Put Your Money Where Your Butt Is:
A Commitment Contract for Smoking Cessation[*]

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Abstract

We designed and tested a voluntary commitment product to help smokers quit smoking. The product (CARES) offered smokers a savings account in which they deposit funds for six months, after which they take a urine test for nicotine and cotinine. If they pass, their money is returned; otherwise, their money is forfeited to charity. Eleven percent of smokers offered CARES tookup, and smokers randomly *offered* CARES were 3 percentage points more likely to pass the 6-month test than the control group. This effect persisted in surprise tests at 12 months, indicating that CARES produced lasting smoking cessation.

Keywords: commitment contract; commitment device; public health; addictive consumption; intertemporal choice; behavioral economics; field experiments

JEL codes: D12, I12

I. Introduction

More than five decades after Strotz (1955) modeled dynamic inconsistency, debate continues over how to represent preferences for consumption over time.[1] Introspection, casual empiricism, and laboratory evidence have motivated theorists to develop several type of models in which consumers exhibit more impatience for near-term trade-offs than for future trade-offs.[2] The consumption of addictive substances has been a particular focus of such models.[3] These models share the prediction that some (self-aware, or "sophisticated") consumers will seek to voluntarily constrain their future consumption choices: they will demand commitment devices.[4] Yet there is little field evidence on the demand for or effectiveness of such commitment devices.

We take some initial steps toward addressing the empirical viability and effectiveness of commitment devices for smoking cessation, using evidence from a field experiment in the Philippines. Some smokers were randomly assigned an opportunity to voluntarily sign a commitment contract (branded Committed Action to Reduce and End Smoking, or "CARES") to stop smoking. A smoker signing the contract pledged his own money that he would pass a cotinine (the primary metabolite of nicotine) urine test six months later.[5] If the CARES client passed the urine test he got his money back (no interest accrued on the account). If he failed the test the local bank offering the savings product donated the money to charity. This is essentially the performance bond contract suggested in Gruber and Koszegi (2001). A second treatment group received "cue cards," visually aversive wallet-sized pictures that are modeled on Canada's mandated cigarette packaging and intended to regularly remind smokers of the health risks from smoking.

Eleven percent of smokers offered the CARES contract signed up. This is comparable to takeup rates for a leading "self-help" treatment: nicotine replacement medications

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[1] See Phelps and Pollack (1968) for another early, formal model with time-inconsistent preferences.

[2] See, e.g., Laibson (1997) , O'Donoghue and Rabin (1999; 2001), Gul and Pesendorfer (2001; 2004), and Fudenberg and Levine (2006).

[3] Models of addiction with self-control or temptation problems include Gruber and Koszegi (2001), Laibson (2001), O'Donoghue and Rabin (2002), Bernheim and Rangel (2004), and Gul and Pesendorfer (2007).

[4] In contrast, standard neoclassical models of intertemporal choice do not predict a demand for commitment. Becker and Murphy (1988) model the consumption of addictive substances along the lines.

[5] The testing protocol has limitations, detailed below, but has been used by public health campaigns and tests of other treatments, including Volpp et al (2006) and some of the randomized trials of nicotine replacement medications summarized in Stead et al (2008).

(patch, gum, inhaler, or nasal spray).[6] The average client made a deposit every two weeks and ended up committing 550 pesos ($11 USD) by the end of the six-month contract period. 550 pesos is about 20% of monthly income[7] and roughly equal to the average out-of-pocket expense for about 6 months' worth of cigarettes incurred by CARES clients at baseline.

Our results suggest that CARES helps smokers quit. Smokers randomly *offered* CARES were an estimated 3.3 to 5.8 percentage points more likely to pass the 6-month urine test than the control group. But this urine test is not necessarily a good indicator of a lasting spell of smoking cessation, since the 6-month test date was scheduled up to 4 weeks in advance, and the test could be passed by abstaining from smoking for as little as a few days before the test date. So we also worked with the bank offering CARES to conduct surprise 12-month tests that would provide sharper evidence on true quits (vs. short-term, strategic ones). The 12-month results show that smokers randomly offered CARES were 3.5 to 5.7 percentage points more likely to pass the test than the control group. The analogous treatment-on-the-treated estimates are 31 to 53 percentage points.

The effect of CARES on smoking quits appears to be large. The sample mean pass rate for the surprise test was only 18% in the control group. One can also compare the effect of CARES to other treatments. Within-sample we find little evidence that the aversive cue cards affect smoking quits, and the upper bound of the cue card 12-month treatment-on-the-treated confidence interval implies an increased likelihood of surprise test passage that is 1/8 of our the comparable point estimate on CARES. The results also suggest that CARES has effects that are comparable to other treatments that have been tested using randomized trials on other samples. Volpp et al (2006) find that modest financial bonuses offered through a U.S. Veterans Affairs hospital increase short-term cessation but not lasting quits. Over-the-counter nicotine replacement medications have been tested in dozens of randomized trials and generally produced treatment-on-the-

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[6] Seventeen percent of smokers U.S. smokers reported using nicotine replacement medication during the last 12 months in a nationally representative 2001 phone survey (Bansal, Cummings, Hyland and Giovino 2004). In the only study we know of from the Philippines, only six percent of a sample of relatively heavy smokers who had already decided to quit had ever used any form of nicotine replacement therapy in past smoking cessation attempts (Tipones and Fernandez 2006).

[7] Income is very roughly estimated from marketer observations of subject appearance and work activity.

treated effects that are smaller than those found here for CARES (Stead, Perera, Bullen, Mant and Lancaster 2008).

Despite its large treatment effects a surprisingly large proportion of smokers who voluntarily commit with CARES, 66%, ended up failing to quit. This is consistent with various behavioral bias in preferences and/or expectations (partial naiveté about dynamic inconsistency, projection bias, over-confidence), and the implications of such biases for optimal contract design and treatment effectiveness is an important topic for future research.

The results in this study are unusually direct evidence on the takeup and effectiveness of a commitment device for managing the consumption of an addictive substance. The only comparable studies we know are Paxton's (1979; 1980; 1982). These studies have three key differences from ours. First, they were administered in a highly structured and clinical setting to smokers who were already participating in a smoking cessation program. Our study includes smokers of varying smoking intensities and *ex-ante* dispositions toward cessation aids. Second, Paxton's control groups received a rich set of other smoking cessation aids, including counseling, social pressure, and aversion therapy. Our study takes a more over-the-counter approach and compares the effects of CARES to a control group that receives nothing other than basic information. Third, Paxton's analysis does not exploit random assignment.[8]

Our study also relates to prior work on commitment devices for other decisions that may involve self-control problems. Ariely and Wertenbroch (2002) find that 37 of 51 MBA students elect to impose binding deadlines on themselves for completing class assignments. Deadlines improve task performance but students do not necessarily set them optimally. Thaler and Benartzi (2004) and Ashraf, Karlan, and Yin (2006) design new commitment products for savings and find high takeup rates and large treatment effects.[9]

Our paper proceeds as follows: the next section describes the voluntary commitment savings product that we designed for smokers who want to quit smoking. Sections III describes the cue cards treatment. Section IV details the experimental design and

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[8] Paxton randomized subjects into different arms but then estimates treatment effects by comparing those who tookup the commitment product to the control group.
[9] See DellaVigna (2007) for a more comprehensive review of field evidence on commitment devices.

implementation by Green Bank in the Philippines. Section V reports the results of the study. Section VI concludes.

II. CARES Product Design

Committed Action to Reduce and End Smoking ("CARES") is a voluntary commitment savings program specifically designed for smokers who want to quit smoking. The basic design of the product allows a smoker to risk a self-selected amount of his own money that will be forfeited unless he passes a biochemically verified test of smoking cessation, administered as a urine test of nicotine and cotinine byproducts, at six months after signing the commitment contract. The particular product design and study described below was implemented by the Green Bank of Caraga, on the island of Mindanao in the Philippines.

Green Bank marketed CARES by sending bank representatives into the street to target obvious smokers. Details on the marketing are described with the experimental design below (in Section IV).

Green Bank required a minimum balance of 50 pesos (~= $1USD), collected by the field marketers, to open a CARES account. Marketers encouraged smokers to deposit the money they would normally expect to spend on cigarettes into a savings account every week for six months. The savings account did not yield any interest— this is an important feature for the bank to prevent non-smokers from opening the account merely because of the convenience of deposit collection services. The bank offered some randomly-selected individuals weekly deposit collection; the remaining CARES clients had to go to a branch to make deposits beyond the opening one.[10]

Clients could only make deposits, and not withdrawals, from the CARES account during the six month commitment period. Hence all deposited funds were at risk. Clients who passed the six-month urine test got their entire balance back. Clients who failed (or did not take) the test forfeited their entire balance.

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[10] Clients lose the weekly deposit collection service if they miss three consecutive deposits.

Trained Green Bank technicians test CARES clients' smoking status using the NicCheck[TM] urine strip test for nicotine and its primary metabolite, cotinine.[11] NicCheck has been used in previous anti-smoking programs, including the Dutch Cancer Society's "Quit and Win" campaign, and the financial bonus incentive testing in Volpp et al (2006). The test result provides a categorical measure of recent nicotine consumption, with values ranging from zero (no exposure) to fifteen (high exposure).[12] Green Bank counts only a zero result as passing, and both marketers emphasized that clients must stop smoking completely in order to be sure of passing the test.

Green Bank contacts each client three to four weeks prior to his six-month deadline to set up a urine testing appointment. If a client can not be reached initially the Bank makes repeated attempts to set up a test date within one week of the maturity date. If a client is deemed unable to take the test within the stipulated one-week grace period due to mitigating circumstances (e.g., working in another location), he is allowed an additional three weeks to take the test. If the client was reached and refused to schedule a date, the account balance was forfeited one week after the six-month commitment date.

III. Cue Cards Treatment Design

The cue cards are pocket-sized, graphic depictions of the negative health consequences of smoking. Each individual received one of four pictures: a premature baby (with text "Smoking harms unborn babies"), bad teeth (with text "Smoking causes mouth and throat cancer"), black lung (with text "Smoking causes lung cancer"), or a child hooked up to a respirator (with text "Don't let children breathe your smoke"). By law, such images must be featured on cigarette packages in Australia, Canada, and New Zealand (Hoek and

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[11] Initially CARES clients were required to take a blood test at a nearby hospital lab. But delays and added costs led Green Bank to switch to urine strips that could be used in the field. NicCheck product specifications indicate that the urine strips sacrifice a bit of test specificity (the ability to detect a true negative result, which is 97% for urine strip versus 99% for lab-based cotinine analysis), but offer equivalent test sensitivity (the ability to detect a true positive result, which is roughly 97% for both urine strips and lab-based cotinine analysis) and the ability to provide results in the field, within 15 minutes. Green Bank found similar specificity (one false positive out of 18 self-reported non-smokers) and much lower sensitivity in its own pilot testing, where marketers randomly approached people on the street in our study area, asked if they were smokers, and then offered 30 pesos to take the urine strip test.

[12] Small and portable test strips are dipped into the urine sample, stimulating a chemical reaction that changes the test strip's color. The color result ranges from white (no nicotine exposure), to light pink (moderate nicotine exposure), to red (high nicotine exposure). The test administrator then compares the test strip's color to a NicCheck color scale and assigns the test result a number ranging from 0 (no exposure) to 15 (high exposure).

Gendall 2005). Smokers assigned to the Cues treatment were offered their choice of the above cards, and encouraged by the marketers to keep them handy and/or post them in locations where the subject tended to smoke. More than 99% of subjects offered the cue cards accepted them.

IV. Experimental Design

Our study sample consists of 2,000 smokers aged 18 or older who reside on the island of Mindanao in southern Philippines. Green Bank marketers identified smokers by approaching people and asking them whether they smoke regularly. If they did, the marketer then asked if they wanted to participate in a short survey on smoking. All subjects received an informational pamphlet on the dangers of smoking, and a tip sheet on how to quit. Since the primary objectives of this study were to determine whether first there was demand for CARES, and second whether CARES increased smoking cessation, the marketers only collected very quick and basic baseline data on age and smoking status (see Section V-A for more details).

The experiment was implemented in three distinct waves of marketing. The first two waves took place in Butuan City from August to December 2006. After completing the baseline survey marketers revealed a sticker on the back of the survey that randomly assigned the subject to one of four groups: (1A) CARES with deposit collection, (1B) CARES without deposit collection, (2) Cues, or (3) Control.[13] The probability of assignment to groups was initially 45%, 45%, 5%, and 5%. After establishing that there was sufficient takeup of CARES, Green Bank changed the assignment probabilities to 15%, 15%, 30%, and 40% for the second wave. 418 smokers were surveyed (and hence drawn into the sample frame) in the first two waves. Of the 266 assigned a CARES offer, 34 took the product. Two individuals from the Cues group also opened an account (after hearing about the product and approaching bank staff). In our analysis we code these individuals in the Cues group, in adherence to the random assignment.

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[13] In the first wave there were 20 situations in which marketers interviewed respondents with either one or two others present; in these cases, marketers were instructed to interview all individuals in the group before disclosing the random assignment. All respondents in the group received the same assignment as the first interviewee. Impact results discussed below correct standard errors for any clustering within groups of individuals that received joint marketing.

The third marketing wave ran from February to May 2007, in the neighboring town of Ampayon. Here Green Bank implemented new randomization procedures designed to produce even better compliance with the randomized treatment assignment. Now marketers used a calculator to solve an equation based on the subject's birth date (the residual of $dd + mm + yy$, divided by three). The individual was then assigned to CARES group if the residual was zero, to Cues if the residual was one, and to Control if the residual was two. Given the low takeup in the CARES group without deposit collection in the first two waves, all respondents in the Ampayon CARES group were offered deposit collection service. 49 of the 515 Ampayon subjects offered CARES opened the account.

In order to validate the quality and accuracy of information provided by the marketers, field staff from Innovations for Poverty Action conducted spot-checking visits with randomly selected respondents who had been offered CARES. More than 90% of the clients accurately described the main features of the product design.

Given the random assignment, we expect individuals who end up in treatment and control groups to have statistically indistinguishable baseline characteristics on average. Table 1a presents related evidence. The F-statistic from a regression of assignment to CARES on all baseline covariates is 0.42 (p-value of 0.963), and for assignment to Cues is 0.54 (p-value of 0.903). When we examine individual variables across the CARES and Control groups, 12 out of 13 are similar statistically, and only one variable fails at the 10% level: 95.4% in the CARES group reported experiencing specific situations that make them want to smoke, whereas only 92.8% of control individuals reported the same. The Cues treatment individuals are similar statistically to the control in 10 out of 13, with the significant differences found on "wanting to stop smoking sometime in your life," "wanting to stop smoking in 1 year" and "will actually quit smoking in 6 months." These variables may also be correlated with smoking cessation, so we estimate treatment effects with the full set of baseline covariates as control variables.

Six months and 12 months after the initial marketing, the bank attempted to administer the urine test to *all* study subjects (testing procedures are detailed in Section II). CARES clients had to take the six-month test or automatically forfeit their deposit balance. Non-clients (including those assigned to the cues and control groups) were paid

30 pesos (60 cents US) for taking the six-month test, and everyone in the sample frame was paid 30 pesos for taking the 12-month test.

Table 1b Panel A shows that the bank reached 63% of those in the baseline for the six-month urine test, with no difference in contact rate across the three treatment and control groups). Of those contacted 95% agreed to take the test. Since we find lower agreement in the CARES group (93% vs. 97% in the control) we report six-month treatment effects under alternative assumptions about the smoking status of those who refused to take the test.

Table 1b Panel B shows that the bank reached 60% of those in the baseline for the 12-month urine test, with no difference in contact rate across the three treatment and control groups). Of those contacted 95% agreed to take the test, again with no differences across groups.

V. Results

A. CARES Takeup

In total, 83 out of 781 (11%) individuals offered CARES signed a contract. Table 1b Columns 7-9 shows univariate analysis of the takeup decision from data on the limited set of characteristics marketers collected in the quick baseline survey administered prior to treatment assignment and marketing.[14] The following baseline characteristics were positively correlated with taking up CARES: wanting to quit (at some point in life, or now), optimism about quitting (as indicated by responding yes to "will you quit smoking in the next year?"), and pre-existing strategic behavior in managing one's cravings (as indicated by responding yes to "do you try to avoid areas or situations that make you want to smoke?"). Negative correlates with CARES takeup were: wanting to quit smoking more than a year in the future (perhaps an indicator of procrastination) and smelling like cigarettes (likely an indicator of heavy smoking). Table 2 shows multivariate estimation of takeup correlates.[15] The main results here are that the full set of

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[14] Only a handful of the 2,000 subjects were existing Green Bank clients. Marketers did not elicit income directly, but their observation of subject appearance and work activity indicated that average subject income was substantially lower than that of typical Green Bank clients.

[15] All takeup and impact regressions include indicator variables for the three marketing waves.

baseline characteristics are jointly significant but explain only about 10% of the variation in the takeup decision.

B CARES Usage

Table 3 shows some summary statistics on CARES deposits.

Opening balances were 57 pesos on average: this is four times the monetary value of the number of cigarettes the client reported smoking per week. Ninety percent of clients opened with the minimum amount of 50 pesos. Eighty percent of clients then made additional contributions. On average CARES clients made a deposit every two weeks, and by six months the average balance grew to 553 pesos. Given self-reported smoking intensity and a per-cigarette cost of one peso, the average CARES client committed roughly six months worth of cigarette spending to the account.

Not surprisingly CARES clients who used the account more intensively were more likely to pass the urine tests. We show results for the 6-month test in Table 3 and the 12-month test in Appendix Table 1. Successful clients made more deposits, were more likely to retain deposit collection services by making regular deposits, and had larger balances at contract maturity. These differences were more pronounced for 6-month test passage than for 12-month passage. Of course, since contract terms and deposit requirements were not randomized, we can not infer a causal relationship between deposit amount, deposit regularity and success.

C. Treatment Effects on Smoking Cessation

We estimate intent-to-treat (ITT) effects of CARES and cue cards on test passage using the OLS specification:

(1): $pass_i^t = \alpha + \beta cares_i + \chi cues_i + \delta X_i + \gamma W_i + \varepsilon_i$

Where i indexes individuals, t refers to the 6-month or 12-month test, *pass*, *cares* and *cues* are all binary variables, *X* is the vector of baseline covariates, and *W* is a vector of dummies for the three marketing waves. We report these results in Table 4, Panel A. We also estimate (1) using probit instead of OLS (Appendix Table 2), and after dropping the baseline covariates (Appendix Table 3), and find very similar results.

Each table reports results on 6-month test passage in odd columns, and on 12-month test passage in even columns. We estimate effects under three different assumptions on clients for whom we do not have a test result: i) these clients would have failed the test (Columns 1 and 2), ii) these clients have the average pass rate; i.e., we drop these clients (Columns 3 and 4), iii) these clients have the average pass rate, unless they were found by the technician and refused to take the test, in which case we assume they would have failed (Columns 5 and 6).[16]

Table 4 Panel A shows CARES ITT effects on 6-month test passage of 3 to 6 percentage points under these assumptions. These effects are large relative the control group sample mean passage rates of 0.08 to 0.12. The effects on 12-month test passage, which as discussed above are probably a better measure of effects on a lasting quit spell, range from 4 to 6 percentage points. Again these effects are large relative to the control group sample mean passage rates of 0.10 to 0.18. We do not find any significant effects of the cue cards.

Table 4 Panel B shows treatment-on-the-treated (ToT) results, using random assignment to CARES as an instrument for takeup. The ToT estimates imply 30 to 65 percentage point increases in test passage. This suggests that CARES usage increases by several fold the probability of test passage and a lasting quit spell.[17]

Appendix Table 4 reports the same specifications for the sub-sample of smokers that reported wanting to quit smoking at some point in their life in the baseline survey (Appendix Table 5 reports summary statistics for this sub-sample). The CARES point estimates suggest somewhat larger treatment effects for this sample. We also find some significant increases in 6-month test passage from the cue cards, but no significant effects at 12 months.

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[16] Six test strips turned blue (off the NicCheck results spectrum) in each of the six- and twelve-month follow-up pools. This is the likely due to the TB medicine Isoniazid. We coded these blue strips as failures, but Green Bank returned the commitment balance to the one CARES client with a blue result.

[17] The cue card treatment-on-the-treated estimates are insignificant and nearly identical to the intent-to-treat because of nearly 100% takeup of the cue cards.

VI. Conclusion

We designed a commitment product to help people quit smoking and tested it in cooperation with Green Bank using a randomized controlled trial in the Philippines.

The results suggest that Committed Action to Reduce and End Smoking ("CARES") helps smokers quit. At the end of the commitment contract period (6-months), subjects *offered* CARES contract were 3 to 6 percentage points more likely to pass a urine test for short-term smoking cessation than the control group. This intent-to-treat effect persisted at a surprise urine yet six months later (12 months after the contract offer): smokers offered CARES were 4 to 6 percentage points more likely to pass the 12-month test. Treatment-on-the-treated estimates suggest that those who *signed* a CARES commitment increased their probability of test passage and a lasting quit spell by several fold.

These results suggest that the CARES product may be an unusually effective treatment for smoking cessation. We do not know of any comparable trials on other treatments in the Philippines, but the CARES treatment effects compare favorably to those found for nicotine replacement therapy in randomized controlled trials in other settings (Stead, Perera, Bullen, Mant and Lancaster 2008). The CARES takeup rate (11%) also compares well to nicotine replacement therapy (Bansal, Cummings, Hyland and Giovino 2004; Tipones and Fernandez 2006), suggesting that commitment contracts could help public health efforts to address the "under-use" of smoking cessation treatments (Cokkinides, Ward, Jemal and Thun 2005; Orleans 2007). Nevertheless the majority of CARES clients in our study failed to quit, suggesting that there is still much to be done in improving the effectiveness of smoking cessation treatments.

We suggest four main areas for further research. One is estimating longer-term treatment effects. Two is testing whether commitment contracts complement or substitute for other smoking cessation treatments. Three is studying the optimal design of an anti-smoking commitment contract.[18] To highlight just one aspect of product design, note that in our study CARES was largely bundled with deposit collection services. Hence we cannot yet unpack how much of the treatment effect was due to the financial punishment, and how much was due to frequent contact with the deposit collector (a sub-question here

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[18] For theories of optimal contracting with consumption commitments see, e.g., DellaVigna and Malmendier (2004), and Eliaz and Spiegler (2006).

is the necessary frequency of such contact in order to change behavior). A fourth and closely related question is what drives the takeup decision. If behavioral biases such as loss aversion, partial naiveté, projection bias, and/or over-optimism play a key role then there may be implications for product design (e.g., strong defaults) and marketing (e.g., framing, information on failure rates). Strong interplay between theory and empirics will be needed to continue developing markets for commitment.

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	All	CARES	Cues	Control	t-test of (2) vs (4)	t-test of (3) vs (4)	CARES Group		
							Took up	Did Not Takeup	t-test of (7) vs (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	0.058	0.061	0.599	0.053	0.525	0.606	0.072	0.069	0.905
	(0.005)	(0.009)	(0.010)	(0.009)			(0.029)	(0.010)	
Age	36.571	36.951	35.667	36.972	0.978	0.101	38.341	37.181	0.465
	(0.310)	(0.493)	(0.547)	(0.576)			(1.367)	(0.520)	
Number of cigarettes per day in the past 7 days	14.531	14.184	15.051	14.461	0.611	0.344	14.122	14.067	0.962
	(0.234)	(0.350)	(0.463)	(0.416)			(1.105)	(0.369)	
Estimated amount spent on cigarettes per week (pesos)	101.715	99.287	105.351	101.227	0.611	0.344	98.854	98.472	0.962
	(1.637)	(2.453)	(3.239)	(2.915)			(7.732)	(2.586)	
Tried to stop smoking in the past 12 months	0.457	0.446	0.452	0.476	0.277	0.417	0.422	0.427	0.927
	(0.011)	(0.018)	(0.020)	(0.020)			(0.055)	(0.019)	
Wants to stop smoking sometime in life	0.723	0.725	0.690	0.754	0.219	0.013	0.855	0.723	0.010
	(0.010)	(0.016)	(0.019)	(0.017)			(0.039)	(0.017)	
Wants to stop smoking now	0.168	0.178	0.144	0.179	0.957	0.099	0.289	0.159	0.003
	(0.008)	(0.014)	(0.014)	(0.015)			(0.050)	(0.014)	
Wants to stop smoking in 1 year	0.426	0.431	0.393	0.452	0.420	0.037	0.494	0.426	0.234
	(0.011)	(0.018)	(0.020)	(0.020)			(0.055)	(0.019)	
Wants to stop smoking after 1 year	0.106	0.095	0.126	0.100	0.721	0.159	0.036	0.113	0.030
	(0.007)	(0.010)	(0.014)	(0.012)			(0.021)	(0.012)	
Will actually quit smoking in 6 months	0.523	0.537	0.473	0.555	0.493	0.004	0.741	0.483	0.000
	(0.011)	(0.018)	(0.020)	(0.020)			(0.049)	(0.019)	
Respondent smells like cigarettes	0.403	0.423	0.379	0.400	0.377	0.469	0.277	0.461	0.001
	(0.011)	(0.018)	(0.020)	(0.020)			(0.049)	(0.019)	
There are situations that make him/her want to smoke	0.933	0.954	0.911	0.927	0.042	0.290	0.927	0.888	0.285
	(0.006)	(0.008)	(0.012)	(0.010)			(0.029)	(0.012)	
Tries to avoid areas that make him/her want to smoke	0.571	0.565	0.578	0.573	0.783	0.857	0.658	0.505	0.010
	(0.011)	(0.018)	(0.020)	(0.020)			(0.054)	(0.019)	
So addicted that s/he needs help to stop smoking	0.524	0.530	0.510	0.532	0.943	0.443	0.582	0.504	0.700
	(0.011)	(0.018)	(0.020)	(0.020)			(0.055)	(0.019)	
F-statistic [p-value] from regression of assigned group					0.410	0.540			
on all of the above baseline variables.					[0.9686]	[0.8999]			
Number of observations	2000	781	603	616			83	698	

Standard errors in parentheses. Summary statistics in columns (1)-(4) are weighted to account for the change in probability of assignment to treatment across the three waves of marketing.

Outcome Measures

| | | | | | t-test of (2) | t-test of (3) | CARES Group | | |
| | All | CARES | Cues | Control | vs (4) | vs (4) | Took up | Did Not Takeup | t-test of (7) vs (8) |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Outcome Measures, Full Sample, Six Months									
Found by surveyor for follow-up measurement	0.634	0.642	0.629	0.629	0.596	0.982	0.723	0.547	0.002
	(0.011)	(0.017)	(0.020)	(0.019)			(0.049)	(0.019)	
Agreed to take urine test, conditional on being found	0.952	0.932	0.963	0.968	0.015	0.737	0.700	0.958	0.000
	(0.006)	(0.012)	(0.009)	(0.009)			(0.060)	(0.010)	
Found and agreed to test urine test	0.604	0.598	0.604	0.608	0.709	0.942	0.506	0.524	0.752
	(0.011)	(0.018)	(0.011)	(0.020)			(0.055)	(0.019)	
Passed urine test (omitted missing respondents)	0.153	0.181	0.153	0.124	0.023	0.316	0.690	0.128	0.000
	(0.010)	(0.019)	(0.010)	(0.016)			(0.072)	(0.018)	
Passed urine test	0.093	0.108	0.093	0.075	0.033	0.355	0.349	0.067	0.000
(assumes all respondents who did not take the test are smokers)	(0.007)	(0.011)	(0.006)	(0.011)			(0.053)	(0.009)	
Passed urine test	0.146	0.168	0.146	0.120	0.041	0.330	0.483	0.123	0.000
(assumes all respondents who were found but refused the test are smokers)	(0.010)	(0.018)	(0.010)	(0.016)			(0.065)	(0.017)	
# of CARES accounts	85	83	2	0					
Number of observations	2000	781	603	616			83	698	
Panel B: Outcome Measures, Full Sample, One Year									
Found by surveyor for follow-up measurement	0.596	0.615	0.578	0.590	0.339	0.670	0.723	0.547	0.001
	(0.011)	(0.017)	(0.201)	(0.020)			(0.049)	(0.019)	
Agreed to take urine test, conditional on being found	0.949	0.948	0.941	0.958	0.489	0.280	0.984	0.939	0.157
	(0.006)	(0.010)	(0.012)	(0.010)			(0.016)	(0.012)	
Found and agreed to test urine test	0.565	0.582	0.544	0.565	0.515	0.451	0.723	0.532	0.001
	(0.011)	(0.018)	(0.020)	(0.020)			(0.049)	(0.019)	
Passed urine test (omitted missing respondents)	0.181	0.203	0.155	0.178	0.372	0.389	0.350	0.175	0.002
	(0.011)	(0.019)	(0.019)	(0.020)			(0.062)	(0.020)	
Passed urine test	0.103	0.118	0.084	0.101	0.296	0.313	0.253	0.093	0.000
(assumes all respondents who did not take the test are smokers)	(0.007)	(0.012)	(0.011)	(0.012)			(0.048)	(0.011)	
Passed urine test	0.172	0.192	0.145	0.171	0.414	0.337	0.344	0.165	0.001
(assumes all respondents who were found but refused the test are smokers)	(0.011)	(0.018)	(0.018)	(0.019)			(0.061)	(0.019)	
# of CARES accounts	85	83	2	0					
Number of observations	2000	781	603	616			83	698	

Standard errors in parentheses. Summary statistics in columns (1)-(4) are weighted to account for the change in probability of assignment to treatment across the three waves of marketing.

Table 2. Multivariate Analysis of CARES Take-up
OLS, Probit

Estimator:	OLS	Probit
	(1)	(2)
Female	-0.034	-0.024
	(0.041)	(0.028)
Age (/100)	0.894**	0.858**
	(0.405)	(0.398)
Age squared (/100)	-.010**	-0.010**
	(0.005)	(0.005)
Number of cigarettes per day in the past 7 days (/100)	0.153	0.103
	(0.321)	(0.252)
Number of cigarettes per day squared (/100)	-0.002	-0.001
	(0.007)	(0.005)
Having tried to stop smoking in the past 12 months	-0.034	-0.025
	(0.025)	(0.019)
Wanting to stop smoking sometime in life	0.085	0.062
	(0.085)	(0.039)
Wanting to stop smoking now	0.034	(0.019)
	(0.038)	(0.028)
Wanting to stop smoking in 1 year	0.076	0.080
	(0.080)	(0.127)
Wanting to stop smoking after 1 year	-0.002	-0.003
	(0.037)	(0.050)
Will actually quit smoking in 6 months	0.116***	0.114***
	(0.036)	(0.041)
Respondent smells like cigarettes	-0.073**	-0.056***
	(0.024)	(0.019)
There are situations that make him/her want to smoke	0.031	0.037
	(0.039)	(0.033)
Try to avoid areas that make him/her want to smoke	0.043	0.039*
	(0.027)	(0.022)
So addicted that s/he needs help to stop smoking	0.034	0.026
	(0.027)	(0.022)
probability (all variables above = 0)	0.002	0.001
Observations	781	775
(pseudo-)R-squared	0.101	0.142
Number of CARES accounts opened	83	83
Mean of dependent variable	0.106	0.107

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered by the marketing group if the respondents were surveyed in group. All regressions control for 3 phases of randomization and use marketer fixed effects. Probit specification reports marginal effects.

Table 3. Usage of CARES Bank Account by 6-Month Urine Test Result
Summary Statistics, Philippine Pesos (P50 = US$1)

	# of Accounts	Min	Average	Max	Std. Dev
	(1)	(2)	(3)	(4)	(5)
Opening balance	85	50	57.18	410	40.49
Success (i.e., those who passed 6-month urine test)	29	50	71.03	410	67.95
Failures (i.e., those who failed 6-month urine test)	56	50	50.00	50	0.00
# of deposits made into CARES account	85	1	11.75	29	9.35
Success (i.e., those who passed 6-month urine test)	29	7	20.90	26	5.47
Failures (i.e., those who failed 6-month urine test)	56	1	7.02	29	7.17
Proportion of clients who missed 3 deposits & lost deposit collection service	85	0	0.64	1	0.48
Success (i.e., those who passed 6-month urine test)	29	0	0.14	1	0.35
Failures (i.e., those who failed 6-month urine test)	56	0	0.89	1	0.31
Balance at 6 months	85	50	551.12	3410	651.01
Success (i.e., those who passed 6-month urine test)	29	282.75	1079.58	3410	703.37
Failures (i.e., those who failed 6-month urine test)	56	50	277.45	2657.75	414.62

Notes: Minimum account opening deposit was 50 pesos. Of the 83 CARES clients, 75 were from CARES with deposit collection group; 6 were from CARES without deposit collection group; and 2 were from CUES group. Although respondents in CUES group were not offered CARES product, marketers opened the accounts for 2 respondents who approached them after finding out about CARES. All takeup and impact analysis codes these 2 individuals into the CUES group in accordance with the random assignment.

Table 4. Impact of CARES on Passing Cotinine Urine Test
OLS, IV

	Everyone That Did Not Take The Test		Drop If Did Not Take The Test		Everyone That Was Found But Refused To Take The Test Still	
Assumption:	Continues Smoking				Smokes	
Outcome Measurement Timing:	Six Months	One Year	Six Months	One Year	Six Months	One Year
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Intent-to-Treat Estimates, OLS						
CARES Treatment	0.033*	0.035**	0.058**	0.057**	0.041*	0.054**
	(0.017)	(0.018)	(0.026)	(0.028)	(0.024)	(0.027)
Cue cards	0.015	0.009	0.022	0.019	0.021	0.019
	(0.016)	(0.016)	(0.024)	(0.026)	(0.023)	(0.025)
# of observations	2000	2000	1226	1161	1287	1218
F-test p-value: CARES = Cues	0.302	0.142	0.162	0.184	0.408	0.194
R-squared	0.048	0.057	0.068	0.083	0.056	0.081
Mean of dependent variable	0.083	0.089	0.123	0.147	0.119	0.140
Sampling weights	no	no	yes	yes	yes	yes
Panel B: Treatment on the Treated Estimates, IV						
CARES Treatment	0.296**	0.312**	0.646**	0.533**	0.522*	0.509**
	(0.151)	(0.159)	(0.270)	(0.266)	(0.293)	(0.253)
Cue cards	0.014	0.008	0.022	0.017	0.021	0.017
	(0.016)	(0.016)	(0.024)	(0.026)	(0.023)	(0.025)
# of observations	2000	2000	1226	1161	1287	1218
F-test p-value: CARES = Cues	0.051	0.053	0.016	0.045	0.077	0.044
Mean of dependent variable	0.083	0.089	0.123	0.147	0.119	0.140
Sampling weights	no	no	yes	yes	yes	yes

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions control for the 3 waves of marketing and include covariates (all independent variables from take-up regressions in Table 3). Panel B shows the results of IV regressions with assignment to treatment group as an instrument for CARES take-up. Cue cards take-up is not instrumented by CUES group assignment, because only two respondents rejected the cue cards. Models estimated in columns (3)-(6) are weighted to reflect the different likelihood of a subject taking a urine test between CARES clients and non-clients and across CARES, Cues, and control groups.

Appendix Table 1. Usage of CARES Bank Account by 12-Month Urine Test Result
Summary Statistics, Philippine Pesos (P50 = US$1)

	# of Accounts	Min	Average	Max	Std. Dev
	(1)	(2)	(3)	(4)	(5)
Opening balance	61	50	60.00	410	11.04
Success (i.e., those who passed 12-month urine test)	21	50	74.29	410	78.97
Failures (i.e., those who failed 12-month urine test)	40	50	52.50	100	47.61
# of deposits made into CARES account	61	1	12.70	26	9.22
Success (i.e., those who passed 12-month urine test)	21	1	15.86	26	9.81
Failures (i.e., those who failed 12-month urine test)	40	1	11.05	25	8.56
Proportion of clients who missed 3 deposits & lost deposit collection service	61	0	0.57	1	0.50
Success (i.e., those who passed 12-month urine test)	21	0	0.43	1	0.51
Failures (i.e., those who failed 12-month urine test)	40	0	0.65	1	0.48
Balance at 6 months	61	50	585.58	3410	673.33
Success (i.e., those who passed 12-month urine test)	21	50	786.76	1886.6	617.58
Failures (i.e., those who failed 12-month urine test)	40	50	479.96	3410	684.60

Minimum account opening deposit was 50 pesos.

For this table we drop the 24 clients who were not found for the surprise 12-month test, and code the 1 client who was found and refused to take the test as a failure.

Appendix Table 2: Impact of CARES
Same as Table 4, except using a probit model
Probit, IV-Probit

	Everyone That Did Not Take The Test		Drop If Did Not Take The Test		Everyone That Was Found But Refused To Take The Test Still Smokes	
Assumption:	Continues Smoking					
Outcome Measurement Timing	Six Months	One Year	Six Months	One Year	Six Months	One Year
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Intent-to-Treat Estimates, Probit						
CARES Treatment	0.033**	0.033*	0.061**	0.059**	0.044*	0.055**
	(0.016)	(0.017)	(0.027)	(0.029)	(0.025)	(0.028)
Cue cards	0.015	0.009	0.023	0.020	0.022	0.020
	(0.016)	(0.017)	(0.027)	(0.029)	(0.025)	(0.028)
# of observations	1993	1989	1225	1155	1286	1212
F-test p-value: CARES = Cues	0.232	0.140	0.140	0.178	0.355	0.192
Mean of dependent variable	0.083	0.089	0.123	0.147	0.119	0.140
Sampling weights	no	no	yes	yes	yes	yes
Panel B: Treatment on the Treated Estimates, IV Probit						
CARES Treatment	0.385	0.509	0.736***	0.702***	0.690*	0.689***
	(0.367)	(0.340)	(0.286)	(0.223)	(0.380)	(0.242)
Cue cards	0.014	0.008	0.0238	0.018	0.023	0.018
	(0.015)	(0.017)	(0.026)	(0.028)	(0.025)	(0.027)
# of observations	1993	1989	1225	1155	1286	1212
F-test p-value: CARES = Cues	0.153	0.053	0.074	0.025	0.134	0.028
Mean of dependent variable	0.083	0.089	0.123	0.147	0.119	0.140
Sampling weights	no	no	yes	yes	yes	yes

Marginal effects with robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. All probits control for the 3 waves of marketing and include covariates (all independent variables from take-up regressions in Table 3). Panel B shows the results of IV probits with assignment to treatment group as an instrument for CARES take-up. Cue cards take-up is not instrumented by CUES group assignment, because only two respondents rejected the cue cards. Models estimated in columns (3)-(6) are weighted to reflect the different likelihood of a subject taking a urine test between CARES clients and non-clients and across CARES, Cues, and control groups. The sample size decreases here vs. OLS because indicator variables for a small number of missing baseline survey responses predict a perfect failure in test results.

Appendix Table 3. Impact of CARES
Same as Table 4, except dropping baseline covariates
OLS, IV

	Everyone That Did Not Take The Test		Drop If Did Not Take The Test		Everyone That Was Found But Refused To Take The Test Still Smokes	
Assumption:	Continues Smoking					
Outcome Measurement Timing:	Six Months	One Year	Six Months	One Year	Six Months	One Year
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Intent-to-Treat Estimates, OLS						
CARES Treatment	0.032*	0.034*	0.055**	0.053*	0.038	0.050*
	(0.017)	(0.018)	(0.026)	(0.028)	(0.024)	(0.027)
Cue cards	0.017	0.006	0.026	0.015	0.026	0.015
	(0.017)	(0.017)	(0.024)	(0.027)	(0.023)	(0.026)
# of observations	2000	2000	1226	1161	1287	1218
F-test p-value: CARES = Cues	0.367	0.103	0.272	0.191	0.612	0.200
R-squared	0.007	0.004	0.010	0.006	0.003	0.006
Mean of dependent variable	0.083	0.089	0.123	0.147	0.119	0.140
Sampling weights	no	no	yes	yes	yes	yes
Panel B: Treatment on the Treated Estimates, IV						
CARES Treatment	0.286*	0.303*	0.620**	0.486*	0.469	0.458*
	(0.148)	(0.157)	(0.272)	(0.264)	(0.286)	(0.250)
Cue cards	0.016	0.005	0.026	0.014	0.025	0.014
	(0.016)	(0.016)	(0.024)	(0.026)	(0.023)	(0.025)
# of observations	2000	2000	1226	1161	1287	1218
F-test p-value: CARES = Cues	0.057	0.047	0.024	0.063	0.109	0.064
Mean of dependent variable	0.083	0.089	0.123	0.147	0.119	0.140
Sampling weights	no	no	yes	yes	yes	yes

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions control for the 3 waves of marketing. Panel B shows the results of IV regressions with assignment to treatment group as an instrument for CARES take-up. Cue cards take-up is not instrumented by CUES group assignment, because only two respondents rejected the cue cards. Models estimated in columns (3)-(6) are weighted to reflect the different likelihood of a subject taking a urine test between CARES clients and non-clients and across CARES, Cues, and control groups.

Same as Table 4, Except on Sub-Sample Reporting in Baseline That Want to Stop Smoking at Some Point in Life

OLS, IV

		Everyone That Did Not Take The Test		Drop If Did Not Take The Test		Everyone That Was Found But Refused To Take The Test Continues Smoking	
Assumption:		Continues Smoking					
Outcome Measurement Timing:		Six Months	One Year	Six Months	One Year	Six Months	One Year
		(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Intent-to-Treat Estimates, OLS							
CARES Treatment		0.045**	0.034	0.085***	0.064*	0.062**	0.058*
		(0.020)	(0.021)	(0.031)	(0.035)	(0.028)	(0.033)
Cue cards		0.032*	-0.001	0.053*	0.006	0.049*	0.004
		(0.019)	(0.020)	(0.028)	(0.032)	(0.027)	(0.031)
# of observations		1434	1434	853	824	898	865
F-test p-value: CARES = Cues		0.517	0.094	0.332	0.102	0.679	0.111
R-squared		0.063	0.066	0.095	0.100	0.075	0.097
Mean of dependent variable		0.074	0.099	0.108	0.161	0.105	0.155
Sampling weights		no	no	yes	yes	yes	yes
Panel B: Treatment on the Treated Estimates, IV							
CARES Treatment		0.343**	0.259	0.865***	0.507*	0.716**	0.457*
		(0.146)	(0.162)	(0.298)	(0.279)	(0.321)	(0.265)
Cue cards		0.032*	-0.001	0.058**	0.006	0.053*	0.004
		(0.019)	(0.020)	(0.029)	(0.032)	(0.028)	(0.031)
# of observations		1434	1434	853	824	898	865
F-test p-value: CARES = Cues		0.026	0.090	0.005	0.061	0.032	0.074
Mean of dependent variable		0.074	0.066	0.108	0.161	0.105	0.155
Sampling weights		no	no	yes	yes	yes	yes

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions control for the 3 waves of marketing and include covariates (all independent variables from take-up regressions in Table III). Panel B shows the results of IV regressions with assignment to treatment group as an instrument for CARES take-up. Cue cards take-up is not instrumented by CUES group assignment, because only two respondents rejected the cue cards. Models estimated in columns (3)-(6) are weighted to reflect the different likelihood of a subject taking a urine test between CARES clients and non-clients and across CARES, Cues, and control groups.

Appendix Table 5. Summary Statistics, Outcome Variables
Outcome Measures, For Respondents who Reported in Baseline Wanting to Quit Smoking at Some Point in Their Life

	All	CARES	Cues	Control	t-test of (2) vs (4)	t-test of (3) vs (4)	CARES Group Took up	CARES Group Did Not Takeup	t-test of (7) vs (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Outcome Measures, Six Months									
Found by surveyor for follow-up measurement	0.608	0.611	0.604	0.609	0.930	0.879	0.718	0.505	0.001
	(0.013)	(0.020)	(0.024)	(0.023)			(0.054)	(0.022)	
Agreed to take urine test	0.949	0.914	0.966	0.977	0.001	0.416	0.686	0.949	0.000
	(0.007)	(0.016)	(0.011)	(0.008)			(0.066)	(0.014)	
Found and agreed to test urine test	0.577	0.558	0.583	0.595	0.248	0.727	(0.493)	(0.479)	0.828
	(0.013)	(0.021)	(0.024)	(0.023)			(0.060)	(0.022)	
Passed urine test (omitted missing respondents)	0.159	0.201	0.162	0.109	0.002	0.067	0.743	0.132	0.000
	(0.013)	(0.024)	(0.022)	(0.018)			(0.075)	(0.022)	
Passed urine test	0.092	0.112	0.095	0.065	0.007	0.108	0.366	0.063	0.000
(assumes all respondents who did not take the test are smokers)	(0.008)	(0.013)	(0.014)	(0.012)			(0.058)	(0.011)	
Passed urine test	0.151	0.184	0.156	0.106	0.006	0.075	0.510	0.125	0.000
(assumes all respondents who were found but refused the test are smokers)	(0.012)	(0.023)	(0.022)	(0.017)			(0.071)	(0.021)	
Number of observations	1434	576	412	446			71	505	
Panel B: Outcome Measures, One Year									
Found by surveyor for follow-up measurement	0.584	0.603	0.571	0.573	0.339	0.933	0.771	0.547	0.001
	(0.013)	(0.020)	(0.024)	(0.023)			(0.051)	(0.022)	
Agreed to take urine test	0.946	0.942	0.928	0.967	0.139	0.047	0.981	0.931	0.157
	(0.008)	(0.013)	(0.016)	(0.011)			(0.019)	(0.015)	
Found and agreed to test urine test	0.553	0.568	0.530	0.555	0.668	0.466	(0.746)	(0.509)	0.000
	(0.013)	(0.021)	(0.012)	(0.024)			(0.052)	(0.022)	
Passed urine test (omitted missing respondents)	0.199	0.224	0.156	0.203	0.536	0.164	0.340	0.195	0.020
	(0.014)	(0.024)	(0.023)	(0.024)			(0.066)	(0.025)	
Passed urine test	0.110	0.128	0.083	0.113	0.472	0.138	0.254	0.099	0.000
(assumes all respondents who did not take the test are smokers)	(0.008)	(0.014)	(0.014)	(0.015)			(0.052)	(0.013)	
Passed urine test	0.188	0.212	0.145	0.197	0.649	0.112	0.333	0.181	0.011
(assumes all respondents who were found but refused the test are smokers)	(0.013)	(0.023)	(0.022)	(0.024)			(0.065)	(0.023)	
Number of observations	1434	576	412	446			71	505	

Standard errors in parentheses. Summary statistics shows in columns (1)-(4) are weighted to account for the change in probability of assignment to treatment across the three waves of marketing.