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Effective Strategies for Recruiting Families Ascertained Through Alcoholic Probands

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Background: Recruiting a large number of participants meeting strict inclusion criteria can be challenging, particularly when selecting for a condition associated with a social stigma such as alcoholism, when participation involves collection of medical specimens and sensitive information, and when the participation of family members or other collaterals is required. Developing and implementing a successful recruitment plan depends upon identifying the most effective recruitment strategies given the available resources.

Methods: Several strategies for recruiting subjects for a large family study on the genetics of alcoholism were evaluated over a two-year period with regard to participant yield, time and cost expenditure.

Results: Overall effectiveness of a recruitment strategy was determined based on a composite of yield, cost and time expenditure. The most effective recruitment strategies were direct mail, press release, the Internet and treatment center collaborations.

Conclusion: Results provide insight into successful strategies for recruiting large numbers of participants and their family members selected for a condition associated with a social stigma.

Key Words: recruitment, alcoholism, family, genetics, linkage.

RECRUITING A LARGE number of participants meeting specific enrollment criteria is challenging, particularly when selecting for a condition associated with a social stigma. In family studies where more than one person from each family is required to participate, recruiting probands who extend to informative relatives provides additional challenges. A comprehensive recruitment plan that includes specific recruitment strategies, a budget designated for recruitment, enrollment goals and a time frame for the recruitment effort is essential to overcoming these challenges and ensuring a steady flow of participants. The most successful recruitment plans rely on ongoing monitoring and a flexible approach (Adams et al., 1997, Connett et al., 1993) allowing for a prompt response to recruitment needs (Zweben et al., 1994).

A common misconception in recruitment is that the total population of eligible participants will be predictive of the number of individuals who volunteer for a study (Hunninghake et al., 1987). Enrollment of numbers lower than originally expected may result from this inaccurate assumption. A survey of recruitment in clinical studies has shown that recruiting an appropriate number of participants within the expected duration rarely occurred (Hunninghake et al., 1987). In many cases, the time period allocated for recruitment was extended, resulting in elevated recruitment costs as well as increased costs for the entire study (Hunninghake et al., 1987 and Valanis et al., 1998). Some studies have found it necessary to modify their eligibility criteria midway through the data collection phase to meet their enrollment goals, potentially impacting the generalizability or specificity of findings, while other studies have been terminated due to recruitment problems (Hunninghake et al., 1987).

Lack of a sufficient number of participants can negatively affect not only the length and cost of a study but can also impact statistical power if the sample size is reduced (Valanis et al., 1998). Difficulty with recruitment can create an uneven or excessive workload (Lovato et al., 1997) and may negatively impact staff morale (Valanis et al., 1998). These problems increase the probability that resources will have to be diverted to recruitment, thereby reducing availability for other study functions (Hunninghake et al., 1987). Problems with recruitment are ameliorated somewhat by offering easily accessible participation at flexible times and in locations convenient for the participant (Black and Smith, 1994 and Vollmer et al., 1991), and providing a tangible incentive (Black and Smith, 1994).

A number of strategies for recruiting individual participants have been evaluated in the literature. Some studies have found that direct mail campaigns were successful enough to become the sole method of recruitment (Connett et al., 1993), as they provided a consistently predictable

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number of inquiries and allowed for efficient management of resources (Garrett et al., 1999). Direct mail was also found to minimize the number of phone calls from ineligible participants since eligibility criteria was provided in writing, which reduced staff time spent screening (Garrett et al., 1999). Following up a direct mail letter with a phone call from the research staff provided a 5-fold increase in yield, further increasing the success of direct mail campaigns (Hunninghake et al., 1987).

Experiences of other clinical studies suggest that multiple recruitment strategies are necessary and should be planned for (Hunninghake, 1987). Studies with broad recruitment criteria have found success with newspaper advertisements (Garrett, 1999 and McIntosh et al., 2000). However, newspaper ads can cause logistical problems by generating a large number of responses immediately following the ad's placement, with a high proportion of those responses from ineligible people due to the limited information possible in an ad (Garrett et al., 1999). Other studies have had success with press releases, public service announcements sent to radio and television stations, and announcements to churches and other community groups (Zweben et al., 1994). Relying solely upon physician referrals, hospital records or clinical lab referrals to generate large numbers of participants has rarely been successful (Hunninghake et al., 1987). Word of mouth or referrals from study participants has often been found to be an unanticipated and valuable source of participants (Garrett et al., 1999 and McIntosh et al., 2000).

Although the literature is replete with effective strategies for recruiting individual participants, effective strategies for recruiting probands and their family members are lacking. In many family studies analyses are conducted based upon relationship pairs such as sibling or parent-child pairs. For these types of analyses, with the unit of interest the relative pair, it is important to evaluate the effectiveness of a recruitment strategy based on the family members generated by each strategy in addition to the number of completed participants per strategy. Issues surrounding research of stigmatized conditions have been explored in the literature (Westermeyer, 1989), but many of these studies were conducted within treatment populations and did not recruit from the general population (Penick et al., 1987). The aim of this study is to evaluate the effectiveness of a variety of strategies for recruiting affected probands and their family members, with particular interest in the recruitment of sibling pairs (with at least one affected sibling) and trios (one affected individual and both parents), for a condition that carries with it a social stigma.

The present study was conducted with data obtained by the UCSF Family Study, a nationwide study that has been recruiting alcoholic subjects and their family members for over six years. The goal of the UCSF Family Study was to collect a large number of small nuclear families, which included at least one affected (alcoholic) member, focusing on sibling pairs and two-parent one-child trios for genetic linkage analysis. To date, approximately 2200 individuals from 900 families have completed the study. The recruitment strategies used in the UCSF Family Study targeted both clinical and community populations, and alcoholics both currently drinking and in recovery. The source of recruitment for each proband was recorded during eligibility screening by asking participants where they heard about the study. The recruitment plan and budget allowed for piloting new recruitment strategies, evaluating them on an ongoing basis, abandoning strategies that proved ineffective, and expanding strategies that proved effective. Over the course of 2 years, several types of recruitment methods were piloted and analyzed for yield, cost and time effectiveness.

METHODS

UCSF Family Alcoholism Study Design

Individuals who reported meeting International Classification of Disease and Related Health Problems, 10th edition (ICD-10) (WHO, 1992) based screening criteria for alcoholism, either currently or in the past, and who had a sibling or both parents who also agreed to participate, were recruited as probands for an ongoing study investigating genes associated with alcoholism. Exclusion criteria included pre-existing or current severe psychiatric illness, a serious medical problem that would have been aggravated by study participation, past or current addiction to drugs other than nicotine or marijuana, history of injection drug use, or inability to complete study procedures due to nonfluency in English or cognitive impairment.

Participants responded by phone to a modified version of the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA) (Bucholz et al., 1994), which captured demographic information, medical and substance use history, and information used to make alcohol and other substance dependence diagnoses based on Statistical Manual of Mental Disorders, 4th edition (DSM-IV) (American Psychiatric Association, 1994) and ICD-10 (WHO, 1992) and other criteria. Additionally, the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) (Hathaway and McKinley, 1989) and questionnaires assessing temperament, novelty seeking, and emotion regulation, a blood sample for genetic analysis and informed consent was obtained from each participant. Family psychiatric and substance abuse history was obtained from each participant with a researcher-developed measure that consisted of constructing a family pedigree structure that included parents, grandparents, siblings and offspring. The participant was asked to comment on whether each relative experienced a past or current problem or never experienced a problem with alcohol, tobacco or other substances or experienced any mental illness, diagnosed or undiagnosed, and the nature of the condition. Relative contact information was obtained from the respondent at the conclusion of the interview. Relatives were contacted by mail with permission from the proband, and if they agreed to participate, completed the same study procedures. Relatives were enrolled regardless of previous addiction, and were only excluded if unable to complete study requirements.

Recruitment Strategies

Churches. Approximately three thousand churches were contacted with a letter of introduction and study flyers to distribute study information to their congregations.

Community Flyers. Approximately 500–800 flyers were posted in local areas by research staff and professional posting services, with an attempt to target AA meeting locations, recovery bookstores, and drinking establishments. Flyers included study information such as basic eligibility criteria and the study's toll-free number.

Conferences. Participation in five conferences of substance abuse treat-

ment professionals, counselors and of recovering alcoholics consisted of placing flyers on "take-one" tables, including brochures in registration packets, renting booth space in the exhibit halls, and presentations by principal investigators.

Direct Mail. A letter of invitation from the principal investigator personalized to the recipient on university letterhead was mailed to 92,000 people in 9 states during this two year period in installments of 10,000–13,000 letters at a time. The letter provided information about the background of the study, eligibility criteria, and participation requirements. The first 10,000 people contacted were selected from market research lists of those indicating that they purchased a certain amount of alcohol each year. A low response rate prompted a shift to market research-identified nicotine consumers aged 18 and older, which resulted in a higher response rate. In addition, privacy concerns expressed by direct mail recipients resulted in an amendment to the letter assuring recipients that they were one of 10,000 people in their area receiving the letter. Printing, envelope stuffing, and mailing were out-sourced to the university campus printing and mailing facilities. Re-mailings to the same individuals were not performed as past studies have found them to be ineffective (Valanis et al., 1998) and they could be considered intrusive. Follow-up phone calls were not performed due to human subjects protection committee prohibitions.

Internet. A web site was created by a study staff member that provided basic study information, eligibility criteria, and the study's toll free number and e-mail address. In addition, general information on genetics, alcoholism, and links to treatment and community groups were included. The web site was listed on major search engines and linked with numerous recovery, treatment, education and addiction resource web sites. A study announcement was also submitted to numerous online/e-mail newsletters. During this two-year period the study web site was accessed 14,399 times.

Mass Media. Mass media recruitment included methods that were not targeted specifically to the population being studied but instead were targeted to the larger population which encompasses the target group as a subgroup. These mass media methods focused on the San Francisco Bay Area and included the following: a full screen ad on 4 movie theater screens prior to movies for a 1 month period; a poster ad in the interior of 200 buses for three months; 400,000 ads placed in the restrooms of bars, restaurants, a major sports arena and major concert venues; 5000 customized matchbooks distributed to local liquor stores; an insert placed in a pack of coupons mailed to 100,000 households; 200,000 ads on the back of grocery receipts; and posters on the university campus shuttle buses for a one month period.

Personal Referrals. Participants were encouraged to recruit their family members, friends, and members of their self-help groups, a method which is sometimes referred to in the literature as "snowball sampling." Upon completion of the study, participants were mailed a thank you note along with study business cards to distribute. Additionally, a newsletter updating participants on study progress was sent to all completed participants and included a section asking participants to help recruit for the study by referring friends and colleagues by posting flyers in places where potential participants might see them, and by putting the study announcement in their community group newsletters.

Press Release. A one-page press release was designed with assistance from the University press office for release to newspapers and radio and television stations. The press release stated that a national study on the genetics of alcoholism was seeking participants, and provided a brief study background. The release was faxed to all commercial and public radio and television stations and all daily and weekly newspapers in 15 states. During this two-year period of evaluation press releases were faxed individually, however this later shifted to a more time effective process utilizing a mass faxing computer program.

Print Ads. A variety of print ads were placed in neighborhood, regional, and national newspapers and in alcoholism recovery newspapers. These were black and white ads that ranged in size from 3" x 4" to 4" x 6". Ads were placed in varying sections of the newspapers, including health, family, news, and clinical research sections.

Radio. Twenty-second radio advertisements on a local San Francisco radio station were run twice a day for a two-week period. Study investigators were interviewed on three syndicated radio shows that focused on alcoholism or recovery.

Recovery Agencies. A number of recovery organizations, including alcohol and drug councils and other community outreach and education agencies, provided mailing lists of their members, added our recruitment materials to their mailings, or distributed study materials to their clients.

Treatment Center Collaborations. Directors of hospital and community based treatment centers were contacted and asked to collaborate to the degree to which they felt comfortable: posting flyers in patient areas, allowing on-site recruitment or providing a letter of endorsement in a mass mailing to treatment center alumni. In return, principal investigators and study personnel offered staff training, computerization of records, educational information, and assistance with follow-up studies. A large, nationally known treatment center included our study information in their widely distributed newsletter on two separate occasions, allowed us a booth at their annual alumni conference, and distributed study information at alumni events.

Treatment Center Mass Mailings. Approximately 5000 treatment centers across the country were mailed study flyers and brochures with a letter asking the treatment center to post flyers in their client and waiting areas and to refer their clients to the study.

Table 1. Yield from recruitment methods

Method	No. of total respondents	% of total probands enrolled	% of eligible probands who completed	No. sibling pairs and trios generated per completed proband
Direct mail	570	34.0	54.6	1.28
Treatment center collaborations	220	56.8	70.4	1.20
Treatment center—mass mailing	173	32.9	56.1	0.63
Print ads	154	41.7	61.9	1.21
Press release	142	43.0	96.7	1.17
Personal referral	92	45.7	11.9	2.20
Internet	86	51.6	77.8	1.37
Unknown—couldn't remember	75	38.7	62.0	1.50
Mass media	66	34.8	52.2	2.25
Flyers—posted on the street	59	27.1	43.7	0.43
Recovery agencies	31	38.7	83.3	1.00
Radio	10	70.0	42.9	1.33
Conferences	9	66.7	66.6	1.75
Churches	9	22.2	50.0	0
All sources	1696	40.3	61.5	1.23

RESULTS

Effectiveness of recruitment strategies was assessed based on yield, cost and time. Yield of each strategy was assessed at three levels: 1) rate of enrolled probands, 2) rate of completed probands 3) number of sibling pairs and trios generated per completed proband. Only probands were actively recruited using the strategies discussed, and their family members by extension. However, sibling pair/trio yields are provided as a means of examining the effectiveness of a recruitment strategy for recruiting family members through the identified proband. Since the UCSF Family Study utilized sibling pairs and trios for purposes of linkage analysis and transmission disequilibrium tests, family member yields are presented as the number of sibling pairs and trios generated per proband per recruitment source. Yield results are presented in Table 1.

The number of responses per recruitment strategy was tracked. Direct mail generated the largest number of responses (570) followed by treatment center collaborations (220) and the press release (142). Conferences and churches provided the lowest number of responses (9 each). The utility of this measure is limited since the number of responses generated is a partial reflection of the number of solicitations distributed. However, calculating the rate was not possible for recruitment strategies other than direct mail. 92,000 direct mail solicitations yielded 570 responses for a 0.6% response rate. Response numbers are presented to provide context to the remaining analysis.

The rate of enrolled probands was calculated per recruitment strategy. This measure indicated the effectiveness of a strategy for generating an enrollment. Sources with high proband enrollment rates, and thus low levels of ineligible respondents, were desired. Probands who heard about the study on the radio had the highest enrollment rate (70.0%) followed by those who learned of the study through conferences (66.7%), collaborations with treatment centers (56.8%), and the Internet (51.6%). Churches had the lowest proband enrollment rate (22.2%). Flyers posted on the street and treatment center mass mailings also yielded a low proband enrollment rate (27.1% and 32.9% respectively). The average proband enrollment rate for all sources was 40.3%.

Rate of enrolled probands who completed the study was also calculated, reflecting the quality of the probands from each recruitment source. Recruitment strategies generating a high enrollment rate are not effective unless they produce probands who go on to complete the study. Strategies with the highest proband completion rate included the press release (96.7%), recovery agencies (83.3%), the Internet (77.8%) and treatment center collaborations (70.4%). Personal referral and radio provided the lowest proband completion rates (11.9% and 42.9% respectively). The average proband completion rate for all sources was 61.5%.

The number of sibling pairs and trios generated per completed proband was evaluated for each recruitment strategy. Mass media provided the highest number of sibling pairs/trios per completed proband (2.25) followed by personal referrals (2.25), conferences (1.75), the Internet (1.37) and radio (1.33). Probands generated from churches did not yield any sibling pairs/trios. Flyers posted on the street yielded a low number of sibling pairs/trios per completed proband (0.43) as did mass mailings to treatment centers (0.63). The average number of sibling pairs and/or trios generated per completed proband was 1.23.

Effectiveness of recruitment strategies was further assessed according to costs expended on recruitment related activities. Recruitment costs consisted of all costs directly related to recruiting participants and included postage costs, materials costs and fax phone call charges (with respect to the press release only). Reported recruitment costs did not include costs of staff time to perform recruitment work or overhead costs such as rental of space, phone charges and rental of copying and fax equipment. Cost and time expenditures are presented in Table 2. Recruitment cost was calculated as the cost per completed proband and as the cost per sibling pair or trio generated. Personal referral was generated by word of mouth, and thus was the least expensive strategy. Other cost effective strategies included: the Internet ($10.57 per completed proband and $7.71 per sibling pair/trio), flyers posted on the street ($14.29 per completed proband and $33.33 per sibling pair/trio), the press release ($40.68 per completed proband and $34.78 per sibling pair/trio) and recovery agencies ($44.80 per completed proband and $44.80 per sibling pair/trio). Churches were the least cost effective strategy due to the lack of response, costing $2565 to generate a completed proband. This source did not generate any sibling pairs/trios. Mass media was also not cost effective as it cost $1464.58 to generate a completed proband and $650.93 to generate a sibling pair/trio. The average cost to generate a completed proband was $236.15 and a sibling pair or trio was $192.22.

Table 2. Recruitment method cost and time expenditure

Method	Cost per completed proband (in dollars)	Cost per sibling pair/trio (in dollars)	Time spent per completed proband (in hours)	Time spent per sibling pair/trio (in hours)
Direct Mail	438.70	341.91	0.23	0.18
Treatment center collaborations	109.09	90.57	4.75	3.94
Treatment center—mass mailing	156.25	250.00	5.63	9.00
Print ads	339.00	281.45	8.92	7.40
Press release	40.68	34.78	19.53	16.70
Personal referral	0	0	0	0
Internet	10.57	7.71	4.0	2.92
Unknown—couldn't remember	–	–	–	–
Mass media	1464.58	650.93	42.92	19.07
Flyers—posted on the Street	14.29	33.33	35.71	83.33
Recovery agencies	44.80	44.80	14.60	14.6
Radio	333.33	250.00	3.33	2.5
Conferences	100.00	57.14	20.00	11.43
Churches	2565.00	–	110.00	–
Total average	236.15	192.22	7.62	6.20

Effectiveness of recruitment strategies was also assessed according to time expended on recruitment activity leading to the generation of a response. Recruitment time was a retrospective estimate of the amount of time expended preparing recruitment materials and distributing them, travel time associated with recruitment activities and time spent coordinating recruitment collaborations. Since the amount of time spent screening subjects was the same regardless of recruitment source, screening time was not included in the measure of recruitment time. Time expended on recruitment efforts was calculated as time spent to generate a completed proband and time spent to generate a sibling pair and trio. The most time effective strategy included personal referral, which did not require any recruitment time, direct mail (0.23 hr per completed proband and 0.18 hr per sibling pair/trio), radio (3.33 hr per com-

pleted proband and 2.5 hr per sibling pair/trio), and the Internet (4.0 hr per completed proband and 2.92 hr per completed sibling pair/trio). The least time effective strategy was churches, which took 110 hr to generate a completed proband and did not generate any sibling pairs/trios. Mass media and flyers posted on the street were also not time effective, taking 42.92 and 35.71 hr of effort, respectively, to generate a completed proband and 19.07 hr and 83.33 hr respectively, to generate a sibling pair/trio. The average time spent to generate a completed proband was 7.62 hr and 6.20 hr to generate a sibling pair or trio.

DISCUSSION

The recruitment experience of the UCSF Family Alcoholism Study has relevance for other clinical studies, particularly those that 1) require a large sample where a relatively substantial fraction of the target population can potentially participate, 2) collect highly sensitive information and/or medical specimens, 3) are studying a potentially stigmatizing condition or behavioral disorder, 4) are utilizing methods that for some are controversial (i.e., genetics), 5) require some level of subject follow-up rather than a single encounter, and/or 6) require ascertainment of family members or other collaterals of the index participant.

The UCSF Family Study evaluated the overall effectiveness of each recruitment strategy based on a composite of participant yield, cost and time effectiveness over a two-year pilot period. Yield of participants generated per source was assessed based on total number of respondents, proband enrollment rate, percentage of enrolled probands who completed, and number of completed sibling pairs and/or trios generated per proband. Relatives were not actively recruited with these strategies, but were ascertained through the completed proband. Sibling pair/trio numbers are presented to provide an indication of the efficacy of a strategy for yielding relatives through a proband. Ideally, number of responses generated per solicitation to participate would be assessed rather than total observed responses. However, it was not possible to estimate how many people saw ads or flyers, or heard radio ads, etc. For example, the number of flyers sent to treatment centers could be estimated, but it is questionable whether each was posted or distributed and to how many potential participants.

After evaluating the recruitment strategies utilized during the two-year pilot period, the UCSF Family Study elected to continue four of the recruitment strategies and to abandon others. Direct mail was selected as the primary recruitment strategy. The authors initially questioned its appropriateness for this project since the condition being studied directly affects only 10% of the population and carries with it a social stigma. However, direct mail consistently generated a good rate of completed probands and sibling pairs/trios. Response numbers were predictable, so magnitude of direct mail was easily manipulated to suit the needs of the study. This strategy was time effective since the bulk of the work was out-sourced. Copying, envelope stuffing, and mailing were completed by university campus facilities, making this a more expensive strategy. Direct mail would not have been an effective source if production was done in-house since the available staff and resources could not meet the demand of up to 13,000 letters being mailed at one time, nor could the volume be as easily manipulated according to workflow and recruitment number needs. Estimating the exact cost and time that would be required to prepare the direct mail in-house is not possible as it is dependent upon the equipment available.

The UCSF Family Study also elected to continue using press releases as a major recruitment strategy. The press release generated a high rate of completed probands and a high number of sibling pairs/trios. Press releases were found to be cost effective, with the majority of the costs due to fax/phone charges. The time expended to generate a completed proband and sibling pair and trio was high due to individual faxing to each media source. A bulk faxing computer program has been initiated since the pilot study, allowing hundreds of faxes to be sent simultaneously, significantly reducing the amount of time expended. In addition, the costs were reduced since faxing could be scheduled at night when phone rates are lower. It was not possible to predict whether a media source would run a release, when they would run it or how many responses would be generated. This inconsistency caused fluctuations in workflow. Larger media outlets were less likely to run a release, but resulted in a significantly greater number of responses, whereas smaller media outlets were more likely to run the release but resulted in fewer responses. Press releases were most often printed by newspapers and occasionally used in television news broadcasts. A study recruiting locally may find the press release less effective as local media sources could be quickly saturated.

The study elected to continue to utilize a web site (www.familystudies.org) to recruit probands. The web site allowed the study to reach a large number of people with a high level of interest and motivation since potential participants located the web site while searching for resources on alcoholism and addiction. The study announcement was published at no charge in numerous online/e-mail newsletters, which proved much more successful than purchasing advertising space on a search engine, an expensive strategy that yielded no responses. The web site generated a high rate of completed probands and sibling pairs/trios. However, the response rate was unpredictable. The highest number of responses were generated when a study announcement was featured on a major web site or when an announcement was featured in an e-mail newsletter. The inconsistent response rate was not voluminous enough to disrupt workflow. The web site was a time and cost effective strategy, with the bulk of time spent on initial design of the site by a study staff member and linking to other related sites. Costs were limited to the purchase of web design

software ($150) hosting of the site on the Internet ($240), and registering the site's domain name ($35/year). This cost can be reduced further if the web site is maintained on an existing internal server. The experience of this study indicated that the success of this strategy depended not only on registering the site with all major search engines, but also to linking the site to as many other sites as possible. It also allowed for brief study advertisements to direct potential participants to the web site for more information, where they could review study information in detail anonymously and at their convenience. In addition, printable flyers for recruitment were posted on the web site, along with educational information about the condition under study and links to other resources. The Internet may not be as effective for studies recruiting locally as only a limited number of people who see the web site will reside in the catchment area.

The study also elected to continue to form collaborations with treatment centers. Treatment center collaborations produced a good enrollment rate and good completion rate. Most of the probands were generated from a large nationally known treatment center with a large alumni base. Anecdotally, the authors found that the success of utilizing treatment centers to recruit participants depended heavily upon directors' attitudes toward research in general and their specific reaction to the aims and methods of our study. Treatment centers tended to respond more favorably when contacted by the principal investigator and when reciprocal contributions were offered to the treatment center, such as providing staff training, assistance with internal research projects, or financial sponsorship. Treatment center collaborations varied from posting flyers to providing a letter of support in alumni mailings. Many treatment centers declined to collaborate, citing lack of time or resources. Attempts to collaborate with hospital-based treatment centers were generally ineffective. These collaborations were time consuming to establish, often requiring several meetings and a significant amount of paperwork, and resulting in only passive collaboration. Overall, passive methods of treatment center recruitment such as posting flyers in waiting rooms were unsuccessful and were abandoned in favor of more systematic methods of contacting potential participants, such as mailings or including recruitment materials in discharge packets. These results suggest that forging strong relationships with one or two highly motivated treatment centers with large client bases could be a more efficient use of time and resources than targeting many smaller treatment centers who will only passively collaborate.

The UCSF Family Study discontinued the use of a number of recruitment sources piloted over the two-year period. However, these strategies could be effective for other studies with less stringent criteria, a limited recruitment budget or staff or requiring fewer enrollees. Radio, churches and conferences were discontinued due to the low number of responses each generated. Recovery organizations, though a targeted source, provided low response numbers and high time expenditure and thus, were abandoned. Mass media was also abandoned. Though mass media sources reached a large number of people, there was little or no response from most of these sources, which were expensive and time intensive. Print ads were abandoned as they were an expensive source that generated a low number of eligible respondents. Posting flyers on the street was an inexpensive recruitment strategy, but took a significant amount of staff time and often retrieved people who did not meet eligibility criteria, had difficulty completing the study, and rarely yielded family members. Treatment center mass mailings were also abandoned. These mailings were relatively inexpensive since the mailing list was located on the Internet free of charge. Costs incurred were limited to postage, letterhead, envelopes, and flyers. However, very few probands were enrolled and very few sibling pairs and trios were generated.

A recruitment source that is prominently missing from this evaluation is 12-step groups. Twelve-step groups with widespread meetings were contacted several times with requests to collaborate or post and distribute flyers. Due to their internal prohibitions regarding anonymity and nonaffiliation, the majority of 12-step groups were reluctant to participate in any way, even in the posting of flyers in meeting places.

This study has a number of limitations to generalizability. Differences in region or size of catchment areas may have an effect on both response rate and costs. Studies recruiting locally who utilize the sources suggested here might have different results. Different inclusion/exclusion criteria may also influence the generalizability our results. A study with broader recruitment criteria may find better success while a study with stricter criteria may find less success.

In retrospect, identifying the most effective strategies for recruitment could have been accelerated by piloting all of the available recruitment strategies more systematically during an earlier phase of the project. Additionally, logs of expended recruitment time would have greatly benefited an evaluation of time effectiveness. Ideally, these logs would distinguish recruitment time by level of staff required for particular tasks, i.e., a principal investigator's time for treatment center collaborations versus a research assistant's time for linking to web sites. Finally, tracking reasons for participant attrition, particularly by recruitment source, would have added important information about attrition vulnerabilities of recruitment sources and assisted with evaluation.

The socioeconomic characteristics of the proband recruited through each method revealed only modest differences in the income and education level of the proband based on recruitment source. The Internet generated probands with modestly higher income and education levels while direct mail generated probands with modestly lower income and education levels. In addition, treatment center collaborations, treatment center mass mailings and print ads all produced probands with modestly higher education

levels (data not shown). Ethnicity was not examined since the majority of the sample (>90%) was Caucasian. Examination of socioeconomic characteristics of probands generated per source in a larger sample may indicate further trends.

Anecdotally, the authors noted that many factors other than the recruitment strategies themselves seemed to affect the success of recruitment and should be further evaluated. Professional brochures and flyers seemed to increase response rates. Minimizing risks and making every effort to increase participant comfort and convenience seemed to positively affect enrollment rates, relative yield, and increase the likelihood of word-of-mouth or snowball sampling. Providing detailed inclusion/exclusion criteria in recruitment materials also seemed to increase enrollment rates among respondents. Capitalizing on motivating factors such as altruism and compensation seemed useful as well. A stair step compensation plan used by the UCSF Family Study, which rewarded participants who completed the study within a shorter time frame, appeared to motivate participants to complete study requirements in a timely manner. A response card allowing the participant to comment on his/her experience, provide suggestions for new recruitment strategies, and elaborate on their motivation for participating was helpful for recruitment planning. Additional strategies designed to increase family member enrollment, such as requiring agreement of relatives prior to proband enrollment merit further examination.

The UCSF Family Study found that developing and implementing a comprehensive recruitment plan was integral to the success of its recruitment of subjects. Tracking the source of each respondent by asking participants how they heard about the study allowed the study to evaluate the effectiveness of the source on an ongoing basis, and allowed for modification of the recruitment plan and associated budget to maximize recruitment effort.

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