

Supplementary Web Material: Price Subsidies, Diagnostic Tests, and Targeting of Malaria Treatment: Evidence from a Randomized Controlled Trial

Jessica Cohen

Pascaline Dupas

Simone Schaner*

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Appendix A: Predicting Malaria Positivity and Main Appendix Tables

We impute malaria probabilities to endline illness episodes based on the following probit model, fit to our symptoms database:

$$\Pr(pos_{eh} = 1 \mid x_{eh}, over14_{eh}) = \Phi \left(\beta_0 + x'_{eh} \delta + over14_{eh} \lambda + (x \times over14)'_{eh} \gamma \right)$$

where pos_{eh} is a dummy variable equal to 1 if illness episode e experienced by household h in our symptoms database tested RDT positive for malaria, x_{eh} is a vector of illness characteristics including patient age and age squared, as well as symptom dummies (cough, chills, headache, diarrhea, runny nose, vomiting, body pain, malaise/fatigue, and poor appetite), and $over14_{eh}$ is a dummy variable indicating that the patient is aged 14 or older (i.e. requires an “adult” dose; see Figure A1). We also interact all the symptom dummies with this indicator, to allow for a different relationship between malaria positivity and symptoms among younger and older patients.¹

*Jessica Cohen: Harvard School of Public Health and Brookings Institution, cohenj@hsph.harvard.edu. Pascaline Dupas: Stanford Department of Economics and NBER, pdupas@stanford.edu. Simone Schaner: Dartmouth College Department of Economics, simone.schaner@dartmouth.edu

¹We do not include the most commonly cited symptom of malaria, fever, in order to avoid endline reporting bias. In Kiswahili (the interview language for our respondents), the word for “fever” – “*homa*” – is commonly used to refer to malaria. A concern is that if the subsidy regimes we study affected the likelihood that people get a formal diagnosis, this would make the reporting of *homa* (hence fever) endogenous. The pseudo R^2 on the probit declines from 0.2308 to 0.2216 when excluding fever and its interaction with the

The results of this regression are presented in Appendix Table A3. Our estimates are consistent with clinical indicators of malaria (CDC 2011) – chills, headaches, and body pain are positively correlated with malaria positivity, while runny nose is negatively correlated with malaria positivity. Table A3 also reveals that age correlates very strongly with malaria positivity. Although the interaction terms make the trend somewhat difficult to infer, sick children (aged 13 and under) are substantially more likely to actually have malaria as compared to sick adults (the relevant fractions testing positive are 14 percent for adults and 58 percent for children). While striking, these results are not unexpected – young children are substantially more vulnerable to malaria, as they do not benefit from the acquired immunity that develops with repeated exposure to the parasite. Appendix Figure A2 presents the distribution of predicted positivity among first illness episodes in our endline survey.

References

CDC (2011). About Malaria. <http://www.cdc.gov/malaria/about/disease.html>. Accessed April 14, 2011.

age variables. In practice, our results are very similar when including fever in predicting malaria positivity (though including fever does appear to introduce some reporting bias).

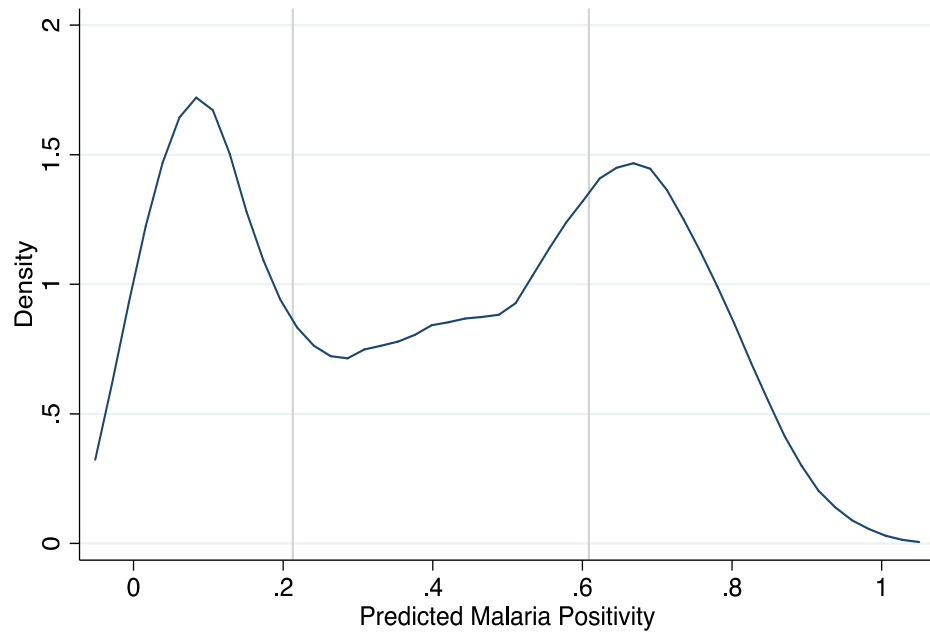
Appendix Figure A1. ACT Price and Dosing Guide

	<i>Recommended Dose and Corresponding Dose Cost for:</i>			
	Adult (14+)	Ages 9-13	Ages 4-8	Ages 3m-3y
Dose	4 pills, twice a day for three days	3 pills, twice a day for three days	2 pills, twice a day for three days	1 pill, twice a day for three days
Price Per Pill				
Ksh 20.83 (Control)	Ksh 500	Ksh 375	Ksh 250	Ksh 125
Ksh 4.16 (80% Subsidy)	Ksh 100	Ksh 75	Ksh 50	Ksh 25
Ksh 2.50 (88% Subsidy)	Ksh 60	Ksh 45	Ksh 30	Ksh 15
Ksh 1.66 (92% Subsidy)	Ksh 40	Ksh 30	Ksh 20	Ksh 10

Notes: The exchange rate at the time of the study was around 78 Ksh to US\$1. The tables reads as follows. Column 1: The unsubsidized ACT cost is Ksh 500 (\$6.25) for an adult dose (age 14+). 80%, 88% and 92% subsidies correspond to 100 Ksh (\$1.25), 60 Ksh (\$0.75) and 40Ksh (\$0.50) for an adult dose, respectively.

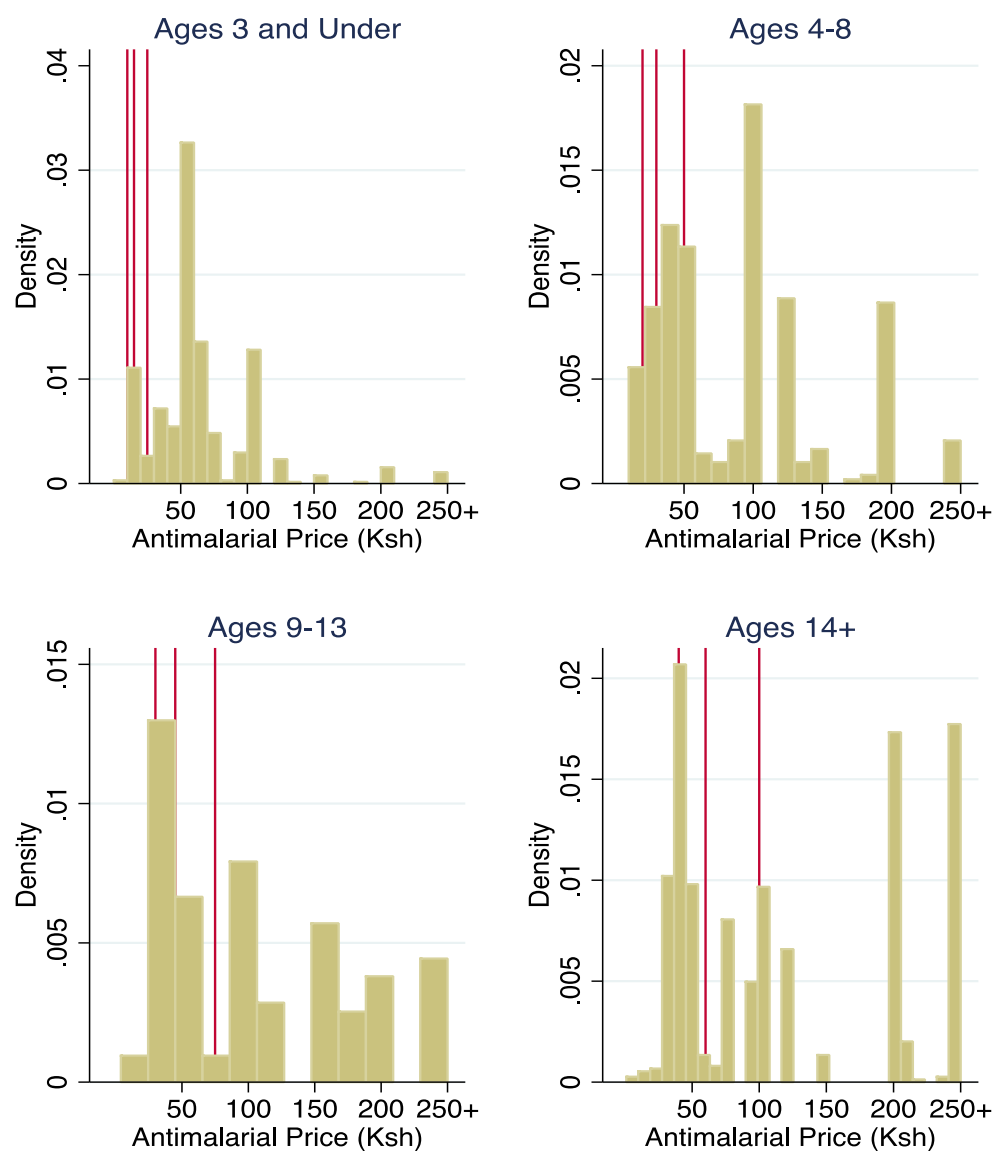
Ideal dosing is based on weight but manufacturers and the Kenyan Ministry of Health provide age guidelines as well, as it is not always feasible to weigh malaria patients. This study used the age guidelines from the Kenya Ministry of Health.

Appendix Figure A2. Distribution of Predicted Positivity Among Endline Illness Episodes



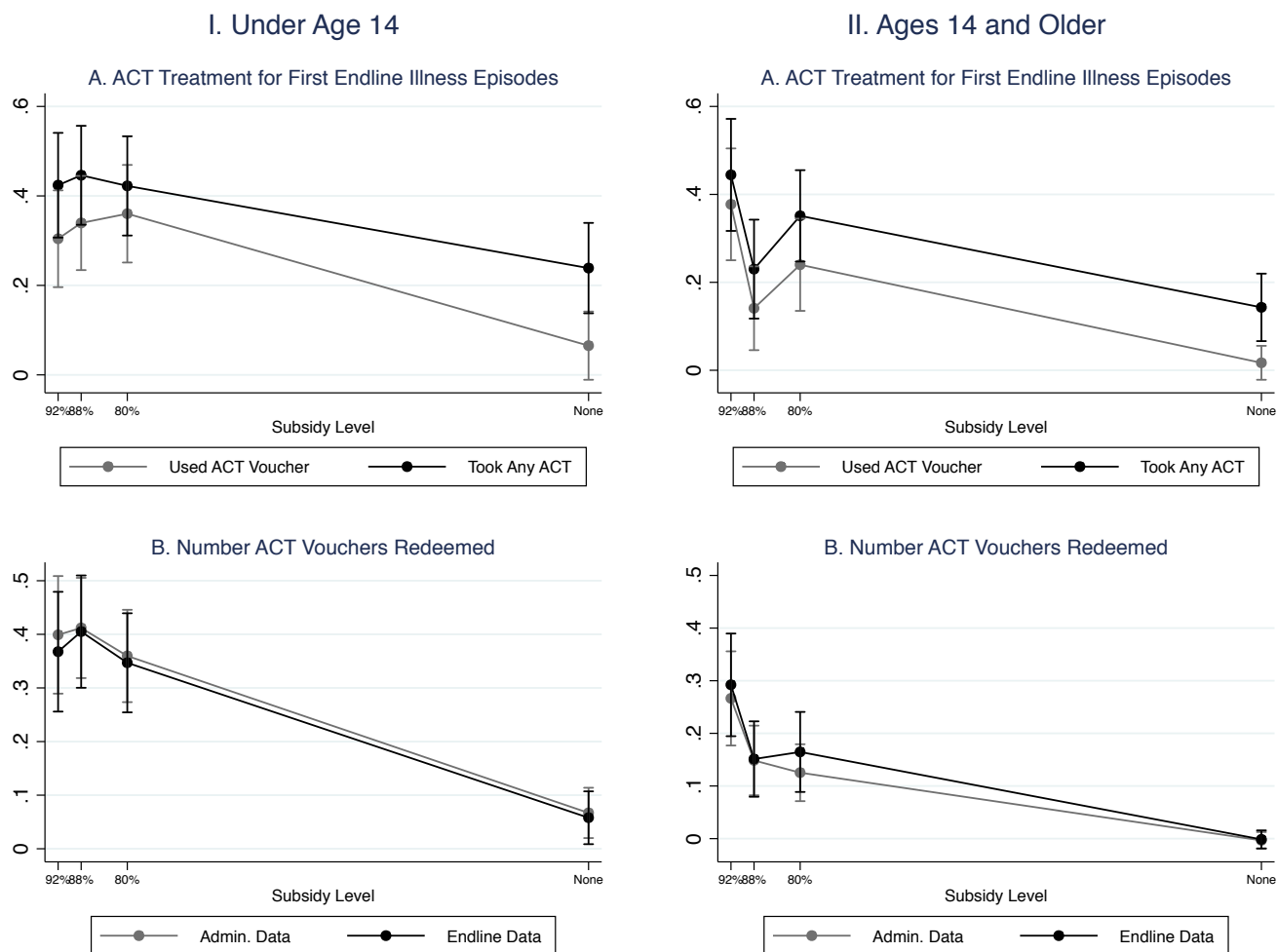
Notes: Data source: endline survey. Sample limited to first illness episodes. Graph shows kernel density estimate. Gray vertical lines demarcate tertiles of predicted

Figure A3. Distribution of Unsubsidized Antimalarial Prices by Patient Age



Notes: Data are from observed purchases of unsubsidized antimalarials at the four study drug shops. Red vertical lines indicate the three subsidized ACT prices for each age group.

Figure A4. ACT Demand by Subsidy Level and Age



Notes: All panels exclude households randomly selected to receive a surprise RDT test and households randomly selected to receive RDT vouchers. All regressions include strata fixed effects as well as controls for the age of the household head. Whiskers give 95 percent confidence intervals based on robust standard errors (clustered at the household level in endline data).

Appendix Table A1. Baseline Treatment Seeking Behavior

	(1)	(2)	(3)	(4)
		By Patient's Age		
		Patient 13	Patient	P-value
		or	14 or	Under
	All	Younger	Older	14=14+
<i>Household Level Malaria and Diagnostic Incidence</i>				
Number of Presumed Malaria Episodes Last Month	1.22	0.752	0.434	-
At Least One Presumed Malaria Episode Last Month	0.685	0.490	0.332	-
HH Member Took RDT Test in Last Month (if Reported Malaria)	0.040	-	-	-
HH Member Took Microscopy Test in Last Month (if Reported Mal	0.251	-	-	-
<i>Treatment Seeking for All Presumed Malaria Episodes</i>				
Did not Seek Care	0.182	0.153	0.218	0.000***
Went to Health Center	0.413	0.445	0.374	0.000***
Went to Drug Shop	0.369	0.365	0.376	0.552
<i>Medication for All Presumed Malaria Episodes</i>				
No Antimalarial Taken	0.221	0.194	0.255	0.000***
Took ACT	0.213	0.237	0.182	0.000***
Took Sulfadoxine-Pyrimethamine (SP)	0.100	0.079	0.140	0.000***
Took Amodiaquine (AQ)	0.181	0.209	0.141	0.000***
Took Other Antimalarial	0.072	0.086	0.052	0.000***
Forgot Name of Antimalarial Taken	0.217	0.198	0.233	0.027**
<i>Source of Antimalarials (Among Antimalarial Takers)</i>				
Health Center	0.444	0.459	0.428	0.149
Drug Shop	0.523	0.515	0.537	0.322
Another Source	0.033	0.026	0.035	0.158
<i>Cost per Episode (Among Antimalarial Takers)</i>				
Total Cost (\$US)	1.68	1.49	2.06	0.001***

Notes: Data source: baseline survey. Standard errors clustered at household level for episode-level statistics. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Appendix Table A2. Reporting Bias With Endline Illness Episodes

	(1)	(2)	(3)	(4)	(5)
	Reported Any Illness Episode	Number Episodes Reported	Predicted Malaria Positivity - First Episode	Days Ago - First Episode	Patient Age - First Episode
ACT 92%	0.015 (0.020)	0.024 (0.157)	0.013 (0.025)	1.73 (3.86)	-1.71 (1.65)
ACT 88%	0.002 (0.021)	-0.063 (0.155)	0.028 (0.025)	4.72 (3.75)	-2.92* (1.61)
ACT 80%	-0.020 (0.021)	-0.168 (0.155)	0.010 (0.025)	3.19 (3.78)	-1.69 (1.62)
RDT Subsidy	0.006 (0.010)	-0.025 (0.078)	0.004 (0.012)	-1.27 (1.87)	0.906 (0.777)
Surprise RDT Test	0.001 (0.010)	0.089 (0.079)	-0.021* (0.012)	5.09*** (1.95)	0.988 (0.797)
P-value (92=88=80)	0.005***	0.101	0.315	0.388	0.221
DV Mean (No Subsidies)	0.950	3.05	0.411	64.7	19.1
N	2621	2621	2473	2438	2473

Notes: Data source: endline survey. Table presents the results of regressing listed outcomes on listed treatment dummies. Robust standard errors (clustered at the household level when relevant) in parentheses. All regressions include full set of strata dummies and a control for household head age. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Appendix Table A3. Predicting Malaria Positivity - Probit Marginal Effects

	(1)	(2)
	Coefficient	Standard Error
Cough	-0.001	(0.061)
Chills	0.132	(0.097)
Headache	0.125*	(0.072)
Diarrhea	0.247***	(0.084)
Runny Nose	-0.119**	(0.060)
Vomiting	0.063	(0.072)
Body Pain	0.197*	(0.111)
Malaise	-0.052	(0.149)
Poor Appetite	0.131	(0.104)
Age 14 or Above	0.398*	(0.239)
Age	0.106***	(0.032)
Age Squared	-0.008***	(0.003)
(Age 14 or Above)×Cough	-0.096	(0.126)
(Age 14 or Above)×Chills	-0.235**	(0.113)
(Age 14 or Above)×Headache	-0.070	(0.126)
(Age 14 or Above)×Diarrhea	-0.221*	(0.131)
(Age 14 or Above)×Runny Nose	0.222	(0.147)
(Age 14 or Above)×Vomiting	0.089	(0.155)
(Age 14 or Above)×Body Pain	-0.106	(0.133)
(Age 14 or Above)×Malaise	-0.075	(0.171)
(Age 14 or Above)×Poor Appetite	0.005	(0.260)
(Age 14 or Above)×Age	-0.138***	(0.034)
(Age 14 or Above)×Age Squared	0.009***	(0.003)
DV Mean / N	0.428	533

Notes: Data source: Symptoms database (see text section 4.3 for details). Standard errors in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively. We do not include the most commonly cited symptom of malaria, fever, in order to avoid endline reporting bias. In Kiswahili, the word for “fever” (homa) is commonly used to refer to “malaria”. A concern is that if the subsidy regimes we study affected the likelihood that people get a formal diagnosis, this would make the reporting of homa endogenous. The pseudo R² on the probit declines from 0.2191 to 0.2103 when excluding fever and its interaction with the age variables. In practice, our results are very similar when including fever in predicting malaria positivity (though including fever does appear to introduce some reporting bias).

Appendix Table A4. RDT Take-Up by RDT Price

	Took RDT	Sought Treatment at Drug Shop	Took RDT Sought Treatment
Free RDT	0.354*** (0.023)	0.016 (0.029)	0.812*** (0.028)
RDT sold at Ksh 15, bundled refund ^a	0.362*** (0.023)	0.055* (0.029)	0.767*** (0.030)
RDT sold at Ksh 15, no refund	0.342*** (0.019)	0.020 (0.025)	0.780*** (0.025)
P-value (equality of RDT treatments)	{0.787}	{0.419}	{0.462}
Any RDT	0.351*** (0.013)	0.029 (0.021)	0.784*** (0.018)
DV Mean (No RDT voucher)	0.005	0.415	0.012
N	2609	2609	1131

Notes: Data source: administrative drug shop data. Sample includes all households selected for subsidized ACTs. Heteroskedasticity robust standard errors in parentheses, p-values in braces. All regressions include controls for ACT price treatment, surprise RDT selection, and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

^a Households in the "bundled refund" group received a refund for the RDT cost in the form of a Ksh 15 rebate on the ACT price if the RDT test was positive.

Appendix Table A5. The Impact of RDT Subsidies on Predicted Positivity of Malaria Treatment Seekers and ACT Takers

	(1)	(2)	(3)	(4)
	First Redemptions at Drug Shop (Admin. Data)		First Illness Episodes at Endline	
	Took ACT		Took	
<i>Sample limited to those who:</i>	Visited Drug Shop	at Drug Shop	Antimalarial or Malaria Test	Took Antimalarial
<i>A. Across all ACT Subsidy Levels</i>				
RDT Subsidy	-0.001 (0.016)	0.031* (0.016)	0.000 (0.020)	0.006 (0.021)
<i>B. By ACT Subsidy Level</i>				
RDT Subsidy $\times$ 92% ACT Sub	0.028 (0.030)	0.049 (0.030)	0.020 (0.036)	0.028 (0.037)
RDT Subsidy $\times$ 88% ACT Sub	-0.006 (0.027)	0.029 (0.027)	-0.021 (0.032)	0.000 (0.035)
RDT Subsidy $\times$ 80% ACT Sub	-0.024 (0.027)	0.014 (0.027)	0.004 (0.033)	-0.006 (0.035)
DV Mean (ACT 92%, No RDT)	0.435	0.437	0.433	0.444
N	1127	1048	1125	1014

Notes: The dependent variable is predicted malaria positivity. Robust standard errors, clustered at the household level, when relevant. Columns 3 and 4 exclude households who did not receive vouchers for subsidized RDTs but were selected for a surprise RDT test at the drug shop. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Appendix Table A6. External Validity Comparisons

	(1)	(2)	(3)	(4)
	Central Uganda ^a	Eastern Uganda ^b	Western and Southeastern Tanzania ^c	Southern Malawi ^d
	November- December 2010	May-June 2011	March 2011	January- March 2011
<i>Malaria Burden (reported/perceived)</i>				
HH Had at least one (Presumed)				
Malaria Episode (Past Month)	0.590	0.354	0.273	0.410
<i>Treatment Seeking for Malaria</i>				
Public Sector	0.250	0.333	0.417	0.760
Private Sector*	0.660	0.426	0.392	0.120
No Treatment Sought	0.090	0.221	0.187	0.120
<i>Malaria Diagnosis (Any Blood Malaria Test)</i>				
Last Month	0.150	0.225		
Last Suspected Episode			0.360	
<i>Medication Taken</i>				
Took ACT (Suspected Malaria)	0.330	0.376	0.496	
Antimalarial Cost	1.690	1.355	1.366	
*Includes private clinics and retail sector				

^aSurvey conducted in Luwero district. Malaria positivity figures are among purchasers of subsidized ACTs sold over-the-counter in local drug shops, with price ranging from \$0.10 - \$0.40 by age group/dosing level. Funding: Department for International Development, Clinton Health Access Initiative and Bill and Melinda Gates Foundation. Author: Jessica Cohen.

^bSurvey conducted in Budaka, Bukedea, Kibuku, Kumi, Ngora and Pallisa districts. Malaria positivity figures are among household members from a random sample of the population. Funding: Clinton Health Access Initiative and Bill and Melinda Gates Foundation. Authors: Jessica Cohen, William Dickens, Gunther Fink.

^cSurvey conducted in Mtwara and Rukwa regions. Funding: Clinton Health Access Initiative and Bill and Melinda Gates Foundation. Authors: Jean Arkedis, Jessica Cohen, Julius Massaga, Prashant Yadav.

^dSurvey conducted in Machinga and Balaka districts. Funding: Bill and Melinda Gates Foundation. Authors: Pascaline Dupas, Dean Karlan, Jonathan Robinson.

Appendix Table A7. Significant Results - Original P-Values and FDR-Adjusted Q-Values

Table Number					
2 (Cols 1-4)	2 (Cols 5-8)	3	4	5	6
0.187***	-0.079*	0.187**	-0.057**	0.216***	0.127*
<i>0.000</i>	<i>0.057</i>	<i>0.022</i>	<i>0.033</i>	<i>0.000</i>	<i>0.071</i>
<i>0.001</i>	<i>0.121</i>	<i>0.061</i>	<i>0.083</i>	<i>0.001</i>	<i>0.147</i>
0.225***	-0.106**	0.182**	-0.080***	0.258***	0.081**
<i>0.000</i>	<i>0.026</i>	<i>0.031</i>	<i>0.002</i>	<i>0.000</i>	<i>0.036</i>
<i>0.001</i>	<i>0.070</i>	<i>0.083</i>	<i>0.009</i>	<i>0.001</i>	<i>0.084</i>
0.161***	-0.096***	0.112***	0.256*	0.252***	0.163**
<i>0.001</i>	<i>0.007</i>	<i>0.009</i>	<i>0.088</i>	<i>0.000</i>	<i>0.020</i>
<i>0.008</i>	<i>0.029</i>	<i>0.033</i>	<i>0.183</i>	<i>0.001</i>	<i>0.060</i>
0.178***	-0.110***	0.107**		0.152***	
<i>0.000</i>	<i>0.009</i>	<i>0.013</i>		<i>0.000</i>	
<i>0.002</i>	<i>0.033</i>	<i>0.042</i>		<i>0.001</i>	
0.222***	-0.097**	0.111**		0.215***	
<i>0.000</i>	<i>0.021</i>	<i>0.036</i>		<i>0.000</i>	
<i>0.001</i>	<i>0.060</i>	<i>0.084</i>		<i>0.001</i>	
0.249***	-0.085*			0.263***	
<i>0.000</i>	<i>0.056</i>			<i>0.000</i>	
<i>0.001</i>	<i>0.121</i>			<i>0.001</i>	
0.217***	-0.072**			0.229***	
<i>0.000</i>	<i>0.036</i>			<i>0.000</i>	
<i>0.001</i>	<i>0.084</i>			<i>0.001</i>	
0.206***	-0.100***			0.166***	
<i>0.000</i>	<i>0.009</i>			<i>0.000</i>	
<i>0.001</i>	<i>0.033</i>			<i>0.001</i>	
0.167***				0.070**	
<i>0.000</i>				<i>0.011</i>	
<i>0.002</i>				<i>0.036</i>	
0.159***					
<i>0.007</i>					
<i>0.028</i>					
0.167***					
<i>0.004</i>					
<i>0.018</i>					
0.173***					
<i>0.001</i>					
<i>0.007</i>					

Notes: Regression coefficients are in plain text, unadjusted p-values are in italics, and sharpened q-values that control the false discovery rate are in bold italics. The sharpened q-values are calculated

Appendix B: Analysis Samples

This appendix describes which sample is used in each table. Indeed given our experimental design we have to omit certain subgroups from certain analyses. For example, when analyzing the impact of subsidies on medication choices we ignore those sampled for surprise RDT tests since obviously getting tested has the potential to change medication decisions. All of our analyses similarly require selecting out a portion of the sample but which portion differs across tables. The table below indicates which subgroup is present in which analysis.

Appendix Table B1. Analysis Samples

Treatment Group	Surprise RDT Test?	Visited Drug Shop?	Took ACT?	Sample Size		Table 1	Table 2	Table 3	Table 4		Table 6				Table A2*, Col 3-5	Table A4		Table A5**	
				Admin. Data	Endline Illnesses				PA	PB	Col 1	Col 2	Col 3	Col 4		Col 1-2	Col 3	Col 1	Col 2
Control	No	No	No	8	136	A	E								E				
		Yes	No	0		A	E								E				
		Yes	Yes	172	32	A	E								E				
ACT Subsidy	No	No	No	296	283	A	E		A						E	A			
		Yes	No	0		A	E		A						E	A	A	A	
		Yes	Yes	201	180	A	E	E	A						E	A	A	A	A
		No	No	280		A			A		A				E	A			
ACT + RDT Subsidy	Yes	Yes	No	1	277	A			A		A	A			E	A	A	A	
		Yes	Yes	206	176	A		A	A	A	A	A	A		E	A	A	A	A
		No	No	186	173	A									E	A			
	No	Yes	No	12		A									E	A	A	A	
		Yes	Yes	138	130	A									E	A	A	A	A
		No	No	716	733	A					A				E	A			
	Yes	Yes	No	67		A					A	A			E	A	A	A	
		Yes	Yes	506	494	A					A	A	A	A	E	A	A	A	A
		Totals		2789	2614	2789	631	206/180	984	206	1993	1776	780	712	573	2614	2609	1131	1051

Notes: Tables marked with asterisks include samples that are not easily described by the guide. We provide additional detail on those samples below. We do not break down the endline data by whether the patient sought care at the drug shop since this is not relevant for any of the tables. The letter "A" indicates that the sample is drawn from the administrative data based, while the letter "E" indicates a sample drawn from the endline database. This table gives the total eligible sample for a given table. In some cases (e.g. Table 3) the actual sample is somewhat lower due to missing data for the outcome variable. The total eligible sample in Panel B of Table 4 is split between columns 1 and 2.

* The eligible sample in columns 1 and 2 of Table A2 is all households (regardless of subsidy treatment or surprise RDT status) interviewed at endline.

** The eligible sample in column 3 of Table A5 includes all first illness episodes treated with either a malaria test or an antimalarial in households not selected for a surprise RDT. The sample in column 4 is then limited to those illness episodes treated with an antimalarial.

Appendix H: Heterogeneity

This web appendix presents heterogeneity analyses for the main results. We test for heterogeneity in the effects of the ACT and RDT subsidies by (1) literacy status of the female head; and (2) baseline knowledge of malaria transmission. The table numbers used in this appendix match those used in the main paper. The index "L" or "K" after the table number reflects whether the heterogeneity analysis is based on literacy status or knowledge status.

Table 2L. Impact of ACT Subsidy on Treatment Seeking and ACT Access - By Literacy of Household Head

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Took ACT	Took ACT from Drug Shop	Took ACT from Health Center	Visited Drug Shop	Visited Health Center	Sought No Care	Took Malaria Test	Used Antibiotic	Sub-Standard Malaria Treatment
<i>Panel A. Pooled Impact</i>									
Any ACT Subsidy	0.243*** (0.053)	0.226*** (0.044)	0.010 (0.033)	0.085 (0.072)	0.002 (0.057)	-0.108* (0.060)	0.005 (0.054)	-0.050 (0.050)	0.004 (0.074)
Any ACT Subsidy $\times$ Literate	-0.102 (0.077)	-0.011 (0.064)	-0.083 (0.057)	0.133 (0.094)	-0.133 (0.081)	0.018 (0.076)	-0.042 (0.078)	-0.039 (0.070)	-0.141 (0.094)
Literate	0.117* (0.064)	0.009 (0.049)	0.110** (0.050)	-0.140* (0.084)	0.195*** (0.073)	-0.054 (0.068)	0.087 (0.068)	0.080 (0.063)	0.152* (0.083)
<i>Panel B. Impact by Subsidy Level</i>									
ACT Subsidy = 92%	0.242*** (0.076)	0.242*** (0.067)	-0.001 (0.039)	0.031 (0.094)	0.059 (0.074)	-0.091 (0.080)	-0.022 (0.067)	-0.026 (0.066)	0.056 (0.098)
ACT Subsidy = 88%	0.230* (0.080)	0.195* (0.066)	0.034* (0.056)	0.041* (0.099)	0.033* (0.080)	-0.074* (0.082)	0.031 (0.074)	-0.001 (0.066)	-0.059 (0.091)
ACT Subsidy = 80%	0.255*** (0.067)	0.234*** (0.061)	0.005 (0.039)	0.153* (0.084)	-0.059 (0.062)	-0.143** (0.068)	0.009 (0.064)	-0.097* (0.051)	0.003 (0.087)
ACT Subsidy = 92% $\times$ Literate	-0.045 (0.105)	-0.003 (0.092)	-0.040 (0.069)	0.201* (0.120)	-0.180* (0.102)	-0.029 (0.093)	-0.035 (0.095)	-0.034 (0.087)	-0.232* (0.123)
ACT Subsidy = 88% $\times$ Literate	-0.118 (0.108)	0.030 (0.092)	-0.147* (0.079)	0.200 (0.124)	-0.165 (0.108)	-0.033 (0.096)	-0.120 (0.101)	-0.098 (0.087)	-0.096 (0.119)
ACT Subsidy = 80% $\times$ Literate	-0.134 (0.094)	-0.048 (0.084)	-0.071 (0.065)	0.037 (0.110)	-0.080 (0.091)	0.092 (0.089)	0.015 (0.093)	-0.010 (0.076)	-0.093 (0.112)
Literate	0.116* (0.064)	0.007 (0.049)	0.111** (0.050)	-0.145* (0.084)	0.199*** (0.073)	-0.051 (0.069)	0.088 (0.068)	0.083 (0.064)	0.151* (0.083)
DV Mean (Control Group)	0.192	0.072	0.120	0.491	0.281	0.228	0.216	0.186	0.539
N	628	628	628	628	628	628	628	628	628

Notes: Data source: endline survey. 'Substandard' malaria treatment includes non-ACT antimalarials and antipyretics. Sample excludes all households selected for a surprise or subsidized RDT. The unit of observation is the first illness episode with at least one malaria-like symptom that the household experienced following the baseline. A few households have multiple observations if multiple household members were ill simultaneously. Robust standard errors clustered at the household level in parentheses. All regressions control for household head age and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 3L. Impact of Retail-Sector ACT Subsidy on ACT Targeting - By Literacy of Household Head

	Dependent Variable:		
	Actual Malaria	Predicted Positivity	Predicted Positivity
	(1)	(2)	(3)
ACT Subsidy = 88%	0.107 (0.145)	0.122 (0.077)	0.050 (0.106)
ACT Subsidy = 80%	0.240* (0.136)	0.237*** (0.066)	0.103 (0.090)
ACT Subsidy = 88% $\times$ Literate	0.119 (0.175)	-0.015 (0.092)	0.066 (0.122)
ACT Subsidy = 80% $\times$ Literate	-0.091 (0.173)	-0.203*** (0.085)	-0.101 (0.111)
Literate	0.005 (0.125)	0.052 (0.064)	0.092 (0.080)
DV Mean (ACT 92%, no RDT)	0.560	0.390	0.365
N	190	189	176
Data Source	Admin.	Admin.	Endline

Notes: The omitted category is the 92% ACT subsidy group. Sample in columns 1 and 2 include all first ACT voucher redemption among households selected for a surprise RDT and no RDT voucher. Sample in column 3 includes all endline first illness episodes among households not selected for a surprise RDT and not selected for an RDT voucher. Robust standard errors (clustered at the household level in the endline data) are in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 4L. Mechanisms Behind ACT Targeting Effects - By Literacy of Household Head

	(1)	(2)	(3)
<i>Panel A. Does the ACT Subsidy Level Reallocate ACTs Across Dosage Groups?</i>			
	Used First Voucher for Patient Under 14	Used First Voucher for Patient 14 or Older	First Voucher for Patient Aged 14 or Older
ACT Subsidy = 88%	0.019 (0.052)	-0.045 (0.044)	-0.131 (0.111)
ACT Subsidy = 80%	0.052 (0.050)	-0.075* (0.040)	-0.235*** (0.100)
ACT Subsidy = 88% $\times$ Literate	0.023 (0.071)	-0.021 (0.057)	0.014 (0.128)
ACT Subsidy = 80% $\times$ Literate	-0.033 (0.070)	-0.006 (0.054)	0.110 (0.120)
Literate	0.018 (0.052)	0.065 (0.045)	-0.095 (0.090)
DV Mean (ACT 92%, no RDT)	0.192	0.160	0.455
N	981	981	407
Subsample	All HH	All HH	Used First Voucher
<i>Panel B. Does the ACT Subsidy Level Reallocate ACTs Within Dosage Groups?</i>			
	Surprise RDT Result: Patient Under 14	Surprise RDT Result: Patient 14+	Surprise RDT Result (All Ages)
ACT Subsidy = 88%	0.010 (0.131)	-0.015 (0.202)	0.028 (0.110)
ACT Subsidy = 80%	-0.024 (0.131)	0.318 (0.393)	0.064 (0.119)
ACT Subsidy = 88% $\times$ Literate	0.076 (0.168)	0.416 (0.276)	0.139 (0.143)
ACT Subsidy = 80% $\times$ Literate	0.140 (0.169)	-0.190 (0.436)	0.059 (0.150)
Literate	-0.099 (0.126)	0.053 (0.164)	-0.031 (0.098)
DV Mean (ACT 92%, no RDT)	0.857	0.182	0.560
N	132	58	190
Additional Controls	None	None	Dose Group

Notes: The omitted category is the 92% subsidy group. Panel A includes all households not sampled for an RDT, regardless of surprise RDT status. Panel B limits sample to households who were selected for a surprise RDT test and redeemed at least one ACT voucher. Dose group controls include dummy variables for three of the 4 ACT dose groups (based on patient age). Heteroskedasticity robust standard errors in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 5L. Impact of RDT Subsidy on Treatment Seeking and ACT Access by ACT Price - By Literacy of Household Head

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Visited Drug Shop	Visited Health Center	Sought No Care	Took Malaria Test	Took RDT Test	Took Microscopy Test	Took ACT	Took Antibiotic	Sub- Standard Malaria Treatment
<i>Panel A. Across all ACT Subsidy Levels</i>									
RDT Subsidy	-0.007 (0.044)	0.005 (0.034)	0.015 (0.035)	0.165*** (0.034)	0.156*** (0.025)	0.006 (0.025)	-0.019 (0.040)	0.032 (0.027)	-0.007 (0.043)
RDT Subsidy $\times$ Literate	0.019 (0.055)	-0.029 (0.046)	-0.010 (0.041)	0.086* (0.046)	0.093*** (0.035)	-0.025 (0.035)	0.066 (0.053)	-0.016 (0.035)	-0.009 (0.055)
Head Literate	0.016 (0.062)	0.078 (0.051)	-0.083* (0.046)	0.113** (0.052)	0.040 (0.041)	0.069* (0.038)	0.085 (0.061)	0.016 (0.041)	-0.002 (0.063)
DV Mean (No RDT)	0.655	0.213	0.124	0.204	0.076	0.121	0.386	0.111	0.458
<i>Panel B. By ACT Subsidy Level</i>									
RDT Subsidy $\times$ 92% ACT Sub	0.027 (0.081)	-0.054 (0.064)	0.025 (0.068)	0.159*** (0.061)	0.151*** (0.047)	0.006 (0.043)	-0.021 (0.075)	0.021 (0.053)	-0.110 (0.083)
RDT Subsidy $\times$ 88% ACT Sub	0.004 (0.082)	0.008 (0.067)	-0.017 (0.066)	0.184*** (0.062)	0.179*** (0.047)	-0.006 (0.048)	0.024 (0.073)	-0.026 (0.053)	0.017 (0.071)
RDT Subsidy $\times$ 80% ACT Sub	-0.043 (0.067)	0.049 (0.048)	0.033 (0.052)	0.155*** (0.054)	0.142*** (0.037)	0.014 (0.040)	-0.050 (0.060)	0.086*** (0.035)	0.052 (0.069)
RDT Subsidy $\times$ 92% ACT Sub $\times$ Literate	-0.044 (0.101)	0.055 (0.085)	0.003 (0.075)	0.177** (0.083)	0.177*** (0.066)	-0.021 (0.061)	0.051 (0.100)	-0.028 (0.067)	0.104 (0.104)
RDT Subsidy $\times$ 88% ACT Sub $\times$ Literate	0.036 (0.100)	-0.082 (0.085)	0.036 (0.073)	0.104 (0.080)	0.077 (0.061)	0.009 (0.064)	0.028 (0.092)	0.016 (0.064)	-0.006 (0.093)
RDT Subsidy $\times$ 80% ACT Sub $\times$ Literate	0.052 (0.087)	-0.044 (0.068)	-0.058 (0.067)	-0.005 (0.077)	0.039 (0.054)	-0.057 (0.058)	0.106 (0.082)	-0.029 (0.053)	-0.104 (0.091)
Head Literate	0.062 (0.088)	0.017 (0.073)	-0.092 (0.064)	0.047 (0.067)	-0.020 (0.047)	0.066 (0.052)	0.096 (0.087)	0.024 (0.057)	-0.084 (0.091)
DV Mean (ACT 92%, No RDT)	0.662	0.225	0.106	0.183	0.070	0.113	0.437	0.127	0.451
N	1989	1989	1989	1989	1989	1989	1989	1989	1989

Notes: Data source: endline survey. 'Substandard' malaria treatment includes non-ACT antimalarials and antipyretics. Sample excludes all households who were selected for a surprise RDT but not an RDT subsidy. The unit of observation is the first illness episode that the household experienced following the baseline. A few households have multiple observations if multiple household members were ill simultaneously. Robust standard errors clustered at the household level in parentheses. All regressions control for ACT price dummies, household head age, and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 6L. Impact of RDT Subsidy on ACT Targeting - By Literacy of Household Head

	(1)	(2)	(3)	(4)
	Dependent Variable: Surprise RDT reveals that patient is malaria-positive			
	Dependent Variable: Sought Treatment at drug shop	Sample: patients who visited drug shop	Sample: patients who bought subsidized ACT at drug shop	Proportion that redeemed RDT voucher, conditional on seeking treatment at drug shop
<i>A. Across all ACT Subsidy Levels</i>				
RDT Subsidy	0.058* (0.031)	-0.035 (0.067)	0.085 (0.066)	0.813
RDT Subsidy $\times$ Literate	-0.041 (0.040)	0.078 (0.081)	0.009 (0.080)	0.807
Literate	0.093** (0.045)	-0.014 (0.088)	0.016 (0.088)	
<i>B. By ACT Subsidy Level</i>				
RDT Subsidy $\times$ 92% ACT Sub	0.050 (0.058)	0.100 (0.120)	0.169 (0.119)	0.732
RDT Subsidy $\times$ 88% ACT Sub	0.098* (0.053)	-0.044 (0.116)	0.077 (0.116)	0.842
RDT Subsidy $\times$ 80% ACT Sub	0.028 (0.050)	-0.170 (0.107)	0.000 (0.105)	0.835
RDT Subsidy $\times$ 92% ACT Sub $\times$ Literate	-0.040 (0.075)	0.060 (0.146)	0.018 (0.146)	0.802
RDT Subsidy $\times$ 88% ACT Sub $\times$ Literate	-0.065 (0.068)	0.009 (0.135)	-0.057 (0.135)	0.821
RDT Subsidy $\times$ 80% ACT Sub $\times$ Literate	-0.024 (0.066)	0.172 (0.135)	0.078 (0.134)	0.795
Literate	0.092 (0.056)	-0.007 (0.124)	0.005 (0.124)	
DV Mean (ACT 92%, No RDT)	0.443	0.556	0.563	
N	2603	870	790	

Notes: Data source: administrative drug shop data. Heteroskedasticity robust standard errors in parentheses. All regressions control for ACT price dummies. Regressions in column 1 also include strata and age controls. Columns 2 and 3 omit these controls so as not to absorb selection effects, which these regressions aim at identifying. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 2K. Impact of ACT Subsidy on Treatment Seeking and ACT Access - By Malaria Knowledge of Household Head

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Took ACT	Took ACT from Drug Shop	Took ACT from Health Center	Visited Drug Shop	Visited Health Center	Sought No Care	Took Malaria Test	Used Antibiotic	Sub-Standard Malaria Treatment
<i>Panel A. Pooled Impact</i>									
Any ACT Subsidy	0.162*** (0.053)	0.219*** (0.040)	-0.058 (0.043)	0.045 (0.066)	-0.063 (0.058)	0.013 (0.047)	-0.077 (0.056)	-0.090* (0.053)	-0.111 (0.069)
Any ACT Subsidy × Knows	0.046 (0.079)	0.006 (0.063)	0.037 (0.062)	0.223*** (0.092)	-0.030 (0.084)	-0.200*** (0.072)	0.116 (0.078)	0.034 (0.070)	0.063 (0.092)
Knows Cause Malaria ^a	0.047 (0.064)	0.063 (0.046)	-0.017 (0.055)	-0.174** (0.080)	0.068 (0.074)	0.105* (0.062)	-0.041 (0.067)	-0.019 (0.064)	-0.122 (0.080)
<i>Panel B. Impact by Subsidy Level</i>									
ACT Subsidy = 92%	0.110 (0.073)	0.174*** (0.060)	-0.065 (0.051)	-0.022 (0.089)	-0.024 (0.075)	0.033 (0.064)	-0.140** (0.063)	-0.085 (0.065)	-0.087 (0.090)
ACT Subsidy = 88%	0.237* (0.072)	0.306* (0.061)	-0.069* (0.052)	0.079* (0.081)	-0.054* (0.071)	-0.024* (0.059)	-0.080 (0.067)	-0.048 (0.063)	-0.148* (0.085)
ACT Subsidy = 80%	0.142** (0.069)	0.183*** (0.058)	-0.043 (0.053)	0.072 (0.081)	-0.100 (0.069)	0.026 (0.064)	-0.026 (0.071)	-0.128** (0.058)	-0.102 (0.085)
ACT Subsidy = 92% × Knows	0.201* (0.103)	0.129 (0.089)	0.074 (0.075)	0.326*** (0.117)	-0.055 (0.105)	-0.257*** (0.084)	0.194** (0.094)	0.068 (0.087)	0.009 (0.116)
ACT Subsidy = 88% × Knows	-0.141 (0.103)	-0.165* (0.088)	0.023 (0.074)	0.162 (0.116)	-0.028 (0.104)	-0.135 (0.085)	0.070 (0.096)	-0.025 (0.083)	0.069 (0.117)
ACT Subsidy = 80% × Knows	0.063 (0.098)	0.039 (0.085)	0.015 (0.073)	0.187* (0.110)	-0.013 (0.097)	-0.204** (0.090)	0.089 (0.096)	0.052 (0.078)	0.105 (0.113)
Knows Cause Malaria	0.050 (0.064)	0.067 (0.046)	-0.017 (0.055)	-0.173** (0.080)	0.069 (0.074)	0.104* (0.063)	-0.041 (0.068)	-0.017 (0.064)	-0.124 (0.080)
DV Mean (Control Group)	0.190	0.071	0.119	0.488	0.286	0.226	0.214	0.185	0.536
N	631	631	631	631	631	631	631	631	631

Notes: Data source: endline survey. 'Substandard' malaria treatment includes non-ACT antimalarials and antipyretics. Sample excludes all households selected for a surprise or subsidized RDT. The unit of observation is the first illness episode with at least one malaria-like symptom that the household experienced following the baseline. A few households have multiple observations if multiple household members were ill simultaneously. Robust standard errors clustered at the household level in parentheses. All regressions control for household head age and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

^a "Knows cause malaria" is a dummy equal to 1 if the household head knows that mosquitoes and only mosquitoes transmit malaria.

Table 3K. Impact of Retail-Sector ACT Subsidy on ACT Targeting - By Malaria Knowledge of Household Head

	Dependent Variable:		
	Actual Malaria	Predicted Positivity	Predicted Positivity
	(1)	(2)	(3)
ACT Subsidy = 88%	0.172 (0.129)	0.166*** (0.064)	0.020 (0.099)
ACT Subsidy = 80%	0.221* (0.124)	0.154** (0.067)	0.020 (0.104)
ACT Subsidy = 88% $\times$ Literate	0.023 (0.166)	-0.094 (0.085)	0.149 (0.117)
ACT Subsidy = 80% $\times$ Literate	-0.072 (0.169)	-0.087 (0.087)	0.022 (0.120)
Literate	0.027 (0.121)	0.055 (0.060)	-0.079 (0.090)
DV Mean (ACT 92%, no RDT)	0.548	0.394	0.480
N	190	189	178
Data Source	Admin.	Admin.	Endline

Notes: The omitted category is the 92% ACT subsidy group. Sample in columns 1 and 2 include all first ACT voucher redemption among households selected for a surprise RDT and no RDT voucher. Sample in column 3 includes all endline first illness episodes among households not selected for a surprise RDT and not selected for an RDT voucher. Robust standard errors (clustered at the household level in the endline data) are in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 4K. Mechanisms Behind ACT Targeting Effects - By Malaria Knowledge of Household Head

	(1)	(2)	(3)
<i>Panel A. Does the ACT Subsidy Level Reallocate ACTs Across Dosage Groups?</i>			
	Used First Voucher for Patient Under 14	Used First Voucher for Patient 14 or Older	First Voucher for Patient Aged 14 or Older
ACT Subsidy = 88%	0.056 (0.049)	-0.032 (0.039)	-0.108 (0.087)
ACT Subsidy = 80%	0.053 (0.049)	-0.063* (0.037)	-0.160* (0.087)
ACT Subsidy = 88% × Literate	-0.038 (0.070)	-0.045 (0.055)	-0.032 (0.114)
ACT Subsidy = 80% × Literate	-0.041 (0.068)	-0.032 (0.052)	0.002 (0.113)
Literate	0.038 (0.049)	0.039 (0.041)	0.011 (0.084)
DV Mean (ACT 92%, no RDT)	0.233	0.144	0.382
N	984	984	407
Subsample	All HH	All HH	Used First Voucher
<i>Panel B. Does the ACT Subsidy Level Reallocate ACTs Within Dosage Groups?</i>			
	Surprise RDT Result: Patient Under 14	Surprise RDT Result: Patient 14+	Surprise RDT Result (All Ages)
ACT Subsidy = 88%	-0.024 (0.132)	0.186 (0.259)	0.049 (0.114)
ACT Subsidy = 80%	0.081 (0.115)	-0.014 (0.222)	0.095 (0.102)
ACT Subsidy = 88% × Literate	0.143 (0.168)	0.100 (0.322)	0.119 (0.144)
ACT Subsidy = 80% × Literate	-0.041 (0.168)	0.300 (0.312)	0.013 (0.146)
Literate	-0.054 (0.127)	0.000 (0.164)	-0.021 (0.100)
DV Mean (ACT 92%, no RDT)	0.824	0.214	0.548
N	132	58	190
Additional Controls	None	None	Dose Group

Notes: The omitted category is the 92% subsidy group. Panel A includes all households not sampled for an RDT, regardless of surprise RDT status. Panel B limits sample to households who were selected for a surprise RDT test and redeemed at least one ACT voucher. Dose group controls include dummy variables for three of the 4 ACT dose groups (based on patient age). Heteroskedasticity robust standard errors in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 5K. Impact of RDT Subsidy on Treatment Seeking and ACT Access by ACT Price - By Malaria Knowledge of Household Head

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Visited Drug Shop	Visited Health Center	Sought No Care	Took Malaria Test	Took RDT Test	Took Microscopy Test	Took ACT	Took Antibiotic	Sub- Standard Malaria Treatment
<i>Panel A. Across all ACT Subsidy Levels</i>									
RDT Subsidy	0.029 (0.040)	0.010 (0.032)	-0.040 (0.031)	0.248*** (0.033)	0.220*** (0.025)	0.017 (0.024)	0.060 (0.037)	0.035 (0.026)	-0.037 (0.040)
RDT Subsidy $\times$ Literate	-0.048 (0.054)	-0.039 (0.046)	0.092*** (0.038)	-0.056 (0.047)	-0.007 (0.036)	-0.054 (0.036)	-0.069 (0.052)	-0.023 (0.035)	0.044 (0.054)
Head Literate	0.089 (0.058)	0.020 (0.050)	-0.108*** (0.041)	0.057 (0.051)	0.008 (0.040)	0.047 (0.039)	0.131** (0.058)	-0.024 (0.039)	-0.038 (0.060)
DV Mean (No RDT)	0.657 1993	0.212 1993	0.123 1993	0.207 1993	0.076 1993	0.125 1993	0.389 1993	0.110 1993	0.456 1993
<i>Panel B. By ACT Subsidy Level</i>									
RDT Subsidy $\times$ 92% ACT Sub	0.068 (0.076)	0.009 (0.063)	-0.064 (0.059)	0.356*** (0.055)	0.284*** (0.046)	0.063 (0.041)	0.139** (0.068)	0.066 (0.050)	-0.110 (0.078)
RDT Subsidy $\times$ 88% ACT Sub	-0.017 (0.067)	-0.007 (0.057)	0.016 (0.048)	0.256*** (0.053)	0.212*** (0.043)	0.020 (0.036)	-0.017 (0.065)	-0.049 (0.045)	-0.022 (0.068)
RDT Subsidy $\times$ 80% ACT Sub	0.041 (0.066)	0.025 (0.050)	-0.074 (0.055)	0.158*** (0.059)	0.178*** (0.040)	-0.021 (0.044)	0.069 (0.060)	0.086** (0.039)	0.006 (0.064)
RDT Subsidy $\times$ 92% ACT Sub $\times$ Knows	-0.128 (0.098)	-0.048 (0.085)	0.164*** (0.067)	-0.175** (0.084)	-0.038 (0.067)	-0.146** (0.065)	-0.239*** (0.096)	-0.115* (0.066)	0.126 (0.100)
RDT Subsidy $\times$ 88% ACT Sub $\times$ Knows	0.083 (0.094)	-0.073 (0.082)	-0.019 (0.061)	-0.006 (0.078)	0.032 (0.060)	-0.035 (0.062)	0.109 (0.088)	0.064 (0.060)	0.066 (0.093)
RDT Subsidy $\times$ 80% ACT Sub $\times$ Knows	-0.100 (0.087)	-0.002 (0.070)	0.132* (0.068)	-0.008 (0.080)	-0.020 (0.057)	0.003 (0.061)	-0.093 (0.083)	-0.028 (0.056)	-0.037 (0.089)
Knows Cause Malaria	0.147* (0.083)	0.026 (0.072)	-0.159*** (0.057)	0.145** (0.066)	0.033 (0.044)	0.113** (0.055)	0.254*** (0.081)	0.042 (0.055)	-0.098 (0.086)
DV Mean (ACT 92%, No RDT)	0.667 N	0.222 1993	0.104 1993	0.194 1993	0.069 1993	0.125 1993	0.444 1993	0.125 1993	0.444 1993

Notes: Data source: endline survey. Sample excludes all households who were selected for a surprise RDT but not an RDT subsidy. The unit of observation is the first illness episode that the household experienced following the baseline. A few households have multiple observations if multiple household members were ill simultaneously. Robust standard errors clustered at the household level in parentheses. All regressions control for ACT price dummies, household head age, and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 6K. Impact of RDT Subsidy on ACT Targeting - By Malaria Knowledge of Household Head

	(1)	(2)	(3)	(4)
	Dependent Variable: Surprise RDT reveals that patient is malaria-positive			
	Dependent Variable: Sought Treatment at drug shop	Sample: patients who visited drug shop	Sample: patients who bought subsidized ACT at drug shop	Proportion that redeemed RDT voucher, conditional on seeking treatment at drug shop
<i>A. Across all ACT Subsidy Levels</i>				
RDT Subsidy	0.038 (0.028)	0.003 (0.058)	0.091 (0.058)	0.810
RDT Subsidy $\times$ Knows	-0.008 (0.039)	0.026 (0.077)	0.000 (0.076)	0.808
Knows Cause Malaria	0.042 (0.042)	0.034 (0.084)	0.037 (0.084)	
<i>B. By ACT Subsidy Level</i>				
RDT Subsidy $\times$ 92% ACT Sub	0.061 (0.054)	0.135 (0.105)	0.175* (0.106)	0.772
RDT Subsidy $\times$ 88% ACT Sub	0.031 (0.046)	-0.018 (0.099)	0.076 (0.099)	0.828
RDT Subsidy $\times$ 80% ACT Sub	0.027 (0.047)	-0.115 (0.096)	0.019 (0.094)	0.816
RDT Subsidy $\times$ 92% ACT Sub $\times$ Knows	-0.058 (0.073)	0.008 (0.139)	0.011 (0.139)	0.787
RDT Subsidy $\times$ 88% ACT Sub $\times$ Knows	0.045 (0.066)	-0.031 (0.126)	-0.060 (0.125)	0.828
RDT Subsidy $\times$ 80% ACT Sub $\times$ Knows	-0.018 (0.065)	0.110 (0.132)	0.057 (0.130)	0.802
Knows Cause Malaria	0.070 (0.054)	0.044 (0.119)	0.027 (0.120)	
DV Mean (ACT 92%, No RDT)	0.442	0.556	0.563	
N	2609	870	790	

Notes: Data source: administrative drug shop data. Heteroskedasticity robust standard errors in parentheses. All regressions control for ACT price dummies. Regressions in column 1 also include strata and age controls. Columns 2 and 3 omit these controls so as not to absorb selection effects, which these regressions aim at identifying. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Appendix M: Multiple Illness Episodes

This web appendix presents the results of the analysis when performed over the first two (or all) endline illness episodes or all drug shop redemptions (while the main paper focuses only on the first illness episode or redemption). The table numbers used in this appendix match those used in the main paper. The index "M" reflects the fact that we use multiple illnesses/redemptions per household.

Table 2Ma: Impact of ACT Subsidy on Treatment Seeking and ACT Access - First Two Illness Episodes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Took ACT							
	Took ACT	Took ACT from Drug Shop	from Health Center	Visited Drug Shop	Visited Health Center	Sought No Care	Took Malaria Test	Took Antibiotic	Sub-Standard Malaria Treatment
<i>Panel A. Pooled Impact</i>									
Any ACT Subsidy	0.149*** (0.032)	0.209*** (0.023)	-0.055** (0.024)	0.170*** (0.036)	-0.080** (0.034)	-0.098*** (0.030)	-0.014 (0.028)	-0.044 (0.027)	-0.038 (0.039)
<i>Panel B. Impact by Subsidy Level</i>									
ACT Subsidy = 92%	0.173*** (0.043)	0.235*** (0.036)	-0.047 (0.030)	0.159*** (0.044)	-0.056 (0.043)	-0.104*** (0.035)	-0.033 (0.037)	0.005 (0.038)	-0.064 (0.049)
ACT Subsidy = 88%	0.148*** (0.043)	0.223*** (0.036)	-0.068** (0.030)	0.182*** (0.046)	-0.083* (0.042)	-0.099*** (0.036)	-0.025 (0.036)	-0.054* (0.032)	-0.049 (0.048)
ACT Subsidy = 80%	0.129*** (0.038)	0.175*** (0.031)	-0.050* (0.027)	0.170*** (0.044)	-0.096*** (0.040)	-0.092*** (0.036)	0.010 (0.035)	-0.076*** (0.030)	-0.008 (0.047)
P-value: 92%=88%=80%=0	0.000***	0.000***	0.135	0.000***	0.087*	0.014**	0.634	0.021	0.497
P-value: 92%=88%=80%	0.616	0.308	0.727	0.885	0.614	0.939	0.481	0.063	0.496
DV Mean (Control Group)	0.187	0.057	0.124	0.482	0.291	0.224	0.194	0.174	0.515
N	1101	1101	1101	1101	1101	1101	1101	1101	1101

Notes: Data source: endline survey. 'Substandard' malaria treatment includes non-ACT antimalarials and antipyretics. Sample excludes all households selected for a surprise or subsidized RDT. The unit of observation is the first or second illness episodes with at least one malaria-like symptom that the household experienced following the baseline. Robust standard errors clustered at the household level in parentheses. All regressions control for household head age and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 2Mb: Impact of ACT Subsidy on Treatment Seeking and ACT Access - All Illness Episodes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Took ACT						
		Took ACT	from	Visited	Visited	Sought No	Took	Took	Standard
	Took ACT	from Drug	Health	Drug Shop	Health	Care	Malaria	Antibiotic	Malaria
		Shop	Center		Center		Test		Treatment
<i>Panel A. Pooled Impact</i>									
Any ACT Subsidy	0.110*** (0.028)	0.172*** (0.019)	-0.053*** (0.021)	0.107*** (0.034)	-0.056* (0.032)	-0.060** (0.026)	-0.003 (0.023)	-0.037 (0.026)	-0.042 (0.033)
<i>Panel B. Impact by Subsidy Level</i>									
ACT Subsidy = 92%	0.121*** (0.037)	0.188*** (0.029)	-0.046* (0.026)	0.085** (0.043)	-0.032 (0.040)	-0.059* (0.030)	-0.013 (0.031)	0.016 (0.036)	-0.075* (0.043)
ACT Subsidy = 88%	0.123*** (0.037)	0.196*** (0.029)	-0.062*** (0.025)	0.134*** (0.042)	-0.068* (0.038)	-0.068** (0.031)	0.001 (0.031)	-0.061** (0.028)	-0.044 (0.042)
ACT Subsidy = 80%	0.090*** (0.033)	0.139*** (0.026)	-0.051** (0.023)	0.105*** (0.040)	-0.066* (0.036)	-0.054* (0.031)	0.003 (0.027)	-0.064** (0.028)	-0.012 (0.041)
P-value: 92%=88%=80%=0	0.002***	0.000***	0.080*	0.009***	0.199	0.142	0.961	0.012	0.316
P-value: 92%=88%=80%	0.586	0.176	0.769	0.504	0.563	0.878	0.868	0.030	0.365
DV Mean (Control Group)	0.206	0.063	0.131	0.510	0.278	0.210	0.173	0.175	0.521
N	1718	1718	1718	1718	1718	1718	1718	1718	1718

Notes: Data source: endline survey. 'Substandard' malaria treatment includes non-ACT antimalarials and antipyretics. Sample excludes all households selected for a surprise or subsidized RDT. The unit of observation is all illness episodes with at least one malaria-like symptom that the household experienced following the baseline. Robust standard errors clustered at the household level in parentheses. All regressions control for household head age and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 3M. Impact of Retail-Sector ACT Subsidy on ACT Targeting -- With All Drug Shop Visits and Additional Endline Illness Episodes

	(1)	(2)	(3)	(4)
ACT Subsidy = 88%	0.095 (0.070)	0.088** (0.038)	0.097*** (0.041)	0.079** (0.037)
ACT Subsidy = 80%	0.120* (0.072)	0.102*** (0.035)	0.044 (0.044)	0.026 (0.037)
P-value: 88%= 80% = 0	0.211	0.010**	0.063*	0.089*
DV Mean (ACT 92%, no RDT)	0.630	0.428	0.430	0.436
N	267	288	278	420
			Endline - First	
			Two Illness	Endline - All
Data Source	Admin.	Admin.	Episodes	Illness Episodes
Measure of Malaria Positivity	Actual	Predicted	Predicted	Predicted

Notes: The omitted category is the 92% ACT subsidy group. Sample in columns 1 and 2 include all ACT voucher redemptions among households selected for a surprise RDT and no RDT voucher. Sample in column 3 includes the first and second endline illness episodes among households not selected for a surprise RDT and not selected for an RDT voucher. Sample in column 4 includes the all endline illness episodes among households not selected for a surprise RDT and not selected for an RDT voucher. The samples in columns 3 and 4 are further limited to those illness episodes treated with an ACT. Robust standard errors clustered at the household level are in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 4M. Mechanisms Behind ACT Targeting Effects - All Drug Shop Visits

	(1)	(2)	(3)
<i>Panel A. Does the ACT Subsidy Level Reallocate ACTs Across Dosage Groups?</i>			
	Number of ACT Doses Purchased for Patients	Number of ACT Doses Purchased for Patients	Fraction of Purchased ACT Doses for Patients 14 and Older
	Under 14	14 and Older	
ACT Subsidy = 88%	0.035 (0.049)	-0.094*** (0.037)	-0.151*** (0.051)
ACT Subsidy = 80%	0.016 (0.048)	-0.126*** (0.035)	-0.172*** (0.052)
P-value: 88% = 80% = 0	0.770	0.001***	0.002***
DV Mean (ACT 92%, no RDT)	0.381	0.256	0.406
N	984	984	407
Subsample	All HH	All HH	HH Used At Least One ACT Voucher
<i>Panel B. Does the ACT Subsidy Level Reallocate ACTs Within Dosage Groups?</i>			
	Surprise RDT Result: Patient Under 14	Surprise RDT Result: Patient 14+	Surprise RDT Result (All Ages)
ACT Subsidy = 88%	-0.009 (0.069)	0.083 (0.125)	0.022 (0.060)
ACT Subsidy = 80%	0.003 (0.067)	0.078 (0.150)	0.032 (0.066)
P-value: 88% = 80% = 0	0.984	0.753	0.873
DV Mean (ACT 92%, no RDT)	0.845	0.333	0.630
N	184	83	267
Additional Controls	None	None	Dose Group

Notes: The omitted category is the 92% subsidy group. Panel A includes all households not sampled for an RDT, regardless of surprise RDT status. Panel B limits sample to households who were selected for a surprise RDT test and redeemed at least one ACT voucher. Dose group controls include dummy variables for three of the 4 ACT dose groups (based on patient age). Robust standard errors (clustered at the household level in Panel B) in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 5Ma: Impact of RDT Subsidy on Treatment Seeking and ACT Access by ACT Price - First and Second Illness Episodes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Visited Drug Shop	Visited Health Center	Sought No Care	Took Malaria Test	Took RDT Test	Took Microscopy Test	Took ACT	Took Antibiotic	Sub- Standard Malaria Treatment
<i>Panel A. Across all ACT Subsidy Levels</i>									
RDT Subsidy	-0.013 (0.022)	-0.013 (0.019)	0.027* (0.015)	0.196*** (0.018)	0.186*** (0.014)	-0.002 (0.014)	0.028 (0.021)	0.013 (0.015)	-0.028 (0.023)
DV Mean (No RDT)	0.653	0.214	0.121	0.186	0.070	0.111	0.350	0.125	0.476
<i>Panel B. By ACT Subsidy Level</i>									
RDT Subsidy × 92% ACT Sub	-0.026 (0.039)	-0.027 (0.035)	0.055** (0.027)	0.229*** (0.035)	0.233*** (0.028)	-0.014 (0.026)	0.014 (0.041)	-0.046 (0.032)	-0.031 (0.042)
RDT Subsidy × 88% ACT Sub	0.002 (0.038)	-0.030 (0.033)	0.015 (0.026)	0.204*** (0.031)	0.179*** (0.025)	0.005 (0.024)	0.020 (0.038)	0.014 (0.024)	-0.013 (0.039)
RDT Subsidy × 80% ACT Sub	-0.017 (0.037)	0.013 (0.030)	0.015 (0.027)	0.164*** (0.030)	0.156*** (0.022)	0.001 (0.023)	0.046 (0.033)	0.057*** (0.023)	-0.038 (0.038)
88% ACT Subsidy	0.007 (0.046)	-0.015 (0.042)	0.011 (0.031)	0.006 (0.038)	0.021 (0.027)	-0.015 (0.031)	-0.028 (0.049)	-0.063* (0.035)	0.011 (0.050)
80% ACT Subsidy	0.007 (0.045)	-0.033 (0.040)	0.011 (0.031)	0.039 (0.038)	0.026 (0.025)	0.001 (0.030)	-0.054 (0.045)	-0.078** (0.034)	0.047 (0.048)
P-value: RDT Terms Jointly = 0	0.877	0.666	0.174	0.000***	0.000***	0.952	0.494	0.032	0.646
DV Mean (ACT 92%, No RDT)	0.656	0.228	0.108	0.176	0.060	0.116	0.392	0.168	0.444
N	3372	3372	3372	3372	3372	3372	3372	3372	3372

Notes: Data source: endline survey. 'Substandard' malaria treatment includes non-ACT antimalarials and antipyretics. Sample excludes all households who were selected for a surprise RDT but not an RDT subsidy. The unit of observation is the first or second illness episodes that the household experienced following the baseline. Robust standard errors clustered at the household level in parentheses. All regressions control for ACT price dummies, household head age, and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 5Mb: Impact of RDT Subsidy on Treatment Seeking and ACT Access by ACT Price - All Illness Episodes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Visited Drug Shop	Visited Health Center	Sought No Care	Took Malaria Test	Took RDT Test	Took Microscopy Test	Took ACT	Took Antibiotic	Sub- Standard Malaria Treatment
<i>Panel A. Across all ACT Subsidy Levels</i>									
RDT Subsidy	-0.014 (0.019)	-0.005 (0.017)	0.015 (0.013)	0.150*** (0.016)	0.146*** (0.011)	-0.005 (0.013)	0.005 (0.018)	0.015 (0.014)	-0.007 (0.021)
DV Mean (No RDT)	0.616	0.227	0.146	0.180	0.057	0.119	0.336	0.131	0.469
<i>Panel B. By ACT Subsidy Level</i>									
RDT Subsidy $\times$ 92% ACT Sub	-0.018 (0.035)	-0.022 (0.033)	0.040* (0.024)	0.164*** (0.030)	0.175*** (0.022)	-0.020 (0.023)	-0.013 (0.034)	-0.048* (0.029)	0.007 (0.038)
RDT Subsidy $\times$ 88% ACT Sub	-0.013 (0.033)	-0.017 (0.028)	0.017 (0.022)	0.150*** (0.029)	0.146*** (0.019)	-0.009 (0.025)	-0.010 (0.031)	0.032 (0.020)	0.002 (0.036)
RDT Subsidy $\times$ 80% ACT Sub	-0.012 (0.032)	0.022 (0.027)	-0.006 (0.023)	0.139*** (0.024)	0.122*** (0.017)	0.010 (0.019)	0.034 (0.028)	0.052*** (0.021)	-0.025 (0.035)
88% ACT Subsidy	0.034 (0.042)	-0.025 (0.038)	-0.003 (0.027)	0.007 (0.035)	0.005 (0.022)	0.000 (0.030)	-0.002 (0.040)	-0.074*** (0.031)	0.026 (0.045)
80% ACT Subsidy	0.017 (0.041)	-0.032 (0.036)	0.008 (0.027)	0.011 (0.032)	0.010 (0.020)	-0.006 (0.026)	-0.039 (0.037)	-0.071** (0.031)	0.057 (0.044)
P-value: RDT Terms Jointly = 0	0.913	0.680	0.329	0.000***	0.000***	0.770	0.615	0.010	0.905
DV Mean (ACT 92%, No RDT)	0.607	0.241	0.141	0.171	0.051	0.120	0.356	0.178	0.444
N	5237	5237	5237	5237	5237	5237	5237	5237	5237

Notes: Data source: endline survey. 'Substandard' malaria treatment includes non-ACT antimalarials and antipyretics. Sample excludes all households who were selected for a surprise RDT but not an RDT subsidy. The unit of observation is the illness episodes that the household experienced following the baseline. Robust standard errors clustered at the household level in parentheses. All regressions control for ACT price dummies, household head age, and a full set of strata dummies. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.

Table 6M. Impact of RDT Subsidy on ACT Targeting - All Drug Shop Redemptions

	(1)	(2)	(3)	(4)
	Dependent Variable: Number of Drug Shop Visits	Dependent Variable: Surprise RDT reveals that patient is malaria-positive		<i>Proportion that redeemed RDT voucher, conditional on seeking treatment at drug shop</i>
		Sample: patients who visited drug shop (all redemptions)	Sample: patients who bought subsidized ACT at drug shop (all redemptions)	
<i>A. Across all ACT Subsidy Levels</i>				
RDT Subsidy	0.097*** (0.041)	-0.004 (0.032)	0.068** (0.032)	<i>0.809</i>
 <i>B. By ACT Subsidy Level</i>				
RDT Subsidy $\times$ 92% ACT Sub	0.122* (0.074)	0.054 (0.057)	0.107* (0.057)	<i>0.784</i>
RDT Subsidy $\times$ 88% ACT Sub	0.117* (0.069)	-0.032 (0.053)	0.042 (0.053)	<i>0.813</i>
RDT Subsidy $\times$ 80% ACT Sub	0.046 (0.074)	-0.038 (0.057)	0.053 (0.056)	<i>0.825</i>
DV Mean (ACT 92%, No RDT)	0.604	0.624	0.630	-
N	1776	1125	1012	<i>880</i>

Notes: Data source: administrative drug shop data. Robust standard errors, clustered at the household level in columns 2 and 3, in parentheses. All regressions control for ACT price dummies. Regressions in column 1 also include strata and age controls. Columns 2 and 3 omit these controls so as not to absorb selection effects, which these regressions aim at identifying. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.