recruitment approaches, utilizing digitally mediated communication tools such as mobile phones, email, social media, and online conferencing to help tackle some of these obstacles (Dalessandro, 2018). Unlike in-person approaches, technology-based recruitment has the advantage of reaching underrepresented populations (Ryan, 2013), including those living in difficult-to-reach geographic locations (Rhodes et al., 2003), is more cost effective for researchers (Graham et al., 2008; Gordon et al., 2006; Ryan, 2013), and more convenient for communities (O'Connor et al., 2016). In the past,

technology-based recruitment approaches have demonstrated their utility in health-related research (Ramo et al., 2010), including with surveys (Temple & Brown, 2011) and interventions to improve physical health (Ramo et al., 2014), and have become increasingly more feasible given the exponential increase in access to the internet (Pew Research Center, 2019). With its potential for wider reach and greater engagement, technology-based recruitment approaches may provide the solution to recruit varied communities across geographic boundaries.

Overview of our Project

In this paper, we examined the efficacy of a technology-based recruitment method to engage a large network of community partners. The general purpose of the network was to engage communities to study their perceptions and beliefs about drug use as well as their health behavior, and to develop interventions that are tailored to community culture and needs. A detailed description and activities of the community network appears in Figure 1.

First, we identified the counties most vulnerable to HCV outbreaks associated with injection drug use based on Van Handel and colleagues (2016), resulting in our target of 99 counties across thirteen states. Then, we used a cascaded effort of emails, phone calls, and Zoom meetings to recruit contacts, tracking all contacts, including the date, form of communication, and outcome. We measured the number of attempts we made, the time taken (in days) from our initial invitation to enrollment, our enrollment success, and our overall recruitment rate. We assessed a period of five months of recruitment before the onset of the COVID-19 pandemic.

Method

County Selection and Randomization

At the onset of the project, we identified the counties ranked in the top 5% for vulnerability to the rapid dissemination of HCV associated with injection drug use, based on

findings by Van Handel and colleagues (2016). In their work, Van Handel and colleagues used a multi-step approach that identified a set of six indicators (i.e., drug overdose deaths, prescription opioid sales, per capita income, white non-Hispanic race/ethnicity, unemployment, and buprenorphine prescribing potential by waiver) associated with higher county rates of acute HCV infection, a proxy outcome for injection drug use. Using these indicators, the authors calculated a composite index score to rank each county's vulnerability, identifying 220 counties in 26 states within the 95th percentile of most vulnerable.

We then identified the counties within this 95th percentile located in Appalachia, the Midwest, and the South. This resulted in a sample of 198 counties. From this, we used a random number generator to select half of these counties, for a final sample of 99 counties distributed across thirteen states, including Georgia, Illinois, Indiana, Kansas, Kentucky, Michigan, Missouri, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. These counties appear in the Appendix.

Identification of Target Organizations

As part of our recruitment efforts, we first brainstormed the types of organizations we should target. This included local health departments; coalitions related to substance use, HIV, or other health outcomes; and agencies that represented aspects of community life, including hospitals, law enforcement, prison/parole/drug courts, family services, and religious institutions. We then used a combination of online sources, as well as referrals from the health departments we contacted, to identify specific organizations that fell into these categories. For each organization, we also identified an individual to serve as a point of contact (e.g., the director of the health department). With these efforts, we were able to compile an initial list of 3,150

organizations across the 99 counties. During recruitment, this list was updated when we

identified other relevant organizations to contact.

Distributed Recruitment Methods

To further aid our recruitment efforts, we developed a Distributed Recruitment Method

(DRM) involving a cascaded effort of emails, phone calls, and Zoom meetings to recruit

contacts. First, we sent out an initial email to organizations to introduce our project. After the

initial email, we sent a follow-up email and/or made a phone call to each organization to request

a meeting, in line with evidence showing that strong communication is best achieved through

scheduled meetings (Pinto et al., 2014). When organizations obliged, we set up informational

meetings to discuss our project, as well as any concerns or challenges of participating in our

project. During these meetings, we also answered questions, provided clarifications, and enrolled

interested parties. Sample scripts for these recruitment methods appear in Figures 1 and 2. When

an organization agreed to join our board, we sent them additional materials, including an

informed consent form, a questionnaire to assess community needs, and a $200 gift card for their

participation in the board over a one-year period. The gift card was sent to the individual who

signed the consent form and completed the questionnaire, to be used however they saw fit.

Reminder emails and phone calls were also made to sustain communication between our

research team and the organization. Throughout this process, we tried to establish one member of

our research team as the primary contact for each organization, as consistent staffing has been

shown to be important in developing trust, long-term relationships, and more honest

conversations (Kaiser et al., 2017).

Recruitment Recording System

To track our communication efforts, we developed the Recruitment Recording System (RRS), which tracked all contacts with organizations, including the date, form of communication, and outcome. Specifically, we recorded information, including the state, county, and the Federal Information Processing Standard (FIPS) of the organization; the organization's classification (whether it was a health department, coalition, or other agency) and type (whether it was a hospital, law enforcement, prison/parole/drug court, family service, religious institution, or something else); and finally, the organization's name, physical address, phone number, and email address. We also recorded the name of the research team member who made the contact attempt, the attempt number, the date of the contact attempt, the recruitment method used (e.g., email, phone, mobile messaging, zoom), and the status of the target organization (enrolled, in progress).

Data Analytic Plan

Our primary goals in this manuscript were to evaluate our recruitment efforts against existing benchmarks, determine predictors of successful recruitment, and identify potential biases in our recruitment. To evaluate our recruitment efforts, we compared the number of attempts made, the time taken to recruit, and our recruitment rate with benchmarks from the existing literature. The number of attempts needed to successfully enroll an organization involved a count of each discrete recruitment attempt made. Although best practices advocate for the measurement of recruitment attempts (Khodyakov et al., 2018), we were unable to find reports on this. When looking at retention of community organizations, however, prior work has shown that sending three or more follow-up emails increases participation, especially when combined with phone calls (Horvath et al., 2012). We therefore compared the number of

attempts we made with this benchmark. Time taken to recruit was measured as the number of

days between the first and last contact attempt between November 2019 (the start of our

recruitment efforts) and March 2020. Prior work shows that the time taken to complete half the

recruitment goal for a multi-site trial can take between 4.4 months (134 days) and 5.8 months

(176 days) to achieve (Monaghan et al., 2007). Thus, we compared the time it took us to recruit

with this benchmark. Recruitment rate was calculated by dividing the number of enrollees by the

number of people who were offered participation. Meta-analyzed reported rates of enrollment

have estimated average success at 53% (Noguchi et al., 2007), and this is the benchmark we

used.

   To determine which aspects of our recruitment method predicted success, we conducted a

series of multilevel models, including the type of organization (health department, coalition,

agency), the number of recruiters involved in each attempt, and the number of methods we used

to recruit agencies (including email, phone, and Zoom), as well as county (Level 2) and state

(Level 3), as predictors of the number of attempts we made, the time taken to recruit, and

whether we were successfully able to enroll an organization or not (treated as a binary variable).

To estimate any bias in our recruitment as a function of the HCV risk of each county, we also

included the vulnerability rank of each county in our models. We reverse-coded the original

vulnerability rank provided by Van Handel and colleagues (2016) so that higher scores

represented greater vulnerability.

Results

   The purpose of our paper was to examine the efficacy of a digitally distributed

recruitment method to engage a large, cross-regional network of community partners. We first

describe any observable differences in our recruitment method. We then compare our

recruitment data with existing benchmarks, determine predictors of this recruitment success, and, finally, identify possible biases in our recruitment.

Descriptive Results

We first analyzed the average number of recruiters and methods we used, as well as the type of organizations we contacted. On average our recruitment involved between one and two recruiters ($M = 1.35$, $SD = 0.54$). Because we had little variability, however, it was not possible to determine whether differences in recruiter characteristics (including their recruitment experience and academic position) moderated success. Our recruitment involved more than one method of recruitment ($M = 1.51$, $SD = 0.64$), most frequently combining emails with phone calls and informational meetings over Zoom. We made the most contact attempts to recruit health departments ($M = 8.33$, $SD = 5.44$), which took an average 68.46 days to recruit and had an enrollment success of 48%. In contrast, both coalitions and agencies took fewer contact attempts (coalition: $M = 4.78$, $SD = 3.23$; agency: $M = 2.81$, $SD = 2.69$), required less time (coalition: 24.84 days; agency: 42.50 days), but had lower enrollment success (coalition: 39%; agency: 2%). Therefore, health departments were difficult to recruit (requiring more attempts and more time) but had a high rate of enrollment success.

Benchmarking Number of Contact Attempts, Time to Recruit, and Recruitment Rate

We were interested in the success of our recruitment method, operationalized by the number of attempts made, time to recruit, and overall recruitment rate, and assessed vis-à-vis existing benchmarks.

Table 1 presents these variables by region and state, with some states collapsed to protect the identity of the counties. We made 2,118 contact attempts, with an average of 4.05 attempts per county. It took us an average of 54.59 days to successfully enroll an organization. During this

period, we were able to achieve 74% of our recruitment goal (89 community organizations from

73 out of our 99 target counties). In fact, our overall recruitment rate was 59%. All in all, our

findings met or exceeded all existing benchmarks in the literature (e.g., Horvath et al., 2012;

Monaghan et al., 2007; Noguchi et al., 2007), suggesting that our method to recruit a

geographically dispersed network of organizations was successful.

Table 1 also shows the regional and state variability in number of attempts, time to

recruit, and recruitment rate. For example, we made the fewest contact attempts in the South (M

$= 3.66$) and the most in Appalachia ($M = 5.09$). We took the shortest time to recruit in Indiana

($M = 30.67$) and the longest in Missouri ($M = 82$). Our recruitment success was lowest in

Michigan (8%) and highest in West Virginia (18%). This variability was important to allow for

the analyses of predictors of number of attempts, time to recruit, and enrollment success, which

we conducted next.

Predictors of Recruitment

Overall, the number of attempts made was positively associated with time to recruit ($r =$

$.68$, $p = .01$). However, the number of attempts and time to recruit were not associated with

enrollment success ($r = .27$, $p = .36$ and $r = .28$, $p = .36$, respectively). We were therefore

interested in determining whether aspects of our recruitment method predicted these indices of

recruitment outcomes. In doing so, we conducted a series of multilevel models, including the

vulnerability score of each state, the type of organization (health department, coalition, agency),

the number of recruiters we used in each attempt, and the number of methods we used to recruit

agencies (including email, phone, and Zoom), as well as county (Level 2) and state (Level 3), to

examine whether these methodological variables predicted recruitment success. See Table 2 for

the model details. Not surprisingly, number of attempts increased with number of recruiters and

methods used, as well as when health departments were targeted as opposed to coalitions or agencies. Similarly, the time taken to recruit was longer, but enrollment success was higher, when more methods were used and when targeting health departments relative to other coalitions or agencies. These findings were homogeneous across county and state.

Bias Assessment

Finally, we were interested in assessing whether the potential for our method to succeed differed by the vulnerability of a county. Therefore, Van Handel and colleague's (2016) vulnerability rank was also included in our analysis in Table 2. For ease of interpretation, we reverse-coded the original vulnerability score so that higher scores represented greater vulnerability. Consistent with this possibility, more contact attempts were required when a county had a higher vulnerability index ($\beta = 0.0017$, $SE = 0.0006$, $p = .01$). However, this effect was small, and neither time to recruit nor enrollment success differed between counties of different vulnerabilities.

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Discussion

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We investigated the feasibility of recruiting for a large network of communities in multiple regions to address a common problem and the results from our recruitment efforts led to several important conclusions. First, we found that it took us an average of 4.05 recruitment attempts per county to meet 74% of our recruitment goal in only 54.59 days, meeting or exceeding all existing benchmarks in the literature (e.g., Horvath et al., 2012; Monaghan et al., 2007; Noguchi et al., 2007). Second, we found that community partners from health departments required a higher number of attempts, and took longer to recruit, compared to partners from either coalitions or agencies, but their enrollment probability was highest. In contrast,

community partners from agencies required a lower number of attempts, and took less time to recruit, but their enrollment probability was lower.

This difference in recruitment outcomes among partners from health departments and those from coalitions or agencies could potentially reflect the differences in organizational structure and their decision-making process. Specifically, given that local health departments tend to be larger, more structured, and funded by government entities, engaging partners from health departments required more attempts and time to reach a decision-maker who could approve the partnership and often required approval from several stakeholders (e.g., county-level director, state-level director), compared to partners from coalitions and agencies. This longer time did not necessarily reflect lack of interest on the part of health departments, however, as their enrollment rate was higher than that of community partners from coalitions and agencies. Therefore, forming partnerships with local health departments is vital in generating the resources and perspectives to craft community solutions (Lasker & Weiss, 2003; Minkler & Wallerstein, 2005), and our results find that our approach is viable, even when done largely virtually.

We also found that, although using multiple recruitment methods did not reduce the time it took to enroll a community partner, it did improve enrollment success. Other recruitment and retention studies have similarly found that using multiple modes of contact with participants is a key factor to maintaining high levels of engagement (Horvath et al., 2012). It is important to note that our recruitment efforts were largely costless given that we relied on digitally mediated communication tools and there were numerous options (e.g., Gmail, outlook, Google voice, Google hangout, zoom) that offered free services for making phone calls, sending emails, and hosting online conference meetings.

We further found that community partners from counties that were more vulnerable to HCV outbreaks required more attempts to recruit but did not vary in the time needed to recruit or the enrollment success. These findings suggest that, although the probability between recruiting a higher or lower risk county did not differ, higher risk counties are more difficult to reach, consistent with prior work (Earl et al., 2009; Noguchi et al, 2007; Wilson & Albarracín, 2015). Finally, although we contacted various types of coalitions and agencies that represent aspects of community well-being, we had more success in recruiting coalitions and agencies that directly dealt with substance use and associated health problems, which constituted 88% of the coalitions/agencies that joined our network. Other coalitions/agencies we recruited included educational and religious institutions (22%). These findings suggest that the alignment between the agenda of the network and the agenda of the community organizations facilitates recruitment outcomes, such that the more the network's goals fit with pre-existing goals of community organizations, the more likely the organizations are to join.

Many collaborations often struggle to find ways to enable diverse participants to work together productively and to sustain their collaborative efforts over time (Okubo & Weidman, 2000). As our advisory board members are geographically distributed across thirteen states, we need a system to keep everyone abreast of the project and facilitate interactions. We have thus developed the Board Interaction System (BIS), a virtual meeting space for the research team and enrolled members, including leaders and community members, to work together and advance health solutions. The BIS will allow members to stay updated on information and facilitate community engagement, by enabling board members to remain abreast of the project and provide their advice on features of the development of the project. The BIS will also include training

materials[1] and videos[2] to provide members with a better understanding of the project, advisory

board, and platform, as well as skills useful for engaging in research activities. As our project

progresses, we will be able to evaluate whether the use of our BIS enhances retention and

collaboration during our project.

Although this paper analyzed the outcomes of using a digitally distributed method to

recruit a geographically dispersed network of community organizations, our analyses are not

without limitations. Specifically, our data do not provide a conclusive answer as to why some

community organizations (i.e., health departments) took longer and higher number of attempts to

recruit than did others (i.e., coalitions/agencies). Several organization-level characteristics, such

as the size, structure, and the availability of funding could systematically influence

organizations' interests and likelihood of joining a research partnership. Future research could

pay more granular attention to these characteristics and identify optimal strategies to recruit

different types of organizations. Likewise, organizational-level characteristics could also affect

retention in the activities of the community network. For example, partners from health

departments may be less likely to follow through the activities compared to partners from

coalitions and agencies, as their time is distributed across multiple health issues (some of which

are unanticipated) within communities. We plan on examining this possibility as we continue our

collaborative partnership with community organizations. Lastly, despite our success in engaging

a relatively large network of community partners surrounding the Appalachian region, we look

forward to future attempts in utilizing the digitally distributed method to recruit communities in

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[1] These materials include short and long versions of self-paced introduction materials that cover topics including participatory action research, research ethics, compliance training, and using Zoom.

[2] These videos were created using an iterative process. First, we created a list of topics that should be covered. For each topic, we selected pre-existing videos that could be useful. We then contacted the owners of these videos to obtain permission to use specific clips. This step typically involved an internal review by the owner's institution to ensure that there would be no violation of third-party copyright laws. If we failed to obtain permission, we used an alternative video and repeated the process. We then combined these videos to generate one video for each topic.

other regions. Community norms and culture can indeed influence their receptivity to different methods, such that some regions may be more open to digitally mediated communications whereas others may prefer more traditional methods including in-person visits and meetings.

Concluding Remarks

The opioid crisis poses a significant health threat in the United States. Despite a sense of urgency among researchers, policy makers, and communities, the implementation of effective evidence-based practices to reduce infections and overdose within communities remains suboptimal. Given the potential for community partnerships to bridge the gap between research and practice, it is imperative that investments be made to foster the inclusion of community members in the development of priorities that might affect social and public health services. In this paper, we described an innovative model to support sustainable, meaningful recruitment of geographically dispersed community partners for research planning and activities. In a period of five months, we were able to recruit organizations from 73 of out 99 counties across thirteen states, showing that a digitally distributed recruitment method can be successful. Findings from this study have the potential to advance multi-state collaborative research and develop an intervention model that other communities can use to address the opioid epidemic, the current COVID-19 crisis, and other health issues affecting vulnerable communities.

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Table 1

Summary Recruitment Data

Region, State, and Organization	Number of Recruiters Used	Number of Approaches Used	Number of Attempts Made	Time Taken to Recruit	Recruitment Rate
Appalachia	**1.33**	**1.60**	**5.09**	**58.06**	**17.17%**
VA	**1.14**	**1.57**	**5.52**	**67.00**	**14.29%**
Health Department	1.00	1.83	8.67	64.00	33.33%
Coalition	1.00	2.00	7.50	73.00	50.00%
Agency	1.23	1.38	3.77		0.00%
WV	**1.38**	**1.60**	**4.97**	**56.14**	**17.95%**
Health Department	1.43	2.29	8.64	79.86	50.00%
Coalition	1.11	1.67	4.89	24.80	55.56%
Agency	1.42	1.42	4.05	51.50	3.64%
Great Plains	**1.64**	**1.71**	**5.00**	**59.50**	**14.29%**
KS	**1.64**	**1.71**	**5.00**	**59.50**	**14.29%**
Health Department	2.00	2.33	9.00	77.00	33.33%
Coalition	2.50	2.50	6.50	42.00	50.00%
Agency	1.33	1.33	3.33		0.00%
Midwest	**1.21**	**1.43**	**3.93**	**52.56**	**10.67%**
IN	**1.23**	**1.64**	**6.05**	**23.00**	**9.09%**
Health Department	1.60	2.60	11.40	31.00	20.00%
Coalition	1.50	2.00	8.00		0.00%
Agency	1.07	1.27	4.00	15.00	6.67%
MI	**1.04**	**1.25**	**2.42**	**36.00**	**8.33%**
Health Department	1.17	1.50	2.67	36.00	33.33%
Agency	1.00	1.17	2.33		0.00%
MO	**1.25**	**1.41**	**3.82**	**73.00**	**9.09%**
Health Department	1.89	2.22	10.89	73.00	44.44%
Coalition	1.25	1.25	1.25		0.00%
Agency	1.06	1.19	2.10		0.00%

Region, State, and Organization	Number of Recruiters Used	Number of Approaches Used	Number of Attempts Made	Time Taken to Recruit	Recruitment Rate
OH	**1.25**	**1.43**	**3.83**	**53.88**	**13.33%**
Health Department	1.90	2.30	12.00	51.00	50.00%
Coalition	1.33	1.67	4.33	69.00	33.33%
Agency	1.11	1.23	2.06	53.50	4.26%
South	**1.42**	**1.52**	**3.66**	**53.58**	**14.40%**
GA	**1.29**	**1.43**	**5.29**	**47.67**	**14.29%**
Health Department	1.50	2.25	11.50	47.67	75.00%
Coalition	3.00	1.00	5.00		0.00%
Agency	1.13	1.25	3.75		0.00%
KY	**1.43**	**1.50**	**3.34**	**55.35**	**14.78%**
Health Department	1.63	2.00	7.19	61.93	87.50%
Coalition	1.43	1.57	4.14	22.00	28.57%
Agency	1.39	1.40	2.61	30.00	1.09%
NC	**1.35**	**1.55**	**4.65**	**79.75**	**12.90%**
Health Department	2.00	2.33	9.00	98.00	50.00%
Coalition	1.67	1.67	4.00	25.00	33.33%
Agency	1.14	1.32	3.55		0.00%
TN	**1.46**	**1.57**	**3.36**	**43.83**	**14.44%**
Health Department	1.85	1.90	5.95	107.75	25.00%
Coalition	2.13	2.13	5.13	11.88	50.00%
Agency	1.11	1.28	1.87		0.00%

Note. Due to suppression, details about enrollment from IL and PA have been aggregated with states whose vulnerability scores were similar to those of IL and PA. Unless otherwise specified, all values reported are averages. Blanks in the Time till Enrollment reflect unsuccessful recruitment attempts.

Table 2

Predictors of Number of Attempts, Time Taken to Recruit, and Enrollment Success

	Attempts Made			Time to Recruit			Enrollment Success		
	β	SE	p-value	*β*	SE	p-value	*β*	SE	p-value
Fixed Effects									
Intercept	1.66	0.09	<0.0001	-6.57	0.35	<0.0001	-1.50	0.43	<0.01
Organization-Agency	-0.63	0.07	<0.0001	-2.63	0.57	<0.001	-2.93	0.64	<0.001
Organization-Coalition	-0.47	0.10	<0.0001	0.61	0.46	0.20	0.07	0.60	0.90
Recruiters	0.40	0.07	<0.001	0.24	0.33	0.47	0.43	0.38	0.26
Method	0.41	0.07	<0.0001	1.57	0.30	<0.0001	2.06	0.43	<0.0001
Vulnerability Rank	0.00	0.00	0.01	0.00	0.00	0.97	0.00	0.00	0.83
Error Variance									
Level-2 (County/FIPS)									
Intercept	0.03	0.02	0.03	0.18	0.36	0.58	0.00	.	1.00
Organization	0.04	0.02	0.01						
Recruiters	0.06	0.04	0.03	0.85	0.63	0.08			
Method	0.06	0.03	<0.01						
Vulnerability Rank									
Level-3 (State)									
Intercept	0.04	0.03	<0.0001	0.00	.	1.00	0.00	.	1.00
Organization				0.39	0.26	0.04	0.64	0.43	0.04
Recruiters									
Method									
Vulnerability Rank				0.00	.	1.00	0.00	0.00	1.00
Model Fit									
AIC	2195.10								
BIC	2201.30								
-2 Res Log Pseudo L				3572.09			3257.53		

Note. The vulnerability rank was obtained from Van Handel and colleagues (2016) and reverse-coded so that higher scores represented greater vulnerability. For the model predicting time to enroll, the model with a random slope for Rank at Level 2 did not converge, so no results are presented here.

[insert date]

Dear [insert name],

It is our pleasure to inform you about a new health study that is starting in [insert county name]. We are developing a 5-year project to understand how we can protect our communities, particularly people aged 18-35, during the economic and health problems experienced in many areas of the United States today. As part of our research, we will conduct surveys and qualitative interviews to determine community strengths, the level of community trust, and mechanisms communities use to promote change when change is needed. We will also examine the role of digital forms of communication that could promote health and foster positive social interactions between people who use opioids and other members of their community. To help inform our research, we will also create community boards who will be vital in providing their input and feedback on all aspects of our project. As drug use, and its associated health problems, are a concern for many communities, this issue will be investigated in depth.

We are currently reaching out to agencies in the county to identify potential partners who can collaborate with us and explore strategies to improve health among people struggling with opioid use in [insert county name].

If interested, agencies can participate in various capacities, for as much or as little as they want, including:
- Disseminating study fliers to clients and the community
- Joining a community collaborative board
- Contributing to the interpretation of findings from your county and participating in publications
- Hosting data collection
- Collaborating in educational activities
- Becoming a study partner agency

Our research team will be contacting you further in the next week or so to discuss these opportunities. In the interim, feel free to contact us directly if you have any questions. If you think there is someone in your agency, or the local community, who may be interested in partnering with us, please let us know or please feel free to forward this letter to them directly. Please let me know if I can provide any information. I can be reached at [insert email] or by phone at [insert phone number].

Sincerely,

[insert name]

On behalf of XXX

Figure 1. An example of the recruitment email initially sent to all 99 counties.

1.	Good [variable: Time of day (morning, afternoon)]. My name is [variable: Name], calling from the University of Illinois at Urbana-Champaign.
	
	We are contacting agencies like yours about a new health study that is starting in [variable: County name]. We are looking to send additional information regarding our study to the primary decision-maker.
	
	Could you please provide me with the contact information of that person?
	    Yes
	    No
		If participant responds
		  Yes, go to section 2.
		  No, go to section 3.

2.	Great. I am ready to annotate.
	    Name: [variable: Contact name]
	    Email: [variable: Contact work email]
	    Address: [variable: Contact work address]
	    Phone: [variable: Contact work phone number]
	    Fax: [variable: Contact work fax number]
		Compile information on Excel spreadsheet. After completion
		  Go to section 8.

3.	Okay, I understand. Sharing that information may be a personal thing that the primary decision-maker would want to do for themselves.
	
	May I speak to that person and ask them myself?
	    Yes
	    No
		If participant responds
		  Yes, go to section 4.
		  No, go to section 6.

4.	Good [variable: Time of day (morning, afternoon)]. My name is [variable: Name], calling from the University of Illinois at Urbana-Champaign. I recently spoke to [variable: Receptionist name], and they transferred me to your extension.
	
	As I was telling [variable: Receptionist name], we are contacting agencies like yours about a new health study that is starting in [variable: County name]. We are looking to send additional information regarding our study to the primary decision-maker, and according to [variable: Receptionist name], that person is you.
	
	Could you please provide me with your institutional contact information?
	    Yes
	    No
		If participant responds
		  Yes, go to section 5.
		  No, go to section 7.

5.	Great. I am ready to annotate.
	    Name: [variable: Contact name]
	    Email: [variable: Contact work email]
	    Address: [variable: Contact work address]
	    Phone: [variable: Contact work phone number]
	    Fax: [variable: Contact work fax number]
		Compile information on Excel spreadsheet. After completion
		  Go to section 8.

6.	Okay, I understand. When could be a good time to call back and try to speak to [variable: Contact name]?	Compile information on Excel spreadsheet. After completion Go to section 8.
7.	Okay, I understand.	If participant responds

Is there a reason your agency would not be interested in participating?
    Yes
    No
	Yes, compile information on Excel spreadsheet. After completion, go to section 9
	No, go to section 9.

8. Wonderful! Your agency will be receiving our information in about [variable: Time frame].
 	
Do you have any questions for me?
    Yes
    No
	If participant responds
	    Yes, go to section Q&A list.
	    No, go to section 10.

9. Okay, I understand. Thank you for your attention and have a wonderful rest of the day.	End call.
10. Fantastic. Thank you for your attention and have a wonderful rest of the day.	End call.

Figure 2. The call guide used when contacting organizations in all 99 counties.