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Can Financial Incentives Improve Research Representation: A Randomized Controlled Trial.

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Importance: Persons of diverse racial and ethnic backgrounds and low socioeconomic status are at high risk of dementia but are underrepresented in clinical trials. Financial incentives may improve research representation.

Objective: To evaluate the effect of financial incentives on enrollment of county health system patients into a brain health registry.

Design, setting, and participants: Patients ages 50 and older from a county health system serving primarily low-income patients were invited to enroll in the Alzheimer Prevention Trials (APT) Webstudy, an online registry aimed at accelerating enrollment into AD clinical trials.

Interventions: Patients were randomized 1:1:1 to an invitation message (arm 1), a message with a small ($25) enrollment incentive (arm 2), or a message with an enrollment incentive of entry into a $2,500 lottery with 1 in 100 odds of award (arm 3).

Main outcomes and measures: The primary outcome was enrollment, defined as APT Webstudy registration and completion of at least one of two remote cognitive assessments.

Results: 44,844 patients (14,945 in arm 1, 14,951 in arm 2, and 14,948 in arm 3) were invited to the APT Webstudy (mean [SD] age, 64.7 [10,1 years; 25,447 [56.8%] women; 53,126 [75.3%] Medicaid 25,024 [55.8%]; 11,347 [25.3% Hispanic/Latino; 12,109 [27%] Non-Hispanic White; 9,526 [21.2%] Non-Hispanic Asian; 6,044 [13.5%] Non-Hispanic Black). Participants randomized to the small $25 incentive were more likely to enroll than those in the message only arm (OR 1.39 [1.09-1.77] adj. p= 0.0158) while those randomized to the prize incentive arm were no more likely

to enroll than those in the message only arm (OR 1.08 [0.84-1.39] adj. p> 0.999). Patients randomized to the prize incentive were less likely to enroll than those randomized to the small incentive arm (OR 0.78 [0.61-0.98] p=0.0374). Secondary heterogeneity analyses indicated that patients of White race (OR 1.60 [1.1-2.2] p= 0.006) and male sex (OR 2.40 [1.55-3.75] p<0.001) were most responsive to the small $25 incentive relative to the message only.

Conclusions: Relative to message invitations, invitations with guaranteed, small financial incentives but not lottery incentives can increase enrollment of economically but not necessarily racially or ethnically diverse participants in clinical studies.

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Introduction

Women, older adults, individuals from communities of color, particularly Black and Latino persons, and individuals with lower socioeconomic status are historically underrepresented in clinical trials.[1,2] While progress in clinical trial representation has been made over the past several decades, representation of individuals from many marginalized groups remains low relative to their population and disease burden.[1] Adequate clinical trial representation among marginalized groups is important for multiple reasons, including strengthening the generalizability of findings, building trust in clinical trials and subsequent medical care, and promoting equitable access to the benefits (and costs) of novel clinical research.[3] The latter two goals are arguably of highest social value given that powering trials to generalize across sub-groups may be impractical and risks further slowing scientific progress.[3,4]

Black and Hispanic older adults in the United States are at increased risk for Alzheimer's disease (AD) and related dementias (AD/ADRD).[5] They face not only higher dementia incidence but also prevalence.[5-13] Despite this, Black and Hispanic older adults are underrepresented in AD clinical trials.[4,5,7,14,15] Underrepresentation in clinical trials for recent novel AD therapeutics, which can alter the disease course for appropriate patients, was particularly acute for Black patients.[16-20] This limitation has the potential to impact subsequent take-up of these novel AD therapeutics and exacerbate existing disparities in treatment and outcomes. Recent findings suggest that Black patients are more trusting of evidence to support the use of medications and providers are more willing to prescribe medications to Black patients if those medicines are tested in representative samples.[21] The projected increase in dementia over the next three decades among Black and Hispanic older adults further increases the importance of improving clinical trial representation.[22]

Reasons for underrepresentation in clinical trials are manifold and include differential access to care and delays in diagnosis, differential awareness and knowledge of clinical studies, differential trust in clinical research studies, differential access to clinical trial sites, and differential impact of trial inclusion and exclusion criteria.[1,4,16,23-26] While recruitment challenges are common across many disease areas, AD trials, which increasingly focus on early or even asymptomatic disease, face unique barriers, including a lengthy and costly screening process,

high screen failure rates, long follow-up times to establish changes in disease progression, and study partner or caregiver participation requirements.[16,26-28]

The US Food and Drug Administration's (FDA's) draft guidance on soon to be required diversity action plans for phase 3 clinical trials recommends several strategies for meeting enrollment goals, including increasing community engagement efforts, limiting study exclusion criteria, decentralizing study sites, and reimbursing participants for costs incurred.[29] Using payment incentives for participation is not discussed in the draft guidance for diversity action plans. However, in earlier guidance to investigators and institutional review boards on payment incentives, the FDA made clear that paying research subjects is a "common and acceptable practice" for recruiting research subjects.[30] The FDA advises, however, attention to the amount, timing and method of payments to limit the potential for coercion or undue influence.[30] Although prior work has debated what constitutes reasonable and ethical payment incentives, a clear consensus has not emerged to guide researchers.[31-37]

To add to the evidence on the potential for financial incentives to increase enrollment of diverse patients into clinical research, we conducted a stratified randomized controlled trial comparing the impact of email or text invitations sent with different financial incentives (small certain or a lottery incentive) relative to an invitation message alone on enrollment to a brain health registry that refers members to Alzheimer's Disease clinical trials when appropriate. We also conducted a back of the envelope calculation to compare the return on investment for each recruitment approach.

Methods

Study Design

The study used a single-blind, 3-arm parallel intention-to-treat design to compare the effect of invitation messages with a certain small financial incentive or a lottery incentive to a simple invitation without an inventive on enrollment into the APT Webstudy, an online registry of adults ages 50 and over who are routinely assessed for eligibility and recruitment into the Trial Ready Cohort for the Prevention of Alzheimer's Disease (TRC-PAD) and ultimately enrollment into early-stage Alzheimer's Disease trials.[38,39] Invitation messages were sent to adult patients ages 50 and over without documentation of dementia from Contra Costa Regional Medical Center (CCRMC), an integrated county health system that includes a hospital and nine outpatient health centers. Patients in the health system are primarily enrolled in the county Medicaid managed care program. The intervention was deployed between March 1 to April 16, 2024, with data collected through April 30, 2024.

Both the University of Southern California's Institutional Review Board and Contra Costa Health's Institutional Review Committee approved this study and provided a waiver of patient consent because (1) the trial was low risk as it simply encouraged patients to enroll in a registry and (2) it was impractical to obtain patient consent from nearly forty-five thousand patients. Individuals who enrolled in the APT Webstudy provided consent and HIPAA authorization through that study's separate approved protocol. All data used by the study team were deidentified. The trial protocol is provided in Supplement 1. This study followed the Consolidated Standards of Reporting Trials (CONSORT) reporting guideline.

Study Participants

Patients were eligible for the study if they were empaneled at CCRMC, were at least 50 years old, had not opted out of receiving health system messages, and did not have a diagnosis of dementia documented in the electronic medical record.

Randomization and Blinding

Patients were allocated 1:1:1 to study arms. The allocation sequence was generated using a stratified randomization sampling method by the biostatistics team at ATRI. Strata were based on age group (50-64, 65 and over), race and ethnic status (Latino (a)/Hispanic, White, Black, Asian, Other) and message modality (email, text). The research team was blinded to patients. Supplemental Table S1 provides evidence that the randomization was successful.

Intervention

Patients were randomized to receive one of three possible arms (Figure 1): (1) a message only arm that was sent a text or email message by the health system inviting patients to enroll in the Alzheimer Prevention Trial (APT) Webstudy (n=14,945), (2) a small financial incentive arm that was sent the same message but with the offer of a $25 incentive for enrolling in the APT Webstudy within a week of the message (n= 14,951) or (3) to a prize incentive arm that was sent the same message but with the offer of entry into a prize drawing for $2500 with a 1 in 100 odds of award for enrolling within a week of the message (n= 14,951). The simple invitation message served as an active control arm to assess the value of financial incentives. Patients in all arms were sent one message via email or text, depending on preferred method of communication. All messages briefly explained what the APT Webstudy is and that participation can contribute to knowledge about dementia. Messages were sent in English or Spanish based on a patient's language preference. Individuals who indicated a preferred language other than English or Spanish were sent the message in English. Message are provided in Supplement 2.

Data and Measures

The primary outcome was enrollment in the APT Webstudy within 2-weeks of messaging as documented by the APT Webstudy team. The 2-week timeframe was chosen based on work showing that shorter actionable windows are more effective in inducing action related to health care prevention.[40] APT Webstudy enrollment requires completion of study consent and HIPAA authorization, and at least one of two online cognitive assessments - the Cogstate Brief Battery, which is a cognitive performance test or the Cognitive Function Index, which is a series of 15 questions probing subjective concerns related to cognitive performance.[41,42] We also pre-specified two secondary outcomes – completion of both cognitive assessments and cost per enrollees.

APT Webstudy enrollment status was tracked via a unique URL embedded in each study invitation and shared by the APT Webstudy biostatistics team. All other data, including patient age, race and ethnicity, sex, preferred mode of communication, and preferred language came from the health system's electronic medical record.

Power Calculation

Power calculations were based on a two-sided chi-square test for detecting a difference between two proportions, assuming a type I error rate of 2.5% (to account for the two comparisons of interest). We assumed a sample size of 11,000 participants in each group (33,000 overall), and an

enrollment rate of 2% in the active control arm, which would have given us 90% power to detect an absolute difference of 0.721% (an enrollment rate of 2.721%) in either of the two financial incentive groups. In practice, we had larger sample sizes (roughly 15,000 per arm) and a much lower control group enrollment rate of 0.78%. Assuming a type I error rate of 2.5% and standard power of 80%, we would be able to detect an absolute difference of 0.35% (an enrollment rate of 1.13%) in either of the two financial incentive groups.

Statistical Analysis

As pre-specified, our primary analysis focused on enrollment into the APT Webstudy comparing our intervention arms (small incentive or prize incentive relative to the message only active control arm). Our analysis used multivariate logistic regression models controlling for stratification variables – age group (50-64, 65 and over), race and ethnic status (Latino (a)/Hispanic, White, Black, Asian, Other) and message modality (email, SMS). In secondary analysis using the same model, we also assessed whether the impact of enrollment differed across financial incentive arms (prize incentive relative to small incentive). We estimated robust standard errors and reported results as odds ratios with corresponding two-sided 95% confidence intervals.

As a secondary objective, we tested the null hypothesis that the prize incentive and the small incentive arm impacts were the same. We also conducted secondary analyses that fit separate logistic regression models by sub-group. We considered sub-groups defined by our stratification variables as well as based on sex and insurance type. We also conducted secondary analysis of completion of both cognitive assessments.

For the primary analysis comparing each of the intervention arms to the active control arm in the full sample, a significance level of $p < 0.025$ was used to address multiple hypothesis testing. We did not correct for multiple hypothesis testing in the secondary analyses. All statistical analyses were performed using Stata 18.

Results

Patient Characteristics

A total of 44,484 patients (mean [SD] age, 64.6 [10.1]) were included in the study (Figure 1). Across all patients, 21.2% [9,526] self-identified as Asian, 13.5% [6,044] as Black, 25.3% [11,347] as Hispanic/Latino(a), 27% [12,109] as non-Hispanic White, and 13.0% [5,818] who self-identified as multi-racial, another race, or declined to provide the heath system with the relevant race or ethnicity information. We classified this last group as "Other" race/ethnicity. Most patients had email such that 60.6% [27,155] were invited to the APT Webstudy by email and 39.5% [17,689] by text. The majority of patients were female 56.8% [25,447] and had Medicaid (55.8%, [25,044]) as their primary insurance, with Medicare accounting for the next most common primary payer (28.1% [12,590]). Nearly 1 in 5 patients (19.7%, [8813]) indicated that their preferred language for communication with the health system was Spanish.

Main Analysis

Figure 2 shows APT Webstudy enrollment rates by study arm. Enrollment in the APT Webstudy was low. In the active control arm, only 0.78% of patients who were messaged enrolled, meaning they registered for the study and completed at least one of two cognitive assessments (Figure 2).

Enrollment in the small incentive arm was about 40% higher than the active control arm, at 1.1% (adjusted P=0.008), while enrollment in the prize incentive arm was similar to the active control arm at 0.86 (adjusted P>0.999).

These basic patterns were borne out in the logistic regression models, irrespective of whether we adjusted for stratification variables and using a significance level of p<0.025 to address multiple hypothesis (Table 2). Odds of enrollment in the APT Webstudy was systematically higher for patients in the small incentive arm than in the message only arm, adjusted OR 1.39 (95% CI: 1.1, 1.8), (P=0.008). In contrast, the odds of enrollment was neither statistically different nor meaningfully different in magnitude in the prize incentive relative to the message only arm, OR 1.08 (95% CI: 0.8, 1.4), (P>0.559).

Secondary Analysis

We tested the whether the prize incentive and the small incentive arm impacts were the same (Appendix Table 1). In contrast to our hypothesis that the prize incentive would be more effective at increasing enrollment than the small incentive, the odds of enrollment was systematically lower in the prize incentive, OR 0.78 (95% CI: 0.62, 0.99), (P=0.037).

We also estimated models by sub-group. Of prime consideration were estimates by race and ethnicity group. Odds ratios from logistics regression models estimated by race and ethnicity are reported in Table 2 and plotted in Figure 3. Adjusted models control for age-group and message type. Only among White patients can we reject that the impact of the small incentive arm is the same as the message only arm, adjusted OR 1.61 (95% CI: 1.1, 02.2), (P=0.006). For all other race and ethnicity groups, the small incentive arm is statistically indistinguishable from the message only arm and, with the exception of patients who identify as Asian, OR 1.88 (95% CI: 0.8, 4.4), (P=0.15), the magnitude of the odds ratios are close to 1. Like the full sample results, the impact of the prize incentive arm is never distinguishable from the message only arm.

Odds ratios for models by the two other stratification variables – age group and message type – and two other covariates of interest – sex and primary insurance – are reported in Appendix Table 2 and plotted in Appendix Figure 1). The odds of enrollment in the small incentive arm was higher than in the message arm for patients across both message modalities, email 1.31 (95% CI: 1.0, 1.7) (P=0.046) and text 1.83 (95% CI: 1.0, 3.3), (P=0.046) as well as for patients ages 50-64 1.52 (95% CI: 1.1, 2.1) (P=0.06) but not for patients ages 65 and over 1.17 (95% CI: 1.1, 2.1) (P=0.47). Across sex and primary insurance sub-groups, the most notable patterns were that the odds of enrollment in the small incentive arm was higher than in the message arm for patients for men, 2.41 (95% CI: 1.55, 3.75) (P<0.001) and for patients with Medicaid as the primary payer, 1.54 (95% CI: 1.11, 2.13) (P=0.010). Across none of the sub-groups was the prize incentive statistically distinguishable from the message only arm.

Appendix Table 3 shows odds ratios for completion of both cognitive screeners, the CFI and the CogState, for the full sample and by sub-groups. Similar to the findings for enrollment, the odds of completion of both screeners is higher for those in the small incentive relative to the message only incentive, 1.82 (95% CI: 1.2, 2.8) (P=0.007) while the odds for the prize incentive arm is statistically indistinguishable to the odds for the message only arm. The higher odds for the small incentive arm are most pronounced for patients who are male 3.41 (95% CI: 1.55, 7.49) (P=0.002) and patients whose primary insurance is through Medicaid 3.39 (95% CI: 1.54, 7.46) (P=0.002).

Discussion

Increasing the diversity of participants in clinical trials and clinical research more generally is a social imperative, underscored by evolving policy changes at FDA. Rigorous evidence on how to cost-effectively increase diversity is limited. In this work, we endeavored to recruit a racially and ethnically diverse group of primarily low socioeconomic status patients from a county health system to a brain health registry, the APT Webstudy, that serves as a connector to clinical trials.

Consistent with other messaging studies (cites??), we found that enrollment into the registry was low. Relative to a message alone, however, a small, guaranteed $25 incentive increased enrollment by almost 40%. In contrast, a lottery incentive did not increase enrollment, even though insights from behavioral economics suggest that they may work better than guaranteed fixed payments with the same expected value.[43,44] This finding is, however, consistent with findings from a scoping review of financial incentives for trial recruitment and retention.[45]

Importantly, although the $25 incentive increased enrollment more than a simple message, the message alone was more cost-effective. Assuming the marginal cost of an email is 0 and the cost of a text is about 1 cent per message, it cost just under $1 to recruit an additional person in the message only arm but $26 per person in each of the incentive arms. Furthermore, small incentives did not increase enrollment of low-income Black or Hispanic participants relative to the message alone. Rather the impact of the small incentive was clearest for White patients, male patients, and patients who had Medicaid as their primary source of insurance. One reason for the differences by race and ethnicity may be due to the form of payment. Incentives were paid by the health system in the form of Amazon e-gift cards. Although the health system has paid out other incentives in this form and over 90% of Americans have used Amazon in the past, some data suggest that older adults from communities of color may be less likely to have Amazon accounts or otherwise use the platform

Our study has several limitations. First, as mentioned above, payments were made via Amazon gift cards and not everyone may have an Amazon account or value Amazon gift cards equally. Second, due to telecommunications regulations, we were limited in using terms like “dollar” and symbols like $ in our messages, which made it harder to communicate about the incentives. Third, the health system, like many health systems, worried about “over-messaging” patients so limited the campaign to one message. These issues limited the potential impact of our incentives and suggest that our campaign could have had bigger impacts if, for example, we could have sent multiple messages. Despite these limitations, our study had several important strengths, including the use of a large, pragmatic RCT in a low-income and racially and ethnically diverse health system, the comparison of messages to two different types of financial incentives, the use of both English and Spanish messages, and the tracking of actual research enrollment behavior rather than simply intentions.

Conclusions

In this large pragmatic randomized trial in an integrated county health system, we found that small, certain financial incentives but not lottery incentives increased enrollment of economically diverse participants into a brain health registry. Nonetheless, a message alone is a more cost-

effective and scalable approach to enrolling diverse patients if studies can partner with communities willing to receive invitations.

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Concept and design: Jacobson, Molina-Henry, Chang,

Acquisition, analysis, or interpretation of data: Chang and Jacobson.

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Figure 1. Study Flow Diagram

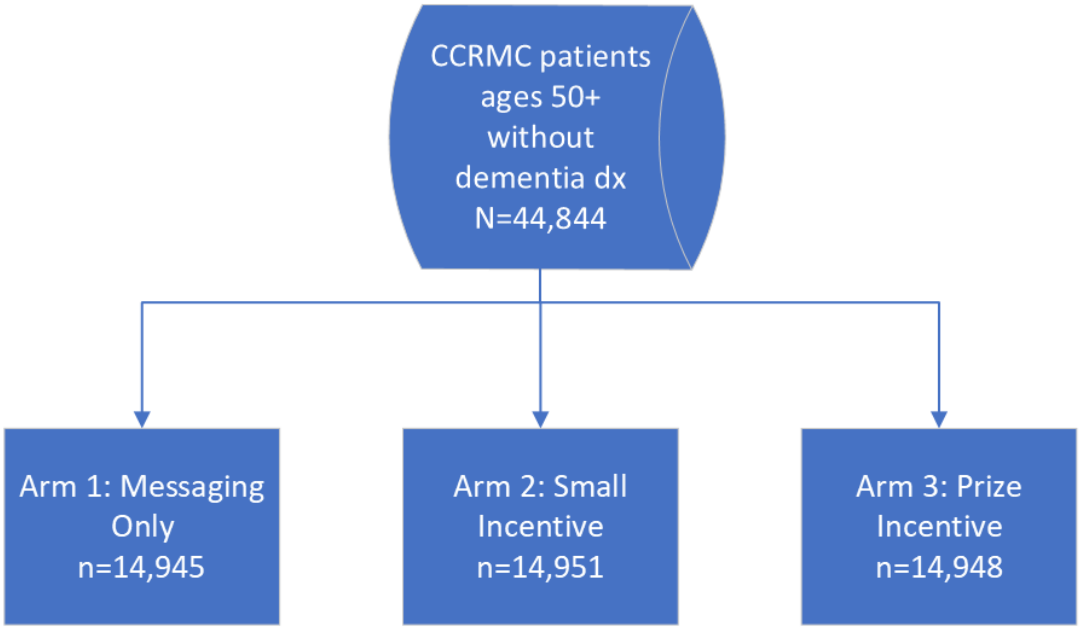


Figure 2. Enrollment Rates by Study Arm

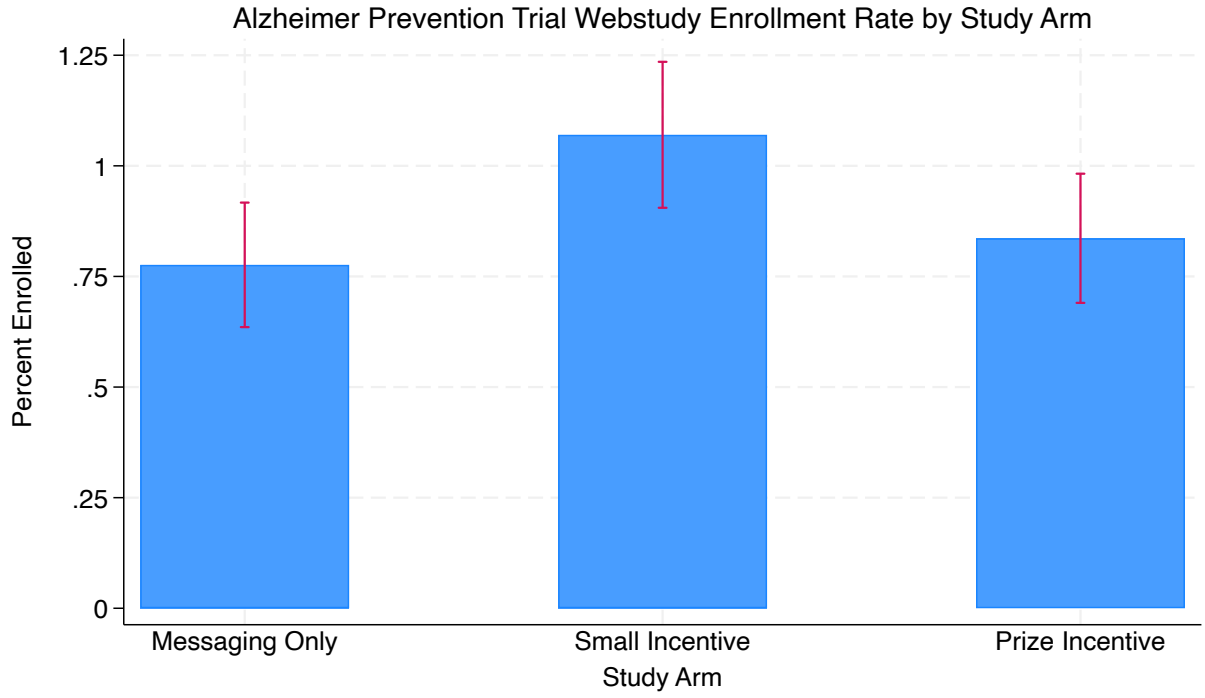


Figure 3: Odds Ratios from Models Estimated by Race and Ethnicity Groups

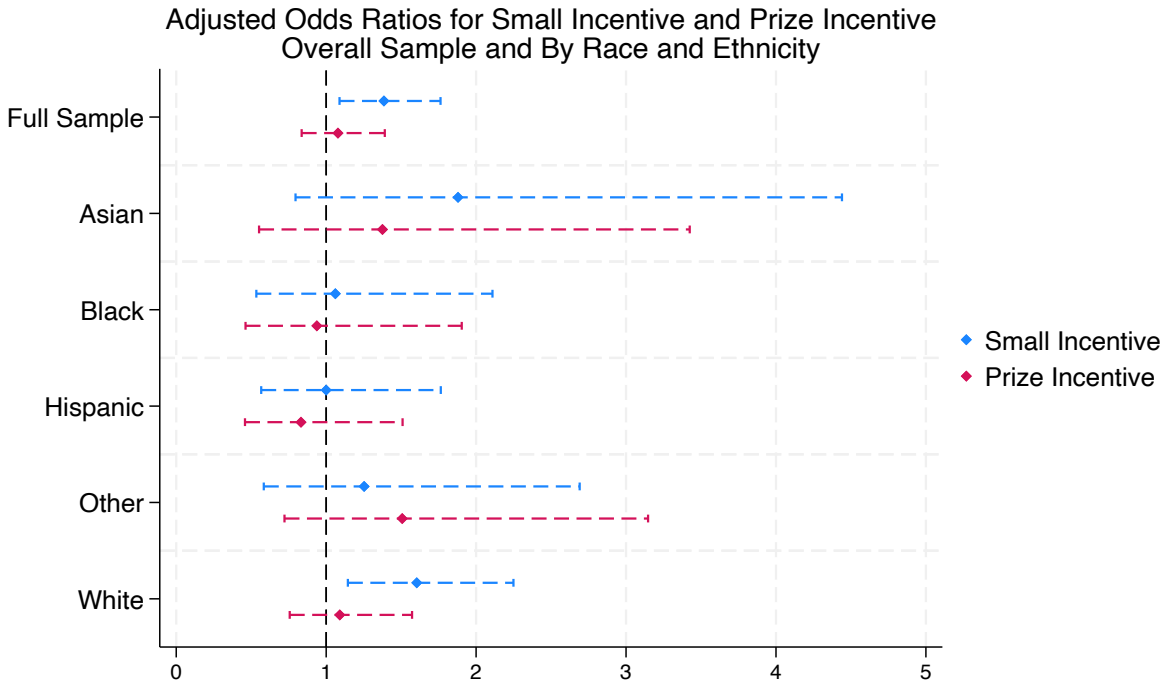


Table 1. Baseline Characteristics by Study Arm

	Message Only		Small Incentive		Prize Incentive		Overall	
Age in Years N (sd)	64.68	(10.13)	64.70	(10.07)	64.64	(10.10)	64.67	(10.10)
Age Group N (%)								
50-64 years old	8180	(54.73)	8184	(54.74)	8182	(54.74)	24546	(54.74)
65 years and over	6765	(45.27)	6767	(45.26)	6766	(45.26)	20298	(45.26)
Race and Ethnicity N (%)								
Asian, non-Hispanic	3174	(21.24)	3176	(21.24)	3176	(21.25)	9526	(21.24)
Black, non-Hispanic	2014	(13.48)	2017	(13.49)	2013	(13.47)	6044	(13.48)
Hispanic/Latino(a)	3782	(25.31)	3782	(25.30)	3783	(25.31)	11347	(25.30)
White, non-Hispanic	4036	(27.01)	4037	(27.00)	4036	(27.00)	12109	(27.00)
Other, non-Hispanic	1939	(12.97)	1939	(12.97)	1940	(12.98)	5818	(12.97)
Message Modality N (%)								
SMS	5894	(39.44)	5898	(39.45)	5897	(39.45)	17689	(39.45)
Email	9051	(60.56)	9053	(60.55)	9051	(60.55)	27155	(60.55)
Sex N (%)								
Female	8490	(56.81)	8409	(56.24)	8548	(57.18)	25447	(56.75)
Male	6455	(43.19)	6542	(43.76)	6400	(42.82)	19397	(43.25)
Message Language N (%)								
English	11983	(80.18)	12007	(80.31)	12041	(80.55)	36031	(80.35)
Spanish	2962	(19.82)	2944	(19.69)	2907	(19.45)	8813	(19.65)
Primary Insurance N (%)								
Medi-Cal	8317	(55.65)	8377	(56.03)	8330	(55.73)	25024	(55.80)
Medicare	4194	(28.06)	4242	(28.37)	4154	(27.79)	12590	(28.08)
Commercial	925	(6.19)	885	(5.92)	899	(6.01)	2709	(6.04)
Other	1509	(10.10)	1447	(9.68)	1565	(10.47)	4521	(10.08)

Table 2. Odds Ratio for Enrollment in the APT Webstudy Overall and by Strata Variables

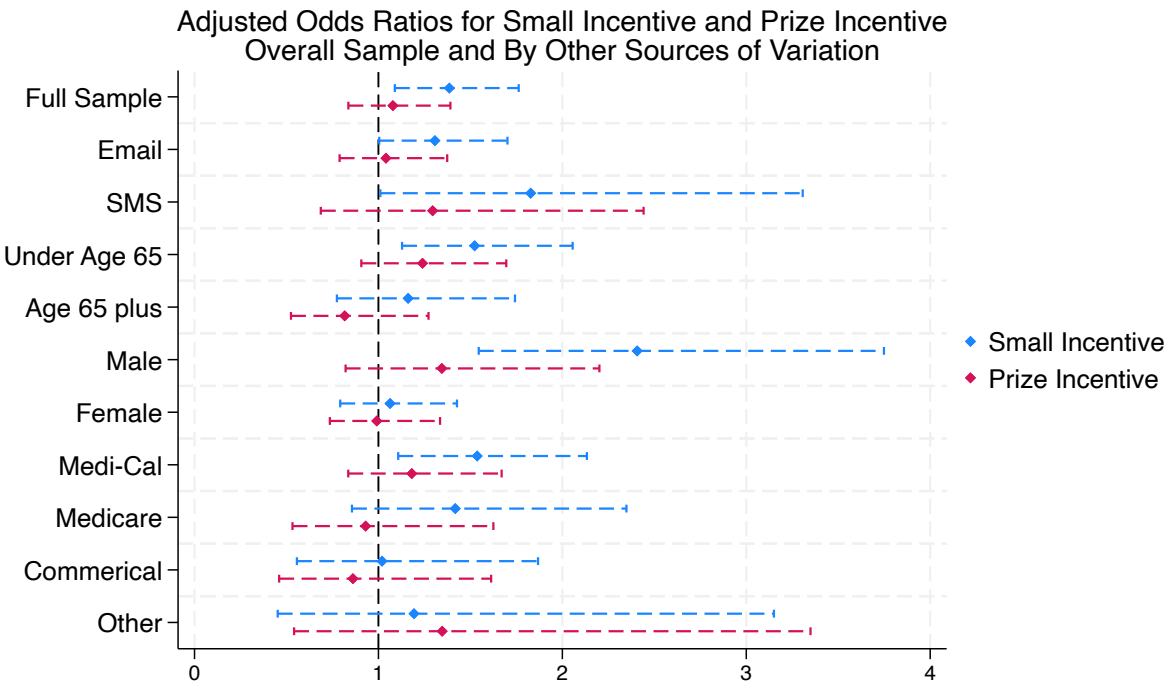
	Enrollment rate (%)	Unadjusted Odds Ratio	95% CI	P value[b]	Adjusted Odds Ratio[c]	95% CI	P value[b]
All patients[a]	0.78%						
Small Incentive		1.383	[1.1, 1.8]	0.008	1.385	[1.1, 1.8]	0.008
Prize Incentive		1.078	[0.8, 1.4]	0.562	1.079	[0.8, 1.4]	0.559
Asian[a]	0.25%						
Small Incentive		1.878	[0.8, 4.4]	0.151	1.88	[0.8, 4.4]	0.15
Prize Incentive		1.375	[0.6, 3.4]	0.493	1.375	[0.6, 3.4]	0.493
Black[a]	0.79%						
Small Incentive		1.061	[0.5, 2.1]	0.865	1.061	[0.5, 2.1]	0.865
Prize Incentive		0.938	[0.5, 1.9]	0.858	0.938	[0.5, 1.9]	0.86
Hispanic[a]	0.63%						
Small Incentive		1	[0.6, 1.8]	1	1	[0.6, 1.8]	1
Prize Incentive		0.832	[0.5, 1.5]	0.545	0.832	[0.5, 1.5]	0.545
White[a]	1.39%						
Small Incentive		1.602	[1.1, 2.2]	0.006	1.605	[1.1, 2.2]	0.006
Prize Incentive		1.091	[0.8, 1.6]	0.642	1.091	[0.8, 1.6]	0.64
Other[a]	0.62%						
Small Incentive		1.252	[0.6, 2.7]	0.563	1.253	[0.6, 2.7]	0.562
Prize Incentive		1.504	[0.7, 3.1]	0.275	1.507	[0.7, 3.1]	0.274

[a] Each panel "All patients," "Asian," … reports the Small and Prize incentive arm estimates from separate logistic regression models.
[a] P values are from a test of the null that the odds of enrollment in a given arm (Small Incentive or Prize Incentive) is the same as the odds in the Message only (active control) arm.
[a] Models for all patients adjust for race and ethnicity (Asian, Black, Hispanic, or Other relative to White), age group (age 65 and over relative to under 65) and message modality (email relative to text). Models by racial and ethnic sub-group only control for age group and message modality.

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SUPPLEMENT – TO BE COMPLETED

Appendix Figure 1. Odds Ratios from Models Estimated by Sub-Groups



Appendix Table 1. Odds Ratios for APT Webstudy Enrollment Estimated Relative to the Small Incentive Arm

	Enrollment rate (%)[a]	Unadjusted[b] Odds Ratio	95% CI	P value	Adjusted Odds Ratio	95% CI	P value
All patients	1.07%						
Message Only		0.723	[0.57, 0.92]	0.008	0.722	[0.57, 0.92]	0.008
Prize Incentive		0.780	[0.62, 0.99]	0.038	0.779	[0.62, 0.99]	0.037
Ages 50-64	1.33%						
Message Only		0.658	[0.49, 0.80]	0.006	0.657	[0.40, 0.89]	0.006
Prize Incentive		0.815	[0.62, 1.08]	0.154	0.814	[0.61, 1.08]	0.153
Ages >=65	0.75%						
Message Only		0.862	[0.58, 1.29]	0.472	0.861	[0.57, 1.29]	0.470
Prize Incentive		0.704	[0.46, 1.08]	0.109	0.703	[0.46, 1.08]	0.108
Email Message	1.42%						
Message Only		0.765	[0.59, 1.00]	0.046	0.764	[0.59, 1.00]	0.046
Prize Incentive		0.796	[0.61, 1.03]	0.087	0.796	[0.61, 1.03]	0.086
SMS Message	0.53%						
Message Only		0.547	[0.30, 0.99]	0.046	0.547	[0.30, 0.99]	0.046
Prize Incentive		0.709	[0.41, 1.23]	0.218	0.708	[0.41, 1.23]	0.217
Asian	0.47%						
Message Only		0.532	[0.23, 1.26]	0.151	0.532	[0.23, 1.26]	0.150
Prize Incentive		0.732	[0.34, 1.60]	0.434	0.732	[0.34, 1.60]	0.433
Black	0.84%						
Message Only		0.942	[0.48, 1.87]	0.865	0.942	[0.47, 1.87]	0.865
Prize Incentive		0.883	[0.44, 1.77]	0.727	0.884	[0.44, 1.78]	0.729
Hispanic	0.63%						
Message Only		1.000	[0.57, 1.77]	1.000	1.000	[0.57, 1.77]	1.000
Prize Incentive		0.832	[0.46, 1.51]	0.545	0.832	[0.46, 1.51]	0.545
White	2.20%						

Message Only		0.624	[0.45, 0.87]	0.006	0.623	[0.45, 0.87]	0.006
Prize Incentive		0.681	[0.49, 0.95]	0.022	0.680	[0.49, 0.95]	0.022
Other	0.77%						
Message Only		0.799	[0.37, 1.71]	0.563	0.798	[0.37, 1.71]	0.562
Prize Incentive		1.201	[0.60, 2.39]	0.602	1.203	[0.60, 2.40]	0.600

Appendix Table 2. Odds Ratio for Enrollment in the APT Webstudy by Age-group, Sex and Primary Insurance

	Enrollment rate (%)[a]	Unadjusted[b] Odds Ratio	95% CI	P value	Adjusted Odds Ratio	95% CI	P value
Ages 50-64	0.88%						
Small Incentive		1.52	[1.1, 2.1]	0.006	1.523	[1.1, 2.1]	0.006
Prize Incentive		1.238	[0.9, 1.7]	0.179	1.24	[0.9, 1.7]	0.178
Ages >=65	0.65%						
Small Incentive		1.16	[0.8, 1.7]	0.472	1.161	[0.8, 1.7]	0.47
Prize Incentive		0.817	[0.5, 1.3]	0.37	0.817	[0.5, 1.3]	0.371
Email Message	1.09%						
Small Incentive		1.307	[1.0, 1.7]	0.046	1.308	[1.0, 1.7]	0.046
Prize Incentive		1.041	[0.8, 1.4]	0.777	1.041	[0.8, 1.4]	0.776
SMS Message	0.29%						
Small Incentive		1.827	[1.0, 3.3]	0.046	1.83	[1.0, 3.3]	0.046
Prize Incentive		1.295	[0.7, 2.4]	0.425	1.295	[0.7, 2.4]	0.425
Male	0.43%						
Small Incentive		2.375	[1.53, 3.7]	<0.001	2.407	[1.55, 3.75]	<0.001
Prize Incentive		1.335	[0.82, 2.18]	0.250	1.345	[0.82, 2.20]	0.239
Female	1.04%						
Small Incentive		1.068	[0.80, 1.43]	0.661	1.063	[0.792, 1.427]	0.683
Prize Incentive		0.993	[0.74, 1.34]	0.964	0.991	[0.736, 1.335]	0.953
Medi-Cal	0.72%						
Small Incentive		1.528	[1.10, 2.12]	0.011	1.537	[1.11, 2.13]	0.010
Prize Incentive		1.183	[0.84, 1.67]	0.340	1.181	[0.836, 1.67]	0.345
Medicare	0.62%						
Small Incentive		1.411	[0.853, 2.33]	0.180	1.418	[0.856, 2.35]	0.175
Prize Incentive		0.932	[0.534, 1.63]	0.803	0.930	[0.533, 1.625]	0.799

Commercial	2.38%						
Small Incentive		1.046	[0.58, 1.90]	0.882	1.020	[0.557, 1.89]	0.950
Prize Incentive		0.886	[0.48, 1.65]	0.703	0.861	[0.460, 1.61]	0.641
Other Insurance	0.53%						
Small Incentive		1.174	[0.452, 3.05]	0.742	1.194	[0.452, 3.15]	0.721
Prize Incentive		1.328	[0.533, 3.31]	0.543	1.346	[0.541, 3.35]	0.522

Appendix Table 3. Odds Ratio for Completion of both Screeners Overall and by Sub-group

	Enrollment rate (%)[a]	Unadjusted[b] Odds Ratio	95% CI	P value	Adjusted[c] Odds Ratio	95% CI	P value
All patients	0.21%						
Small Incentive		1.815	[1.2, 2.8]	0.007	1.818	[1.2, 2.8]	0.007
Prize Incentive		1.062	[0.7, 1.7]	0.806	1.063	[0.7, 1.7]	0.805
Asian	0.03%						
Small Incentive		7.009	[0.9, 57.0]	0.069	7.02	[0.9, 57.1]	0.068
Prize Incentive		3	[0.3, 28.9]	0.342	3	[0.3, 28.9]	0.341
Black	0.15%						
Small Incentive		1.332	[0.3, 6.0]	0.708	1.332	[0.3, 6.0]	0.708
Prize Incentive		1.335	[0.3, 6.0]	0.706	1.336	[0.3, 6.0]	0.705
Hispanic	0.13%						
Small Incentive		0.8	[0.2, 3.0]	0.739	0.8	[0.2, 3.0]	0.739
Prize Incentive		0.6	[0.1, 2.5]	0.484	0.599	[0.1, 2.5]	0.484
White	0.40%						
Small Incentive		2.451	[1.4, 4.4]	0.003	2.456	[1.4, 4.4]	0.003
Prize Incentive		1	[0.5, 2.0]	1	1	[0.5, 2.0]	0.999
Other	0.36%						
Small Incentive		0.571	[0.2, 2.0]	0.371	0.57	[0.2, 2.0]	0.371
Prize Incentive		1.143	[0.4, 3.2]	0.797	1.143	[0.4, 3.2]	0.797
Ages 50-64	0.22%						
Small Incentive		1.724	[1.0, 3.1]	0.066	1.727	[1.0, 3.1]	0.066
Prize Incentive		1.111	[0.6, 2.1]	0.746	1.112	[0.6, 2.1]	0.745
Ages >=65	0.21%						
Small Incentive		1.932	[1.0, 3.7]	0.046	1.936	[1.0, 3.7]	0.045
Prize Incentive		1	[0.5, 2.1]	1	1	[0.5, 2.1]	0.999
Email Message	0.31%						

Small Incentive		1.826	[1.2, 2.9]	0.011	1.828	[1.2, 2.9]	0.011
Prize Incentive		1.179	[0.7, 2.0]	0.522	1.18	[0.7, 2.0]	0.521
SMS Message	0.07%						
Small Incentive		1.75	[0.5, 6.0]	0.372	1.751	[0.5, 6.0]	0.372
Prize Incentive		0.25	[0.0, 2.2]	0.215	0.25	[0.0, 2.2]	0.215
Male	0.12%						
Small Incentive		3.340	[1.52, 7.36]	0.003	3.407	[1.55, 7.49]	0.002
Prize Incentive		1.514	[0.618, 3.71]	0.364	1.537	[0.629, 3.75]	0.345
Female	1.04%						
Small Incentive		1.305	[0.765, 2.23]	0.328	1.300	[0.761, 2.22]	0.337
Prize Incentive		0.910	[0.51, 1.63]	0.750	0.911	[0.510, 1.63]	0.754
Medi-Cal	0.72%						
Small Incentive		3.358	[1.53, 7.40]	0.003	3.388	[1.537, 7.464]	0.002
Prize Incentive		1.999	[0.855, 4.67]	0.110	2.004	[0.856, 4.69]	0.109
Medicare	0.62%						
Small Incentive		1.371	[0.671, 2.80]	0.387	1.373	[0.671, 2.81]	0.386
Prize Incentive		0.543	[0.216, 1.36]	0.193	0.540	[0.216, 1.35]	0.189
Commercial	2.38%						
Small Incentive		1.046	[0.433, 2.53]	0.921	0.969	[0.401, 2.34]	0.944
Prize Incentive		0.615	[0.222, 1.70]	0.348	0.579	[0.211, 1.59]	0.289
Other Insurance	0.53%						
Small Incentive		3.133	[0.325,30.2]	0.323	3.061	[0.297,31.5	0.347
Prize Incentive		4.833	[0.564,41.4]	0.151	4.742	[0.557,40.4]	0.154