



Put Your Money Where Your Butt Is: A Commitment Savings Account for Smoking Cessation

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Motivation

- Theories on consumption preference over time:
 - Hyperbolic Preferences for addictive substances (Laibson, Thaler, Loewenstein, Rabin, etc....)
 - Dual-self (Fudenberg and Levine)
 - Models of temptation (Gul and Pesendorfer)
- All similar prediction:
 - Preference for commitment
 - Requires some level of sophistication

Prior Empirical Studies

- Empirical literature on commitment savings
 - Ashraf, Karlan, and Yin (2006)—Philippines
 - Thaler and Benartzi (2004)—U.S.
 - Dellavigna and Malmendier (2005)
- Literature on commitment contract on smoking
 - Paxton (1979; 1980; 1982)—but not a randomized study
- Several more underway
 - Exercise
 - weight loss
 - voting (?) etc.
 - stickK.com...

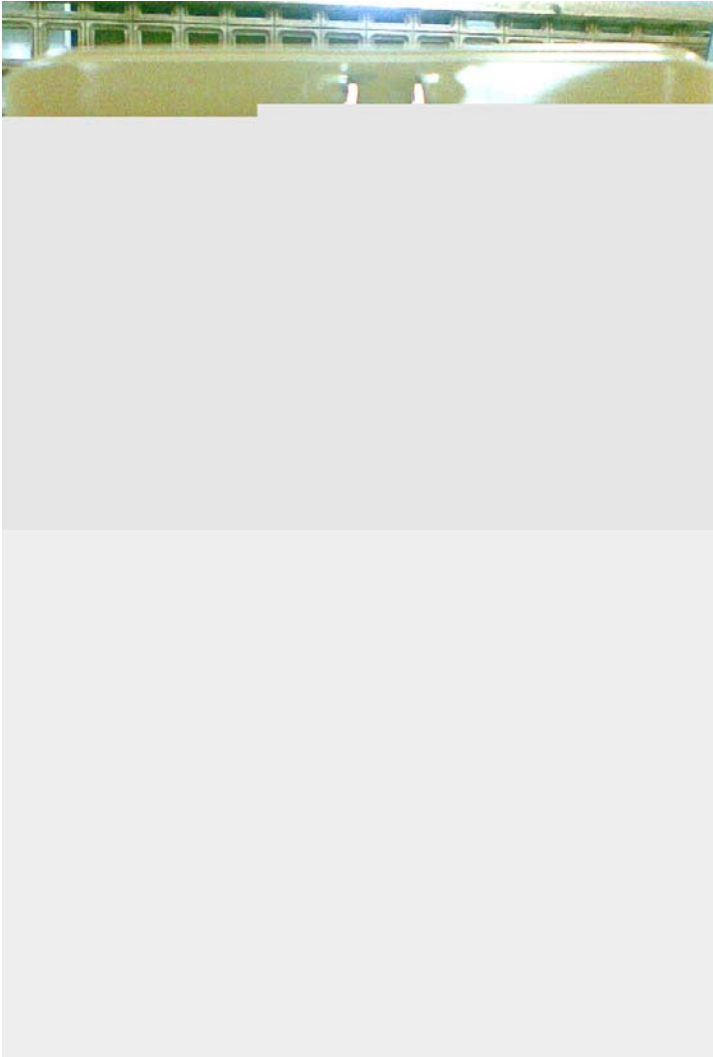
CARES Product Design

“**C**ommitted **A**ction to **R**educe and **E**nd **S**moking”

- Minimum deposit of 50 pesos (\$1.25)
- CARES lock box to help clients save daily
- No access to the money in the account for 6 months
- No interest-bearing
- Weekly deposit collection service (the service stops if the client fails to deposit for 3 consecutive weeks)
- Must pass a urine test within 1 week of the 6 month maturity date in order to gain access to the money in the account

CARES Product Design

CARES Lockbox



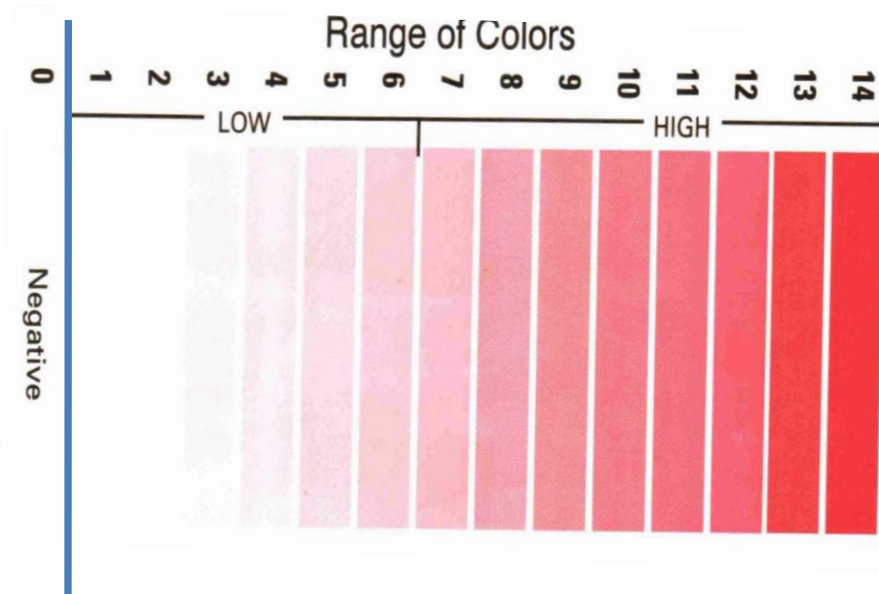
CARES Product Design

Urine Test—NicCheck

- a semi-quantitative urine test for cotinine
- Test strips are dipped into a urine sample
- A chemical reaction that changes the test strip's color



Negative



Positive (L-7)

CUES Treatment

- Testing the theory of aversive signaling
- Pocket-sized card with anti-smoking image
- Subjects are encouraged to put the image at places that make them want to smoke
- Over 99% of those who were offered cue cards received them.



Experimental Design

Sample Frame:

- Smokers in the vicinity of Butuan City
- Smokes everyday (identified during the short baseline survey conducted by Green Bank marketers)

Randomization:

- Pre-randomized survey forms (phase 1 & 2)
- Using respondent's birth date: the residual of $“(dd + mm + yy) / 3”$ (phase 3)

Project Flow

Baseline Survey: Smokers in the target villages
“Do you smoke everyday?” Yes -> Continue with the survey

Phase 1 & 2

Check the Randomization
Assignment (under the sticker in
the back of the survey form)

Phase 3

-Take the respondent's birthday
-Calculate the residual of $(dd + mm + yy)/3$
-1: CARES, 2: CUES, 3: Control

1. CARES Offer
with deposit
collection

2. CARES Offer
without deposit
collection

3. CUES

4. Control

1. CARES

2. CUES

3. Control

Follow-Up Visit for Urine Test after 6 months
and 12 months

Experimental Design

	Interventions	Phase 1: Butuan	Phase 2: Butuan	Phase 2: Ampayon
		Aug-Oct 2006	Oct-Dec 2006	Jan-Jun 2007
CARES 1	-Pamphlet on smoking cessation -CARES offer with deposit collection	45%	15%	33%
CARES 2	-Pamphlet on smoking cessation -CARES offer without deposit collection	45%	15%	--
CUES	-Pamphlet on smoking cessation -Aversive Cue Cards	5%	30%	33%
Control	-Pamphlet on smoking cessation	5%	40%	33%

Analysis

- Uses two assumptions:
 - 1) Those who did not take the urine tests during the follow-up visits continue smoking
 - 2) CARES clients who did not take the urine tests during the follow-up visit continue smoking; others who didn't take the test have the same quit rate
- Specifications
 - 1) OLS (ITT)
 - 2) Probit (ITT)
 - 3) IV/IV-probit (TOT, using Treatment assignment as a predictor for taking up the product)

Table I: Usage of CARES Bank Account

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
# of deposits made into CARES account	85	1	11.75	29	9.35
Balance at 6 months	85	50	551.12	3410	665.01
Balance at 6 months returned to clients (successes)	29	282.75	1079.58	3410	703.37
Balance at 6 months forfeited to charity (failures)	56	50	277.45	2657.75	414.62
Proportion of clients who missed 3 deposits & lost deposit collection service	85	0	0.14	1	0.35

Table IIa.1: Summary Statistics, Baseline Variables

Baseline Measures

							CARES Group		
	All	CARES	Cues	Control	t-test of (2) vs (4)	t-test of (3) vs (4)	Took up	Did Not Takeup	t-test of (7) vs (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	0.058 (0.005)	0.061 (0.008)	0.599 (0.010)	0.053 (0.009)	0.528	0.609	0.072 (0.029)	0.069 (0.010)	0.905
Age	36.572 (0.310)	36.952 (0.493)	35.671 (0.547)	36.972 (0.576)	0.978	0.102	38.341 (1.367)	37.181 (0.520)	0.465
# cigs per day, past 7	14.532 (0.234)	14.184 (0.350)	15.052 (0.463)	14.462 (0.417)	0.609	0.344	14.122 (1.105)	14.067 (0.369)	0.962
Tried to stop smoking in the past 12 months	0.457 (0.011)	0.446 (0.018)	0.453 (0.020)	0.476 (0.020)	0.275	0.419	0.422 (0.055)	0.427 (0.019)	0.927
Wants to stop smoking sometime in life	0.723 (0.010)	0.725 (0.138)	0.690 (0.019)	0.754 (0.351)	0.223	0.013	0.855 (0.039)	0.723 (0.017)	0.010

Table IIa.2: Summary Statistics, Baseline Variables

Baseline Measures (continued)

							CARES Group		
	All	CARES	Cues	Control	t-test of (2) vs (4)	t-test of (3) vs (4)	Took up	Did Not Takeup	t-test of (7) vs (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Wants to stop smoking now	0.168	0.178	0.144	0.179	0.958	0.100	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	0.168	0.452	0.427	0.038	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	0.101	0.717	0.162	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	0.474	0.555	0.497	0.005	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	0.380	0.400	0.377	0.473	0.277	0.461	0.001
	(0.011)	(0.018)	(0.020)	(0.020)			(0.049)	(0.019)	

Table IIa.3: Summary Statistics, Baseline Variables

Baseline Measures (continued)

							CARES Group		
	All	CARES	Cues	Control	t-test of (2) vs (4)	t-test of (3) vs (4)	Took up	Did Not Takeup	t-test of (7) vs (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
There are situations that make him/her want to smoke	0.933	0.954	0.912	0.928	0.046	0.292	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	0.781	0.858	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	0.525	0.530	0.510	0.532	0.939	0.446	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 on all of the above baseline variables.					0.410	0.540			
					[0.9686]	[0.8999]			
Number of observations	2000	781	603	616			83	698	

Table III.1: Analysis of CARES Take-up
OLS, Probit

Specifications:	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)

Table III.2: Analysis of CARES Take-up
 OLS, Probit (continued).

Specifications:	OLS	Probit
	(1)	(2)
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)
Observations	781	775
Mean of dependent variable	0.106	0.107

Appendix Table I: Impact of CARES
 Same as Table IV, except using probit model, ITT

Restrictions on sample frame from baseline questions:	Everyone That Did Not Take The Test Continues Smoking		No Assumption		Everyone That Was Found But Refused To Take The Test Still Smokes	
	(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
Include covariates	no	no	yes	yes	yes	yes

Appendix Table I: Impact of CARES

Same as Table IV, except using probit model, TOT

Restrictions on sample frame from baseline questions:	Everyone That Did Not Take The Test Continues Smoking		No Assumption		Everyone That Was Found But Refused To Take The Test Still Smokes	
	(1)	(2)	(3)	(4)	(5)	(6)
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
Include covariates	no	no	yes	yes	yes	yes

Appendix Table II: Impact of CARES

Same as Table IV, except using no covariates, ITT

Restrictions on sample frame from baseline questions:	Everyone That Did Not Take The Test Continues Smoking		No Assumption		Everyone That Was Found But Refused To Take The Test Still Smokes	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: Treatment on the Treated 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
Include covariates	no	no	yes	yes	yes	yes

Appendix Table II: Impact of CARES

Same as Table IV, except using no covariates, TOT

Restrictions on sample frame from baseline questions:	Everyone That Did Not Take The Test Continues Smoking		No Assumption		Everyone That Was Found But Refused To Take The Test Still Smokes	
	(1)	(2)	(3)	(4)	(5)	(6)
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
Include covariates	no	no	yes	yes	yes	yes

Appendix Table III: Impact of CARES, ITT

Same as Table IV, Sub-Sample Restriction from Baseline:

Respondent Reported Wanting to Stop Smoking at Some Point in Life

Restrictions on sample frame from baseline questions:	Everyone That Did Not Take The Test Continues Smoking		No Assumption		Everyone That Was Found But Refused To Take The Test Still Smokes	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: Treatment on the Treated 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
Include covariates	no	no	yes	yes	yes	yes

Appendix Table III: Impact of CARES, TOT

Same as Table IV, Sub-Sample Restriction from Baseline:

Respondent Reported Wanting to Stop Smoking at Some Point in Life

Restrictions on sample frame from baseline questions:	Everyone That Did Not Take The Test Continues Smoking		No Assumption		Everyone That Was Found But Refused To Take The Test Still Smokes	
	(1)	(2)	(3)	(4)	(5)	(6)
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
Include covariates	no	no	yes	yes	yes	yes

Summary Results

- 83 out of 781 (11%) individuals offered CARES signed a contract.
- Few take-ups among those who were offered CARES without deposit collection services
- Intent-to-treat effect of 3.1 percentage points (38.8% increase in the likelihood of passing the urine test)
- Slightly higher impact among those who reported that they wanted to quit smoking.
- Treatment-on-the-treated effect of 28.7 percentage points

Future Studies

- Specific contract features
 - Savings box
 - Deposit collection
- Wider implementation questions
 - How to market effectively and clearly
 - Refereeing system
 - Marketing

**Table IIb: Summary Statistics, Outcome Variables
Outcome Measures, Full-Sample, Six Months**

	Treatment Assignment Groups					
	All	CARES	Cues	Control	t-test of (2) vs (4)	t-test of (3) vs (4)
	(1)	(2)	(3)	(4)	(5)	(6)
Found by surveyor for follow-up measurement	0.634 (0.011)	0.642 (0.017)	0.629 (0.020)	0.629 (0.019)	0.596	0.982
Agreed to take urine test, conditional on being found	0.952 (0.006)	0.932 (0.012)	0.963 (0.009)	0.968 (0.009)	0.015	0.737
Passed urine test (omitted missing respondents)	0.153 (0.010)	0.181 (0.019)	0.153 (0.010)	0.124 (0.016)	0.023	0.316
Passed urine test (assumes all respondents who did not take the test are smokers)	0.093 (0.007)	0.108 (0.011)	0.093 (0.006)	0.075 (0.011)	0.033	0.355
# of CARES accounts	85	83	2	0		
Number of observations	2001	781	603	616		

Table IIb: Summary Statistics, Outcome Variables
Outcome Measures, Full-Sample, Six Months (continued).

	CARES Group		
	Took up	Did Not Takeup	t-test of (7) vs (8)
	(7)	(8)	(9)
Found by surveyor for follow-up measurement	0.723 (0.049)	0.547 (0.019)	0.002
Agreed to take urine test, conditional on being found	0.700 (0.060)	0.958 (0.010)	0.000
Passed urine test (omitted missing respondents)	0.690 (0.072)	0.128 (0.018)	0.000
Passed urine test (assumes all respondents who did not take the test are smokers)	0.349 (0.053)	0.067 (0.009)	0.000
# of CARES accounts			
Number of observations	83	698	

Table IIb: Summary Statistics, Outcome Variables
 Outcome Measures, Full-Sample, One Year

	Treatment Assignment Groups					
	All	CARES	Cues	Control	t-test of (2) vs (4)	t-test of (3) vs (4)
	(1)	(2)	(3)	(4)	(5)	(6)
Found by surveyor for follow-up measurement	0.596 (0.011)	0.615 (0.017)	0.578 (0.201)	0.590 (0.020)	0.339	0.670
Agreed to take urine test, conditional on being found	0.949 (0.006)	0.948 (0.010)	0.941 (0.012)	0.958 (0.010)	0.489	0.280
Passed urine test (omitted missing respondents)	0.181 (0.011)	0.203 (0.019)	0.155 (0.019)	0.178 (0.020)	0.372	0.389
Passed urine test (assumes all respondents who did not take the test are smokers)	0.103 (0.007)	0.118 (0.012)	0.084 (0.011)	0.101 (0.012)	0.296	0.313
# of CARES accounts	85	83	2	0		
Number of observations	2001	781	603	616		

Table IIb: Summary Statistics, Outcome Variables
Outcome Measures, Full-Sample, One Year (continued).

	CARES Group		
	Took up	Did Not Takeup	t-test of (7) vs (8)
	(7)	(8)	(9)
Found by surveyor for follow-up measurement	0.723 (0.049)	0.547 (0.019)	0.001
Agreed to take urine test, conditional on being found	0.984 (0.016)	0.939 (0.012)	0.157
Passed urine test (omitted missing respondents)	0.350 (0.062)	0.175 (0.020)	0.002
Passed urine test (assumes all respondents who did not take the test are smokers)	0.253 (0.048)	0.093 (0.011)	0.000
# of CARES accounts			
Number of observations	83	698	

Appendix Table 2.1: Impact of CARES

Dropping non-CARES clients who did not take the urine test, ITT

Restrictions on sample frame from baseline questions:	Full sample		Wants to quit smoking sometime in their lives		There are situations that make him/her want to smoke	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Intent-to-treat estimates, OLS						
CARES Treatment	0.026 (0.024)	0.031 (0.024)	0.047* (0.028)	0.052* (0.028)	0.030 (0.024)	0.034 (0.024)
Cue cards	0.028 (0.024)	0.024 (0.024)	0.058** (0.029)	0.057** (0.028)	0.028 (0.024)	0.025 (0.024)
# of observations	1273	1273	894	894	1255	1255
F-test p-value: CARES = Cues	0.94	0.77	0.74	0.88	0.96	0.71
R-squared	0.00	0.05	0.01	0.07	0.00	0.05
Mean of dependent variable	0.12	0.12	0.11	0.11	0.12	0.12

Appendix Table 2.2: Impact of CARES

Dropping non-CARES clients who did not take the urine test, TOT

Restrictions on sample frame from baseline questions:	Full sample		Wants to quit smoking sometime in their lives		There are situations that make him/her want to smoke	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: Treatment on the treated estimates, IV						
CARES Treatment	0.285	0.340	0.450*	0.516*	0.303	0.350
	(0.262)	(0.263)	(0.265)	(0.281)	(0.243)	(0.243)
Cue cards	0.027	0.023	0.057**	0.059**	0.028	0.025
	(0.024)	(0.024)	(0.028)	(0.029)	(0.024)	(0.024)
# of observations	1273	1273	894	894	1255	1255
F-test p-value: CARES = Cues	0.31	0.21	0.12	0.09	0.24	0.16
R-squared	0.02	0.06	0.01	0.07	0.02	0.07
Mean of dependent variable	0.12	0.12	0.11	0.11	0.12	0.12