Published in final edited form as:

Health Educ Behav. 2011 June ; 38(3): 293–300. doi:10.1177/1090198110372879.

Efficiency and cost effectiveness of recruitment methods for male Latino smokers

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Abstract

Background—Little is known about the most effective strategies to recruit male Latino smokers to cessation research studies. The purpose of this study was to identify efficient and cost effective research recruitment strategies for this priority population.

Methods—Male Latino smokers age 18 years or older were eligible. Five recruitment strategies were compared: two involved “proactive” face-to-face contact by research staff in formal or informal settings; three “reactive” strategies used mass media and flyers. Efficiency was based on the number of eligible men/number screened and the number enrolled/number screened. Incremental costs per added enrolled participant were calculated using micro-costing from a short-term, societal perspective. National data were used to estimate time costs exclusive of research and development.

Results—Over 11 months, 1006 men were screened, 363 (36%) were eligible, and 294 (81% of those eligible) were enrolled. Proactive recruitment yielded more enrollees than reactive recruitment (256 vs. 38) but individuals were less likely to be eligible (34.0% vs. 68.9%) and to enroll in the study (27.4% vs. 62.3%). Average cost per enrollee was more than ten times lower for proactive than reactive approaches (\$18 vs. \$193). Proactive recruitment in informal settings was comparable in efficiency to reactive approaches and had the lowest incremental costs per additional enrollee.

Discussion—This study suggests that approaching Latino smokers in informal community settings may be an efficient and cost-effective recruitment approach. These results are intended to guide tobacco researchers in recruiting male Latinos into smoking cessation trials in a cost effective and timely manner.

Keywords

recruitment; Latino; smoking cessation

INTRODUCTION

Historically, racial and ethnic minorities have been underrepresented in research (Durant et al., 2007; Kressin, Meterko, & Wilson, 2000; Murthy, Krumholz, & Gross, 2004; Ness, Nelson, Kumanyika, & Grisso, 1997). Following the NIH Revitalization Act of 1993 which mandated the inclusion of women and racial/ethnic minorities in research, greater attention has been given to recruitment of priority populations (Harris et al., 2003; Horowitz, Brenner, Lachapelle, Amara, & Arniella, 2009; Larkey, Ogden, Tenorio, & Ewell, 2008; Larson, Ferng, Wong-McLoughlin, & Wang, 2009; Marquez, Muhs, Tosomeen, Riggs, & Melton, 2003; Rhodes, Foley, Zometa, & Bloom, 2007; UyBico, Pavel, & Gross, 2007; Yancey,

Ortega, & Kumanyika, 2006). However, the majority of studies have been descriptive in nature, focused primarily on identifying barriers to trial participation (Larkey et al., 2008; Sheppard et al., 2005; Swanson & Ward, 1995; Yancey et al., 2006). Fewer studies have addressed the effectiveness of specific recruitment approaches, and the methodological rigor of recruitment research is variable (UyBico et al., 2007). In addition, many studies are not able to determine the unique contribution of specific recruitment strategies because they are implemented in tandem with other approaches, and data are not available about how the participant heard of the study (Larkey et al., 2008; UyBico et al., 2007). Given the state of the science, there have been numerous recent calls for more rigorous research focused on identifying efficient and cost effective strategies to recruit minorities to research studies (Durant et al., 2007; Larkey et al., 2008; Larson et al., 2009; Rhodes et al., 2007; UyBico et al., 2007; Yancey et al., 2006).

Recruitment research is of particular importance among Latinos. Latinos are the largest and fastest growing minority group in the United States, with a current population of 46 million (U.S. Census Bureau, 2008) projected to reach 102.6 million by 2050 (U.S. Census Bureau, 2006). Currently, 18% of Latino men smoke (Centers for Disease Control and Prevention, 2008b), which translates into approximately 2.8 million current smokers (U.S. Census Bureau, 2008). This number will increase to more than 9 million by 2050 if smoking rates remain unchecked. To reduce the public health burden associated with smoking among Latino men, smoking cessation treatment trials are needed (Backinger & O'Connell, 2007), the success of which hinges on the identification of effective recruitment strategies. Unfortunately, there are few analytical studies focused on testing hypotheses about the effectiveness of specific recruitment approaches for Latinos (Yancey et al., 2006) and none on the costs associated with recruitment.

The present study sought to compare the efficiency and cost effectiveness (Larkey et al., 2008) of five specific strategies in recruiting Latino male smokers to a research study. Two strategies were proactive and involved face-to-face community outreach by research staff in professional (e.g., government agencies, community based organizations) and informal (e.g., convenience stores, grocery stores, Latino community events) settings. Three strategies required the target audience to react to mass media (newspaper ads, radio ads, flyers) by calling a toll-free number to enroll. Based on previous recruitment research in other racial/ethnic minority groups (Harris et al., 2003; Larkey et al., 2008; Larson et al., 2009; Marquez et al., 2003; UyBico et al., 2007; Webb, Seigers, & Wood, 2009; Yancey et al., 2006), we hypothesized that reactive recruitment would be more efficient than proactive recruitment in terms of the proportion of screened individuals who were eligible and enrolled and would be more cost effective.

METHODS

This study was conducted through the Latin American Cancer Research Coalition (LACRC). Funded by the National Cancer Institute, the LACRC is a Community Network Program based in the metropolitan Washington, DC region. The study received human subject protections approval from the Georgetown University institutional review board.

Setting and Population

This study was conducted from December 2008 through October 2009 in a variety of settings, including professional organizations such as social services agencies and consulates, and informal settings such as grocery stores, markets, and churches. Males were eligible to participate in the study if they were Latino, currently smoking cigarettes, and over 18 years of age.

Data Collection

Each of the recruitment strategies indicated that the purpose of the study was to understand the smoking and quitting patterns among Latino men and that participation would involve completing a 20-minute survey about their smoking habit and related health behaviors. Recruitment information also indicated that participants who completed the survey would be compensated \$15 for their time.

Proactive Recruitment—Proactive recruitment strategies were tested before the three media-based reactive strategies in order to ensure that potential participants had not already heard about the study through other methods. Proactive recruitment was conducted in formal and informal settings. Formal settings included community based social service and grassroots organizations, consulates, and churches. Research staff obtained written support to conduct recruitment efforts on site from each organization, and information about the most desirable times and locations within each site to conduct recruitment. Of the 19 sites we approached, 11 sites agreed to participate; the remaining 8 organizations felt that their location would not be a fruitful place to locate male smokers. Two bilingual male research assistants were responsible for recruitment at the professional locations. Men who appeared to be Latino and age 18 or older were approached to determine their eligibility and interest in participating in the study. Eligible and interested men completed the survey in person.

For informal settings, a male from the Latino community was hired as part of the research team to serve as a lay recruiter. The informal locations targeted by the lay recruiter included convenience stores, supermarkets, and Latino community events. The lay recruiter approached men who appeared to be Latino and age 18 or older about participating in the study. In addition, the lay recruiter also approached men who he observed to be smoking in outdoor locations. Eligible and interested men completed the survey in person.

Reactive Recruitment—Reactive recruitment strategies were implemented following the conclusion of data collection for proactive recruitment. Reactive recruitment used three forms of media targeted to Latino men. First, a Spanish radio advertisement ran for three months on a popular syndicated Spanish language radio station. Also, two bilingual research staff members were interviewed by the radio host about smoking in Latinos and a toll-free study telephone number was provided at the end of the interview. Second, an advertisement ran for three months in the classified section of a free, local Spanish-language newspaper. Third, a flyer about the study written in both English and Spanish was distributed throughout the DC metropolitan area. Eligibility criteria and a toll-free study number were included in all reactive approaches.

Recruitment Costs

Costs included staff time and material costs of implementing each recruitment strategy, participant time, space, and overhead costs (Gold, Seigel, Russell, & Weinstein, 1996). Research and development costs were excluded because we are interested in the costs if these methods were disseminated. Specific costs are presented in Table 3. The United States Bureau of Labor Statistics 2008–2009 data (Bureau of Labor Statistics, 2008) were used to determine wage rates for staff and participants since this period was concurrent with the study. Staff-time costs were divided into three categories: travel time, time spent actively recruiting (i.e., distributing study materials in the field, interview at the radio station, or time spent at the newspaper agency), and time spent interviewing. Research staff time costs (\$17.42) were valued using wage rates for *survey researchers* and lay recruiter time costs (\$14.11) were valued using wage rates for *healthcare support workers, all others*. Participant time costs were divided into two categories: time spent being recruited, and time spent being interviewed and were valued using wage rates (\$12.01) for *Helpers, Construction Trades, all*

others. Material costs included the reproduction of study materials and advertisements. Space and overhead costs were excluded since: 1) no added space was used for the recruitment beyond existing research space, and 2) space requirements were constant across all recruitment approaches.

Measures

The primary outcome measures were the efficiency and cost-effectiveness for each of the five recruitment strategies. Eligibility efficiency was defined as the ratio of the number of eligible participants to the total number of individuals screened; enrollment efficiency was defined as the ratio of the number of participants enrolled to the number of participants screened. Cost metrics included the average cost per enrollee (total costs per recruitment strategy divided by the number of participants enrolled by that strategy) and incremental cost effectiveness (the added cost per enrollee of each strategy compared to the next least expensive approach).

To characterize the sample generated by each recruitment method, enrolled participants completed a 20-minute survey that assessed demographic characteristics, acculturation, current smoking and smoking history, and nicotine dependence. Participants could choose to complete the survey in English or Spanish. Existing Spanish-language scales and items were used. Translation of study materials followed recommended procedures (Brislin, 1970): materials were translated into Spanish by a native Spanish speaking staff member. The Spanish version was then back translated to English by two bilingual research staff. All materials and measures were pilot tested and revised prior to implementation.

Recruitment Method—Individuals who contacted the study via the toll-free telephone number (reactive recruitment) were asked how they had heard of the study. Research staff and the lay recruiter (proactive recruitment) documented the location for all recruited individuals.

Demographics—Age, race, education, marital status, employment status, birth place, and number of years living in the United States were measured using items from the 2007 Behavioral Risk Factor Surveillance System Spanish Language Survey (Centers for Disease Control and Prevention, 2008a).

Short Acculturation Scale for Hispanics (SASH) - Language Factor—The 4-item language scale from the SASH (Marín, Sabogal, Marín, Otero-Sabogal, & Pérez-Stable, 1987) measured acculturation. The four items assess the language in which participants read and speak, speak at home, think, and speak with friends (1=Only Spanish, 2=More Spanish than English, 3=Both Equally, 4=More English than Spanish, and 5=Only English). The language factor shows excellent reliability (Cronbach alpha=.92) and validity as a brief measure of acculturation (Marín et al., 1987). An average score of 2.99 or less differentiates less acculturated respondents.

Smoking variables—Respondents reported age of first smoking experience, number of smoking days per month, smoking rate, number of intentional quit attempts in the past year, desire to quit and confidence in quitting (1 = not at all, 10 = very much). The Fagerstrom Test for Nicotine Dependence (FTND) measured nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). Spanish language items were drawn from the Tobacco Use Supplement to the Current Population Survey (TUS-CPS; National Cancer Institute, 2005) and the 2007 Health Information National Trends Survey (HINTS; National Cancer Institute, 2008).

Statistical Analyses

Descriptive statistics for continuous variables and relative frequencies for categorical variables were used to summarize demographic, smoking, and acculturation variables on the enrolled sample. We compared participants recruited via proactive and reactive methods using Chi-Square for categorical variables and t-test for continuous variables. Welch's test was used for continuous variables with unequal variance.

To examine efficiency, we summarized the number and percentages of men who were eligible and enrolled among the total number screened. We also calculated the 95% confidence interval around each percentage using the binomial standard deviation formula. Odds ratios and confidence intervals were calculated to assess the effect of proactive vs. reactive recruitment on eligibility and enrollment. We also tested the significance of the association between proportions eligible and enrolled by recruitment strategy using the Chi Square test.

To examine cost effectiveness, the recruitment strategies were ranked based on the average recruitment cost per participant enrolled from the least to most expensive. We then calculated incremental cost-effectiveness ratios, where the additional costs of a recruitment strategy, divided by the added number of participants enrolled, are compared to the next least expensive recruitment strategy. Since the time horizon for the evaluation of recruit is short, costs and effects are not discounted. A strategy is considered "dominated" if it is less effective than the next least cost-effective approach and is more costly.

RESULTS

Participant Characteristics

During the study period, 1028 men were screened: 22 were missing mode of recruitment in the dataset and were excluded from further analysis, leaving 1006 men in the final analytic sample. Of those, 568 (56.5%) were ineligible, 75 (7.5%) were not interested in providing screening information, and 363 (36.1%) were eligible. Of the 363 eligible, 294 (81%) were enrolled into the study and completed the study assessment. Characteristics of enrolled participants are shown in Table 1. Notably, acculturation scores reflected a low level of acculturation ($M=1.6\pm0.7$): 95.2% of participants had a SASH score of 2.99 or lower. The majority of participants reported a household income of less than \$30,000 a year (63.4%) and less than a high school education (65.7%). The average smoking rate was 10 cigarettes a day ($SD=7.9$), and the average score on the FTND was 2.5 ($SD=2.2$) reflecting a low level of nicotine dependence.

Compared to those reactively recruited, participants recruited via proactive methods were more likely to have less than a high school education (71.9% vs. 23.7%, $p<.001$), to report annual household income of more than \$20,000 (61.3% vs. 37.8%, $p<.05$), higher daily cigarette consumption (10.3 ± 8.2 vs. 8.2 ± 5.4 , $p<.05$), but less frequent smoking (days per month: 23.0 ± 10.5 vs. 26.5 ± 7.9 , $p<.05$).

Recruitment Efficiency

As shown in Table 2, more participants were recruited using proactive approaches ($N=256$) than reactive approaches ($N=38$). However, both eligibility efficiency and enrollment efficiency were much lower using proactive than reactive strategies. Despite their small numbers, when individuals responded to the reactive recruitment by calling to participate, they were more likely to be eligible (68.9% vs. 34.0%; $OR=4.30$, 95% $CI= 2.46-7.51$) and more likely to enroll in the study (62.3% vs. 27.4%; $OR=4.45$, 95% $CI 2.56-7.61$) than those recruited via proactive approaches.

Within each approach, there were some differences in outcomes based on specific recruitment strategy. While eligibility and enrollment efficiency were comparable among all three reactive strategies, newspaper advertisements yielded the highest absolute number (N=25) of individuals screened and enrolled. Among proactive approaches, recruitment in informal settings yielded significantly higher eligibility (78.9% vs. 24%) and enrollment (60.8% vs. 19.6%) efficiency ratios than recruitment in formal settings.

Cost Effectiveness Results

Types of costs associated with each recruitment approach differed (Table 3). Proactive recruitment required the physical presence of a staff member at each recruitment site, resulting in high time costs. Reactive strategies required expenses such as purchasing radio and newspaper advertisements, as well as staff time distributing flyers, answering the toll-free line, and returning messages left by participants responding to flyers. In terms of average cost per enrollee by recruitment approach, reactive strategies were 10 times more expensive than proactive strategies (\$193 vs. \$18 per enrollee, respectively). The primary reason was that reactive recruitment via distribution of flyers was more expensive than the other strategies in terms of staff time and materials but yielded the fewest enrollees.

Proactive recruitment in informal community settings had the lowest incremental cost per additional participant enrolled (\$7 additional per eligible participant enrolled compared to the next least expensive approach), although all other strategies except using flyers had low added costs per added enrollee (Table 4). Flyers cost more than all other strategies but yielded fewer enrollees, so this strategy would not be considered.

DISCUSSION

To our knowledge, this is the first study to systematically test the efficiency and cost effectiveness of different strategies for recruiting Latino male smokers to a smoking research study. Overall, reactive recruitment approaches were more efficient than proactive approaches. However, in this population, reactive recruitment yielded significantly smaller numbers of participants and was ten times more costly per person enrolled than proactive approaches. Proactive recruitment by bilingual lay recruiters in informal community settings where smoking behavior could be directly observed yielded one third of the total recruited sample, high rates of both eligibility and enrollment efficiency, and the lowest incremental cost per added enrollee.

The greater efficiency of reactive strategies compared to proactive strategies is consistent with other research (Harris et al., 2003; Yancey et al., 2006). Motivated, eligible participants are able to self-select in response to reactive strategies. However, it is important to note that the majority of the effect in “driving down” the efficiency of proactive recruitment was largely due to the inefficiency of recruiting in formal settings. Face-to-face recruitment in informal locations where the lay recruiter could observe individuals smoking and approach them about participating (“interviewer selection bias”) is analogous to the self-selection in reactive recruitment; indeed, the eligibility and enrollment efficiency of proactive informal recruitment were comparable to reactive recruitment methods. To our knowledge, this informal recruitment approach has not been previously tested in other studies and represents a promising new strategy. Importantly, smokers were receptive to the lay recruiter as evidenced by the very high enrollment rate.

Despite the congruence of our overall results regarding the efficiency of reactive strategies with prior research, the quantitative yield was quite low. One explanation is that we were only able to conduct a limited media campaign (i.e., newspaper ads in only one paper once a week and a once daily public service announcement). Although ads ran for 12 weeks, it may

be that greater coverage and intensity are needed for reactive, media-based recruitment. In addition, many of the Latinos in this region are relatively new and undocumented immigrants who may be hesitant to call an unfamiliar telephone number.

This study was designed to address limitations in other recruitment research (Larkey et al., 2008). The study team was comprised of Latino researchers and staff, including a male lay recruiter from the target population. Few studies within Hispanic/Latino communities in the U.S. have involved men as lay recruiters and none specifically targeted Latino men as participants (Rhodes et al., 2007). In addition, recruitment efforts involved close partnerships with community agencies and materials were culturally relevant and language appropriate. The design of the study allowed us to determine the unique contribution of each recruitment approach in isolation and critical denominators were tracked to calculate both eligibility and enrollment efficiency. Finally, cost data were systematically recorded to enable cost effectiveness analysis.

Despite these strengths, two limitations should be considered in evaluating our results. First, the men recruited to this study reported low levels of education and acculturation and were mostly from Central America, reflecting the large Salvadoran population in the Washington, DC metropolitan area. Our results may not generalize to other Latino subgroups or to more acculturated Latino men. Second, our project team was bilingual and included several native Spanish speakers. This increased the cultural relevance and appropriateness of our materials and protocols, but it also meant we did not incur additional costs to acquire this expertise as reported in other studies (Marquez et al., 2003). Since there are no other comparable studies that we are aware of that evaluate the cost-effectiveness of recruitment strategies in this population, it is important to replicate our results in other settings and Latino populations.

In summary, we found that proactive recruitment of Latino male smokers in informal community settings where smoking behavior could be directly observed was the most cost-effective approach to increase enrollment. These results are a first step in developing future efficient and cost-effective recruitment approaches of Latino men to smoking cessation trials to reduce the prevalence and burden of smoking in this priority population.

Implications for Practitioners

Proactive recruitment by lay recruiters in informal settings is an efficient and cost effective approach to reach male Latino smokers. Participants were receptive to proactive outreach efforts by a gender- and ethnicity-matched recruiter. Future research should examine whether this approach is effective with other priority populations that are often underrepresented in smoking cessation studies. The methods used in this study can guide such efforts and add to the growing literature on how best to recruit racial and ethnic minorities to clinical research.

Acknowledgments

This research was funded by a grant from the National Cancer Institute (U01 CA 114593-03S3) as part of the Latin American Cancer Research Coalition (LACRC). This research was also supported by NCI grant 2K05CA096940 and the infrastructure from the Schroeder/Lombardi Cancer Control Consortium Memorandum of Understanding.

LACRC members include Stacey Banks, Larisa Caicedo, MA, Janet Cañar MD, MPH, Enrique Cobham, MBA, Michael Daliou, MA, Marguerite Duane, MD, MHA, Kirsten Edmiston, MD, Karol Espejo, Amanda Graham, PhD, Kristi Graves, PhD, Ronald Greger, MD, Margarita Gutierrez, Elmer Huerta, MD, MPH, Anna Maria Izquierdo-Porrera, MD, Barbara Kreling, PhD, MPH, Maria Lopez-Class, PhD, MPH, Gheorge Luta, PhD, Jeanne Mandelblatt, MD, MPH, Barbara Merritt, RN, Lilian Meza, Noel Mueller, MPH, Anne-Michelle Noone, MS, Donetta Padmore, Nancy Pallesen, MSW, Margarita Paredes, MD, Monique Perret-Gentil, MD, MS, Jyl Pomeroy, RN, Dino Ramzi MD, MPH, Christine Reesor, MSN, FNP, Yosselyn Rodriguez, Juan Romagoza, MD, Michael

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References

- Backinger CL, O'Connell ME. Developing consensus on tobacco control and research. *American Journal of Preventive Medicine*. 2007; 33(6 Suppl):S311–313. [PubMed: 18021904]
- Brislin RW. Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*. 1970; 1(3):185–216.
- Bureau of Labor Statistics. May 2008 National Industry-Specific Occupational Employment and Wage Estimates. 2008. Retrieved November 29, 2009, from <http://www.bls.gov/oes/current/oesosci.htm>
- Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System: 2007 Spanish Language Survey Questions. 2008a. Retrieved December 12, 2009, from <http://www.cdc.gov/brfss/questionnaires/pdf-ques/q2007span.pdf>
- Centers for Disease Control and Prevention. Cigarette smoking among adults--United States, 2007. *Morbidity and Mortality Weekly Reports*. 2008b; 57(45):1221–1226.
- Durant RW, Davis RB, St George DM, Williams IC, Blumenthal C, Corbie-Smith GM. Participation in research studies: factors associated with failing to meet minority recruitment goals. *Annals of Epidemiology*. 2007; 17(8):634–642. [PubMed: 17531504]
- Gold, M.; Seigel, J.; Russell, L.; Weinstein, M., editors. *Cost-Effectiveness in Health and Medicine*. New York, NY: Oxford University Press; 1996.
- Harris KJ, Ahluwalia JS, Catley D, Okuyemi KS, Mayo MS, Resnicow K. Successful recruitment of minorities into clinical trials: The Kick It at Swope project. *Nicotine and Tobacco Research*. 2003; 5(4):575–584. [PubMed: 12959796]
- Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. *British Journal of Addiction*. 1991; 86(9):1119–1127. [PubMed: 1932883]
- Horowitz CR, Brenner BL, Lachapelle S, Amara DA, Arniella G. Effective recruitment of minority populations through community-led strategies. *American Journal of Preventive Medicine*. 2009; 37(6 Suppl 1):S195–200. [PubMed: 19896019]
- Kressin NR, Meterko M, Wilson NJ. Racial disparities in participation in biomedical research. *Journal of the National Medical Association*. 2000; 92(2):62–69. [PubMed: 10800293]
- Larkey LK, Ogden SL, Tenorio S, Ewell T. Latino recruitment to cancer prevention/screening trials in the Southwest: setting a research agenda. *Applied Nursing Research*. 2008; 21(1):30–39. [PubMed: 18226761]
- Larson EL, Ferng YH, Wong-McLoughlin J, Wang S. Retention and protocol adherence of Hispanic volunteers in a longitudinal trial. *American Journal of Health Behavior*. 2009; 33(4):435–444. [PubMed: 19182988]
- Marín G, Sabogal F, Marín B, Otero-Sabogal F, Pérez-Stable E. Development of a short acculturation scale for Hispanics. *Hispanic Journal of Behavioral Sciences*. 1987; 9:183–205.
- Marquez MA, Muhs JM, Tosomeen A, Riggs BL, Melton LJ 3rd. Costs and strategies in minority recruitment for osteoporosis research. *Journal of Bone and Mineral Research*. 2003; 18(1):3–8. [PubMed: 12510799]
- Murthy VH, Krumholz HM, Gross CP. Participation in cancer clinical trials: race-, sex-, and age-based disparities. *Journal of the American Medical Association*. 2004; 291(22):2720–2726. [PubMed: 15187053]
- National Cancer Institute. 2003 Tobacco Supplement to the Current Population Survey, Spanish translation. 2005. Retrieved December 11, 2009, from http://riskfactor.cancer.gov/studies/tus-cps/translation/TUS_PAPI_Spanish-TRANS.pdf
- National Cancer Institute. Health Information National Trends Survey 2007 (HINTS 2007): Spanish Extended Interview Instrument - Field Version. 2008. Retrieved December 12, 2009, from [http://hints.cancer.gov/docs/HINTS%202007%20CATI%20Instrument%20\(Spanish\).pdf](http://hints.cancer.gov/docs/HINTS%202007%20CATI%20Instrument%20(Spanish).pdf)

- Ness RB, Nelson DB, Kumanyika SK, Grisso JA. Evaluating minority recruitment into clinical studies: how good are the data? *Annals of Epidemiology*. 1997; 7(7):472–478. [PubMed: 9349914]
- Rhodes SD, Foley KL, Zometa CS, Bloom FR. Lay health advisor interventions among Hispanics/Latinos: a qualitative systematic review. *American Journal of Preventive Medicine*. 2007; 33(5): 418–427. [PubMed: 17950408]
- Sheppard VB, Cox LS, Kanamori MJ, Canar J, Rodriguez Y, Goodman M, et al. Brief report: if you build it, they will come: methods for recruiting Latinos into cancer research. *Journal of General Internal Medicine*. 2005; 20(5):444–447. [PubMed: 15963169]
- Swanson GM, Ward AJ. Recruiting minorities into clinical trials: toward a participant-friendly system. *Journal of the National Cancer Institute*. 1995; 87(23):1747–1759. [PubMed: 7473831]
- U.S. Census Bureau. Facts for Features: Hispanic Heritage Month 2006: Sept. 15 – Oct. 15. 2006. Retrieved December 3, 2009, from <http://www.census.gov/Press-Release/www/2006/cb06ff-14.pdf>
- U.S. Census Bureau. The Hispanic Population in the United States: 2008 Detailed Tables. Washington, DC: U.S. Census Bureau; 2008. Retrieved December 2, 2009 from <http://www.census.gov/population/www/socdemo/hispanic/cps2008.html>
- UyBico SJ, Pavel S, Gross CP. Recruiting vulnerable populations into research: a systematic review of recruitment interventions. *Journal of General Internal Medicine*. 2007; 22(6):852–863. [PubMed: 17375358]
- Webb MS, Seigers D, Wood EA. Recruiting African American smokers into intervention research: Relationships between recruitment strategies and participant characteristics. *Research in Nursing and Health*. 2009; 32(1):86–95. [PubMed: 18767129]
- Yancey AK, Ortega AN, Kumanyika SK. Effective recruitment and retention of minority research participants. *Annual Review of Public Health*. 2006; 27:1–28.

Table 1

Characteristics of N=294 enrolled participants (% unless noted otherwise)

DEMOGRAPHICS	
Mean age (SD)	34.5 (11.9)
18–24	24.8
25–44	54.1
45+	21.1
Birth Place	
Mexico	19.5
Central America	63.8
South America	15.0
Caribbean	1.7
Mean # years in the US (SD)	10.3 (8.8)
Less than 5	32.0
5 to 10	34.7
More than 10	33.3
Mean acculturation score (SD)	1.6 (0.6)
Marital Status	
Single	55.8
Married or living as married	36.4
Divorced or separated	6.8
Widowed	1.0
Education	
Grade 8 or less	37.1
Grades 9–11	28.6
GED or Grade 12	21.1
College 1–3	9.5
College 4+	3.7
Employment	
Employed for wages	27.3
Self employed	30.0
Unemployed < 1 year	29.4
Unemployed > 1 year	9.2
Student	1.4
Unable to work	2.7
Income	
< \$20,000	42.1
\$20,000 to less than \$30,000	21.3
\$30,000 to less than \$40,000	15.0
\$40,000 or more	21.6
SMOKING VARIABLES	
Age of first puff, mean (SD)	16.3 (3.6)

DEMOGRAPHICS

Number smoking days per month, mean (SD)	23.4 (10.3)
Number cigarettes per day, mean (SD)	10.0 (7.9)
Number quit attempts past year, mean (SD)	2.5 (7.7)
Nicotine dependence, mean (SD)	2.5 (2.2)
Desire to quit, mean (SD)	7.5 (2.4)
Confidence in quitting, mean (SD)	7.3 (2.5)

Table 2

Eligibility and enrollment efficiency of specific recruitment methods.

	Number screened	Number eligible	Number enrolled	Eligibility ER ^a (95% CI)	Enrollment ER ^b (95% CI)
Proactive	945	321	256	34.0% (30.9 – 37.1)	27.4% (24.5 – 74.7)
Informal	171	135	104	78.9% (72.7 – 85.1)	60.8% (53.3 – 68.3)
Professional	774	186	152	24% (20.9 – 27.1)	19.6% (16.8 to 22.5)
Reactive	61	42	38	68.9% (57.1 – 80.8)	62.3% (68.5 – 56.1)
Flyer	10	7	7	70% (41.0 – 99.0)	70% (41.0 – 99.0)
Newspaper	42	29	25	69.0% (54.7 – 83.3)	59.5% (44.4 – 74.7)
Radio	9	6	6	66.6% (35.2 – 98.0)	66.6% (35.2 – 98.0)
Total	1006	363	294	36.1% (33.1 – 39.1)	29.2% (26.3 – 32.1)

^aER = eligibility efficiency ratio = number eligible divided by number screened.^bER = enrollment efficiency ratio = number enrolled divided by number screened.

CI = confidence interval

Table 3

Costs by recruitment approach.

	Proactive						Reactive					
	Informal Settings ^a			Formal Settings ^b			Radio ^c			Newspaper ^d		
	Time (hours)	Costs	Time (hours)	Time (hours)	Costs	Time (hours)	Time (hours)	Costs	Time (hours)	Time (hours)	Costs	Flyer ^e
STAFF TIME												
Travel	14.25	\$201.07	28.33		\$399.74	2		\$34.84	N/A		\$463.89	
Eligibility screening and consenting	20.98	\$296.03	65.1		\$918.56	4.85		\$84.49	4.85		\$84.49	
Interviewing	33.77	\$476.49	43.9		\$619.43	1.62		\$28.22	8.67		\$151.03	
Gas mileage (miles)	594.8	\$326.09	238.9		\$131.40	20.4		\$11.22	N/A		N/A	
RA ^f training	3	\$52.26	3		\$52.26	N/A		N/A	N/A		N/A	
Lay recruiter ^g training	3	\$42.33	3		\$42.33	N/A		N/A	N/A		N/A	
PARTICIPANT TIME^h												
Eligibility screening and consenting	2.85	\$34.23	13.23		\$158.89							
Interviewing	33.77	\$405.58	43.9		\$527.24	1.62		\$19.46	8.67		\$104.13	
MATERIALS												
Duplication cost ⁱ	N/A	N/A	N/A		N/A	N/A		N/A	N/A		N/A	
Radio ad	N/A	N/A	N/A		N/A	N/A		\$900	N/A		N/A	
Newspaper ad	N/A	N/A	N/A		N/A	N/A		N/A	N/A		\$936.00	
Total Cost		\$1834			\$2850			\$1078			\$1276	\$4971
Total # Enrollees	104		152			6			25			7
Average Cost Per Enrollee	\$18		\$19			\$180			\$51			\$710
Average Cost Per Enrollee by Recruitment Approach	\$18 per enrollee across proactive strategies			\$193 per enrollee across reactive strategies								

^aParticipants recruited from informal community settings (e.g., Cultural festivals, Supermarkets, 7–11 stores, Latino events)

^bParticipants recruited in formal settings (e.g., consulates, community based organizations)

^c30 second radio spot ran for 12 weeks on WACA 1540 AM-Radio America from 1PM to 2PM.

^dNewspaper advertisement ran for 12 weeks in the classified section of El Tiempo Latino (free daily newspaper)

^eFlyers distributed by research staff

^fUS average wages for *Survey Researchers*: \$17.42²⁰

^gUS average wages for *Healthcare Support Workers*: \$14.11²⁰

^hUS average wages for *Construction Trades*: \$12.01²⁰

ⁱPer page printing cost on 09/25/2008; HP Laser Jet 5M \$0.096 (Color); Work center 5675 Xerox Copy, \$0.06.

Table 4

Incremental Costs and Effects by Recruitment Strategy

Recruitment Strategy	Recruitment costs ^a	Incremental costs ^b	Effects: # Enrolled	Incremental Effects: # Enrolled	Incremental costs per # enrolled
Reactive: Radio	\$1078	--	6	--	Referent
Reactive: Newspaper	\$1276	\$198	25	19	\$10
Proactive: Informal Settings	\$1834	\$558	104	79	\$7
Proactive: Formal Settings	\$2850	\$986	152	48	\$21
Reactive: Flyer	\$4971	\$2121	7	--	Dominated ^c

^a Costs are rounded to the nearest dollar.

^b Incremental costs (and effects) are calculated as the difference between a less expensive strategy and the next most expensive alternative.

^c Dominated indicates that the recruitment strategy costs more and is less effective and therefore would not be considered a viable strategy.