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Title

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Permalink

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Journal

Clinical Trials, 11(2)

ISSN

1740-7745

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Publication Date

2014-04-01

DOI

10.1177/1740774513518849

Peer reviewed



Published in final edited form as:

Clin Trials. 2014 April ; 11(2): 167–177. doi:10.1177/1740774513518849.

Recruiting Chinese Americans into Cancer Screening Intervention Trials: Strategies and Outcomes

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Abstract

Background—Cancer is the leading cause of death among Asian Americans. While Asian Americans are the fastest growing minority population in the United States, they are under-represented in cancer research and report poor adherence to cancer screening guidelines.

Purpose—This study utilized data from two large randomized intervention trials to evaluate strategies to recruit first-generation Chinese American immigrants from community settings and Chinese American physician practices. Findings will inform effective strategies for promoting Asian American participation in cancer control research.

Methods—Chinese Americans who were nonadherent to annual mammography screening guidelines (Study 1 with 664 immigrant women >age 40) and to colorectal cancer screening guidelines (Study 2 with 455 immigrants >age 50) were enrolled from the greater Washington DC, New York City (NYC), and Philadelphia (PA) areas. Both studies trained bilingual staff to enroll Chinese-speaking participants with the aid of linguistically appropriate fliers and brochures to obtain consent. Study 1 adopted community approaches and worked with community organizations to enroll participants. Study 2 randomly selected potential participants through 24 Chinese American primary care physician offices, and mailed letters from physicians to enroll

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Disclaimer: This work was prepared while Dr. Wenchi Liang was employed at Georgetown University. The opinions expressed in this article are the author's own and do not reflect the view of the National Institutes of Health, the Department of Health and Human Services, or the United States government.

patients, followed by telephone calls from research staff. The success of recruitment approaches was assessed by yield rates based on number of participants approached, ineligible, and consented.

Results—Most participants (70%) of Study 1 were enrolled through in-person community approaches (e.g. Chinese schools, stores, health fairs, and personal networks). The final yield of specific venues differed widely (6% to 100%) due to various proportions of ineligible subjects (2% to 64%) and refusals (0% to 92%). The Study 2 recruitment approach (physician letter followed by telephone calls) had different outcomes in two geographic areas, partially due to differences in demographic characteristics in the DC and NYC/PA areas. The community approaches enrolled more recent immigrants and uninsured Chinese Americans than the physician and telephone call approach ($p < .001$). Enrollment cost is provided to inform future research studies.

Limitations—Our recruitment outcomes might not be generalizable to all Chinese Americans or other Asian American populations because they may vary by study protocols (e.g., length of trials), target populations (i.e., eligibility criteria), and available resources.

Conclusions—Use of multiple culturally relevant strategies (e.g., building trusting relationships through face-to-face enrollment, use of bilingual and bicultural staff, use of a physician letter, and employing linguistically appropriate materials) was crucial for successfully recruiting a large number of Chinese Americans in community and clinical settings. Our data demonstrates that substantial effort is required for recruitment; studies need to budget for this effort to ensure the inclusion of Asian Americans in health research.

Keywords

Randomized controlled trial; Chinese Americans; Minority enrollment; Community recruitment

Introduction

There are over 17 million Asian Americans in the United States (US) [1]. Although cancer is the leading cause of death among this group, adherence to clinical guidelines is poor [2–5]. For example, Asian Americans have lower breast and colorectal cancer screening rates than Whites [6;7]. Unfortunately, they are underrepresented in cancer control research, with participation rates ranging from zero to 9% [8–11]. Recruitment is one of the most difficult tasks in cancer-related trials and many research studies experience delays due to slow recruitment, particularly among minority populations [12;13]. Asian Americans have been described as one of the underrepresented and hard-to-reach populations [14].

Various approaches have been used to reach and enroll underrepresented minority populations [15–17]. For example, Keyzer JF et al. (2005) reported that community outreach that used ethnically and linguistically concordant recruiters and interviewers to visit community events and organizations was more effective in recruiting minority women for a cancer prevention study than social marketing via media (e.g., newspapers, radio, and/or bilingual flyers), which yielded few responses at a high cost [18]. However, UyBico SJ et al. (2007) documented that community outreach was the least effective in recruiting minority populations to participate in clinical research, relative to social marketing, healthcare system recruitment (e.g., recruitment by clinical providers and staff), and referrals from friends,

family, and participants [17]. Many of these studies enrolled African American and Latino populations [17], and few studies have tested whether these aforementioned strategies are effective for promoting Asian American participation in clinical research [19].

Culturally appropriate strategies to enroll minority and hard-to-reach populations need to build mutual trust to encourage participation, especially when a targeted disease is seen as stigmatizing [20]. A culturally sensitive strategy known as snowball sampling has been found to be effective in enrolling minority immigrant populations and HIV/AIDS patients [20;21]. This strategy identifies gatekeepers or trusted community members, and then builds upon their social networks to access hard-to-reach populations. Asian Americans often view cancer as a stigmatizing disease and a negative mark for family wellness [22;23], which may reduce their willingness to participate in cancer-related research.

In this paper, we utilize data from two large randomized controlled trials (RCT) to evaluate strategies to recruit Chinese Americans in community settings and in Chinese American primary care physician practices. These two trials adopted the various strategies (e.g., community outreach, social marketing, and trusted community members and clinicians) to enroll and consent participants. A large proportion of Chinese Americans (the largest Asian American subgroup in the US) are first-generation, Chinese-speaking immigrants (>76%) [1]. Asian Americans are projected to be the fastest growing immigrant population by 2050 [24], and methods to effectively recruit Asian American immigrants will be essential for including this population in health-related research. Based on our experience in these two trials, we provide recommendations for future recruitment efforts in this fast growing population.

Methods

The two trials tested different interventions to promote adherence to cancer screening guidelines (Study 1: mammography and Study 2: colorectal cancer-CRC screening) among Chinese Americans from two geographic areas: 1) greater Washington DC and 2) New York City and/or Philadelphia city (hereafter as referred to DC and NYC/PA areas). The Study 1 intervention focused on educating Chinese American immigrant women, whereas the Study 2 intervention educated Chinese American physicians and assessed screening outcomes among their patients. We adopted different approaches for the two trials to enroll first-generation Chinese American immigrants who were non-adherent to recommended screening guidelines (see Table 1). The mammography study (study 1) utilized various community venues (e.g., community outreach, social marketing, and referrals) to identify potentially eligible Chinese American women over 40 years of age. The CRC screening study (study 2) identified participants from the healthcare system (i.e., physicians' charts and electronic files). Patients 50 years of age and older were recruited through signed physician letters and telephone calls from trained bilingual research staff (hereafter labeled as a physician letter + telephone call approach). Because many Chinese immigrants (>48%) have limited English proficiency, all of our recruitment materials (including fliers, brochures, and consent forms) were provided in both English and Chinese. All participants spoke Chinese dialects (i.e., Mandarin, Cantonese, and Taiwanese) as their first language. All of the trained research staff and community recruiters in the two trials were first-

generation Chinese American immigrants. They introduced the trial and consented potential participants either face-to-face or via telephone. Both trials were approved by the Institutional Review Boards at the Georgetown University and Temple University (for study 2 only).

Recruitment through Community Venues (Study 1: Mammography Screening)

We used four community-based approaches and created recruitment fliers and brochures to assist our recruitment. The recruitment materials stated the study's purpose, eligibility criteria, procedures including risks, incentives, funding sources, and the recruiters' contact information. They were distributed through community-based approaches, such as in person recruitment (e.g., at community events), mailed to patients who requested them via telephone, or posted on ethnic media (e.g., Chinese newspapers). Only few women requested English materials (<2%).

The first approach was *in-person recruitment*. Through Chinese newspapers and word of mouth, we identified a variety of events in the Chinese American community and sought permission from the organizers to attend and briefly speak at the events to introduce our trial. At the events where we were unable to make a public announcement, we asked permission to directly approach potentially eligible women. Women who did not immediately decide to participate received a study brochure and a follow-up telephone call if they provided their contact information.

The second approach was *telephone recruitment* in which paid staff from our three collaborating community organizations in NYC helped call potentially eligible women to invite their participation. The third approach, called *referrals*, involved some lay women voluntarily referring their family members or friends to our staff, who called to enroll them via telephone. In the fourth approach, *ethnic media*, women responded to our recruitment fliers and news articles posted in Chinese newspapers, Asian restaurants, grocery stores, and the newsletters of local Chinese associations.

If eligible women agreed to participate in our study during a face-to-face encounter, we collected the consent form in person. If women were recruited via telephone, we obtained verbal consent prior to the telephone interview and mailed a stamped, self-addressed return envelope for the return of the signed consent form. Approximately 93% of all participants who completed the baseline interview returned a signed consent form. This community-based enrollment attempted to include new immigrants and uninsured Chinese American women who may not be able to access the mainstream healthcare system and consequently, are hard to reach [25;26].

Recruitment through Physician Offices (Study 2: CRC Screening)

Patients in Study 2 were recruited from Chinese American physicians in either community based solo or group practice in the study areas. We identified 40 physicians in the DC area and 69 physicians in the NYC/PA area through Chinese American physician directories, Yellow Pages, local newspaper advertisements, existing Asian Community Cancer networks (NCI funded, PI: Grace Ma), and the American Medical Association (AMA) master file. A

total of 24 Chinese-speaking primary care physicians (12 from DC and 12 from NYC/PA areas) with at least 200 Chinese American patients over the age of 50 participated. The following strategy was used to identify and recruit eligible patients from physicians' offices.

First, staff of the participating physicians identified age-eligible Chinese American patients from their database or billing records, using Chinese surnames. Second, we randomly selected about 40–150 age-appropriate patients per physician to contact and screen for eligibility. Third, we used a physician letter + telephone call approach to invite potentially eligible patients to participate in this trial. The dual language, one-page letter signed by the physician introduced the study purposes, benefits of participation, and its significance for the Chinese American community. We solicited each physician's feedback and approval for the letter before mailing it to their patients. About a week after mailing, trained bilingual research staff started calling these patients. During the calls, the staff first mentioned that their primary care physicians participated in this study and gave us their phone number, and then invited them to participate in the project. For patients who were hard to reach, clinical staff assisted in making phone calls.

Data Analysis

We report the number of people approached and the proportions that were ineligible, refused (sometimes before eligibility was determined), and enrolled for each community approach and for the two geographic areas of the approach through Chinese American physicians. Three different rates were computed to estimate the recruitment outcome: the *overall yield rate* - number of participants enrolled divided by the number of all people approached - is influenced both by the proportions that were ineligible and that refused, and indicates the overall yield from all recruitment efforts. The *modified yield rate* - number of participants enrolled divided by the number of potentially eligible patients (the number of approached minus the number of ineligible people), is higher than the overall yield rate because ineligible people are excluded. The *consent rate* is the number of participants enrolled divided by the number of people who were eligible to participate. In study 2, the modified yield rate is identical to the consent rate because the refusals were not screened for eligibility so that we conservatively assumed them all eligible. We calculated the 95% confidence limits for overall yield/modified yield/consent rate by using binomial proportions and standard error. We further compared demographic characteristics between participants from the two geographic areas and by study.

Although the two intervention trials were not designed to examine cost-effectiveness, we used payroll information (not taking into account annual inflation) to estimate the cost of our staff time for their efforts during the enrollment periods including total time spent for developing recruitment materials, traveling to the community events (Study 1) and physician offices (Study 2) for recruitment, making an introduction of the study, identifying and screening eligible participants, consenting of participants, and organizing enrollment data for follow-ups. For Study 2, we included the reimbursement for clinical staff's assistance in locating patient charts and medical electronic records to identify potential participants. Using these estimates, we computed the average dollar amount per screened participant (total number of approached people minus number of refusals). We excluded refusals

because they were not screened for eligibility and did not take much staff time. In addition, inclusion of refusals in the denominator would have artificially decreased the cost per screened participant. The cost estimate also excluded mileage expenses and stipends paid to participants. The cost estimate also excluded the time it took to administer the baseline survey with study participants, which occurred *after* the recruitment.

Results

Results of Community-Based Recruitment (Study 1)

Among 3,904 women approached, a total of 664 Chinese Immigrant women were enrolled from November 2006 to December 2009, for a modified yield rate of 34% (664/3904-1977), see Table 2). The majority of Chinese immigrant women were enrolled through various in-person community venues (70%, 466 out of 664 women). The telephone approach enrolled ~1% of the 664 participants and had the lowest modified yield rate (6%) since many women (92%) immediately refused after introducing this study. Although the modified yields were higher for ethnic media (84%) and referrals (79%), these strategies provided only 13% and 16% of all enrolled women, respectively.

The in-person approach in community venues such as health fairs and Chinese schools generated high modified yields (>36%), but more than 63% of the women approached were ineligible due to age or being adherent to the annual mammography screening guideline. Enrollment through Asian stores and businesses reached a large number of women who were eligible and yielded a good rate (40%) for participation. Community recruitment through personal networks and Asian community clinics was effective, although the number of women approached was much lower (range: 18–67) than at other community venues (>230). Many women approached at senior centers (43%) refused to participate.

Results of recruitment through physician offices (Study 2)

Among 1,409 Chinese American patients approached, 455 patients (231 from the DC site and 224 from the NYC/PA site) were enrolled from 24 Chinese American primary care physician offices from August 2008 to March 2011, for a modified yield of 55% (455/1409-587). The modified yield or consent rates varied widely among the 24 physician practices ranging from 24% to 100%, respectively (data not shown). Such differential rates were likely to be random without regards to the gender of participating physicians.

Although each study site achieved similar participant numbers by design, there were different consent rates between the two study sites (43% for DC and 80% for NYC/PA). This corresponded to higher proportions of ineligible (45%) and refusing (32%) women in the DC area than the NYC/PA area (30% and 12%, respectively, see Table 2). To explore potential reasons for these differences, we consulted the literature and compared the demographic characteristics of participants at the two study sites. First, two studies suggest that adherence to CRC screening guidelines among Chinese Americans is higher in the DC area (~57%) than in the NYC/PA area (~20%) [27;28], which may explain the higher proportion of ineligible patients in the DC area in this study. Second, Census data show that Chinese Americans living in the DC area have a higher level of education than those living

in the NY areas [29]. One study indicates that Chinese Americans with higher level of education are more likely to decline CRC screening due to lack of time [30]. This may explain the higher refusal rate in DC in this study. Demographic data from our two studies agree with this explanation. Chinese immigrants in the greater DC area were more likely to be college-educated than those in the NYC/PA area across the two intervention trials (both $p < .001$, see Table 3).

Demographic characteristics of participants

Demographic characteristics displayed in Table 3 showed that 44% of participants in Study 1 had resided in the US for 10 years or less, compared to 19% of participants in Study 2 ($p < .001$). Likewise, more Study 1 participants (65%) reported having low English proficiency than Study 2 participants (52%, $p < .001$). Study 1 had a significantly greater proportion of uninsured participants than Study 2 (41% and 10%, respectively, $p < .001$). In addition, due to the focus of Study 1 on mammography screening, Study 1 included only women, while Study 2 included both men and women.

Enrollment cost

For Study 1, the total direct cost to support staff salary and fringe benefits to recruit and screen for 2,960 potential participants (3,904 approached –944 refusals) was approximately \$66,600, resulting in \$22.50 per screened person. For Study 2, the cost per screened patient varied by site: \$24.90 in DC (671 screened in total) and \$15.00 in NYC/PA (371 screened in total). In both trials, at least one full-time employee (FTE) would be needed for patient enrollment across a 2-year study period, and it is possible to reduce staff effort to 0.5 FTE in the second year when the enrollment has decelerated.

Discussion

This paper presents detailed information on recruitment strategies through community venues and physicians that resulted in the enrollment of more than 1,100 Chinese Americans into two randomized intervention trials. Regardless of the specific recruitment method, both trials employed Chinese-speaking staff, linguistically appropriate recruitment materials, and partnerships with community organizations and/or Chinese American physicians to overcome commonly reported barriers (e.g., language barriers, lack of knowledge and distrust of research) to RCT enrollment among Asian Americans [31;32]. Participants enrolled through community and clinical settings and in different geographic areas differed with respect to demographic characteristics. Thus, one should refrain from directly comparing the yields of the recruitment approaches used in the two studies and from the two different sites.

Using culturally and linguistically appropriate materials and recruiters is essential to recruiting Asian Americans into clinical trials because over 74% of them are first-generation immigrants [1]. Specifically, Asian cultures tend to be more collectivist-oriented and stress interpersonal relationships [33]. Thus, meeting in person to build rapport or having personal relations and group membership with targeted audiences may increase the likelihood of success in recruitment into research studies. This type of snowball sampling method may

explain the overall success of the in person-recruitment strategies in Study 1, both in terms of numbers enrolled and the high consent rate, and the relatively high yield and high consent rates of referrals from family and friends who have been shown to be facilitators of Asian Americans' participation in research [32]. Maxwell (2005) showed that Filipino American women were more likely to participate in a cancer screening intervention program when they knew the person who invited them [34]. This also may explain why the physician letter + a telephone call approach in Study 2 had a high yield rate versus the telephone only approach in Study 1; the former had included a signed letter from patients' physicians, but the latter involved a "cold" telephone call from trained staff who had no specific relationship with potential participants. For immigrants to the US, a telephone call from a stranger is often viewed with suspicion, resulting in immediate refusal. On the other hand, Asian Americans generally hold physicians in high regard [35;36]. Therefore, we believe that the physician letter was an essential component of the Study 2 recruitment approach. Our results confirm that the telephone-only approach is not effective for recruiting ethnic minority or immigrant women [37], and that the inclusion of minority and community physicians is crucial for recruiting their minority patients into clinical trials [38]. Our consent rate in study 2 (55%) is similar to that of other research (42–46%) that uses the same approach to enroll English-speaking patients including minorities [39;40].

Some in-person recruitment strategies are more effective than others. For example, in study 1, recruitment venues through personal networks and Asian community clinics had the highest yield and consent rates followed by Chinese schools, Asian stores and business, and health fairs. The former two venues demanded less personnel time and effort to identify qualified people than the latter three. However, they contributed only few subjects to the total sample. At the latter three venues, recruiters were able to approach many women within a short time period, which helped us to reach our accrual goals. Another community-based approach--utilization of ethnic media (e.g., posting Chinese flyers and advertising)--also yielded a high rate of enrolling Chinese women to consent. Through these social marketing [17] or reactive recruitment strategies which do not take advantage of personal relations or lack dynamic interactions [41] and where participants must call the organizers of the study, only few Chinese people (less than 4% of total approached) responded, and they comprised approximately 13% (86 consented out of 664) of the enrolled sample. Although researchers have documented the effectiveness of social marketing strategies in recruiting vulnerable populations [17], we were not able to recruit many Chinese American women through this approach. Researchers should consider the yield and consent rates of each approach and the resources available in their geographic areas to decide on the most efficient community strategies for their specific study.

Our results support the argument that community-based recruitment strategies are able to reach a diverse sample, especially hard-to-reach and underserved people (e.g., recent immigrants and uninsured) [20;25]. Our results also show that Chinese Americans who reside in different geographic areas might have different characteristics such as education, acculturation, and sources of healthcare. For example, although participants in the DC area have higher educational levels, they are less likely to be insured, compared to participants in NYC/PA area. Therefore, recruiting Chinese American samples from different geographic areas may increase the external validity of study findings.

The cost of recruiting participants from different geographic regions can vary, depending on the size of populations and demographic composition of an area. Because the NYC/PA area has approximately fourfold more Chinese residents than the greater DC area[42], it may be a more efficient location to approach and enroll Chinese participants in a shorter timeframe with lower cost. We provided the cost per screened person in our studies as a reference for other researchers who need to budget recruitment efforts. However, recruitment outcomes among Chinese Americans and other populations depend on study protocols (e.g., required time commitment, length of trial, incentives, the type of disease etc.), the target population (e.g., age group, gender, acculturation status, eligibility criteria), and other factors (e.g., resources available for recruiting, support from community spokespersons, etc.) in addition to the recruitment strategies that are employed. All of these factors limit generalizability of our findings, including cost estimates.

Overall, multiple culturally appropriate strategies had to be employed for recruiting a large number of Chinese Americans in community settings and physicians' offices. Our experiences suggest that building a trusting relationship with populations often described as "hard-to-reach" is critical in sustaining community partnerships. Our study has indicated tangible ways to build trust, including the use of culturally appropriate recruitment materials and trained bilingual staff to deliver messages and bridge communication between researchers and underrepresented populations, similar to the recruitment model described for enrolling Latinos into cancer research [26]. Report of detailed recruitment outcomes such as ours, in different populations for a range of study protocols and using diverse recruitment strategies, may assist in optimizing recruitment strategies and venues for future studies. Our data demonstrates the substantial effort that is required for recruiting underrepresented minority and immigrant populations. Studies need to budget for this effort to ensure the inclusion of Asian Americans in health research.

Acknowledgements

The first study was supported by the American Cancer Society Mentored Research Grant (MRSMT-05-104-01-CPPB), Susan G. Komen for the Cure (POP0504327), National Cancer Institute (NCI, R03 CA117552) to Wang. The second study was supported by NCI R01 CA121023 to Liang and Wang and U54 CA153513 to Ma. We greatly appreciate our community partners: American Cancer Society Asian Initiative New York Division, Chinese American Nurse Association, Chinese Culture and Community Service Center, Asian Community Health Coalition, our participating Chinese American physicians for their support in participant enrollment, as well as the support of Georgetown University research team staff (including I-Jung Ma, Ai-ling Cowen, Grace Ji, Mei-yuh Chen, and Hsingchuan Hsieh) and Temple University Center for Asian Health research team staff in both Philadelphia and New York City Offices (including Richard Lee, Yin Tan, Ying Yuan, Jianwei Li, Mei Zhao, Dunli Wu, Xingjie Wang, and Kathy Zhou).

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Table 1

Description of Two Intervention Trial Protocols that Provided Recruitment Data

Study Title	Study Site/Setting	Eligibility Criteria	Recruitment Timeline	Intervention Protocol	Telephone Surveys	Study Outcome	Consent & Incentives
Study 1 Promoting Adherence to Mammography Use in Chinese Women	Community settings in two areas:	<ul style="list-style-type: none"> Chinese American Women > 40 years old 	November 2006 to December 2009	Women randomized to one of the 3-arm RCT:	<ul style="list-style-type: none"> Baseline (35–40 minutes) 	Receipt of a mammogram 6 months after intervention	<ul style="list-style-type: none"> Both written and verbal consent
	1 Greater Washington DC area including District of Columbia, Maryland, northern Virginia; and	<ul style="list-style-type: none"> No personal history of breast cancer 		1 Viewed a cultural video at home;	<ul style="list-style-type: none"> 2–4 weeks post-intervention (30 minutes) 	incentive: total \$35 gift cards for participants	<ul style="list-style-type: none"> Incentive: total \$35 gift cards for participants
	2 New York City	<ul style="list-style-type: none"> Non-adherent to the American Cancer Society annual mammography screening guideline[†] 		2 Viewed a generic video at home; or	<ul style="list-style-type: none"> 6-month post-intervention (~20 minutes) 		<ul style="list-style-type: none"> No HIPAA required.
Study 2 A Physician-based Trial to Increase Colorectal Cancer (CRC) Screening in Chinese Men and Women	Chinese American physicians' practices in 1) the Greater Washington DC area 2) Philadelphia and New York City areas	<ul style="list-style-type: none"> Chinese American men and women 50 years old and 75 years old. Active patients of participating Chinese-speaking physicians (Had a visit in the past 2 years). 	August 2008 to March 2011	Physicians randomized to one of the 2-arm RCT:	<ul style="list-style-type: none"> Baseline (20–30 minutes) 	Receipt of CRC screening 12 months after intervention	<ul style="list-style-type: none"> Verbal consent
		<ul style="list-style-type: none"> No personal or family history of CRC Non-adherent to the 2008 U.S. Preventive Services Task Force CRC screening guidelines[‡] 		1 Intervention arm where physicians received intervention materials and in-office training; or	<ul style="list-style-type: none"> 12-month post-intervention (20–30 minutes) 	<ul style="list-style-type: none"> Incentive: total \$30 gift cards for participants HIPAA (optional) 	
		<ul style="list-style-type: none"> Usual care arm 	2				

[†]American Cancer Society annual mammography screening guideline: Had not or never had a mammogram in the past 12 months at the time of enrollment

[‡]2008 U.S. Preventive Services Task Force CRC screening guidelines: Had not or never had a fecal occult blood test (FOBT) in the past 12 months, sigmoidoscopy in the past 5 years, and/or colonoscopy in the past 10 years at the time of enrollment.

Table 2

Results of Recruitment Strategies through Community Venues and Physicians' Offices

Community-Based Recruitment (Study 1: Mammography Screening)												
Recruitment Method	Total Approached		Ineligible		Refusal [‡]		Eligible		Consent Given	Overall Yield Rate (95% CI)	Modified Yield Rate (95% CI)	Consent Rate (95% CI)
	N	(%)	N	(%)	N	(%)	N	(%)				
In-Person Recruitment	3459	(55)	1895	(55)	802	(23)	762	(22)	466	0.13 (0.12, 0.15)	0.30 (0.28, 0.32)	0.61 (0.58, 0.65)
<i>Community/cultural events</i>	1180	(61)	715	(61)	326	(28)	139	(12)	72	0.06 (0.05, 0.08)	0.15 (0.12, 0.19)	0.52 (0.43, 0.60)
<i>Chinese health fairs</i>	601	(63)	381	(63)	99	(16)	121	(20)	80	0.13 (0.11, 0.16)	0.36 (0.30, 0.43)	0.66 (0.57, 0.74)
<i>Asian stores/business</i>	515	(36)	187	(36)	136	(26)	192	(37)	130	0.25 (0.22, 0.29)	0.40 (0.34, 0.45)	0.68 (0.61, 0.74)
<i>Chinese churches/temples</i>	440	(51)	223	(51)	93	(21)	124	(28)	52	0.12 (0.09, 0.15)	0.24 (0.18, 0.30)	0.42 (0.33, 0.51)
<i>Chinese schools</i>	399	(64)	257	(64)	46	(12)	96	(24)	68	0.17 (0.13, 0.21)	0.48 (0.39, 0.56)	0.71 (0.61, 0.80)
<i>Senior centers</i>	239	(41)	98	(41)	102	(43)	39	(16)	17	0.07 (0.04, 0.11)	0.12 (0.07, 0.19)	0.44 (0.28, 0.60)
[†] Personal network	67	(37)	25	(37)	0	(0)	42	(63)	38	0.57 (0.44, 0.69)	0.90 (0.77, 0.97)	0.90 (0.77, 0.97)
<i>Asian community clinics</i>	18	(50)	9	(50)	0	(0)	9	(50)	9	0.50 (0.26, 0.74)	1 (0.66, 1.00)	1 (0.66, 1.00)
Telephone Recruitment	131	(2)	2	(2)	121	(92)	8	(6)	8	0.06 (0.03, 0.12)	0.06 (0.03, 0.12)	1 (0.63, 1.00)
[‡] Referral	169	(22)	38	(22)	9	(5)	122	(72)	104	0.62 (0.54, 0.69)	0.79 (0.71, 0.86)	0.85 (0.78, 0.91)
Ethnic Media	145	(29)	42	(29)	12	(8)	91	(63)	86	0.59 (0.51, 0.67)	0.84 (0.75, 0.90)	0.95 (0.88, 0.98)
Total	3904	(51)	1977	(51)	944	(24)	983	(25)	664	0.17 (0.16, 0.18)	0.34 (0.32, 0.37)	0.68 (0.65, 0.70)
Recruitment through Physicians' Offices (Study 2: Colorectal Cancer Screening)												
Physician Letter + Telephone Recruitment	Total Approached		Ineligible		Refusal [‡]		*Eligible and Completed Baseline		Overall Yield Rate (95% CI)	Modified Yield Rate (95% CI)	‡Consent Rate (95% CI)	
	N	(%)	N	(%)	N	(%)	N					
Washington DC areas (12 practices)	982	(45)	440	(45)	311	(32)	231		0.24 (0.21, 0.26)	0.43 (0.38, 0.47)	0.43 (0.38, 0.47)	
NYC and PA areas (12 practices)	427	(30)	147	(30)	56	(12)	224		0.52 (0.48, 0.57)	0.80 (0.75, 0.85)	0.80 (0.75, 0.85)	
Total (24 practices)	1409	(33)	587	(33)	367	(21)	455		0.32 (0.30, 0.35)	0.55 (0.52, 0.59)	0.55 (0.52, 0.59)	

Note. Overall yield rate = number of participants enrolled divided by number of total approached; Modified yield rate = number of participants enrolled divided by number of potentially eligible participants (the number of approached minus the number of ineligible people); Consent rate = number of participants enrolled divided by number of eligible. NYC=New York City. PA= Philadelphia.

[†] Community members who were trained as a recruiter actively contacted and consented their family and friends on their own.

The clinics served low-income and uninsured patients.

^d Research staff contacted and consented women who were referred by their family and friends.

^e Having no interest in participation was the main reason for refusals (>80%), followed by being too busy, ill or other personal reasons.

* For Study 2, all patients who stayed on the phone to be screened as eligible would complete a baseline interview but the eligibility of refusals who immediately declined when called was unknown.

^f The consent rate of Study 2 was the same as the modified yield rate since this trial was not able to discern how many refusals were actually eligible, but not interested in participating.

Table 3
Demographic Characteristics of Study Samples from Metropolitan Washington DC and New York City/Pennsylvania areas

	Study 1 N=664			Study 2 N=455			P values between studies
	DC† n (%)	NYC‡ n (%)	P values between sites	DC† n (%)	NYC/PA‡ n (%)	P values between sites	
Gender	Male	0	--	106 (46%)	120 (54%)	.091	--
	Female	353 (100%)	311 (100%)	125 (54%)	103 (46%)		
Age	40–49	124 (35%)	.005			.168	--
	50–64	133 (38%)		--	--		
	65	96 (27%)		179 (77%)	161 (72%)		
Education	High school	115 (33%)	<.001	56 (24%)	128 (57%)	<.001	.571
	>High school	238 (67%)		174 (76%)	95 (43%)		
Marital status	Married	289 (82%)	<.001	157 (87%)	175 (98%)	.086	<.001
	Non-married	64 (18%)		23 (13%)	4 (2%)		
Employment	Yes	177 (50%)	.061	143 (62%)	128 (57%)	.300	.043
	No	175 (50%)		87 (38%)	95 (43%)		
Years in the U.S.	10 years	151 (43%)	.362	35 (15%)	51 (24%)	.015	<.001
	>10 years	202 (57%)		195 (85%)	165 (76%)		
*English proficiency	Low	218 (62%)	.038	93 (40%)	144 (64%)	<.001	<.001

	Study 1 N=664		Study 2 N=455		P values between studies
	DC [†] n (%)	NYC [‡] n (%)	DC [†] n (%)	NYC/PA [‡] n (%)	
	135 (38%)	95 (31%)	138 (60%)	80 (36%)	
Health insurance					
High					
Yes	198 (56%)	194 (62%)	200 (87%)	207 (93%)	.039
No	155 (44%)	117 (38%)	30 (13%)	16 (7%)	<.001
Physician recommendation for mammography or CRC screening					
Yes	134 (38%)	150 (48%)	133 (58%)	99 (46%)	.013
No	217 (62%)	161 (52%)	97 (42%)	116 (54%)	.003

* The two studies used the same questionnaire to measure English proficiency in listening, speaking, reading, and writing.

[†] DC denotes the greater DC areas including District of Columbia, Maryland, and Northern Virginia

[‡] NYC denotes New York City and PA is pertinent to Philadelphia.

Some column frequency did not add up to the sample size due to missing values.