A Appendix Figures

Figure A1: Time use data: cooking hours by cooking technology

(A) Traditional jiko

(B) Jikokoa

(C) LPG

(D) All stove types
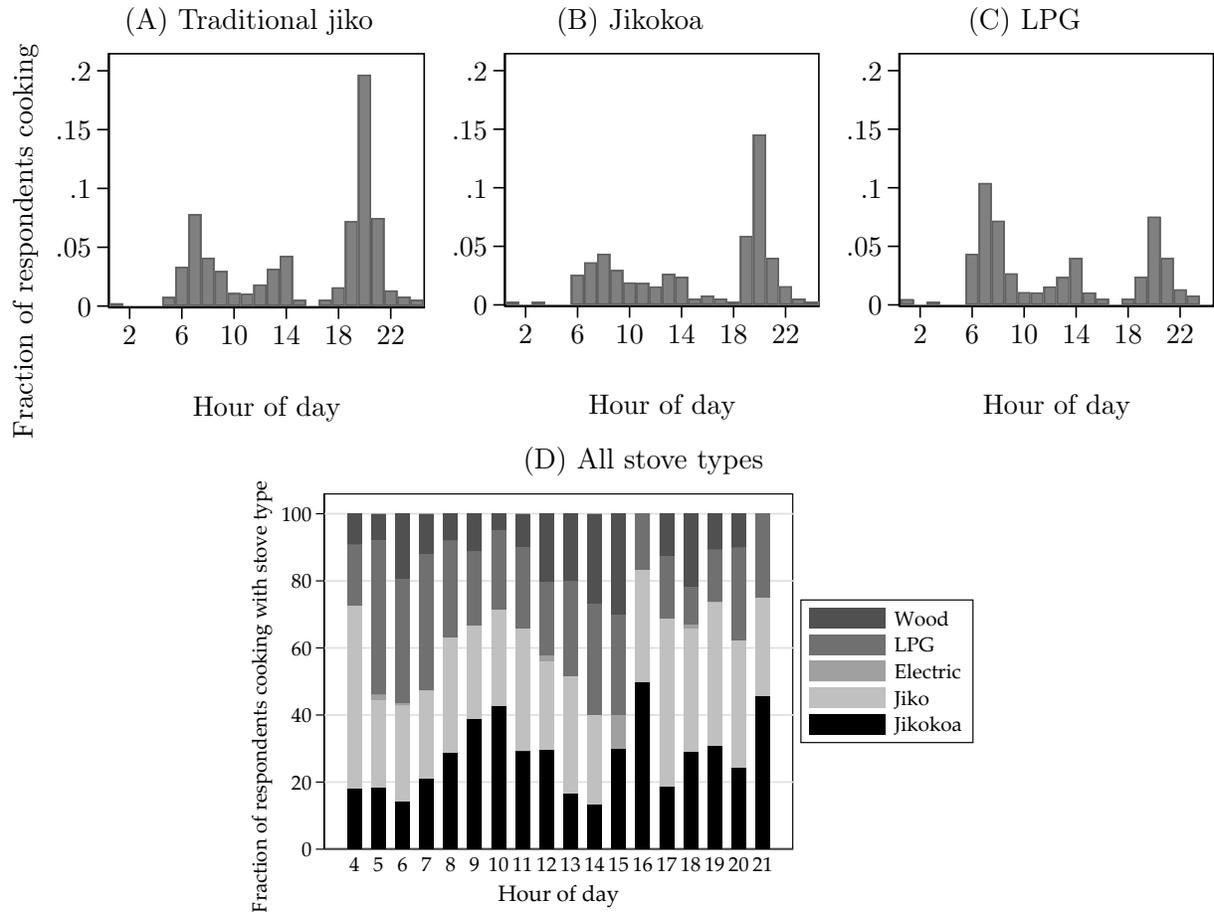
Panels (A), (B), and (C) show the fraction of respondents who report using a particular cooking technology across the various hours of the day. Panel (D) shows the same as a fraction of people who report cooking during that hour.

Figure A2: Impacts of experimental treatments on WTP

Panel (A)   Panel (B)
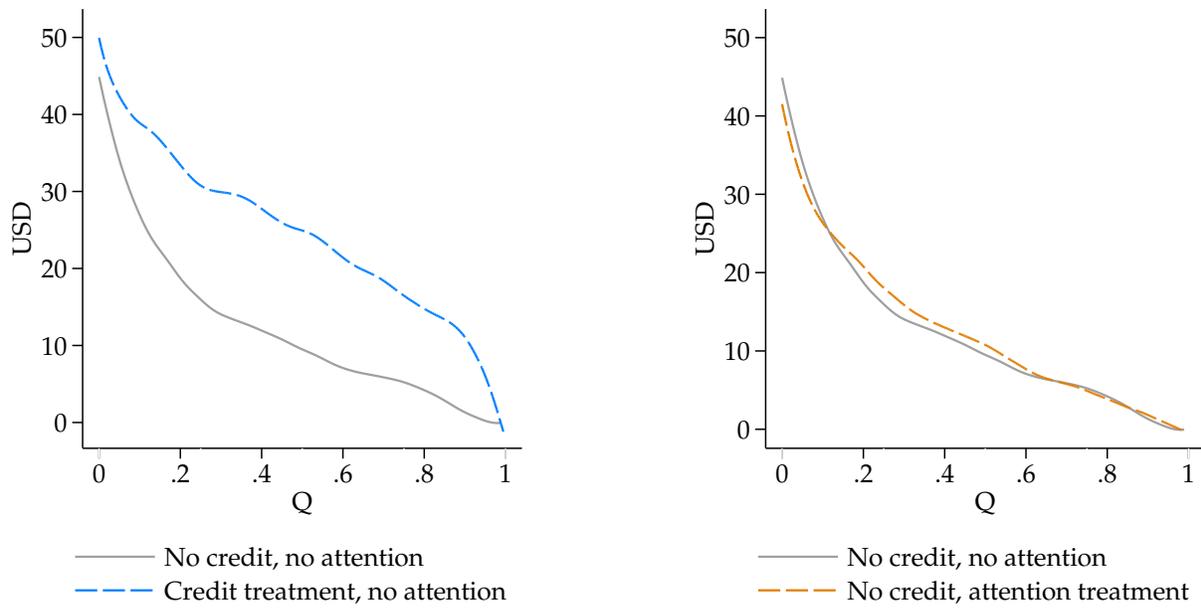
Note: This figure has been reproduced in its entirety from Berkouwer and Dean (2022a). Graphs show the cumulative distribution of WTP for the control and treatment groups for both experimental treatments. Panel A presents results by credit treatment status among people in the attention control group only. Panel B presents results by attention treatment status among people in the credit control group only. Access to credit increases WTP by USD 13 (104 percent relative to control). Attention to benefits does not affect WTP.

Figure A3: Devices to record air pollution and mesh backpacks containing them

(A) Particulate Matter

(B) Carbon Monoxide

(C) Backpack contents

(D) Final backpack

Panel A shows a Purple Air Inc. device, which records PM1.0 and PM2.5 readings every 2 minutes. Panel B shows a Lascar Electronics device, which records one CO reading every minute. Panel C displays how the devices are affixed to a lightweight foam material to stay in place. Behind the purple air device is a battery. Panel D displays the final backpack as deployed with respondents.

Figure A4: Co-located air pollution readings for devices

A) PM2.5 (PA-II devices)
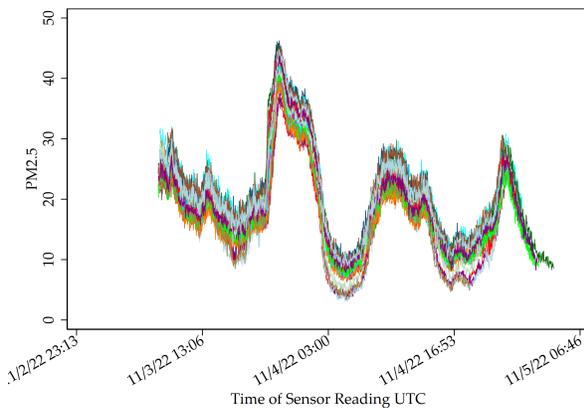
B) CO (LASCAR devices)
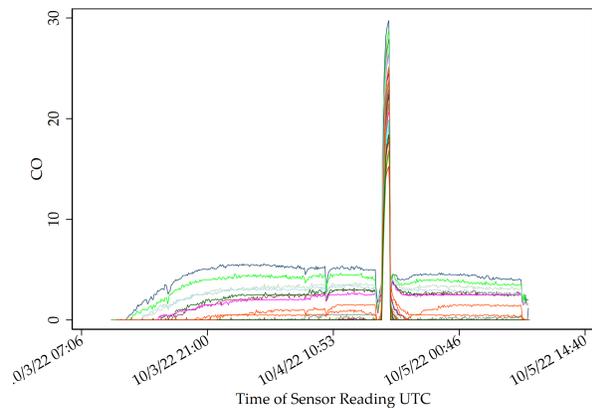
Air pollution data from a 48-hour testing window during which all 68 devices (34 PA-II devices and 34 LASCAR devices) were placed in the same location (Busara offices). To capture level differences across devices, all regressions include device fixed effects where relevant.

Figure A5: Particulate Matter (PM1.0, in $\mu g/m^3$) and Carbon Monoxide pollution by Jikokoa ownership

A) Average hourly exposure over the hours of the day
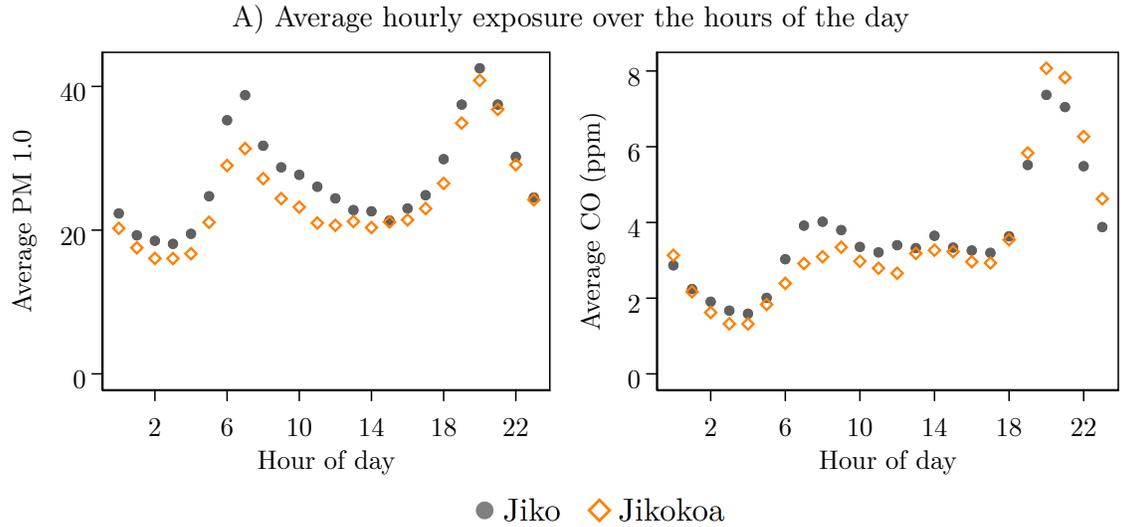
● Jiko   ◇ Jikokoa

B) Distribution of 10th and 50th percentile of 10-minute concentrations, across individuals

- - - - - 50th percentile (trad)
- - - - - 50th percentile (Jikokoa)
───── 99th percentile (trad)
───── 99th percentile (Jikokoa)
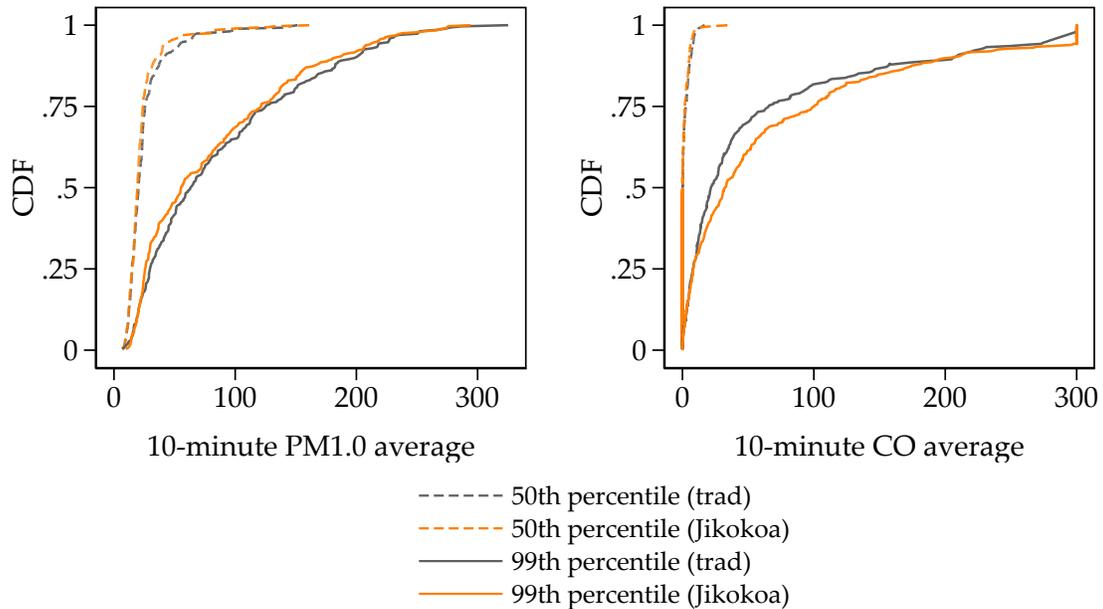
Panel A presents average PM1.0 and CO exposure by hour of day and endline Jikokoa ownership, as collected by respondents wearing backpacks for on average 48 hours. Panel B presents the distribution of mean and 99th percentile 10-minute average exposure across respondents. Figure 4 presents the same for PM2.5.

A-4

Figure A6: Planetary boundary layer height using MERRA-2 satellite data
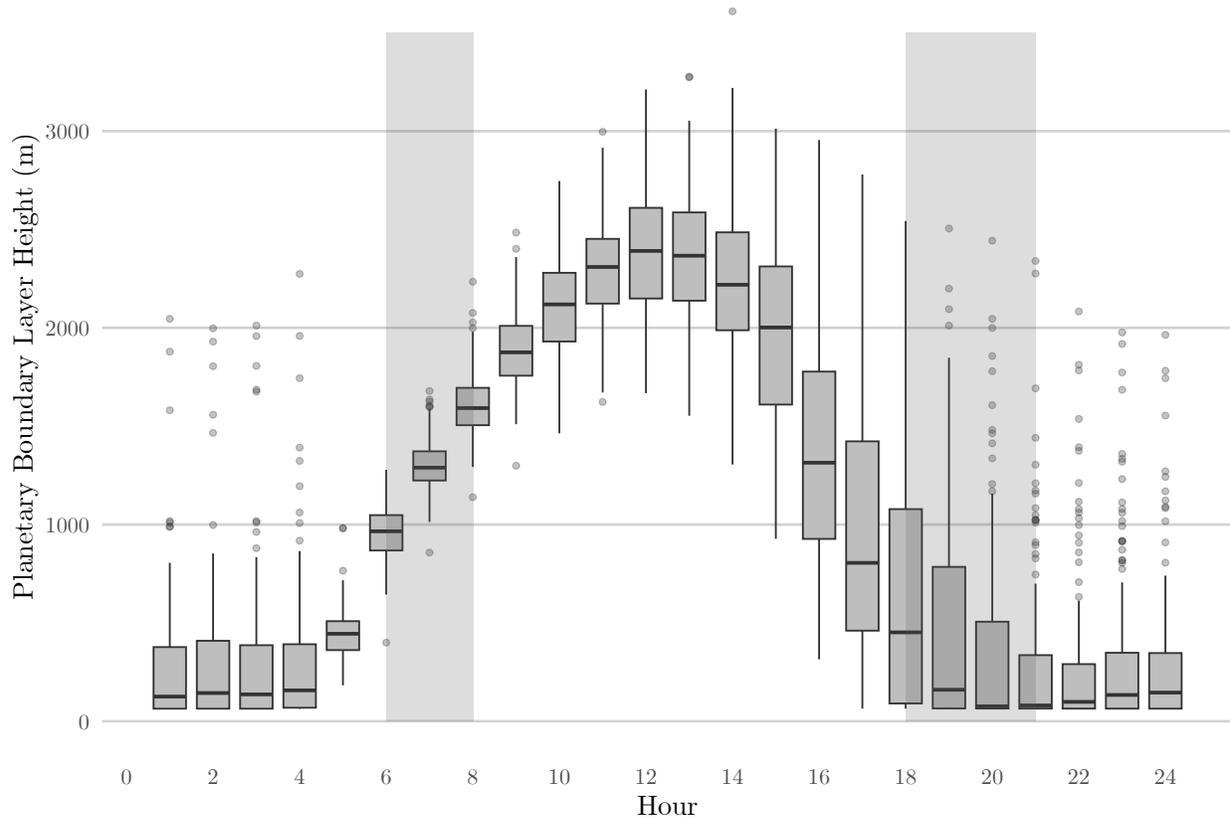
The figure shows an hourly box plot of the Planetary Boundary layer Height as reported in the NASA MERRA-2 satellite data from the study period. Typical breakfast and dinner hours are shaded in gray. The figure shows that the median height during breakfast is more than one and a half kilometers higher than the median height during dinner.

B Appendix Tables

Table A1: Experimental research on cookstove impacts

Authors	Year	Country	Urban	Pollution Monitoring	Health Measure-ments	Months to Last Follow Up	House-holds
Berkouwer and Dean	2023	Kenya	Yes	PM, CO	Yes	42	702
RESPIRE trial papers							
McCracken *et al.*	2007	Guatemala	No	PM	Yes	10	537
Smith-Sivertsen *et al.*	2009	Guatemala	No	CO	Yes	18	534
Smith *et al.*	2011	Guatemala	No	CO	Yes	18	534
Thompson *et al.*	2011	Guatemala	No	CO	Yes	18	266
Romieu *et al.*	2009	Mexico	No	*None*	Yes	10	668
Burwen and Levine	2012	Ghana	No	PM, CO	No	8	488
Beltramo and Levine	2013	Senegal	No	PM, CO[b]	No	6	790
Alexander *et al.*	2014	Bolivia	No	CO	No	24	20
Jary *et al.*	2014	Malawi	No	PM, CO	Yes	0.25	50
Bensch and Peters	2015	Senegal	No	*None*	Yes	30	253
Tielsch *et al.*	2016	Nepal	No	PM	No	18	3376
Hanna *et al.*	2016	India	No	CO	Yes	48	2575
Mortimer *et al.*	2017	Malawi	No	*None*	Yes	24	8470
Alexander *et al.*	2018	Nigeria	Yes	PM, CO	No[a]	24	324
Checkley *et al.*	2020	Peru	No	PM, CO[c]	Yes	23	180
Adane *et al.*	2021	Ethiopia	No	PM	No	24	1977

"Pollution Monitoring" refers to quantitative monitoring using a pollution monitoring device. "Health Measurements" refer to quantitative measurements, such as blood pressure, blood oxygen saturation, and spirometry (which are the most common among those with any quantitative measures). Pollution monitored includes particulate matter (PM) and carbon monoxide (CO). [a]While no health measurements are conducted, pregnancy outcomes are verified by hospital reports. [b]Also measures nitrogen dioxide (NO_2). [c]Also measures NO_2 and black carbon (BC).

Table A2: Pollution during self-reported time use activities

Activity	Hours	PM2.5	CO
Cooking	2.6	46.0	8.7
	[1.7]	[34.4]	[13.4]
Sleeping	8.1	31.2	4.3
	[2.4]	[20.1]	[7.0]
Eating	2.5	42.6	8.5
	[1.1]	[33.3]	[13.0]
Bus	0.4	32.9	6.7
	[1.1]	[19.3]	[12.8]
Bicycle	0.0	45.1	5.1
	[0.2]	[56.3]	[7.4]
Walking	1.9	35.0	5.6
	[2.3]	[28.3]	[11.2]
Work	5.2	37.6	5.7
	[4.7]	[28.0]	[8.9]
Schoolwork	0.1	40.8	9.4
	[0.3]	[32.3]	[17.0]
Other (away)	0.9	37.1	6.9
	[1.6]	[32.1]	[16.5]
Other (home)	4.0	37.5	7.7
	[3.5]	[24.5]	[10.8]

Average hourly air pollution matched with hourly self-reported time use data, collected during the 2022–2023 endline survey. Hours add up to >24 because respondents occasionally report doing multiple activities in one hour. PM2.5 units are ug/m^3. CO units are ppm. Walking refers to walking outdoors, within or across neighborhoods. Schoolwork was typically done at home.

Table A3: First stage: impact of random treatments on take-up

	(1)	(2)	(3)	(4)	(5)
Credit treatment	0.29***		0.30***	0.21***	0.20**
	(0.04)		(0.04)	(0.08)	(0.08)
Subsidy (10 USD)		0.20***	0.20***	0.23***	0.23***
		(0.02)	(0.02)	(0.03)	(0.04)
Credit treatment X Subsidy (10 USD)				0.00	0.00
				(0.00)	(0.00)
Socioeconomic controls	No	No	No	No	Yes
Observations	702	702	702	702	702
Control mean	0.4	0.4	0.2	0.2	0.2

Impact of randomly assigned subsidy (between USD 0-40), credit treatment status, and their interaction on Jikokoa ownership, estimated using ordinary least squares regressions (OLS). Column (1) presents the OLS estimate of the effect of the credit treatment on take-up of the Jikokoa. Column (2) presents the OLS estimate of the effect the randomly assigned subsidy (normalized to 10 USD) on Jikokoa take-up. Column (3) presents the OLS estimate of both the credit treatment and randomly assigned subsidy on Jikokoa take-up. Columns (4) and (5) presents the OLS estimate of the credit treatment, randomly assigned subsidy, and their interaction on Jikokoa take-up. Column (5) includes socioeconomic controls.

Table A4: More detailed socio-economic outcomes

	Control Mean	Treatment Effect	N
Charcoal expenditures past 7 days (USD)	3.84	-1.50***	702
	[3.16]	(0.47)	
Charcoal expenditures past 7 days (log)	5.98	-0.33***	667
	[0.82]	(0.12)	
Earnings past 2 weeks (USD)	32.53	4.73	563
	[35.41]	(7.83)	
Has formal bank account (=1)	0.13	0.11	702
	[0.34]	(0.07)	
Total savings (USD)	53.64	-8.63	701
	[86.62]	(19.88)	
... in mobile banking (USD)	5.85	-0.22	702
	[12.29]	(2.05)	
... contributions to SACCO (USD)	7.93	-0.67	701
	[14.30]	(2.69)	
... in SACCO payout (USD)	40.25	-15.30	701
	[64.75]	(13.97)	
... in formal banking (USD)	7.63	6.81	702
	[34.99]	(8.69)	
Minutes cooking per day	136.72	3.49	702
	[57.76]	(8.32)	
... minutes in the morning	30.97	-0.20	702
	[18.73]	(2.81)	
... minutes in the afternoon	40.53	1.17	702
	[25.05]	(4.06)	
... minutes in the evening	65.22	2.53	702
	[31.56]	(4.19)	
People in network who adopted Jikokoa	0.78	1.13***	702
	[2.04]	(0.40)	
... neighbors	0.28	0.56***	702
	[0.82]	(0.16)	
... family members	0.20	0.21	702
	[0.69]	(0.13)	
... friends	0.20	0.22*	702
	[0.69]	(0.13)	
... other people	0.10	0.14	702
	[0.45]	(0.10)	

Each row is an instrumental variables regressions where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership, and includes socioeconomic controls. The lower number of observations (<702) for "Charcoal expenditures past 7 days (log)" can be attributed to participants reporting zero charcoal expenditures in the past seven days. The lower number of observations for the other rows can be attributed to participants declining to answer.

Table A5: Impacts on Time Use

	Control Mean	Treatment Effect	N
Cooking	2.50	0.31	691
	[1.84]	(0.23)	
Sleeping	9.60	-0.72**	691
	[2.26]	(0.34)	
Eating	2.38	-0.15	691
	[1.07]	(0.17)	
Bus	0.32	-0.05	691
	[0.91]	(0.15)	
Bicycle	0.03	0.01	691
	[0.17]	(0.04)	
Walking	1.67	0.37	691
	[2.01]	(0.33)	
Work	4.40	0.35	691
	[4.12]	(0.67)	
Schoolwork	0.08	0.03	691
	[0.34]	(0.04)	
Other (away)	0.82	-0.29	691
	[1.54]	(0.26)	
Other (home)	3.86	-0.13	691
	[3.21]	(0.51)	

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership, and includes socioeconomic controls. The outcome variable for each row is hours spent on each task each day. Rows add up to > 24 as some respondents report multiple activities within a given hour window.

Table A6: Causal impact of cookstove adoption on pollution exposure (in logs)

Panel A) All

	PM2.5				CO		
	(1) Median	(2) Mean	(3) Max Hour	(4) 99th	(5) Mean	(6) Max Hour	(7) 99th
Own Jikokoa	-0.01	-0.03	-0.13	-0.07	0.48	0.51*	0.56**
	(0.06)	(0.08)	(0.14)	(0.14)	(0.33)	(0.30)	(0.28)
Control Mean	3.1	3.5	4.8	5.0	0.7	2.8	3.1
Weak IV F-Statistic	53	53	53	53	53	53	53
Observations	651	651	651	651	652	651	645

Panel B) When self-reporting cooking

	PM2.5				CO		
	(1) Median	(2) Mean	(3) Max Hour	(4) 99th	(5) Mean	(6) Max Hour	(7) 99th
Own Jikokoa	-0.17*	-0.25**	-0.29*	-0.37**	0.17	0.18	0.15
	(0.09)	(0.11)	(0.15)	(0.18)	(0.41)	(0.41)	(0.37)
Control Mean	3.4	3.7	4.1	4.6	0.9	1.8	2.5
Weak IV F-Statistic	48	48	48	48	45	44	45
Observations	598	598	595	598	548	546	548

Panel C) Between 6–8am and 6–9pm (when most respondents report cooking)

	PM2.5				CO		
	(1) Median	(2) Mean	(3) Max Hour	(4) 99th	(5) Mean	(6) Max Hour	(7) 99th
Own Jikokoa	-0.09	-0.12	-0.23	-0.16	0.26	0.33	0.24
	(0.08)	(0.10)	(0.14)	(0.15)	(0.37)	(0.35)	(0.31)
Control Mean	3.5	3.8	4.5	5.0	1.0	2.3	2.9
Weak IV F-Statistic	53	53	53	53	50	50	50
Observations	649	649	646	649	628	628	628

Panel D) When self-reporting not cooking

	PM2.5				CO		
	(1) Median	(2) Mean	(3) Max Hour	(4) 99th	(5) Mean	(6) Max Hour	(7) 99th
Own Jikokoa	-0.01	-0.03	-0.11	-0.06	0.55*	0.55*	0.47*
	(0.06)	(0.08)	(0.14)	(0.15)	(0.33)	(0.31)	(0.28)
Control Mean	3.1	3.5	4.7	5.0	0.6	2.7	3.1
Weak IV F-Statistic	53	53	53	53	53	53	52
Observations	651	651	651	651	651	651	643

Instrumental variables regressions where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. We omit presenting median CO in log because 55% of 10-minute average observations equal 0. Columns (1) and (5) use median exposure, (2) and (6) use mean exposure, (3) and (7) use maximum 1-hour average exposure, and (4) and (8) use 99th percentile of 10-min average exposure. Regressions include socioeconomic controls and fixed effects for the specific LASCAR or PA-II device used for that respondent. Table 3 presents the same for all hours and for when self-reporting cooking.

Table A7: Causal impact of cookstove adoption on pollution exposure

Panel A) Between 6–8am and 6–9pm (when most respondents report cooking)

	PM2.5				CO			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Median	Mean	Max Hour	99th	Median	Mean	Max Hour	99th
Own Jikokoa	-7.1	-9.4	-28.6*	-23.2	0.5	5.1*	18.4*	21.2
	(4.3)	(5.7)	(16.3)	(22.9)	(1.7)	(3.0)	(10.6)	(15.3)
Control Mean	37.4	53.3	117.0	189.8	3.4	9.3	33.1	54.8
Weak IV F-Statistic	53	53	53	53	52	52	52	52
Observations	649	649	646	649	656	656	656	656

Panel B) When self-reporting not cooking

	PM2.5				CO			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Median	Mean	Max Hour	99th	Median	Mean	Max Hour	99th
Own Jikokoa	-0.0	-0.7	-15.0	-5.8	-0.6	2.0	18.8	23.9*
	(1.7)	(3.3)	(18.2)	(23.1)	(0.4)	(1.6)	(12.3)	(14.2)
Control Mean	24.7	36.2	138.5	189.1	1.8	6.2	46.5	57.7
Weak IV F-Statistic	53	53	53	53	52	52	52	52
Observations	651	651	651	651	656	656	656	656

Instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Columns (1) and (5) use median exposure, (2) and (6) use mean exposure, (3) and (7) use maximum 1-hour average exposure, and (4) and (8) use 99th percentile of 10-min average exposure. Regressions include socioeconomic controls and fixed effects for the specific LASCAR or PA-II device used for that respondent. Table 3 presents the same for all hours and for when self-reporting cooking. Table A6 presents all four outcomes in logs.

Table A8: Causal impact of cookstove adoption on pollution exposure using hourly data

	Cooking	PM 2.5		PM 1.0		CO	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	IV	OLS	IV	OLS	IV	OLS	IV
Own Jikokoa	0.00	-1.79	0.41	-1.13	0.15	0.89	2.84**
	(0.01)	(1.54)	(2.91)	(0.91)	(1.74)	(0.69)	(1.44)
Cooking and Own Jikokoa		-9.76***	-15.04**	-5.18***	-8.37**	1.30	-1.45
		(3.05)	(7.30)	(1.78)	(4.21)	(1.37)	(2.43)
Cooking		9.20***	12.10***	5.04***	6.79***	0.78	2.30
		(2.56)	(4.04)	(1.53)	(2.31)	(0.83)	(1.54)
DoW*HoD*Geocluster FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Mean	0.10	36.32	36.32	25.65	25.65	6.17	6.17
Weak IV F-Statistic	39		29		29		29
Households	661	652	652	652	652	656	656
Observations	29428	23380	23380	23380	23380	29154	29154

Columns (2), (4), and (6) are each OLS regressions, while Columns (3), (5), and (7) are instrumental variables regressions which use randomly assigned price and credit treatment status as instruments for endline Jikokoa ownership. Standard errors clustered by respondent. All regressions include socioeconomic controls, panel data fixed effects, and Lascar or PA-II device fixed effects.

Table A9: Causal impact of cookstove adoption on propensity to cook indoors

	(1)
Own Jikokoa	-0.026
	(0.047)
Control Mean	0.889
Weak IV F-Stat	46
Observations	649

Instrumental variables regressions using randomly assigned price and credit treatment status as instruments for endline Jikokoa ownership. Regression includes socioeconomic controls.

Table A10: Causal impact of cookstove adoption on minutes per day in excess of exposure thresholds

Panel A) All

	(1) $50\mu g/m^3$	(2) $75\mu g/m^3$	(3) $100\mu g/m^3$	(4) $200\mu g/m^3$	(5) $300\mu g/m^3$	(6) $400\mu g/m^3$
Own Jikokoa	1.3	-2.7	-2.8	-2.2	-2.4	-2.1
	(30.8)	(23.3)	(18.6)	(10.7)	(7.3)	(4.9)
Households	653	653	653	653	653	653
Control Mean	193.5	120.8	86.3	36.1	20.4	12.6

Panel B) When self-reporting cooking

	(1) $50\mu g/m^3$	(2) $75\mu g/m^3$	(3) $100\mu g/m^3$	(4) $200\mu g/m^3$	(5) $300\mu g/m^3$	(6) $400\mu g/m^3$
Own Jikokoa	-4.7	-5.5	-4.3	-3.9	-4.4**	-2.6*
	(8.0)	(6.2)	(5.0)	(3.0)	(2.1)	(1.5)
Households	599	599	599	599	599	599
Control Mean	35.6	24.2	17.7	8.5	5.3	3.3

Each column is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Column labels are the exposure thresholds. Regressions include socioeconomic controls and fixed effects for the specific LASCAR or PA-II device used for that respondent.

Table A11: Physiology outcomes

	Control Mean	Treatment Effect	N
Average systolic blood pressure	122.16	0.49	696
	[18.97]	(3.30)	
Average diastolic blood pressure	81.32	0.58	696
	[11.73]	(2.15)	
Hypertension: Stage 1 or higher (>130/80)	0.51	0.02	696
	[0.50]	(0.09)	
Hypertension: Stage 2 or higher (>140/90)	0.27	-0.02	696
	[0.44]	(0.08)	
Blood oxygen	96.61	0.31	696
	[2.53]	(0.37)	

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls.

Table A12: Respiratory-related health symptoms

	Control Mean	Treatment Effect	N
Respiratory health symptom index	-0.00	-0.24*	702
	[1.00]	(0.13)	
Number of respiratory health symptoms	1.70	-0.48**	702
	[1.76]	(0.23)	
Respiratory health symptom index (frequent symptoms)	0.00	-0.32**	702
	[1.22]	(0.16)	
Number of respiratory health symptoms (frequent symptoms)	1.61	-0.46**	702
	[1.63]	(0.22)	
Persistent cough	0.24	-0.09	702
	[0.43]	(0.07)	
Always feeling tired	0.30	-0.07	702
	[0.46]	(0.07)	
Breathlessness at night	0.08	-0.01	702
	[0.27]	(0.04)	
Frequent diarrhea	0.02	-0.02	702
	[0.15]	(0.03)	
Difficulty breathing / Chest tightness	0.07	-0.01	702
	[0.26]	(0.04)	
Runny nose	0.23	-0.05	702
	[0.42]	(0.07)	
Sore throat	0.16	-0.12*	702
	[0.37]	(0.06)	
Headache	0.52	-0.12	702
	[0.50]	(0.08)	
Wheezing	0.03	0.01	702
	[0.17]	(0.03)	
Persistent mucus problems	0.04	-0.01	702
	[0.19]	(0.02)	

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls. Rows 3 and 4 only include symptoms with prevalence of at least 5% among the control group.

Table A13: Non-respiratory related health symptoms

	Control Mean	Treatment Effect	N
Non-respiratory health symptom index	-0.00	-0.03	702
	[1.00]	(0.19)	
Number of non-respiratory health symptoms	1.09	-0.24	702
	[1.54]	(0.25)	
Non-respiratory health symptom index (frequent symptoms)	-0.00	-0.38*	702
	[1.22]	(0.20)	
Number of non-respiratory health symptoms (frequent symptoms)	0.84	-0.33*	702
	[1.16]	(0.19)	
Fever	0.20	0.01	702
	[0.40]	(0.07)	
Malaria	0.15	-0.13*	702
	[0.36]	(0.07)	
Stomach pain	0.16	-0.11*	702
	[0.37]	(0.06)	
Pain when urinating	0.01	-0.01	702
	[0.10]	(0.03)	
Worms	0.01	0.05**	702
	[0.11]	(0.02)	
Rapid weight loss	0.06	-0.09**	702
	[0.24]	(0.04)	
Frequent and excessive urination	0.03	0.02	702
	[0.16]	(0.02)	
Skin Rash or irritaion	0.02	0.04	702
	[0.12]	(0.03)	
Constant thirst / increased drinking of fluids	0.14	-0.01	702
	[0.35]	(0.05)	
Difficulty swallowing	0.03	-0.02	702
	[0.17]	(0.02)	
Muscle pain (myalgia)	0.12	-0.01	702
	[0.32]	(0.05)	
Loss of sense of smell / not being able to taste food	0.05	-0.01	702
	[0.21]	(0.03)	
Diarrhea / Nausea / Vomiting	0.05	-0.04	702
	[0.21]	(0.03)	
Swelling in ankles, feets or legs	0.04	0.00	702
	[0.20]	(0.03)	
Other accidents	0.02	0.07***	702
	[0.14]	(0.02)	

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls. Rows 3 and 4 only include symptoms with prevalence of at least 5% among the control group.

Table A14: Diagnoses by a doctor

	Control Mean	Treatment Effect	N
Number of health diagnoses	0.30	0.13	702
	[0.58]	(0.09)	
Asthma	0.01	-0.01	702
	[0.08]	(0.01)	
Pneumonia	0.13	0.02	702
	[0.34]	(0.05)	
Chronic Pulmonary Disease	0.00	0.01	702
	[0.06]	(0.01)	
Other lung disease	0.01	-0.01	702
	[0.08]	(0.01)	
Stroke or cardiovascular disease	0.01	-0.00	702
	[0.08]	(0.01)	
Hypertension	0.05	0.11***	702
	[0.22]	(0.04)	
Tuberculosis	0.01	0.02	702
	[0.08]	(0.01)	
COVID	0.01	-0.01	702
	[0.08]	(0.01)	
Diabetes	0.02	-0.00	702
	[0.14]	(0.02)	
Other	0.04	0.01	702
	[0.19]	(0.03)	
Typhoid	0.02	0.01	702
	[0.14]	(0.02)	
Tuberculosis	0.01	-0.01	702
	[0.08]	(0.02)	
Cholera	0.00	0.01	702
	[0.00]	(0.01)	

Each variable is the respondent's self-report of whether they have been diagnosed with each disease by a doctor in the past three years. Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls.

Table A15: Impacts on cognitive function

	Control Mean	Treatment Effect	N
Cognitive index	-0.00	-0.01	587
	[1.00]	(0.15)	
Working memory (Corsi)	-0.00	-0.48**	305
	[1.00]	(0.22)	
Attention (d2)	0.00	-0.09	564
	[1.00]	(0.15)	
Inhibitory control (HF - % correct)	-0.00	0.18	516
	[1.00]	(0.16)	
Inhibitory control (HF - reaction time)	0.00	0.14	516
	[1.00]	(0.19)	

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls. See Section 3.4 and Appendix C for descriptions of the cognitive exercises conducted to measure cognitive function. Variables standardized for the control group to have mean 0 and standard deviation 1. Due to a technical issues with the tablets not displaying the behavioral games, the sample size for some of the cognition outcomes is smaller than in other outcome tables. Since this was a technical issue that occurred in the earlier stages of the surveying round, and since the order of follow-up surveys was randomized, it is unlikely that this biased the results in any meaningful way. Regressions control for baseline demographic and socioeconomic characteristics.

Table A16: Healthcare utilization outcomes

	Control Mean	Treatment Effect (2022 Ownership)	Treatment Effect (2019 ownership)	N
	(1)	(2)	(3)	
Non-hospital health expenditures (USD)	4.34	0.80	0.56	702
	[7.64]	(1.07)	(0.78)	
Hospital visits in past 30 days	0.33	-0.01	-0.01	702
	[0.57]	(0.09)	(0.07)	
Hospital visit expenditures (USD)	3.39	1.03	0.79	702
	[11.17]	(1.48)	(1.08)	

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls.

Table A17: Children's outcomes

	Control Mean	Treatment Effect	N
Child weight (kg)	17.73	-1.02	224
	[7.57]	(1.80)	
Child height (cm)	98.59	6.02	199
	[31.07]	(6.08)	
Child arm circumference (cm)	16.37	1.24	220
	[7.26]	(1.41)	
Number of child health symptoms	1.19	0.34	343
	[1.50]	(0.40)	
Child health symptom index	0.00	0.32	343
	[1.00]	(0.29)	
Fever	0.18	-0.01	343
	[0.38]	(0.09)	
Vomiting	0.10	-0.01	343
	[0.30]	(0.06)	
Cough	0.40	0.03	343
	[0.49]	(0.12)	
Diarrhea	0.10	0.00	343
	[0.30]	(0.07)	
Breathlessness	0.04	0.08	343
	[0.19]	(0.06)	
Persistent headache	0.08	0.05	343
	[0.27]	(0.05)	
Very bad cough	0.25	0.10	343
	[0.43]	(0.09)	
Pneumonia - DHS	0.03	0.03	343
	[0.18]	(0.05)	
Pneumonia - WHO	0.16	0.02	343
	[0.21]	(0.06)	

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include household and adult socioeconomic controls. 'Pneumonia - DHS' and 'Pneumonia - WHO' make an attempted pneumonia diagnosis based on self-reported respiratory symptoms and hospital visits using guidelines from the Demographic and Health Survey (DHS) and World Health Organization (WHO), respectively.

Table A18: Children's outcomes for children age ≤ 5

	Control Mean	Treatment Effect	N
Child weight (kg)	14.16	-2.45	156
	[6.36]	(2.32)	
Child height (cm)	87.75	-2.79	131
	[30.02]	(6.98)	
Child arm circumference (cm)	15.64	2.25	152
	[8.73]	(2.61)	
Number of child health symptoms	1.22	0.34	327
	[1.51]	(0.40)	
Child health symptom index	0.02	0.29	327
	[1.01]	(0.30)	
Fever	0.18	-0.01	327
	[0.39]	(0.09)	
Vomiting	0.10	-0.02	327
	[0.30]	(0.06)	
Cough	0.41	0.03	327
	[0.49]	(0.12)	
Diarrhea	0.10	0.01	327
	[0.30]	(0.07)	
Breathlessness	0.04	0.09	327
	[0.20]	(0.06)	
Persistent headache	0.08	0.05	327
	[0.27]	(0.05)	
Very bad cough	0.25	0.11	327
	[0.44]	(0.09)	
Pneumonia - DHS	0.03	0.03	327
	[0.18]	(0.05)	
Pneumonia - WHO	0.17	0.02	327
	[0.21]	(0.06)	

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls. 'Pneumonia - DHS' and 'Pneumonia - WHO' make an attempted pneumonia diagnosis based on self-reported respiratory symptoms and hospital visits using guidelines from the Demographic and Health Survey (DHS) and World Health Organization (WHO), respectively.

Table A19: Heterogeneity in primary health impacts by baseline socioeconomic variables

	Treatment X Age (1)	Treatment X WTP (2)	Treatment X Health (3)	Treatment X Health beliefs (4)	N
Average systolic blood pressure	-0.73	-2.53	-2.20	-1.51	696
	(3.26)	(4.88)	(3.07)	(3.42)	
Average diastolic blood pressure	-2.49	-3.07	-3.77*	-1.58	696
	(2.09)	(3.13)	(1.97)	(2.32)	
Hypertension: Stage 1 or higher ($>$130/80)	-0.01	-0.05	-0.15*	-0.05	696
	(0.08)	(0.13)	(0.09)	(0.09)	
Hypertension: Stage 2 or higher ($>$140/90)	0.03	-0.20*	-0.15*	-0.09	696
	(0.08)	(0.12)	(0.08)	(0.08)	
Blood oxygen	0.05	0.94	-0.15	-0.05	696
	(0.33)	(0.60)	(0.35)	(0.37)	
Number of non-respiratory health symptoms	0.00	0.31	0.21	0.10	702
	(0.20)	(0.35)	(0.21)	(0.29)	
Non-respiratory health symptom index	-0.07	0.10	0.15	0.09	702
	(0.14)	(0.23)	(0.14)	(0.21)	
Number of respiratory health symptoms	0.25	0.04	-0.12	-0.02	702
	(0.20)	(0.34)	(0.21)	(0.24)	
Respiratory health symptom index	0.12	-0.06	-0.07	-0.00	702
	(0.12)	(0.19)	(0.11)	(0.13)	
Observations					

Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls. All heterogeneity variables are baseline measures and standardized to have mean 0 and standard deviation 1.

Table A20: Primary health outcomes by ambient concentrations

	Treatment (1)	Treatment X Ambient (2)	N
Average systolic blood pressure	-1.20	3.64	649
	(4.69)	(5.97)	
Average diastolic blood pressure	1.43	-1.06	649
	(2.85)	(4.03)	
Hypertension: Stage 1 or higher (>130/80)	0.07	-0.11	649
	(0.11)	(0.17)	
Hypertension: Stage 2 or higher (>140/90)	-0.02	0.05	649
	(0.10)	(0.15)	
Blood oxygen	-0.08	0.44	649
	(0.41)	(0.67)	
Number of non-respiratory health symptoms	0.12	-0.76	655
	(0.31)	(0.52)	
Non-respiratory health symptom index	0.07	-0.24	655
	(0.22)	(0.38)	
Number of respiratory health symptoms	-0.34	-0.14	655
	(0.28)	(0.45)	
Respiratory health symptom index	-0.17	-0.05	655
	(0.17)	(0.25)	
Health diagnoses index	0.06	0.08	655
	(0.24)	(0.32)	
Number of health diagnoses	0.10	0.06	655
	(0.13)	(0.19)	
Cognitive index	-0.17	0.24	547
	(0.21)	(0.30)	
Non-hospital health expenditures (USD)	1.04	0.25	655
	(1.42)	(2.32)	
Hospital visits in past 30 days	-0.02	0.02	655
	(0.12)	(0.19)	
Hospital visit expenditures (USD)	0.99	2.37	655
	(1.67)	(3.07)	
Observations			

High ambient concentration is a dummy for above median average non-cooking PM2.5. Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls. Table A12, Table A13, Table A14, and Table A15 present detailed results on the components of the symptoms, diagnoses, and cognitive indices, respectively.

Table A21: Primary health outcomes for rural respondents

	Control Mean (1)	Treatment Effect (2022 Ownership) (2)	Treatment Effect (2019 ownership) (3)	N
Physiology health index (blood oxygen and blood pressure)	-0.03 [0.91]	-1.04*** (0.31)	-0.98*** (0.33)	53
Number of non-respiratory health symptoms	0.64 [0.79]	-0.11 (0.21)	-0.11 (0.21)	53
Non-respiratory health symptom index	-0.29 [0.44]	0.08 (0.08)	0.07 (0.07)	53
Number of respiratory health symptoms	1.23 [1.11]	-0.02 (0.35)	0.06 (0.35)	53
Respiratory health symptom index	-0.31 [0.50]	-0.15 (0.19)	-0.13 (0.19)	53
Health diagnoses index	-0.16 [1.18]	0.38** (0.18)	0.41** (0.19)	53
Number of health diagnoses	0.14 [0.47]	0.14 (0.12)	0.14 (0.13)	53
Cognitive index	-0.07 [0.80]	0.01 (0.28)	-0.02 (0.28)	51
Healthcare utilization index (spending and visits)	0.02 [0.97]	0.80* (0.44)	0.84* (0.46)	53

Health outcomes for the rural sample only. Each row is an instrumental variables regression where the randomly assigned price, credit treatment status, and their interaction are used as instruments for endline Jikokoa ownership. Regressions include socioeconomic controls. Table A12, Table A13, Table A14, and Table A15 present detailed results on the components of the symptoms, diagnoses, and cognitive indices, respectively. Table 4 presents results for the full sample.

Table A22: Testing for experimenter demand: direct effect of price on self-reported health

	Respiratory			Non-respiratory		
	(1)	(2)	(3)	(4)	(5)	(6)
Owns Jikokoa	-0.45***	-0.29	-0.30	-0.39***	-0.40	-0.38
	(0.12)	(0.28)	(0.28)	(0.11)	(0.26)	(0.27)
Price (10 USD)	-0.00	0.05	0.05	-0.06	-0.07	-0.06
	(0.07)	(0.11)	(0.11)	(0.06)	(0.10)	(0.10)
Owns Jikokoa X Price (10 USD)		-0.09	-0.09		0.00	0.01
		(0.14)	(0.14)		(0.13)	(0.13)
WTP (10 USD)			0.02			-0.02
			(0.05)			(0.05)

Regressions include socioeconomic controls. If respondents with a lower price (higher subsidy) were more likely to self-report better health, price would correlate directly with self-reported symptoms rather than through the adoption channel ('Owns Jikokoa'). We do not find evidence of this here, meaning we do not find evidence of experimenter demand.

Table A23: Attrition: reaching participants

Reason	Frequency
Completed survey	702
Unable to contact	164
Unavailable	13
Withdrew from study	31
Relocated outside survey team reach	29
Deceased	7
Imprisoned	2
Other	7
Total	955

Participants who we were unable to contact were labeled only after repeated phone calls to their phone numbers and to the phone numbers of family members, physical visits to their home locations, and inquiries with nearby participants. Participants were labeled as "relocated outside survey team reach" if they moved out of Kenya or far away from the major cities of Nairobi and Mombasa.

Table A24: Attrition

	Baseline Mean	Attrited	N
BDM Price (USD)	17.6	0.3	955
	[8.3]	(0.6)	
Credit Treatment	0.7	-0.0	955
	[0.5]	(0.0)	
Attention Treatment	0.7	0.1*	955
	[0.5]	(0.0)	
Jikokoa (=1)	0.6	-0.0	955
	[0.5]	(0.0)	
Persistent cough in past week	0.3	-0.0	955
	[0.5]	(0.0)	
Persistent breathlessness in past week	0.3	-0.0	955
	[0.5]	(0.0)	
Hours work missed due to health in past week	3.2	1.1	951
	[14.8]	(1.1)	
Female	1.0	-0.0	955
	[0.2]	(0.0)	
Respondent age	37.5	-3.8***	955
	[11.8]	(0.9)	
Number of household residents	4.8	-0.4**	955
	[2.1]	(0.2)	
Number of child residents	2.6	-0.3*	955
	[1.7]	(0.1)	
Savings in bank, mobile, ROSCA (USD)	75.7	11.8	955
	[130.2]	(9.5)	
Household income (USD/week)	47.3	2.5	949
	[34.8]	(2.6)	
Total energy consumption (USD/week)	8.6	-0.4	955
	[3.6]	(0.3)	
Charcoal consumption (USD/week)	5.6	-0.4*	955
	[2.6]	(0.2)	
Price of old jiko (USD)	3.4	0.2	950
	[1.3]	(0.1)	
Risky investment amount (0-4 USD)	1.2	-0.0	955
	[1.0]	(0.1)	
Mean		0.26	

All variables from baseline (2019). Attrited = 1 if respondent has not completed a 2022–2023 endline survey. Column (1), Baseline Mean, is the mean of both attriters and non-attriters in 2019. Column (2), Attrited, is the difference in means between the full sample and attriters. Any changes in Column (3), N, is due to participants declining to answer a question. The bottom row, Mean, presents the percentage of respondents who attrited.

Table A25: Correlation between health and average, maximum, and duration of PM2.5 exposure

	Mean	Average Pollution in SD	Max Hourly Pollution in SD		Hours Above $100\mu g/m^3$		N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average systolic blood pressure	123.49	-0.08	0.52	0.52	0.25	0.25	645
	[21.60]	(0.91)	(0.85)	(0.85)	(0.50)	(0.50)	
Average diastolic blood pressure	81.74	0.53	0.53	0.53	0.29	0.29	645
	[12.71]	(0.56)	(0.53)	(0.53)	(0.31)	(0.31)	
Hypertension (>130/80)	0.51	0.01	0.00	0.00	0.00	0.00	645
	[0.50]	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	
Hypertension: Stage 2 or higher	0.27	0.00	-0.01	-0.01	0.00	0.00	645
(>140/90)	[0.44]	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	
Blood oxygen	96.72	0.12	-0.03	-0.03	0.03	0.03	645
	[2.43]	(0.10)	(0.10)	(0.10)	(0.06)	(0.06)	
Number of health symptoms	2.52	0.02	0.23**	0.23**	0.02	0.02	651
	[2.66]	(0.11)	(0.10)	(0.10)	(0.06)	(0.06)	
Health symptoms index (z-score)	-0.09	0.01	0.07**	0.07**	0.01	0.01	651
	[0.92]	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	
Number of non-respiratory health	0.96	0.03	0.15***	0.15***	0.02	0.02	651
symptoms	[1.44]	(0.06)	(0.06)	(0.06)	(0.03)	(0.03)	
Non-respiratory health symptom	-0.07	0.02	0.09**	0.09**	0.01	0.01	651
index	[0.99]	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	
Number of respiratory health	1.55	-0.01	0.08	0.08	0.00	0.00	651
symptoms	[1.60]	(0.06)	(0.06)	(0.06)	(0.03)	(0.03)	
Respiratory health symptom index	-0.09	-0.01	0.04	0.04	-0.00	-0.00	651
	[0.88]	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)	
Number of health diagnoses	0.29	-0.03	-0.00	-0.00	-0.02	-0.02	651
	[0.56]	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	
Health diagnoses index	-0.04	-0.04	0.00	0.00	-0.03	-0.03	651
	[0.89]	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	
Hospital visits in past 30	0.30	-0.01	0.01	0.01	-0.00	-0.00	651
days	[0.55]	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	
Non-hospital health expenditures	4.17	0.63*	0.60*	0.60*	0.28	0.28	651
(USD)	[7.94]	(0.33)	(0.32)	(0.32)	(0.18)	(0.18)	
Hospital visit expenditures (USD)	2.82	0.66	0.62	0.62	0.26	0.26	651
	[10.14]	(0.44)	(0.42)	(0.42)	(0.24)	(0.24)	
Control for average pollution			No	Yes	No	Yes	

Each row and column cell in columns (2)–(6) is a separate OLS regression. Regressions include socioeconomic controls and fixed effects for month surveyed and for the specific LASCAR or PA-II device used for that respondent. Regressions in columns (4) and (6) control for average PM2.5 pollution, while regressions in columns (3) and (5) don't. Table A12, Table A13 and Table A14 present detailed results on symptoms and diagnoses.

Table A26: Correlation between health and mean, median, maximum, and duration of CO exposure

	Mean	Mean Pollution in SD	Median Pollution in SD	Max Hourly Pollution in SD	Hours Above 10coppm	N
	(1)	(2)	(3)	(4)	(5)	(6)
Average systolic blood pressure	123.49	1.50*	1.50	0.79	-0.08	645
	[21.60]	(0.88)	(1.02)	(0.88)	(0.27)	
Average diastolic blood pressure	81.74	1.32**	0.45	0.71	0.06	645
	[12.71]	(0.54)	(0.63)	(0.54)	(0.17)	
Hypertension (>130/80)	0.51	0.02	-0.01	0.00	-0.01	645
	[0.50]	(0.02)	(0.02)	(0.02)	(0.01)	
Hypertension: Stage 2 or higher (>140/90)	0.27	0.04**	0.02	0.02	-0.00	645
	[0.44]	(0.02)	(0.02)	(0.02)	(0.01)	
Blood oxygen	96.72	0.23**	0.20*	0.19*	0.06*	645
	[2.43]	(0.10)	(0.12)	(0.10)	(0.03)	
Number of health symptoms	2.52	0.14	0.14	0.17	0.08**	651
	[2.66]	(0.11)	(0.12)	(0.11)	(0.03)	
Health symptoms index (z-score)	-0.09	0.05	0.04	0.06*	0.03**	651
	[0.92]	(0.04)	(0.04)	(0.04)	(0.01)	
Number of non-respiratory health symptoms	0.96	0.05	0.05	0.11*	0.03*	651
	[1.44]	(0.06)	(0.07)	(0.06)	(0.02)	
Non-respiratory health symptom index	-0.07	0.04	0.02	0.08**	0.02*	651
	[0.99]	(0.04)	(0.05)	(0.04)	(0.01)	
Number of respiratory health symptoms	1.55	0.08	0.09	0.06	0.05**	651
	[1.60]	(0.06)	(0.07)	(0.06)	(0.02)	
Respiratory health symptom index	-0.09	0.06	0.05	0.03	0.02**	651
	[0.88]	(0.04)	(0.04)	(0.04)	(0.01)	
Number of health diagnoses	0.29	0.04*	0.02	0.03	0.00	651
	[0.56]	(0.02)	(0.03)	(0.02)	(0.01)	
Health diagnoses index	-0.04	0.04	0.03	0.04	-0.00	651
	[0.89]	(0.04)	(0.04)	(0.04)	(0.01)	
Hospital visits in past 30 days	0.30	-0.01	-0.01	0.01	0.00	651
	[0.55]	(0.02)	(0.03)	(0.02)	(0.01)	
Non-hospital health expenditures (USD)	4.17	0.18	-0.20	0.10	-0.10	651
	[7.94]	(0.33)	(0.38)	(0.33)	(0.10)	
Hospital visit expenditures (USD)	2.82	0.49	-0.51	0.11	-0.11	651
	[10.14]	(0.42)	(0.50)	(0.43)	(0.13)	

Each row and column cell in columns (2)–(5) is a separate OLS regression. Regressions include socioeconomic controls and fixed effects for month surveyed and for the specific LASCAR or PA-II device used for that respondent. Table 5 provides the same for PM2.5.

Table A27: Correlation between health and mean, median, maximum, and duration of PM2.5 exposure (among non-adopters)

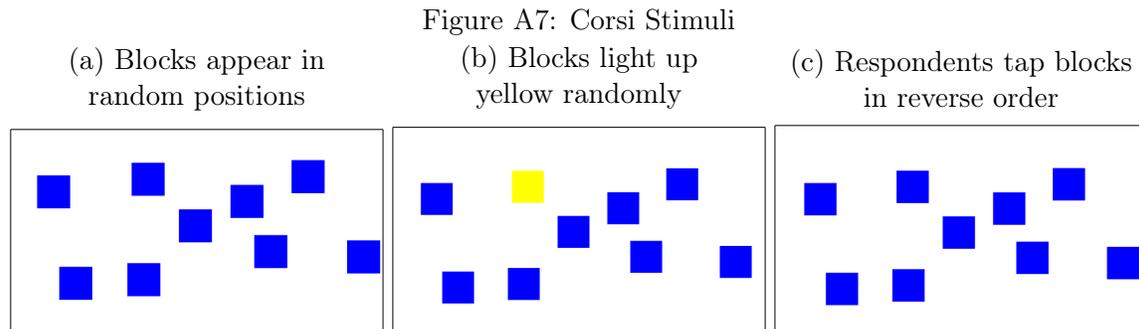|	Mean	Mean Pollution in SD	Median Pollution in SD	Max Hourly Pollution in SD	Hours Above $100\mu g/m^3$	N
	(1)	(2)	(3)	(4)	(5)	(6)
Hypertension (>130/80)	0.52	-0.01	-0.02	-0.01	-0.00	290
	[0.50]	(0.04)	(0.04)	(0.04)	(0.02)	
Blood oxygen	96.58	0.31*	0.27	0.33*	0.14	290
	[2.59]	(0.18)	(0.19)	(0.18)	(0.10)	
Health symptoms index (z-score)	0.02	-0.00	0.03	0.09	-0.00	291
	[1.02]	(0.06)	(0.07)	(0.07)	(0.04)	
Number of health symptoms	2.82	0.01	0.10	0.33*	0.01	291
	[2.96]	(0.18)	(0.19)	(0.19)	(0.10)	
Health diagnoses index	0.01	-0.04	-0.06	0.04	-0.01	291
	[1.00]	(0.07)	(0.07)	(0.07)	(0.04)	
Number of health diagnoses	0.31	-0.01	-0.02	0.04	-0.00	291
	[0.59]	(0.04)	(0.04)	(0.04)	(0.02)	
Hospital visits in past 30 days	0.35	0.02	-0.02	0.05	-0.01	291
	[0.59]	(0.04)	(0.04)	(0.04)	(0.02)	
Hospital visit expenditures (USD)	3.41	1.17	0.58	1.57**	0.29	291
	[10.94]	(0.73)	(0.75)	(0.75)	(0.40)	

Each row and column cell in columns (2)–(5) is a separate OLS regression. Regressions include socioeconomic controls and fixed effects for month surveyed and for the specific LASCAR or PA-II device used for that respondent. Hypertension refers to stage 1. Table 5 present the same for the entire sample.

C   Cognitive assessments

C.1   Reverse Corsi Block

Implementation of the Reverse Corsi Block task follows Brunetti, Del Gatto, and Delogu (2014). For each trial, nine blue blocks appear in random locations on the screen. They take turns lighting up. Respondents are then asked to tap the blocks in reverse order of how they lit up (see Figure A7). For each element in the sequence, if the respondent taps on the correct block, it turns green and the respondent can proceed to tap the next block in the sequence. If the respondent taps any other block, it flashes red and the respondent moves to the next trial. The first trial sequence contains two elements. For each sequence the respondent gets completely correct, the sequence length increases by one.

Figure A7: Corsi Stimuli

(a) Blocks appear in random positions   (b) Blocks light up yellow randomly   (c) Respondents tap blocks in reverse order

Note: This figure shows the three stages of the reverse Corsi blocks test. The test is designed to measure working memory. First nine blocks appear in random positions. They then light up in a random sequence. Respondents must then tap the blocks in the reverse order of how they lit up. After each correct trial, the length of the sequence increases by one, and after every incorrect trial, the length of the sequence decreases by one down to a minimum of two elements.

C.2   Hearts and Flowers

Implementation of the Hearts and Flowers task follows the "dots" task outlined by Davidson et al. (2006). Respondents see a fixation dot in the center of their screen with blue boxes on the left and right. Respondents then see a sequence of hearts and flowers appear on the boxes. For each trial, respondents must press either the "Q" or "P" key. When a heart appears, respondents must press the key on the same side as the heart. While when a flower appears, respondents must press the key on the opposite side (see Figure A8).
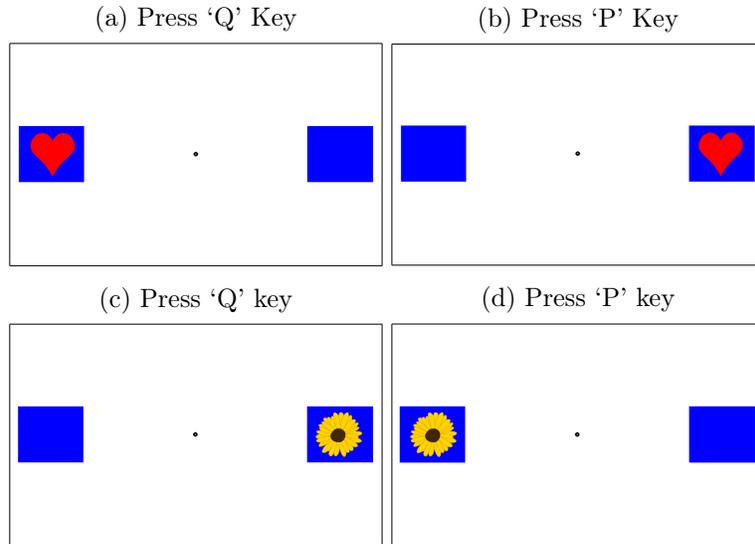
(a) Press 'Q' Key   (b) Press 'P' Key

(c) Press 'Q' key   (d) Press 'P' key

Figure A8: Hearts and Flowers Possible Stimuli and Responses

Note: The figure shows the four possible stimuli and responses for the hearts and flowers test. The test is designed to assess inhibitory control. Respondents see a series of hearts and flowers appear on the blocks. When a flower appears, the respondent must press the key on the opposite side of the keyboard. When a heart appears, the respondent must press the key on the same side of the keyboard.

C.3   d2 Attention Task

The d2 task follows the general instructions outlined in Bates and Lemay Jr. (2004) and Brickenkamp and Zillmer (1998). For each trial, eleven letters (either p or d) appear on the screen with between zero and two dashes above and zero and two dashes below for a total number of dashes between zero and four (see Figure A9). The respondent's job is to mark all of the d's with a total of two dashes by tapping the box below the letter. After 5106 ms, the trial ends. Until that time has elapsed, respondents can un-mark and re-mark letters as they please. Another set of eleven letters appears after 500 ms.

Figure A9: d2 Stimuli
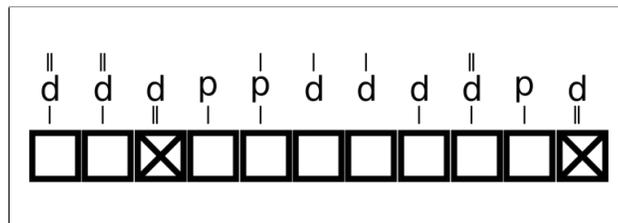
Note: The figure shows an example of a trial from the d2 test. The test is designed to assess attention. Respondents see a series of d's and p's with up to two lines below and above. They must tap the boxes below all d's with a total of two dashes before the trial ends.