DOCUMENT DE TRAVAIL DT/2023-07

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Willingness to pay for a new mosquito-repellent ointment: Experimental evidence from Burkina Faso *

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December 2023

Abstract. We use a randomized experiment to study how a subsidy for a mosquito-repellent ointment to protect from malaria affects uptake, usage, and future demand for the product in Burkina Faso. We randomly vary the subsidy level across enumeration areas and approximately 3,100 households are randomly allocated to one of the three groups: 0%, 50% of 100% subsidy. Our main results are that subsidies strongly and significantly increase the likelihood of acquiring a jar of mosquito-repellent ointment, and of using it on a regular basis during the rainy season. We do not find any evidence supporting heterogeneous treatment effects based on household characteristics, nor on the use of preventive measures at baseline.

Journal of Economic Literature classification: I12, O33, H43.

Keywords: Malaria, Behavior, Technology adoption, Price, Africa, Burkina Faso.

*We are grateful to Maïa Africa SAS and Innovations for Poverty Action (Aliou Diallo, Harouna Bado, Rose Dounialou Hema/Yara, Jean-Baptiste Koadima) for a very fruitful collaboration, and to Estelle Koussoubé for the insightful discussions at the beginning of the project. This project was funded by the Fund for Innovation in Development. We are grateful to Lou Chiani, Anne-Sophie Kontopoulos, and Jean-Toussaint Olivieri-Battestini for research assistance on survey preparation. Registration reference of the Randomized Control Trial at AEA RCT Registry is AEARCTR-0009647. This study received IRB approval from the Paris School of Economics Institutional Review Board on May 2022, and approval from the local ethical committee (CERS Comité d'Ethique pour la Recherche en Santé) in March 2022. Declarations of interest: none.

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1. Introduction

Significant efforts are still required to reach the goal of zero malaria by 2030, although households in seriously affected regions around the world have greater access to a variety of complementary prevention tools to avoid infection. In 2021, there were 247 million malaria cases and 619,000 malaria deaths worldwide (World Health Organization 2022).[1] The WHO African Region accounts for 95% of malaria cases. Children under 5 years of age are the most vulnerable group affected by malaria. In 2018, they accounted for 67% of all malaria deaths worldwide (World Health Organization 2019). The cost of malaria is not only significant in terms of annual deaths. Morbidity due to malaria results in absenteeism at work, loss of productivity, absenteeism at school, and a loss in cognitive skills, all of which combine to exert increasing pressure on health expenditures.

Over the last decade, the focus of prevention has been to encourage households to adopt insecticide-treated bed nets (ITNs) over standard bed nets to increase the positive externalities of each use on the community. The use of ITNs has drastically reduced the prevalence of *Plasmodium falciparum* (the most prevalent parasite in sub-Saharan Africa) among children aged 2-10 over the period 2000-2015 in the region (Bhatt et al. 2015; World Health Organization 2015). However given mosquito resistance to insecticides, in its strategy for malaria, the World Health Organization indicates a range of complementary tools. (World Health Organization 2022). Such complementary tools may include topical mosquito-repellent products.

This paper contributes to the existing literature on the impact of pricing on take-up for preventive health products (ie., technology that reduces health risks). A large drop in purchases as prices increase is documented in a series of randomized evaluations on other technologies designed to protect from malaria (e.g., Comfort and Krezanoski (2017); Cohen and Dupas (2010); Cohen et al. (2015); Dupas (2009, 2014); Tarozzi et al. (2014)) and on the adoption of water treatment (e.g., Ashraf et al. (2010); Blum et al. (2014)).

The paper measures the price effect on a technology that requires purchase on a regular basis, and daily use during the rainy season. The former characteristic might drive different reaction of the demand to changes in price. It estimates households' demand for a mosquito-repellent ointment, and relies on a randomized controlled trial involving 3,120 sampled households and their children under five years old living in rural, semi-urban and urban areas of Burkina Faso. Households were offered a mosquito-repellent ointment for purchase to protect against mosquito bites and then malaria, during a four-month intervention that lasted until the end of the 2022 rainy season. Using a Take-It-Or-Leave-It approach (TIOLI), households were randomly assigned to one of the

[1] Before the COVID-19 pandemic, worldwide there were 228 million cases of malaria and 405,000 malaria deaths in 2018 according to World Health Organization (2019).

three price groups (defined by their level of subsidies: 0%, 50% or 100%) and were surveyed before and after the implementation of the intervention.

Price is expected to have an effect on both purchase and usage. Firstly, on average, high prices are likely to discourage purchase. Secondly, the effect of price on usage, conditional upon purchase, is ambiguous. On the one hand, the effect is positive if people buying the preventive product at high price reveals a high willingness to pay, i.e., they assign a high value to the product and consider the perceived benefits to be greater than the perceived costs. The effect is also expected to be positive if a low price reduces the value the households grant to the product, implying wastage if the good is given for free. On the other hand, the effect could be negative if a high price discourages households to use the product effectively in order to save it for future usage. Lastly, over the entire population (of buyers and non-buyers), the effect of price on usage is expected to be negatively driven by the effect of price on purchase. To increase take-up, subsidizing health products appears as a way of improving coverage and fight the spread of the disease. Take-up of preventive measures is indeed crucial to reduce the disease burden because they improve users' health, and because it contributes to public health by reducing the transmission of infectious diseases. The effect of a temporary subsidy on future demand is ambiguous: while a subsidy may deter future demand due to an anchoring effect, it may lead to an increase if it enables households to reappraise their beliefs as to the costs and benefits of using a mosquito-repellent ointment, through a learning-by-doing mechanism.

Our results confirm that there is a large drop in demand when price increases even though demand is already high at full price. Households consistently use the ointment, as the declared use remains constant over a lengthy or short recall period, and is consistent with the information recorded in each associated point of sale. We found no heterogeneous effect based on household characteristics (head of household's level of education, household prevention practices at baseline) or on the relationship between the household and the point of sale. Results are robust to possible social desirability bias. Joint estimation among alternative preventive measures suggests that households have understood that the mosquito-repellent ointment is a complement to mosquito bed nets rather than a substitute, though they are willing to switch from mosquito coils to the ointments. The willingness to pay for mosquito-repellent ointment increases with its use during the experiment.

The remainder of the paper is organised as follows. Section 2 describes the context in Burkina Faso, Section 3 the structure of the study and the data. Section 4 presents the treatment effects and possible heterogeneous effects according to baseline characteristics. Section 5 discusses the extent to which mosquito-repellent ointment is used as a complement to bed nets and willingness to pay in the future. Section 6 offers our conclusions and recommendations for future research.

2. Malaria in Burkina Faso

In Burkina Faso, despite extensive malaria prevention campaigns, the disease remains the leading cause of consultations, hospitalizations and deaths, with more than 12 million cases and 4,355 deaths recorded in 2021 (Permanent Secretary for Malaria Elimination of Burkina Faso 2023), with the UN's World Population Prospects estimating the country's population to be around 22 million inhabitants (World Development Indicators).

The latest Malaria Indicator Survey (MIS) carried out in Burkina Faso from November 2017 to March 2018 shows that 16.9% of children under 5 were infected (see INSD, PADS, PNLP and ICF 2018). The prevalence is high even though the survey was not collected during the high transmission period i.e., not during the rainy season. The proportion is much larger in rural areas compared to urban areas (19.1% in rural areas, vs 3.6 in Ouagadougou, 6.1 in other cities and 5.4 in other kinds of urban areas). The wealth gradient is significant: 20.1% of children living in the poorest households are infected, while this amounts to 6.8% in the richest quintile. The proportion of households owning an ITN was 77% (compared to 92% in 2014 MIS wave). The use of ITNs for children under 5 during the night before the survey was 58% (compared to 79% in 2014).

In the fight against malaria, mosquito-repellent ointment could be used as a complement to bed nets in order to protect users during high mosquito periods and when people are not yet sleeping under their bed net (e.g., 6pm-9pm). In addition, the need for complementary tools has emerged from the fact that the benefits of ITN have recently been seen to decrease as mosquitos become more and more resistant. Studies have described that the scaling up of ITNs has also led to a greater incidence of outdoor biting by Anopheles gambiae s.l. commonly understood to be endophagic (Corbel et al. (2012); Meyers et al. (2016); Reddy et al. (2011)). A recent study in the Cascades region of Burkina Faso showed that more than 50% of the major vectors, i.e., Anopheles gambiae s.l., were biting outdoors (Sanou et al. (2021)). The outdoor, early evening and morning biting habits of Anopheles combined with resistance to insecticides showed that the mass distribution of insecticide-treated nets alone eventually leads to a reduction in the efficacy of this intervention (Ojuka et al. (2015); Pombi et al. (2018)).

Several brands of topical repellents are available in Burkina Faso at the beginning of the study, mostly as sprays. Maïa Africa SAS, a company based in Burkina Faso, has designed a new type of repellent product that leverages the existing daily habits of sub-Saharan African families who often use ointments to moisturize the skin of their children, particularly in the evening after a shower. As such, it is not a repellent spray similar to those already on the market, but an ointment containing shea butter, that also moisturizes the skin, and could potentially be seen as a substitute to standard ointment or shea butter. MAÏA is safe for daily use, including for children

above 6 months old. MAÏA is the first long-lasting repellent ointment that offers protection for 8 consecutive hours. Two studies has documented how effective MAÏA repellent ointment is in avoiding bites. In Tanzania, Mbuba et al. (2021) found that the product provides a complete protection for nine consecutive hours against both Anopheles gambiae and Anaopheles arabiensis, and seven hours against Anopheles aegypti. In Burkina Faso Traoré et al. (2021) estimated the complete protection time againt Anopheles gambiae s.l. for both outdoor and indoor settings. The overall median CPTs (time interval between the beginning of test and the first mosquito landing) of MAÏA were estimated at 450 min for outdoor collections, and 480 min for indoor collections.

Before the implementation of the intervention, the product was available in 852 points of sale located in the main cities (411 in the capital city Ouagadougou, 110 in the second largest city Bobo-Dioulasso). There are two types of jars: a 250ml variety covers the need of an adult for one month and costs 1600 XOF, while a 100ml one covers the needs of a child for one month and costs 750 XOF.

3. Study design and data

3.1. Sampling and randomization

The study was conducted in four regions around the capital city Ouagadougou (i.e., Centre, Centre-Ouest, Centre-Sud, Plateau Central). The sampling was carried out in two stages. Firstly, we defined the 195 points of sale that would be enrolled in the study and sell the jars. Secondly, we carried out a census of all households in the catchment area of the selected points of sale to randomly draw a sample of 16 eligible cases. The eligibility criteria is based on the household living in the catchment area and having at least one child aged between 6 and 59 months old. The size of the catchment area depends on the population density around the point of sale. The catchment area progressively increases from 500m, to 750m or 1,000m from the point of sale in order to obtain at least 26 eligible households to make the random draw of the sampled 16 households. Out of the 195 enumeration areas (EAs), 170 have a radius of 500m from the selling point, 20 a radius of 750m, and 5 of 1000m from the selling point.

The baseline survey took place after the complete household listing in the catchment areas and before the random draw. Two enumeration areas were lost in the first phase due to exogenous reasons.[2] The location of the remaining 193 points of sale appears in Figure 1. About 3,071 households were surveyed at baseline to gather information about the household (dwelling, ownership of durable goods) and individual characteristics (age, education, work, time use), malaria

[2] One point of sale dropped out, and in one sampled enumeration area, conflicts occurred between the households and the point of sale.

(knowledge, preventive behaviors, attitudes, beliefs, costs; occurrence of symptoms and curative practices during the previous rainy season; knowledge of MAÏA, previous use and willingness-to-pay) and other health issues (self-declared health; anthropometric measures for children under 5).

3.2. Random assignment of the subsidy levels

We randomly varied the price across the 193 enumeration areas (EA), minimizing information spillovers across households assigned to different treatments and avoiding difficulties for the points of sale related to the checking of the household eligibility to different prices. Specifically, EAs were randomly assigned to either a 0%, 50% or 100% discount on the (full) mosquito-repellent ointment price. Our initial design allocated 64 EAs (or 1,018 households) to the 0% subsidy treatment arm, 64 EAs (1,023 households) to the 50% subsidy treatment, and 65 EAs (1,030 households) to the 100% subsidy treatment. Randomization was stratified according to the location of the EA (within a urban or rural commune), and according to whether MAÏA was already sold in the point of sale.[3]

Other RCTs on malaria rely on multiple treatments based on different subsidy or price levels, including a free access arm. In the RCT in antenatal clinics in Kenya, Cohen and Dupas (2010) has a control group and four subsidy levels from 90% to 100%. 17 price levels for a ITN are used in Dupas (2009, 2014) where subsidy levels vary from 100% to 40%. Comfort and Krezanoski (2017)'s RCT design has five subsidy levels: 100, 75, 50, 25 and 0%, allocated to 342 households in Madagascar. In Tarozzi et al. (2014), the 141 villages included in the study were randomly assigned either to the control group, the free distribution of ITN or to the microfinance group that was offered to buy the ITN on credit. In Cohen et al. (2015) on malaria treatment (ACT, antimalarials, artemisinin combination therapies), households were randomly assigned to an ACT subsidy level of 0, 92, 88, or 80 percent.

3.3. Intervention

The intervention relies on an encouragement design. There is no pure control group because we assign a point of sales in all clusters even in the clusters where the "business as usual" would have been such that the ointment was not available at all. All households are treated in the sense that the intervention includes a full access to the product for every one. The difference in the incentives to purchase the ointment and to use the ointment is exogenously determined by the assigned level of subsidies.

[3] 39% of the EA are in a urban commune and 24.5% are associated to a point of sales that was already selling MAIA before the study.

In late July 2022 (after the baseline and randomization process), vouchers were given to the households of both groups with positive subsidy. Even though vouchers are also given to households in the unsubsidized group in Comfort and Krezanoski (2017) in Madagascar to acquire the ITN, and in Cohen et al. (2015) to purchase ACTs at market price in Kenya, we have decided not to distribute vouchers to the 0% subsidy group as in Burkina Faso vouchers are associated to a discount.

In all households (control and subsidized groups), a flyer mentioning the name of the point of sale and the price of the jars was given out. Lastly, a visit was organized in order to make sure all households know where the point of sale associated to their enumeration area was located, and hence where they can purchase the ointment in their neighborhood. In the three groups, points of sale had to keep a registry up to date and write down each time a study participant came to purchase or acquire a jar. Note that strictly speaking, the intervention is not only a price intervention as it adds features such as registry, flyer, and/or vouchers in this type of randomized trials.

The intervention lasted for four months, and the households in the 50% and the 100% subsidy group were allowed to get two small jars and two large jars per month. The names of the household head and spouse were written on the vouchers and the points of sale were asked to check that the names on the vouchers and on the registry matched. The points of sale in the subsidized EAs were asked to keep the vouchers redeemed.

3.4. Baseline data and balance checks

Summary statistics from the baseline survey are presented in column 1 of Table 1. The sampled households have 6 household members on average, 27% live in the urban area of Ouagadougou. 10% of the heads of household are women, 45% have some level of formal education, 86% declare that they are in good or very good health, and their average age is 41.5. The child mortality risk is high in our sample: 16% of the households include a female member aged 15-49 who had experienced the death of her child before 5 years old, and 10% before the age of 1. The youngest child is 1.7 years old on average.

Regarding the household's risk of contracting malaria during the last rainy season, 88% declared at least one episode of malaria in their household, with 65% households declaring an episode of malaria from a child under 5 years old. The questionnaire includes a set of questions about their practices to prevent from mosquito bites and malaria. Households own 1.5 mosquito bed nets on average, 15% declared that they used an untreated bed net during the last rainy season and 87% a treated bed net. In 68% of the households, at least one household member slept under a bed net (any type) during the night before the baseline interview. 12% had already heard about

MAÏA ointment. The average Euclidean distance between the household and the point of sale associated with the project to sell MAÏA during the intervention period is 340 meters (we observe GPS locations of all sampled households and all points of sale).

We rely on three proxy variables for household's living conditions. Firstly, a material poverty index is provided by a Principal Component Analysis score that includes the ownership of durable goods, and dwelling characteristics. By construction, the mean over the entire sample is zero. The other two scores are short-term indicators of poverty, as they refer to events taking place in the last four weeks. The food consumption score (FCS) is an index developed by the World Food Programme and is calculated based on (i) the number of days the household has consumed foods belonging to each aggregate food group and (ii) the weights attributed to each food group (Wiesmann et al. 2009). We had ten food groups. The average value of the index is 52.4 in our sample (over a maximum value of 126 for a household consuming every food group seven days per week). Lastly, the Household Food Insecurity Access Scale (HFIAS) is a measure of food access and is equal to the sum of the answers to nine questions, giving the frequency at which the household has experienced issues related to food insecurity (Coates et al. 2007). For each question, the answers are on a 4 point-scale (0 never, 1 rarely, 2 sometimes, 3 often) with details as regards the number of times each frequency refers to.[4] The average is 5.6, while in theory, the highest possible value is equal to 27 for households who "often" experience all of the nine events. To avoid multicollinearity, we control by only one of the three proxy variables in the regressions: the material poverty index will be used in all regressions with control variables and the other two measures will be used as a robustness check.

Table 1 also shows, for each baseline characteristic mentioned in the row, the results from independent regressions where the characteristic is regressed on the treatment status and both stratification variables (denoted by S). The estimated equation is $X_{hc} = \alpha + \beta_{50} T_c^{50} + \beta_{100} T_c^{100} + \gamma S_c + \epsilon_{hc}$ where h is the household, c the enumeration area, T_c^{50} is equal to one if the EA is in the 50% subsidy group and T_c^{100} is equal to one if it is in the 100% subsidy group. None of these treatment variables are significant in explaining the baseline characteristics. In addition, the difference between β_{50} and β_{100} is not significantly different from zero as shown in column 4 (except for whether the main caregiver is a woman). Randomization was successful in achieving balance across the three groups. Results still hold when restricting the sample to the balanced sample (see Appendix Table A1).

[4] The first three questions are as follows: "In the past four weeks, did you worry that your household would not have enough food?", "In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?", "In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?"

3.5. Follow-up sample and attrition

Most of the analysis relies on the balanced sample composed of the 2,986 households observed during all four survey rounds (baseline, first follow-up, second follow-up, endline surveys).[5][6] The attrition rate is very low, as the balanced sample accounts for 97.2% of the initial sample. In most reported cases, attrition is due to moving out or travel at the time of the data collection.

Results from the attrition analysis are reported in Table 2 where we estimate the probability of attrition in the first follow-up survey (columns 1 and 2), in the second follow-up survey (columns 3 and 4), in the endline survey (columns 5 and 6), and lastly the probability of dropping out of the balanced sample (columns 7 and 8). The main characteristics of the households at baseline are not strong and significant determinants of attrition at later stages of the study. The probability of attrition is also orthogonal to the treatment assignment.

The control variables observed at baseline are included in columns 2, 4, 6 and 8. Having any episode of malaria in the household in the previous rainy season significantly reduces the likelihood of dropping out of the sample, and the material poverty index and the age of the household head are significantly associated to the probability of dropping out of the sample in some cases (although the coefficients are very low). Living in an urban area does not make a difference in terms of attrition. Note that the sample size is slightly lower when control variables are included due to missing values.

3.6. Outcomes

To measure the willingness to pay of households, we rely on a "Take-It-Or-Leave It" (TIOLI) experiment and on contingence valuation. Firstly, the price randomization provides exogenous variation to study the adoption of MAÏA mosquito-repellent ointment. At a given price, we observe how likely and how much the household buys, or uses MAÏA from the three consecutive household surveys, and we observe the number of jars acquired or purchased in the point of sale as recorded in the registers. During each follow-up survey, households were asked to list all preventive resources they had used over the 30 days, 7 days and the day/night before the interview. If they report having used a mosquito-repellent ointment, the brand name is requested. Secondly, the Contingence Valuation (CV) is a direct approach to measure hypothetical willingness to pay where the head of the household and his wife (or wives) are directly asked how much they are willing to pay for MAÏA mosquito-repellent ointment as part of the endline survey.

[5] Among the 3,071 initial households, 3,039 are observed in the first follow-up, 3,027 in the second follow-up and 3,001 in endline.

[6] The first follow-up survey was conducted in late August 2022, the second follow-up late September 2022 and the endline survey between November 3 and 26, 2022.

The main outcome variables appear in Table 3. Panel A refers to the household's declared use of mosquito-repellent ointment or spray over the 30/7/1 day(s) preceding the survey over the three follow-up surveys. The data is derived from the open questions in which the households were asked to report all preventive resources they used over the given recall period. Columns 1-4 refer to the first follow-up survey, columns 5-8 to the second follow-up survey and columns 9-12 to the endline survey. Among all households independently of their assigned treatment, 60.8% declared using a mosquito-repellent ointment over the last 30 days during the first follow-up, 70.1% during the second follow-up and 75.8% during the endline survey (see columns 1, 5 and 9).[7] Adoption of the product is thus increasing over time. The declared use is consistent for any recall period, suggesting constant use over the course of the month.

The household sample is also split by treatment arm. There are strong differences across groups. The difference in using a mosquito-repellent ointment over the last 30 days is about 60 percentage points (pp) between the 0% subsidy and the 100% subsidy group in the first two follow-up surveys and about 45 pp in the endline survey. The same holds for smaller recall periods.

If households declare using a mosquito-repellent ointment or cream over the 30 days preceding the survey, the next question was about the name of the ointment. For some households, two brands were given. We report the unconditional proportions of households who declared using MAÏA, i.e., not conditioned upon using any mosquito-repellent. We see that almost all households who report using a repellent ointment mention MAÏA in the subsidized groups, and the difference between using any repellent ointment and using MAÏA is larger in the group with 0% subsidy, which is consistent, as there are no monetary incentives for using MAÏA relative to another brand in that group. The adoption is increasing over time due to increased use in the 50% and 0% subsidy groups while the proportion of users in the fully subsidized group has been already close to 100% since the first follow-up survey. The use of MAÏA over the last 30 days doubles in the 0% group and increases from 51.8% to 75.7% in the 50% group between the first follow-up survey and the endline survey.

Panel B shows the average number of jars bought over the entire intervention period. The period lasts for four months, at most households in the subsidized groups were allowed to redeem four vouchers per month (two vouchers for two large jars, and two vouchers for two small jars). In total over the intervention, 16 vouchers could be redeemed covering eight vouchers for eight small jars and eight vouchers for eight large jars. The mean number of jars acquired or bought is 6.9 for the small jars, and 6.6 for the large jars. Households in the 100% subsidy group mostly used all their vouchers. In the group with no subsidy, we see that the mean is 0.4 for the small jars and 0.1 for the large jars. This suggests that households are highly liquidity-constrained, as the small jars are more expensive.

[7] The sample size is slightly lower in column 5 because 12 missing values appear in the second follow-up among the balanced sample.

The total number of jars bought or acquired by the household during the experiment is the number of large jars, plus the number of small jars multiplied by a factor of 0.5, to express it in terms of a large-jar equivalent. On average, households acquired the equivalent of 4.1 large jars: 0.3 in the group with no subsidy, 2 in the group with 50% subsidy and 10.1 in the group with full subsidy.

4. Results

4.1. Main estimates

Firstly, we measure the price effect on the acquisition of the product. Information from the registers of the points of sale are used to estimate the effect of the subsidy level on the number of jars bought by households. Here we have one observation per household, as the outcome variables are the sums of jars acquired or purchased over the whole intervention period. As shown in Table 4, for the small jars (columns 1 and 2), the households in the 50% subsidy group obtained one additional jar and those in the 100% subsidy 6.6 additional jars on average compared to those in the no-subsidy group. For the large jars (columns 3 and 4), we obtain similar point estimates: the 50% subsidy group bought 1.1 additional jar and the 100% subsidy 6.5 additional jars on average compared to the no-subsidy group. Columns 5 and 6 estimate the total number of jars acquired in terms of a large-jar equivalent. The point estimates are 1.7 and 9.8 respectively for the 50% subsidy and 100% subsidy group. Two covariates remain consistently significant when estimating the number of jars acquired: any episode of malaria in 2021, and awareness of MAÏA ointment at baseline (coefficients are reported in Appendix Table B1).

The intervention was designed such that each point of sale was given a register for the first half of the intervention, and another for the second half that was distributed during the second follow-up surveys. As a result, we are able to distinguish the take up of the first two months and the take-up for the last two months of the intervention. Table 5 provides the treatment effects when using two observations for each household and controlling for a time dummy. Results go in the same direction, the point estimates of the treatment variables are around half the size of those in Table 4. On average the number of jars acquired during the second half of the intervention period is lower than that during the first half.

One might argue that the purchases in the 0% subsidy-enumeration areas are less accurate for at least two reasons. On the one hand, households who want to buy MAÏA jars can do so at any point of sale, without much incentive to go to the associated point of sale exclusively. However, in some areas there is no alternative shop where MAÏA is available, although for the households living in the capital, supply of the product is greater. On the other hand, from the point of sale's perspective, there are less incentives to keep the registry accurate, because the information

reported can not be compared to the number of vouchers received. However, all points of sale are made aware at their enrollment that there are monetary incentives and rewards available for the proper maintenance of their register, which is assessed at the end of the intervention period. For the subsidized groups, we find a high correlation between the data coming from the registers and the number of vouchers redeemed (see Online Appendix Table S1).

Secondly, we look at the price effect on the declared use of MAÏA. We observe whether anyone in the household has used MAÏA, and also whether each household member has used it over the three recall periods. This enables an estimation of the treatment effects at the household and individual levels, and to discuss the effect of price on usage with and without restricting to the sample of observed buyers.

Panel A in Table 6 estimates the effects of treatment status on the use of mosquito repellent over the last 30 days, using linear probability models and pooling the three survey rounds. The effects on the use of any brand of mosquito repellent are estimated at the household level in columns 1 and 2 and at the individual level in columns 3 and 4. The effects on the use of MAÏA over the last 30 days appear in columns 5 and 6. Two models are estimated: a model without controls except for round dummies and the stratification variables (point of sale already selling MAÏA before the study, living in an urban area), and a model with households' control variables observed at baseline, alongside point of sale covariates. Given the random assignment of the treatment and the results of the balance checks shown above, we do not expect the effect of the treatments to vary with the inclusion of controls. However it is of interest to document the determinants of adoption in terms of household size, poverty, and head of household's characteristics.

Compared to households from the no-subsidy group, those from the 50% and the 100% subsidy group are respectively 27 and 57 pp more likely to declare using a mosquito-repellent ointment during the last 30 days (in columns 1 and 2). As expected, when control variables at the household level and point of sale level are included, the coefficients associated to the treatment variables are unchanged. In all cases, much of the difference in adoption comes from the price differential, as the change in adjusted R^2 between the models with and without controls is extremely low.

As suggested previously in the descriptive statistics, the results are very consistent for every recall period. In the Online Appendix Table S2, the models are replicated when using the alternative recall periods, i.e., whether the household (or household member) has used a mosquito-repellent ointment over the last seven days, or the day and night before the survey. The difference between the households of the 50% (100%) subsidy group and those in the 0% subsidy group is 29 pp (61 pp) when the likelihood of using the ointment the day/night before the interview is estimated.

We then asked households which brand of mosquito-repellent ointment they had used during the last 30 days. Based on this information, we find very similar results (columns 5 and 6) with a

31 pp increase in the likelihood of using MAÏA in the last 30 days in the 50% subsidy group and a 63 pp increase in the fully subsidized group compared to the no-subsidy group. This is not surprising since almost all households using a mosquito-repellent ointment report MAÏA as the ointment they used (96%) over this recall period.

Appendix Table B2 reports the coefficients of the control variables: only a few controls are significant predictors of mosquito-repellent use. Usage increases over time as the households are more likely to declare using the mosquito-repellent during the second follow-up and endline than during the first follow-up survey. The difference between the last two surveys is not significantly different from zero. Declared usage over the last month increases with the use of bed nets (the number of bed nets reported by the household, and whether anyone had slept under net the night before the survey). It slightly decreases with household size, and is greater for households who are aware MAÏA ointment at baseline. Results using different measures of household living conditions are reported in Online Appendix Tables S3 and S4.

One additional question to address is whether households who were charged a high price are more likely to use the product conditional on purchase. In other words, among the population of purchasers, is the willingness to use the product higher in the 0% subsidy group than in the other groups? This relates to the selection issue or screening effects, and to the value people grant to the good. If the product is given for free, households may be likely to consider it as of low value and neglect it, leading to a waste of resources.

Panel B in Table 6 shows the estimates of the treatment assignment status on declared use of mosquito-repellent ointment among buyers (the subsample of households with a strictly positive number of jars acquired or purchased during the intervention). Households from the 100% subsidy group are 16 pp more likely to declare using the ointment over the last 30 days, compared to their counterparts from the 0% subsidy group. The difference is around 22 pp at the individual level. There is no significant difference between the 0% and the 50% subsidy group. These results suggest that cost sharing significantly reduces actual use.

4.2. Robustness

We run a number of robustness checks to confirm our core results.

Other measures of purchase. As part of the surveys, enumerators reported whether there is any jar in the household as well as the number of jars. This is in line with a more objective measure of bed net use when the enumerator observes whether there is a bed net hanging over the bed. Results when using this complementary measure of purchase are reported in Online Appendix

Tables S5 - S8. The estimated equation is $Y_{hct} = \alpha + \beta_{50}T_c^{50} + \beta_{100}T_c^{100} + \gamma S_c + \delta_t + \epsilon_{hct}$, where t is one of the three survey rounds collected after the baseline survey and δ_t the survey round dummy variables. Results hold in terms of significance and the effects of the 100% subsidy being about twice to three times larger than those of the 50% subsidy. The point estimates can not be directly compared to the estimates obtained when using the data from the registers as there are three data points here while for the register data it is either the cumulative number of jars acquired or the total number at each of the two data points.

Controlling for possible reporting bias using a social desirability score. It is likely that the households over-report the use of MAÏA mosquito-repellent ointment, as it is the express purpose of the study. Survey responses suffer from social desirability bias if the participant is willing to answer that they adopt a given preventive behavior because they consider that this is the "correct" type of behavior expected by the enumerators and the experimenter.

To correct for such a bias, we rely on the strategy initially used in Dhar et al. (2022). They add as a control variable a social desirability score based on survey questions from Crowne and Marlowe (1960) and adapted to their Indian setting. We use an 8-item version of the 33 initial questions developed by Crowne and Marlowe (1960). The questions are designed to capture personality traits that people are unlikely to truly possess. For example, "I am never irritated by people who ask favors of me". The questions are then summed up and the score increases with the individual's concern for social approval or the likelihood of concerns as regards social desirability.

The analysis here is at the household level while the module of questions on personality traits was administered to the head of the household and the caregiver(s) of the children below 5. We do not observe both members in all households if, for instance, the household is headed by a woman who is also the caregiver. Taking the average value of the score if there is one household head and one or two caregivers in the households, we include it as an additional control variable in Tables D1 (hence when the regression is at the individual level, it is not necessarily the score computed for that person). Coefficients are highly stable in size and significance whether this dimension is included or not in the analysis. The coefficients of the score are not significantly different from zero, except in the model at the individual level even though the size of the coefficient is very low, and the sign is counter-intuitive: when the household head or his spouse has a high social desirability score, the probability to declare that the household member uses a mosquito ointment is lower.

Change in behaviors over time. The intention-to-treat version of the model is extended by interacting the treatment assignment with the dummy variables for survey round. Results on the main outcome variables are reported in Appendix C, and the replication for usage over different recall

periods are reported in Online Appendix Table S9. Firstly, the adoption of mosquito-repellent ointment is significantly different across the three treatment groups. Secondly, we see here a difference in usage over time. Households from the no-subsidy group are increasing their likelihood of using a mosquito-repellent ointment. The difference between the households from the no-subsidy group and those from the 50% subsidy group increases in the second follow-up. The difference between the households from the no-subsidy group and those from the 100% subsidy group slightly decreases over time, this might be due to the increased proportion of users in the 0% subsidy group.

4.3. Heterogeneity

To explore the heterogeneous effects of price on adoption, we replicate the estimation with no controls and add an interaction term between the group assignment and the characteristics at baseline. We focus on the use of any mosquito-repellent over the last 30 days as there is no noticeable difference based on the recall period. We estimate the probability of using mosquito repellent among the full sample, whatever their purchase of MAÏA as part of the experiment. Point estimates are reported in Tables 7 - 8.

Household-level analysis. Firstly, we look at any differential effects depending on the characteristics of the household head in columns 1 and 2. There is no differential effect on declared use of mosquito-repellent ointment based on whether the head of the household is a woman (in column 1), or whether they have some kind of formal education (in column 2). If women are more likely than men to be the person in charge of moisturizing the children and use the mosquito-repellent ointment, we also look at any differential effect based on the level of education of the head of household's spouse. This appears in column 3. If the spouse has some formal education, it increases the likelihood of using the mosquito-repellent ointment over the last 30 days, and it reduces the magnitude of the difference between the 100% and the 0% subsidy group.

Secondly, the household might be more or less likely to accept the intervention and go to the associated point of sale if they are familiar with this point of sale before the intervention. When the vouchers or flyers were distributed to the households, they were asked whether they usually went shopping at the associated point of sale. 85% declared that it was the case. This variable makes no difference in the treatment effect (in column 4). We look at any differential effect of price on demand depending on whether the household head and/or their spouse(s) receives the first set of vouchers/flyers. During this distribution, the fieldworkers were asked to gather all the members of each household to inform them about MAÏA, and to provide instructions on how to use the vouchers so that the information is distributed across all household members and similarly over all households of a given treatment group. The list of household members is

reported on the tablet. In the models in columns 5 and 6, we interact the treatment assignment with a binary variable equal to one if the household head or their spouse was present respectively. The interaction terms are not significant, meaning that there is no heterogeneous effect on this dimension, for any outcome variable (see Table 7).

Thirdly, preventive behaviors at baseline may affect how the household reacts to the intervention. If households were already using mosquito-repellent spray or ointment at baseline, or whether they were using bed nets, the adoption of MAÏA may be notably costly for them. We thus interact the treatment assignment to a binary variable for using a bed net at baseline (in columns 7 and 8), and to a binary variable for using a mosquito-repellent ointment at baseline (in column 9). There is no significant difference in the treatment effect according to these behaviors, for both outcome variables.

Lastly, we explore the interplay between price and wealth index. Here, the method is different, as we estimate the probability of using the mosquito-repellent ointment at least once over the last 30 days as a function of the treatment assignment, the wealth index as a polynomial of order 3, and the interaction terms, through a probit specification to generate the predicted probabilities for each level of subsidy. Results appear in Panel A of Figure 3. We can observe that for the 0% subsidy group, the wealth gradient appears as the difference in predicted probabilities for households from the bottom and the top of the wealth distribution is significantly different from zero (and the size of the difference is about 20 percentage points). Households from the 50% subsidy group are as likely to use the mosquito-repellent ointment across wealth levels. For the households in the 100% subsidy, the income effect is at stake as the households from low- and high-income groups have a significantly different predicted probability of using the ointment. Our results suggest that rich households are less likely to adopt the ointment compared to the low-income households for whom the take-up is full.

In terms of acquisition of jars during the intervention, several household and locality characteristics reinforce the positive effect of the 50% subsidy (Table 8), such as household head formal education (column 2), the urban nature of the locality (column 10), and the fact that the point of sale was already selling MAÏA before the study (column 11). We observe no similar heterogeneous pattern within the 100% subsidy group, in which the number of jars acquired is already high, whatever the household characteristics considered.

Individual-level analysis. We also explore potential heterogeneous effects of price on individual use of mosquito-repellent ointment based on individual characteristics such as whether the individual is a child, a female, a pregnant women or experienced a malaria episode last rainy season. Point estimates reported in Table 9 show that under-five children (column 1) and women (column 2) are more likely to use mosquito-repellent ointment than others. Being an under-five children also significantly increases by 2.4 percentage points the positive effect of the 50% subsidy on individual

use, an effect absent in the 100% subsidy group in which there is no financial constraint on the acquisition of jars. This suggests that when financial constraints exist, households make trade-offs in favor of young children. We find no other heterogeneous effects of subsidies with respect to other individual characteristics presented in Table 9.[8]

5. Discussion

5.1. Complementarity with or substitution from other preventive tools

Providing a subsidy for mosquito-repellent ointment may shift households' habits in terms of prevention behaviors against mosquito bites. Households may consider mosquito-repellent ointment as a substitute rather than as a complement to some prevention tools such as mosquito bed nets or mosquito coils. We expect households to be more willing to substitute mosquito-repellent ointment to mosquito coils rather than to bed nets: they both enable protection outside sleeping hours and can thus more easily be seen as substitutes.

To investigate this point, we estimate three bivariate probit models at the household level in which we simultaneously estimate the effect of the different subsidy levels on the usage of mosquito-repellent ointment and alternative prevention tools, namely untreated bed nets, insecticide-treated bed nets, and mosquito coils. Results are presented in Figure 4 for prevention tools used over the last 30 days. Three main facts emerge from these estimations. Firstly, we observe that for mosquito bed nets, either treated or untreated, there is essentially no substitution effect: a subsidy induces a positive shift in the probability of using a mosquito-repellent ointment without dramatic change in the use of mosquito-bed net. Secondly, there is a significant substitution effect on mosquito coils, as expected. We observe that subsidizing a mosquito-repellent pushes households to reduce their use of mosquito coils and to replace it with the ointment: a 50% subsidy generates a 12.8 percentage point decrease in the probability of using mosquito coils but not mosquito-repellent ointment, and a 19.2 percentage point increase in the probability of using the ointment but not the coils. Thirdly, this substitution effect is even stronger in the 100% subsidy group, with estimated effects more than twice as high as in the 50% subsidy group. These conclusions remain similar when using alternative recall periods for prevention behaviors (Online Appendix Figures S1 ans S2).[9]

[8] Results are robust to clustering the standard errors at the household level (see Online Appendix Table S10).

[9] We also estimate simple ordinary least squares models to assess the direct effect of a mosquito-repellent subsidy on the use of alternative prevention behaviors (mosquito bed nets and mosquito coils) regardless of the use of a mosquito-repellent ointment. Results shown in Figure 5 produce similar conclusions, with a large substitution effects on mosquito coils.

5.2. Willingness to pay in the future

As regards future demand, a subsidy may deter future demand due to an anchoring effect, or increase it if it allows the households to update their beliefs about the costs and benefits of using a mosquito-repellent ointment through a learning-by-doing mechanism.

To elicit willingness to pay (WTP) in the future, we rely on the contingence valuation approach. Households (caregivers and heads) were asked the following questions "How much are you willing to pay for a mosquito-repellent ointment made with shea butter that protects for 8 hours (for your own use, for a one week usage)? What is the minimum price, the maximum price, and the desired price?" On average, minimum price is 403 XOF, the maximum price: 682 XOF, and the desired price: 474 XOF. As the price of the large jar is 1600 XOF and lasts for one month, this corresponds to 400 XOF per week. Declared prices are thus particularly relevant.

We estimate the effect of the treatments in a intention-to-treat (ITT) model, and the effect of having used MAÏA during the experiment in a two-stage least squares (2SLS) specification. The ITT estimates reported in Table 10 show that the willingness to pay is 27-29 XOF lower for the households from the 50% subsidy group compared to those in the 0% subsidy group. When controlling for the WTP at baseline, the coefficients are significant only for the minimum price regression. Whether the analysis is conditional upon the baseline value or not, When the standard errors are clustered at the household level, some coefficients turn significant in Online Appendix Table S11: the households who benefited from a 100% subsidy reveal a larger willingness to pay (the size is small, 11-14 XOF).

When we estimate a 2SLS model, we observe that the number of jars acquired significantly increases the minimum price and desired price declared (with and without control variables) even though the size of the effect is close to null (Table 11).[10] In Table 12, the causal effect of any use of mosquito-repellent ointment is significantly different from zero when conditioned upon the WTP declared at baseline, and there is no significant effect when the outcome variable is the maximum price.[11]

6. Conclusion

In this paper, we report the outcomes of a field experiment in Burkina Faso, designed to evaluate the effect of prices on the purchase and use of MAÏA ointment, a mosquito-repellent ointment that

[10] Results are robust to clustering the standard errors are the household level, except that the maximum price significantly increases conditioned upon the baseline value (see Online Appendix Table S12).
[11] The coefficients of usage are significant on desired price when standard errors are clustered at the household level (Online Appendix Table S13).

protects from mosquito bites for eight consecutive hours. We find strong evidence that demand decreases in accordance with price, with similar results both in the cases of households whose heads have received some form of formal education or those who are not formally educated, and households implementing different practices to prevent malaria at baseline.

We believe the contribution of this paper is twofold. It contributes directly to ongoing policy debates around subsidizing access to prevention when externalities are high. It also contributes to our understanding of the perceived benefits of the mosquito-repellent ointment as a complement to standard bed nets, as most of the population in the study were already using bed nets before the intervention.

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Tables

Table 1. Balance checks

	(1) Mean [SD]	(2) β_{50} (SE)	(3) β_{100} (SE)	(4) p-value $\beta_{50}=\beta_{100}$	(5) N
Panel A. *Household level*					
Household size	5.928 [2.640]	-0.059 (0.156)	-0.049 (0.160)	*0.953*	3,071
Ouagadougou commune	0.274 [0.446]	0.016 (0.049)	0.018 (0.048)	*0.962*	3,071
Material poverty index	0.001 [2.450]	-0.089 (0.274)	-0.117 (0.253)	*0.905*	3,060
Food consumption score	52.433 [22.567]	-0.636 (2.029)	0.771 (1.878)	*0.432*	3,059
Household Food Insecurity Access Scale (HFIAS) score	5.644 [5.609]	0.333 (0.463)	0.234 (0.482)	*0.839*	3,059
Age of youngest children	1.693 [1.356]	-0.048 (0.062)	-0.021 (0.066)	*0.659*	3,071
At least one episode of malaria last year	0.877 [0.329]	-0.027 (0.020)	-0.006 (0.015)	*0.264*	3,071
At least one episode of malaria last year among under-5	0.653 [0.476]	-0.027 (0.026)	0.002 (0.024)	*0.253*	2,997
Number of bednets reported	1.532 [1.467]	-0.147 (0.117)	-0.122 (0.118)	*0.821*	3,068
No household member slept under bednet last night	0.320 [0.467]	-0.001 (0.029)	-0.010 (0.027)	*0.758*	3,068
Used an untreated net last rainy season	0.153 [0.360]	-0.001 (0.034)	-0.010 (0.030)	*0.761*	3,067
Used a treated net last rainy season	0.866 [0.340]	0.029 (0.024)	0.030 (0.023)	*0.961*	3,067
Used a mosquito repellent ointment last rainy season	0.138 [0.345]	-0.022 (0.021)	-0.003 (0.019)	*0.332*	3,067
MAÏA is known in the household	0.118 [0.323]	-0.004 (0.017)	-0.014 (0.017)	*0.523*	3,032
At least one 15-49 women experienced an under-5 death	0.165 [0.371]	-0.017 (0.020)	-0.013 (0.019)	*0.848*	3,061
At least one 15-49 women experienced an infant death	0.100 [0.300]	-0.015 (0.017)	-0.012 (0.015)	*0.852*	3,061
Distance to MAÏA point of sale in kilometers	0.340 [0.181]	-0.014 (0.018)	0.009 (0.021)	*0.241*	3,071
Buffer used for census	1.426 [0.706]	-0.120 (0.115)	-0.003 (0.125)	*0.308*	3,071
Panel B. *Household head level*					
Female household head	0.098 [0.298]	0.008 (0.019)	0.021 (0.021)	*0.507*	3,071
Age in years of household head	41.470 [12.182]	0.037 (0.736)	-0.690 (0.716)	*0.286*	3,070
Very good or good household head health status	0.861 [0.346]	0.014 (0.020)	0.007 (0.021)	*0.720*	3,039
Household head attended primary school at least	0.452 [0.498]	0.004 (0.034)	0.019 (0.037)	*0.654*	3,070
Panel C. *Caregiver level*					
Female caregiver	0.982 [0.132]	0.010 (0.005)	-0.001 (0.006)	*0.025*	3,393
Age in years of caregiver	31.293 [8.663]	0.231 (0.408)	0.151 (0.430)	*0.830*	3,392
Very good or good caregiver health status	0.888 [0.316]	0.001 (0.020)	0.007 (0.019)	*0.764*	3,358
Caregiver attended primary school at least	0.476 [0.499]	-0.008 (0.030)	-0.012 (0.030)	*0.880*	3,392

Notes: Unweighted statistics. Standard deviations in brackets and robust standard errors clustered at the enumeration area level in parentheses. Column 1 shows summary statistics at baseline for sampled households at the household level (Panel A), household head level (Panel B) or caretaker level (Panel C). Columns 2 and 3 report the coefficients β_{50} and β_{100} along with standard errors obtained from linear probability models used for balance checks. Column 4 reports the p-values attached to the null hypothesis test of equality of β_{50} and β_{100} while column 5 shows the sample size. Similar figures for the balanced sample of households are shown in Appendix Table A1.
$^{*}p<.10$; $^{**}p<.05$; $^{***}p<.01$

Table 2. Attrition analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Attrited							
	Midline 1		Midline 2		Endline		Panel	
50% subsidy	0.000	0.000	0.002	0.001	−0.001	−0.002	0.004	0.002
	(0.004)	(0.004)	(0.005)	(0.005)	(0.007)	(0.006)	(0.008)	(0.007)
100% subsidy	0.014	0.012	0.012	0.010	0.005	0.004	0.000	−0.002
	(0.016)	(0.014)	(0.016)	(0.014)	(0.016)	(0.015)	(0.016)	(0.015)
Urban commune	−0.008	−0.007	−0.009	−0.009	0.003	0.000	0.000	−0.003
	(0.008)	(0.006)	(0.009)	(0.007)	(0.010)	(0.008)	(0.010)	(0.009)
MAÏA already present	0.008	0.009	0.010	0.010	−0.004	−0.011	0.006	−0.003
	(0.006)	(0.006)	(0.007)	(0.007)	(0.008)	(0.009)	(0.009)	(0.009)
Very good or good household head health status		0.005		0.002		0.010*		0.005
		(0.004)		(0.005)		(0.006)		(0.007)
At least one episode of malaria last year		−0.021*		−0.025**		−0.027**		−0.039***
		(0.011)		(0.012)		(0.012)		(0.014)
Number of bed nets owned		0.001		0.000		0.000		−0.001
		(0.001)		(0.001)		(0.002)		(0.002)
No household member slept under bednet last night		0.008		0.010		0.005		0.005
		(0.007)		(0.008)		(0.009)		(0.009)
Used a mosquito repellent ointment last rainy season		0.001		0.005		−0.010		−0.003
		(0.006)		(0.008)		(0.008)		(0.009)
MAÏA is known in the household		−0.001		−0.003		0.010		0.010
		(0.004)		(0.006)		(0.009)		(0.010)
Used an untreated net last rainy season		0.000		0.000		0.007		0.004
		(0.004)		(0.005)		(0.008)		(0.008)
Used a treated net last rainy season		0.004		0.004		−0.005		−0.004
		(0.005)		(0.006)		(0.008)		(0.010)
Female household head		0.017		0.019		0.002		0.017
		(0.011)		(0.012)		(0.009)		(0.013)
Age in years of household head		0.000		0.000**		−0.001**		−0.001***
		(0.000)		(0.000)		(0.000)		(0.000)
Household head attended primary school at least		0.002		0.001		−0.001		0.000
		(0.004)		(0.005)		(0.005)		(0.006)
Material poverty index		0.000		0.000		0.004***		0.004**
		(0.001)		(0.001)		(0.002)		(0.002)
Household size		0.000		0.000		−0.001		0.000
		(0.001)		(0.001)		(0.001)		(0.001)
Distance to MAÏA point of sale in kilometers		0.063		0.061		0.056		0.053
		(0.067)		(0.068)		(0.068)		(0.068)
Constant	0.007	0.001	0.011**	0.020	0.021***	0.048**	0.025***	0.078***
	(0.004)	(0.019)	(0.005)	(0.023)	(0.006)	(0.023)	(0.006)	(0.026)
N	3,071	2,984	3,071	2,984	3,071	2,984	3,071	2,984

Table 3. Summary statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Midline 1				Midline 2				Endline			
Sample:	All	0%	50%	100%	All	0%	50%	100%	All	0%	50%	100%
Panel A. *Use of mosquito-repellent ointment at household level*												
Last 30 days	0.608	0.313	0.549	0.957	0.701	0.391	0.718	0.992	0.758	0.516	0.777	0.980
Last 7 days	0.602	0.301	0.546	0.956	0.694	0.373	0.714	0.992	0.716	0.451	0.725	0.970
Yesterday	0.596	0.285	0.544	0.955	0.689	0.364	0.708	0.992	0.698	0.425	0.700	0.965
MAÏA last 30 days	0.572	0.240	0.518	0.954	0.671	0.327	0.694	0.988	0.735	0.466	0.757	0.979
N	2,986	991	992	1,003	2,986	991	992	1,003	2,973	988	988	997

	(13)	(14)	(15)	(16)
	Full intervention period			
Sample:	All	0%	50%	100%
Panel B. *Number of jars acquired*				
Number of small jars acquired	2.944 [3.245]	0.378 [0.818]	1.450 [1.744]	6.957 [1.687]
Number of large jars acquired	2.666 [3.194]	0.098 [0.375]	1.244 [1.679]	6.609 [1.835]
Number of jars acquired in large-jar equivalent	4.138 [4.733]	0.287 [0.635]	1.969 [2.251]	10.088 [2.564]
N	2,986	991	992	1,003

Notes: Unweighted statistics. Standard deviations in brackets. Panel A comes from declared data collected in the households, Panel B relies on the information collected in the registers by the points of sale.

Table 4. Price Effects on number of jars acquired during the intervention

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of small jars		Number of large jars		Total number of jars (large-jar equivalent)	
50% subsidy	1.072***	1.078***	1.147***	1.166***	1.683***	1.706***
	(0.091)	(0.091)	(0.083)	(0.085)	(0.116)	(0.118)
100% subsidy	6.582***	6.591***	6.514***	6.523***	9.805***	9.819***
	(0.149)	(0.150)	(0.160)	(0.163)	(0.227)	(0.230)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.378	0.372	0.098	0.095	0.287	0.281
Adjusted R^2	0.793	0.796	0.793	0.793	0.821	0.822
N	2,986	2,902	2,986	2,902	2,986	2,902

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household. Coefficients from linear probability models are reported. All regressions use data from the registry database and control for the stratification variables. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale (see Appendix Table B1).

Table 5. Price Effects on number of jars acquired during the intervention using panel data

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of small jars		Number of large jars		Total number of jars (large-jar equivalent)	
50% subsidy	0.536***	0.539***	0.573***	0.583***	0.841***	0.853***
	(0.046)	(0.045)	(0.042)	(0.043)	(0.058)	(0.059)
100% subsidy	3.291***	3.296***	3.257***	3.262***	4.903***	4.910***
	(0.074)	(0.075)	(0.080)	(0.081)	(0.113)	(0.115)
Second register	−0.525***	−0.523***	−0.530***	−0.532***	−0.792***	−0.794***
	(0.058)	(0.059)	(0.058)	(0.059)	(0.084)	(0.085)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.189	0.186	0.049	0.047	0.144	0.140
Adjusted R^2	0.687	0.688	0.691	0.690	0.727	0.728
N	5,972	5,804	5,972	5,804	5,972	5,804

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household and observations are at the household × register level. Coefficients from linear probability models are reported. All regressions use data from the registry database and control for a register dummy identifying which register the information comes from, as well as the stratification variables. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table 6. Price Effects on declared use of mosquito-repellent ointment

	(1)	(2)	(3)	(4)	(5)	(6)
	Use last 30 days				Use MAÏA last 30 days	
Unit of analysis:	*Household*		*Individual*		*Household*	
Panel A. *Analysis <u>not conditional</u> on the acquisition of at least one jar*						
50% subsidy	0.275***	0.276***	0.260***	0.257***	0.312***	0.313***
	(0.030)	(0.029)	(0.029)	(0.028)	(0.032)	(0.030)
100% subsidy	0.570***	0.572***	0.580***	0.580***	0.630***	0.631***
	(0.021)	(0.021)	(0.022)	(0.021)	(0.023)	(0.023)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.406	0.405	0.349	0.349	0.344	0.342
Adjusted R^2	0.271	0.279	0.253	0.260	0.314	0.322
N	8,945	8,693	53,946	52,408	8,945	8,693
Panel B. *Analysis <u>conditional</u> on the acquisition of a jar*						
50% subsidy	0.013	0.016	0.043	0.036	0.025	0.027
	(0.024)	(0.023)	(0.031)	(0.030)	(0.025)	(0.025)
100% subsidy	0.161***	0.164***	0.229***	0.223***	0.181***	0.184***
	(0.021)	(0.020)	(0.028)	(0.026)	(0.022)	(0.022)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.818	0.818	0.700	0.705	0.796	0.796
Adjusted R^2	0.097	0.099	0.093	0.104	0.104	0.106
N	5,852	5,657	35,644	34,421	5,852	5,657

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is either a household (columns 1, 2, 5, and 6) or an individual (columns 3 and 4) in Panel A, and is restricted to households or individuals living in a household that acquired at least one jar of mosquito-repellent ointment during the intervention period according to the registers in Panel B. Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification variables. Columns 2, 4, and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale (see Appendix Tables B2 for Panel A and B3 for Panel B).

Table 7. Heterogeneous price effects on declared use of mosquito-repellent ointment (household level)

Outcome:	Use last 30 days					
Panel A. *Household characteristics at baseline*						
	(1)	(2)	(3)	(4)	(5)	(6)
X:	Female head of household	Household head primary education at least	Spouse of household head primary education at least	Household has the habit to shop at the point of sale	Household head present during presentation of the point of sale	Spouse of household head present during presentation of the point of sale
50% subsidy	0.275***	0.279***	0.290***	0.217***	0.277***	0.253***
	(0.030)	(0.037)	(0.035)	(0.058)	(0.040)	(0.066)
100% subsidy	0.567***	0.591***	0.586***	0.578***	0.579***	0.522***
	(0.022)	(0.027)	(0.027)	(0.035)	(0.026)	(0.057)
50% subsidy × X	0.006	−0.009	−0.046	0.063	−0.003	0.016
	(0.061)	(0.040)	(0.035)	(0.063)	(0.043)	(0.062)
100% subsidy × X	0.041	−0.047	−0.050*	−0.012	−0.016	0.045
	(0.046)	(0.029)	(0.025)	(0.039)	(0.028)	(0.051)
X	−0.040	0.033	0.045*	0.041	0.030	−0.054
	(0.045)	(0.028)	(0.024)	(0.036)	(0.027)	(0.050)
Mean in 0% subsidy group with X=0	0.410	0.392	0.391	0.373	0.390	0.461
Mean in 0% subsidy group with X=1	0.372	0.425	0.438	0.415	0.418	0.408
Adjusted R^2	0.271	0.271	0.263	0.273	0.271	0.263
N	8,945	8,942	8,013	8,927	8,927	8,004
Share with X=1	0.096	0.449	0.468	0.850	0.604	0.866

Panel B. *Prevention behaviors at baseline and locality characteristics*					
	(7)	(8)	(9)	(10)	(11)
X:	Used untreated net last rainy season	Used insecticide-treated net last rainy season	Already used mosquito repellent ointment at baseline	Urban locality	MAÏA already sold by the point of sale
50% subsidy	0.279***	0.250***	0.279***	0.303***	0.287***
	(0.031)	(0.054)	(0.031)	(0.041)	(0.035)
100% subsidy	0.576***	0.577***	0.578***	0.592***	0.583***
	(0.022)	(0.041)	(0.023)	(0.030)	(0.025)
50% subsidy × X	−0.031	0.027	−0.032	−0.072	−0.050
	(0.053)	(0.057)	(0.050)	(0.058)	(0.064)
100% subsidy × X	−0.043	−0.009	−0.056	−0.056	−0.051
	(0.034)	(0.042)	(0.038)	(0.041)	(0.045)
X	0.030	0.017	0.052	0.035	0.046
	(0.032)	(0.041)	(0.037)	(0.040)	(0.045)
Mean in 0% subsidy group with X=0	0.402	0.392	0.399	0.390	0.396
Mean in 0% subsidy group with X=1	0.432	0.409	0.451	0.432	0.437
Adjusted R^2	0.271	0.271	0.271	0.272	0.271
N	8,936	8,936	8,936	8,945	8,945
Share with X=1	0.152	0.867	0.138	0.388	0.244

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household. Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification variables.

Table 8. Heterogeneous price effects on number of jars acquired during the intervention

Outcome:	Total number of jars acquired during the intervention (large-jar equivalent)					
Panel A. *Household characteristics at baseline*						
	(1)	(2)	(3)	(4)	(5)	(6)
X:	Female head of household	Household head primary education at least	Spouse of household head primary education at least	Household has the habit to shop at the point of sale	Household head present during presentation of the point of sale	Spouse of household head present during presentation of the point of sale
50% subsidy	1.666***	1.506***	1.614***	1.595***	1.733***	1.754***
	(0.117)	(0.126)	(0.136)	(0.234)	(0.136)	(0.211)
100% subsidy	9.781***	9.924***	9.689***	9.865***	9.437***	9.613***
	(0.231)	(0.239)	(0.267)	(0.471)	(0.373)	(0.297)
50% subsidy × X	0.183	0.390***	0.106	0.093	−0.082	−0.105
	(0.270)	(0.144)	(0.150)	(0.252)	(0.176)	(0.207)
100% subsidy × X	0.265	−0.256	0.194	−0.071	0.580	0.204
	(0.308)	(0.234)	(0.209)	(0.453)	(0.362)	(0.297)
X	−0.201***	−0.083	−0.112*	0.094	0.104*	−0.135
	(0.077)	(0.068)	(0.063)	(0.080)	(0.058)	(0.090)
Mean in 0% subsidy group with X=0	0.300	0.295	0.329	0.206	0.256	0.415
Mean in 0% subsidy group with X=1	0.149	0.277	0.272	0.307	0.308	0.285
Adjusted R^2	0.821	0.822	0.820	0.821	0.822	0.821
N	2,986	2,985	2,675	2,980	2,980	2,672
Share with X=1	0.096	0.449	0.468	0.850	0.604	0.866

Panel B. *Prevention behaviors at baseline and locality characteristics*					
	(7)	(8)	(9)	(10)	(11)
X:	Used untreated net last rainy season	Used insecticide-treated net last rainy season	Already used mosquito repellent ointment at baseline	Urban locality	MAÏA already sold by the point of sale
50% subsidy	1.634***	1.532***	1.690***	1.503***	1.484***
	(0.117)	(0.210)	(0.122)	(0.136)	(0.116)
100% subsidy	9.818***	9.819***	9.758***	9.793***	9.735***
	(0.235)	(0.257)	(0.233)	(0.290)	(0.265)
50% subsidy × X	0.309	0.171	−0.071	0.461*	0.800**
	(0.336)	(0.228)	(0.198)	(0.243)	(0.309)
100% subsidy × X	−0.104	−0.018	0.315	0.030	0.276
	(0.270)	(0.248)	(0.248)	(0.465)	(0.501)
X	0.019	0.003	−0.035	−0.215	−0.026
	(0.058)	(0.053)	(0.068)	(0.132)	(0.139)
Mean in 0% subsidy group with X=0	0.284	0.275	0.289	0.306	0.302
Mean in 0% subsidy group with X=1	0.306	0.290	0.278	0.257	0.241
Adjusted R^2	0.821	0.821	0.821	0.821	0.822
N	2,983	2,983	2,983	2,986	2,986
Share with X=1	0.152	0.867	0.138	0.388	0.244

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household. Coefficients from linear probability models are reported. All regressions use data from the registry database and control for the stratification variables.

Table 9. Heterogeneous price effects on declared use of mosquito-repellent ointment (individual level)

Outcome:	Individual use last 30 days			
	(1)	(2)	(3)	(4)
X:	Under-5 children	Female	Pregnant	Malaria episode last rainy season
50% subsidy	0.258***	0.263***	0.271***	0.256***
	(0.029)	(0.030)	(0.030)	(0.032)
100% subsidy	0.584***	0.583***	0.593***	0.581***
	(0.022)	(0.023)	(0.021)	(0.024)
50% subsidy × X	0.024*	0.001	−0.072	0.011
	(0.013)	(0.011)	(0.044)	(0.023)
100% subsidy × X	0.008	0.005	−0.055	0.004
	(0.011)	(0.009)	(0.040)	(0.017)
X	0.016*	0.022***	0.010	0.014
	(0.009)	(0.007)	(0.035)	(0.016)
Mean in 0% subsidy group with X=0	0.350	0.343	0.362	0.344
Mean in 0% subsidy group with X=1	0.366	0.365	0.373	0.357
Adjusted R^2	0.264	0.263	0.268	0.256
N	52,751	52,934	12,628	50,045
Share with X=1	0.258	0.526	0.080	0.513

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is an individual (columns 1, 2, and 4) or a female between 15 and 49 years old (column 3). Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification variables.

Table 10. Price Effects on declared willingness-to-pay for mosquito-repellent ointment

	(1)	(2)	(3)	(4)	(5)	(6)
	Minimum price		Maximum price		Desired price	
Panel A. *Analysis not conditional on baseline willingness-to-pay*						
50% subsidy	−27.545***	−27.951***	−31.785	−33.696	−27.794*	−29.172**
	(9.870)	(9.172)	(26.004)	(26.218)	(14.224)	(14.005)
100% subsidy	11.004	11.745	6.668	6.586	14.492	14.580
	(10.155)	(9.619)	(23.547)	(23.022)	(13.914)	(13.678)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	408.198	407.609	690.497	689.315	478.957	478.673
Adjusted R^2	0.010	0.035	0.002	0.009	0.007	0.022
N	5,944	5,775	5,948	5,780	5,933	5,764
Panel B. *Analysis conditional on baseline willingness-to-pay*						
50% subsidy	−26.373***	−25.322***	−14.733	−13.063	−22.954	−22.583
	(9.807)	(9.447)	(26.611)	(27.362)	(14.332)	(14.138)
100% subsidy	14.105	15.406	24.596	25.050	20.569	21.635
	(10.355)	(9.990)	(24.324)	(23.981)	(13.824)	(13.645)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	406.627	405.466	679.338	676.977	473.561	472.599
Adjusted R^2	0.021	0.036	0.004	0.009	0.012	0.025
N	5,062	4,943	5,060	4,941	5,037	4,918

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from ordinary least squares models are reported. All regressions use endline data and control for the stratification variables. Estimations presented in Panel B additionally control for the baseline value of the outcome. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table 11. Effect of acquisition on declared willingness-to-pay for mosquito-repellent ointment (2SLS)

	(1)	(2)	(3)	(4)	(5)	(6)
	Minimum price		Maximum price		Desired price	
Panel A. *Analysis <u>not conditional</u> on baseline willingness-to-pay*						
Number of jars acquired (sum 1 for large jars, 0.5 for small)	2.278**	2.362**	1.969	2.022	2.659*	2.707**
	(0.993)	(0.950)	(2.336)	(2.310)	(1.370)	(1.348)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	408.198	407.609	690.497	689.315	478.957	478.673
Kleibergen-Paap F-Statistic	1018.392	996.824	1030.913	1009.517	1057.472	1043.796
N	5,944	5,775	5,948	5,780	5,933	5,764
Panel B. *Analysis <u>conditional</u> on baseline willingness-to-pay*						
Number of jars acquired (sum 1 for large jars, 0.5 for small)	2.559**	2.653***	3.248	3.227	3.125**	3.218**
	(1.026)	(0.990)	(2.500)	(2.481)	(1.376)	(1.358)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	406.627	405.466	679.338	676.977	473.561	472.599
Kleibergen-Paap F-Statistic	952.551	946.060	972.887	967.143	996.938	996.172
N	5,062	4,943	5,060	4,941	5,037	4,918

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from two-stage least squares models are reported. All regressions use endline data and control for the stratification variables. Estimations presented in Panel B additionally control for the baseline value of the outcome. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table 12. Effect of acquisition on declared willingness-to-pay for mosquito-repellent ointment (2SLS)

	(1)	(2)	(3)	(4)	(5)	(6)
	Minimum price		Maximum price		Desired price	
Panel A. *Analysis not conditional on baseline willingness-to-pay*						
Use last 30 days at each wave	23.139	24.152*	17.604	17.823	28.178	28.416
	(14.228)	(13.463)	(32.693)	(31.912)	(19.352)	(18.890)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	408.198	407.609	690.497	689.315	478.957	478.673
Kleibergen-Paap F-Statistic	523.191	515.896	526.807	520.114	528.014	520.819
N	5,944	5,775	5,948	5,780	5,933	5,764
Panel B. *Analysis conditional on baseline willingness-to-pay*						
Use last 30 days at each wave	26.806*	28.483**	39.554	39.816	35.394*	36.803**
	(14.499)	(13.933)	(34.048)	(33.483)	(19.121)	(18.765)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	406.627	405.466	679.338	676.977	473.561	472.599
Kleibergen-Paap F-Statistic	576.364	564.942	576.314	568.317	600.009	587.689
N	5,062	4,943	5,060	4,941	5,037	4,918

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from two-stage least squares models are reported. All regressions use endline data and control for the stratification variables. Estimations presented in Panel B additionally control for the baseline value of the outcome. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table 13. Heterogeneous price effects on WTP (unconditional on baseline value)

Outcome:	Willingness-to-pay - Desired price						
Panel A. *Household characteristics at baseline*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
X:	Female	Female head of household	Household head primary education at least	Spouse of household head primary education at least	Household has the habit to shop at the point of sale	Household head present during presentation of the point of sale	Spouse of household head present during presentation of the point of sale
50% subsidy	−31.092**	−28.554*	−17.354	−24.504	−98.033***	−43.544**	−25.018
	(14.976)	(14.520)	(15.564)	(16.619)	(34.006)	(20.866)	(25.668)
100% subsidy	18.686	14.175	20.879	11.800	−29.675	12.304	28.163
	(15.760)	(14.528)	(15.466)	(15.128)	(31.614)	(21.297)	(29.731)
50% subsidy × X	5.812	14.476	−25.475	−3.461	84.013**	25.605	−2.105
	(10.625)	(39.882)	(17.544)	(17.420)	(35.959)	(22.972)	(28.006)
100% subsidy × X	−7.832	6.398	−15.675	1.821	55.077	6.054	−17.426
	(10.261)	(30.065)	(18.534)	(18.305)	(33.533)	(22.895)	(30.878)
X	−27.084***	−7.807	29.258**	31.782**	−58.364**	−36.764**	6.252
	(7.284)	(23.015)	(13.620)	(13.092)	(27.466)	(16.016)	(21.478)
Urban commune	−15.956	−15.731	−17.195	−17.842	−20.963	−16.104	−16.944
	(15.736)	(15.750)	(15.529)	(15.610)	(14.863)	(15.121)	(15.915)
MAIA already present	18.330	18.396	14.641	16.737	21.638	13.374	23.139
	(16.241)	(16.371)	(16.463)	(16.608)	(16.028)	(15.602)	(16.554)
Constant	495.985***	480.896***	469.478***	467.199***	529.299***	503.915***	474.883***
	(11.048)	(10.240)	(10.534)	(11.071)	(26.224)	(15.091)	(20.203)
Mean in 0% subsidy group with X=0	494.324	479.274	466.814	464.388	522.307	501.178	474.896
Mean in 0% subsidy group with X=1	467.306	473.333	495.376	496.293	469.185	464.219	480.053
Adjusted R^2	0.011	0.007	0.009	0.012	0.011	0.011	0.007
N	5,933	5,933	5,931	5,557	5,922	5,922	5,550
Share with X=1	0.566	0.058	0.435	0.455	0.860	0.601	0.861

Panel B. *Prevention behaviors at baseline and locality characteristics*

	(7)	(8)	(9)	(10)	(11)
X:	Used untreated net last rainy season	Used insecticide-treated net last rainy season	Already used mosquito repellent ointment at baseline	Urban locality	MAÏA already sold by the point of sale
50% subsidy	−28.155**	−40.048	−24.480*	−5.456	−31.051*
	(14.160)	(33.945)	(14.580)	(18.165)	(17.272)
100% subsidy	19.167	−8.440	15.699	25.618	11.913
	(14.980)	(23.327)	(13.884)	(15.924)	(16.012)
50% subsidy × X	1.287	13.928	−30.574	−58.852**	13.845
	(31.668)	(32.735)	(29.140)	(28.587)	(28.048)
100% subsidy × X	−29.003	26.591	−8.046	−29.760	10.953
	(24.519)	(23.681)	(31.188)	(30.178)	(32.331)
X	21.680	−14.968	2.196	14.090	10.040
	(19.539)	(19.017)	(24.413)	(22.619)	(24.326)
Urban commune	−16.818	−15.586	−15.659	0.000	−15.683
	(15.805)	(15.793)	(15.766)	(0)	(15.691)
MAIA already present	18.155	17.953	17.841	17.949	0.000
	(16.279)	(16.311)	(16.287)	(15.932)	(0)
Constant	477.347***	493.275***	480.228***	469.436***	482.443***
	(10.703)	(18.525)	(10.130)	(10.459)	(10.788)
Mean in 0% subsidy group with X=0	475.335	491.897	478.511	470.280	479.023
Mean in 0% subsidy group with X=1	497.154	476.697	481.271	493.487	478.747
Adjusted R^2	0.008	0.007	0.008	0.010	0.007
N	5,928	5,928	5,928	5,933	5,933
Share with X=1	0.156	0.871	0.140	0.377	0.234

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from ordinary least squares models are reported. All regressions use endline data and control for the stratification variables.

Table 14. Heterogeneous price effects on WTP (conditional on baseline value)

Outcome:	Willingness-to-pay - Desired price						
Panel A. *Household characteristics at baseline*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
X:	Female	Female head of household	Household head primary education at least	Spouse of household head primary education at least	Household has the habit to shop at the point of sale	Household head present during presentation of the point of sale	Spouse of household head present during presentation of the point of sale
Willing price	0.042***	0.046***	0.044***	0.043***	0.046***	0.046***	0.048***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)	(0.014)
50% subsidy	−35.641**	−24.247*	−15.635	−23.733	−76.446**	−33.452	−10.711
	(15.328)	(14.637)	(15.748)	(17.022)	(29.728)	(21.362)	(25.687)
100% subsidy	20.348	20.029	23.995	14.250	0.738	12.940	35.682
	(16.522)	(14.294)	(15.354)	(15.220)	(31.233)	(20.853)	(29.928)
50% subsidy × X	22.064*	28.061	−17.414	4.450	63.266**	16.447	−13.467
	(11.837)	(41.998)	(17.013)	(17.290)	(31.836)	(23.656)	(27.829)
100% subsidy × X	0.414	12.037	−8.386	10.070	25.618	14.180	−18.616
	(10.990)	(32.327)	(17.484)	(18.911)	(32.475)	(22.613)	(30.758)
X	−30.980***	−13.612	17.815	26.430**	−33.279	−30.569*	11.756
	(7.329)	(24.276)	(11.962)	(12.529)	(22.991)	(15.548)	(20.392)
Urban commune	−19.966	−19.847	−20.642	−22.485	−22.814	−20.166	−21.892
	(15.034)	(15.007)	(14.983)	(15.051)	(14.672)	(14.655)	(15.275)
MAIA already present	24.260	24.039	21.558	21.220	26.103	20.198	27.355*
	(15.952)	(15.948)	(16.127)	(16.196)	(16.089)	(15.504)	(16.164)
Constant	470.825***	451.530***	444.897***	442.320***	478.997***	470.493***	440.274***
	(12.637)	(11.030)	(11.509)	(12.172)	(22.352)	(15.231)	(19.786)
Mean in 0% subsidy group with X=0	492.413	474.104	464.066	459.457	497.903	492.916	464.844
Mean in 0% subsidy group with X=1	459.418	462.338	485.411	489.670	467.981	460.625	475.580
Adjusted R^2	0.015	0.012	0.012	0.017	0.014	0.015	0.012
N	5,037	5,037	5,035	4,758	5,027	5,027	4,751
Share with X=1	0.568	0.049	0.457	0.473	0.857	0.594	0.867

Panel B. *Prevention behaviors at baseline and locality characteristics*					
	(7)	(8)	(9)	(10)	(11)
X:	Used untreated net last rainy season	Used insecticide-treated net last rainy season	Already used mosquito repellent ointment at baseline	Urban locality	MAÏA already sold by the point of sale
Willing price	0.047***	0.045***	0.045***	0.044***	0.046***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)
50% subsidy	−22.645	−31.673	−20.563	0.648	−26.536
	(13.912)	(34.809)	(14.654)	(18.774)	(17.343)
100% subsidy	27.438*	−5.417	20.616	30.954*	17.163
	(14.666)	(23.344)	(13.755)	(15.900)	(15.613)
50% subsidy × X	−4.561	9.951	−21.967	−60.250**	14.405
	(31.135)	(33.257)	(27.273)	(28.498)	(29.215)
100% subsidy × X	−42.501*	30.080	−0.570	−27.045	13.665
	(24.348)	(23.023)	(30.362)	(29.511)	(33.423)
X	35.231*	−14.258	−6.472	9.750	14.697
	(18.433)	(17.910)	(22.794)	(20.765)	(23.865)
Urban commune	−21.262	−19.523	−19.659	0.000	−19.739
	(15.062)	(15.091)	(15.027)	(0)	(14.928)
MAIA already present	24.102	23.846	23.772	23.431	0.000
	(15.905)	(15.983)	(15.920)	(15.564)	(0)
Constant	445.263***	463.827***	452.309***	440.645***	453.211***
	(11.071)	(18.831)	(11.004)	(11.701)	(11.307)
Mean in 0% subsidy group with X=0	468.141	486.709	474.409	464.133	472.430
Mean in 0% subsidy group with X=1	501.389	471.344	468.981	488.629	476.891
Adjusted R^2	0.014	0.012	0.012	0.015	0.012
N	5,033	5,033	5,033	5,037	5,037
Share with X=1	0.161	0.868	0.147	0.391	0.244

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from ordinary least squares models are reported. All regressions use endline data and control for the baseline value of the outcome as well as for the stratification variables.

Figures

Figure 1. Location of the 193 points of sale

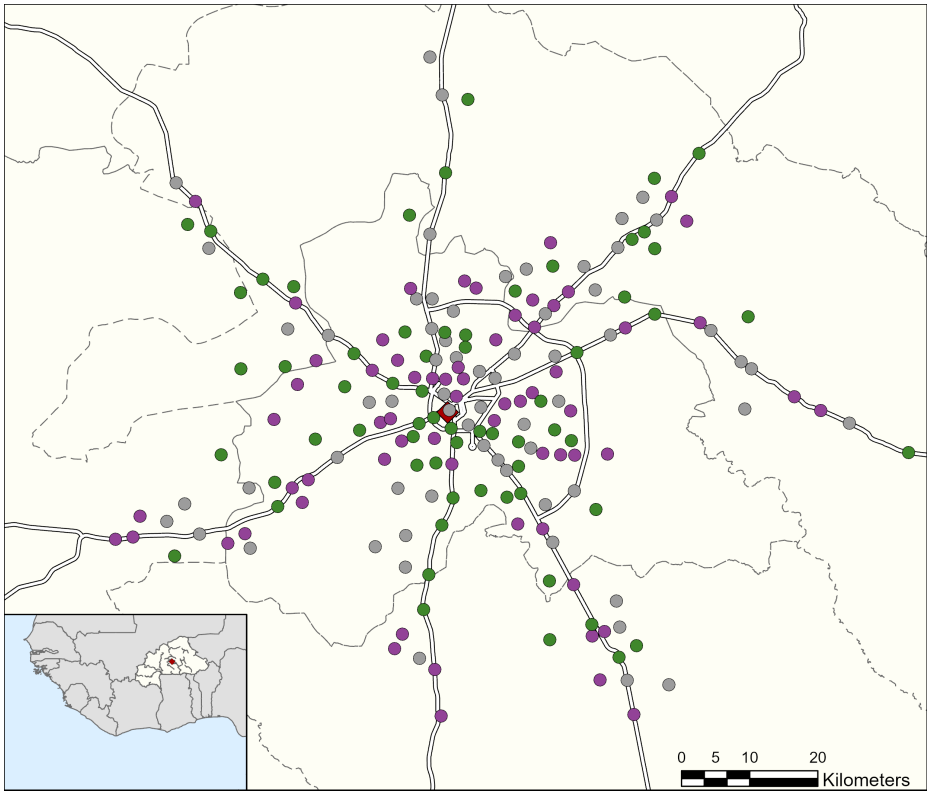
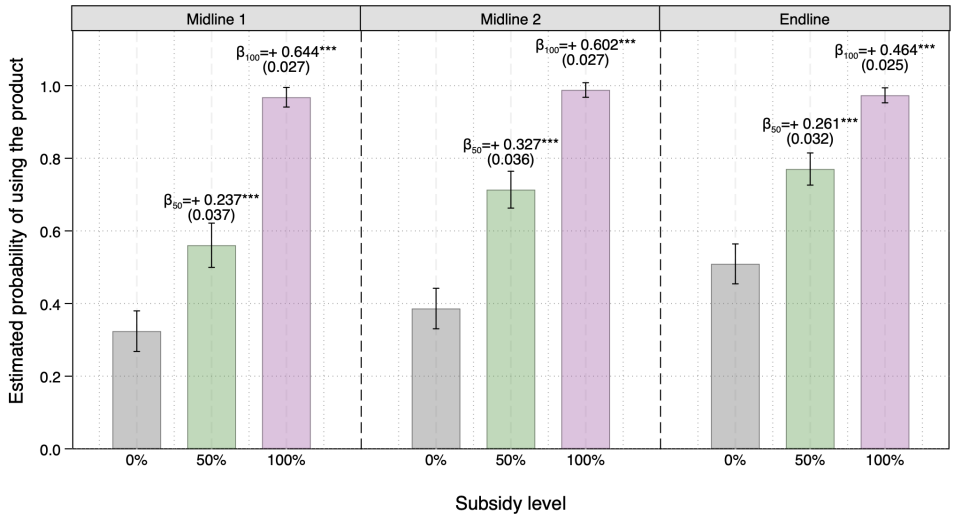


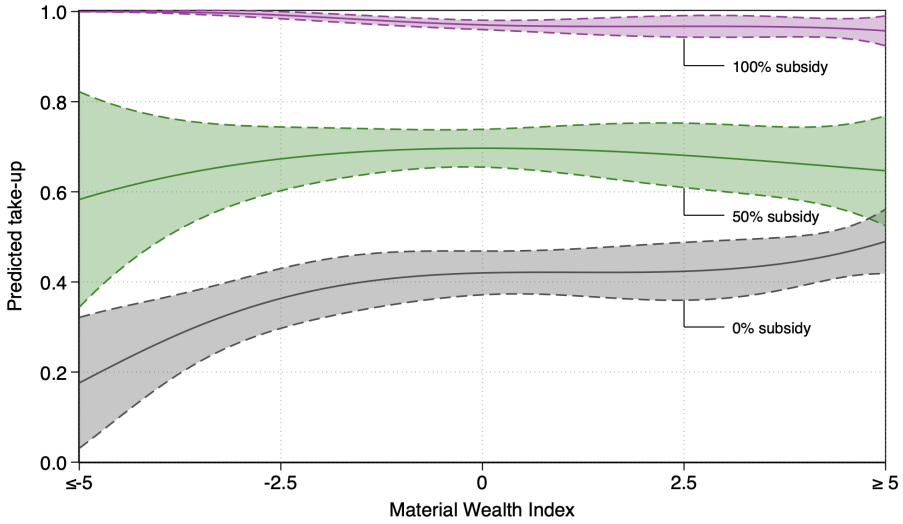
Figure 2. Price Effects on declared use of mosquito-repellent ointment last 30 days by survey round



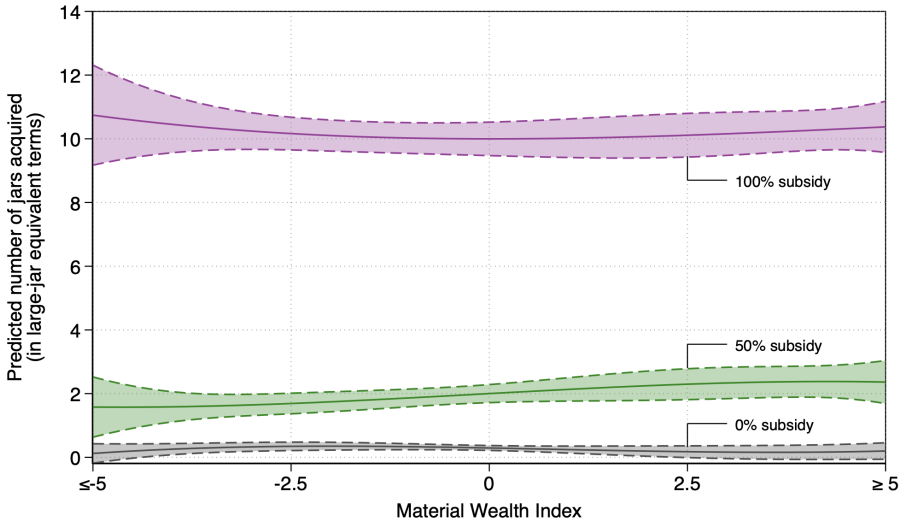
Notes: These estimations replicate column 1 of Table 6 by survey wave, controlling for urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. The figure shows the point estimates of β_{50} and β_{100} along with the estimated conditional proportions of households declaring that they used a mosquito-repellent ointment during the last 30 days. Standard errors clustered at the enumeration area level are in parentheses.

Figure 3. Heterogeneous effects with respect to material poverty index

A. Use last 30 days

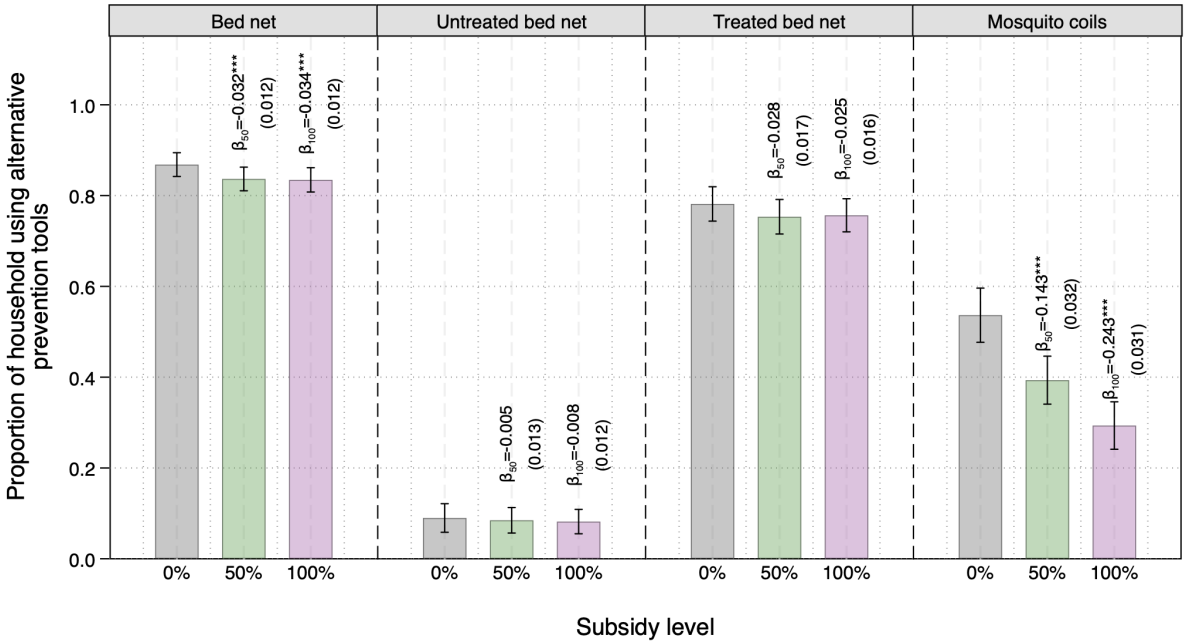


B. Number of jars acquired during the intervention



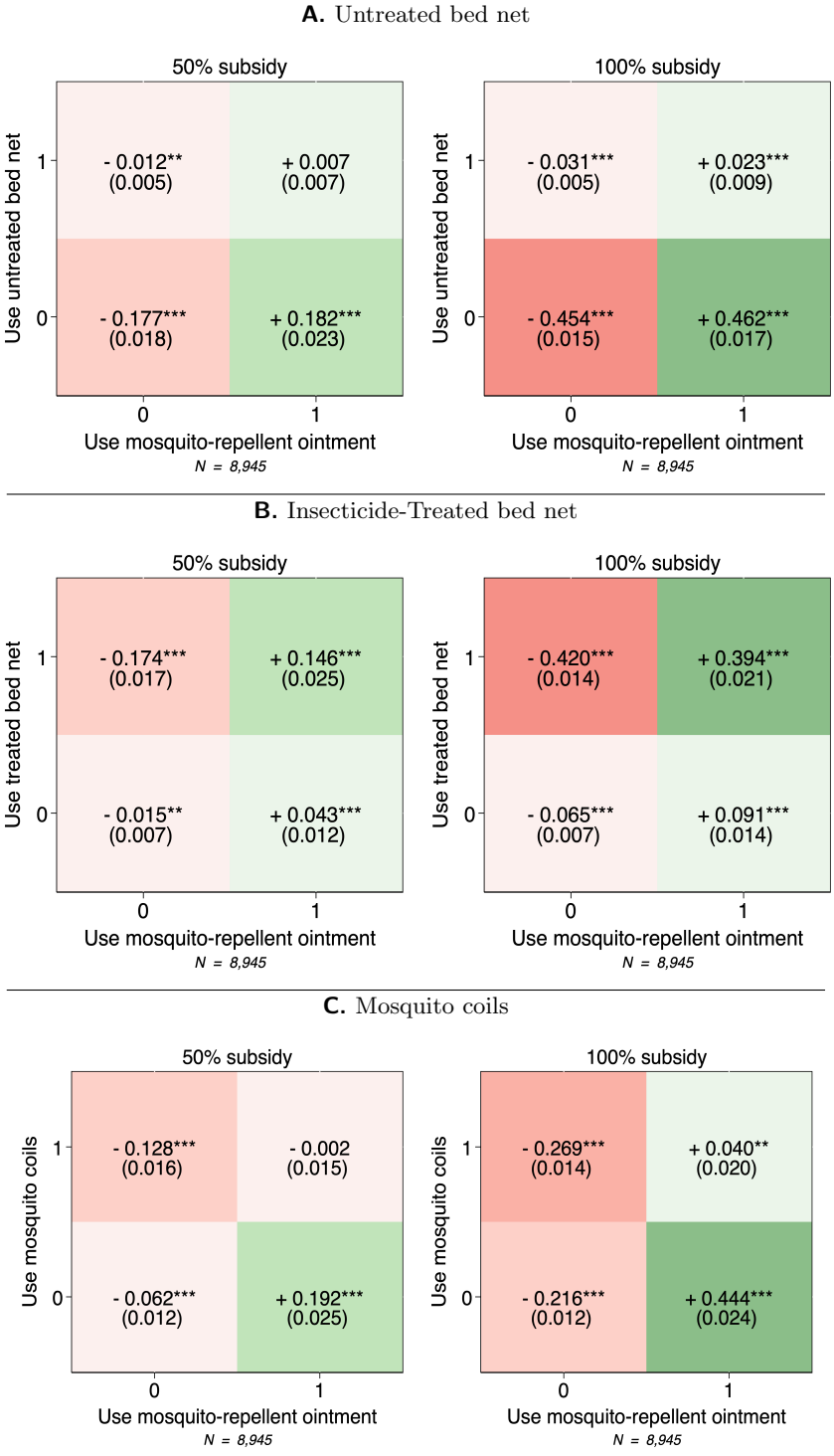
Notes: This figure plots the prediction by subsidy level of either the probability of using the mosquito-repellent ointment at least once over the last 30 days (A) or the number of jars acquired during the intervention in large-jar equivalent (B) as a function of the treatment assignment, the wealth index as a polynomial of order 3, and the interaction terms. These estimations are done through a probit specification (A) or ordinary least squares (B) controlling for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study, as well as for survey round dummies in (A).

Figure 5. Spillovers to other prevention behaviors adopted in the household during the last 30 days



Notes: The figure shows the point estimates of β_{50} and β_{100} along with the estimated conditional proportions of households declaring that they used other prevention tools over the last 30 days (bed nets, untreated bed nets, treated bed nets, mosquito coils). These estimations use pooled data and control for survey round dummies, as well as for the stratification variables. Standard errors clustered at the enumeration area level are in parentheses.

Figure 4. Bivariate Probit estimates of complementarity and substitution effects with other prevention tools over the last 30 days



Notes: These matrices represent the marginal effects obtained from bivariate probit estimation of the effect of each subsidy level on the use of a mosquito-repellent ointment and of another prevention tool over the last 30 days. Standard errors clustered at the enumeration area level are in parentheses. Each panel corresponds to a single bivariate probit estimation. All regressions use pooled data and control for survey round dummies, as well as for the stratification variables.

Appendix

for

Willingness-to-pay for a new mosquito-repellent ointment: Experimental evidence from Burkina Faso

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This version: January 31, 2024

A. Balance checks for the balanced sample **S2**

B. Main specifications showing covariates **S3**

C. Main results in panel with survey round interactions **S6**

D. Main results controlling for social desirability score **S8**

E. Heterogeneous price effects on declared willingness-to-pay **S9**

A. Balance checks for the balanced sample

Table A1. Replication of Table 1 for the balanced sample

	(1) Mean [SD]	(2) β_{50} (SE)	(3) β_{100} (SE)	(4) p-value β_{50}=β_{100}	(5) N
Panel A. *Household level*					
Household size	5.949 [2.633]	-0.057 (0.157)	-0.059 (0.160)	*0.993*	2,986
Ouagadougou commune	0.272 [0.445]	0.017 (0.049)	0.018 (0.048)	*0.967*	2,986
Material poverty index	-0.020 [2.421]	-0.061 (0.270)	-0.077 (0.247)	*0.944*	2,975
Food consumption score	52.245 [22.462]	-0.369 (1.962)	1.174 (1.826)	*0.386*	2,975
Household Food Insecurity Access Scale (HFIAS) score	5.656 [5.602]	0.328 (0.464)	0.150 (0.483)	*0.714*	2,975
Age of youngest children	1.692 [1.357]	-0.058 (0.064)	-0.040 (0.067)	*0.776*	2,986
At least one episode of malaria last year	0.882 [0.323]	-0.026 (0.019)	0.001 (0.015)	*0.138*	2,986
At least one episode of malaria last year among under-5	0.656 [0.475]	-0.025 (0.025)	0.005 (0.024)	*0.236*	2,912
Number of bednets reported	1.539 [1.473]	-0.127 (0.119)	-0.105 (0.120)	*0.846*	2,984
No household member slept under bednet last night	0.319 [0.466]	-0.003 (0.030)	-0.014 (0.027)	*0.701*	2,984
Used an untreated net last rainy season	0.152 [0.359]	-0.001 (0.034)	-0.013 (0.031)	*0.722*	2,983
Used a treated net last rainy season	0.867 [0.339]	0.029 (0.024)	0.030 (0.023)	*0.984*	2,983
Used a mosquito repellent ointment last rainy season	0.138 [0.345]	-0.021 (0.020)	-0.000 (0.019)	*0.275*	2,983
MAÏA is known in the household	0.117 [0.321]	-0.009 (0.017)	-0.014 (0.017)	*0.797*	2,947
At least one 15-49 women experienced an under-5 death	0.166 [0.372]	-0.022 (0.020)	-0.015 (0.019)	*0.702*	2,976
At least one 15-49 women experienced an infant death	0.100 [0.301]	-0.019 (0.017)	-0.013 (0.015)	*0.717*	2,976
Distance to MAÏA point of sale in kilometers	0.339 [0.178]	-0.015 (0.018)	0.000 (0.020)	*0.406*	2,986
Buffer used for census	1.422 [0.701]	-0.125 (0.116)	-0.032 (0.125)	*0.415*	2,986
Panel B. *Household head level*					
Female household head	0.096 [0.295]	0.004 (0.018)	0.022 (0.021)	*0.368*	2,986
Age in years of household head	41.626 [12.198]	0.074 (0.734)	-0.749 (0.713)	*0.227*	2,985
Very good or good household head health status	0.859 [0.348]	0.017 (0.021)	0.006 (0.022)	*0.615*	2,956
Household head attended primary school at least	0.449 [0.498]	0.006 (0.034)	0.022 (0.037)	*0.629*	2,985
Panel C. *Caregiver level*					
Female caregiver	0.982 [0.131]	0.009 (0.005)	-0.002 (0.006)	*0.036*	3,301
Age in years of caregiver	31.362 [8.699]	0.214 (0.406)	0.113 (0.431)	*0.790*	3,300
Very good or good caregiver health status	0.887 [0.317]	0.002 (0.020)	0.007 (0.019)	*0.798*	3,266
Caregiver attended primary school at least	0.475 [0.499]	-0.006 (0.030)	-0.009 (0.030)	*0.933*	3,300

Notes: Unweighted statistics. Standard deviations in brackets and robust standard errors clustered at the enumeration area level in parentheses. Column 1 shows summary statistics in our balanced sample of households at the household level (Panel A), household head level (Panel B) or caretaker level (Panel C). Columns 2 and 3 report the coefficients β_{50} and β_{100} along with standard errors obtained from linear probability models used for balance checks. Column 4 reports the p-values attached to the null hypothesis test of equality of β_{50} and β_{100} while column 5 shows the sample size. $^{*}p<.10$; $^{**}p<.05$; $^{***}p<.01$

B. Main specifications showing covariates

Table B1. Price Effects on number of jars acquired during the intervention

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of small jars		Number of large jars		Total number of jars (large-jar equivalent)	
50% subsidy	1.072***	1.078***	1.147***	1.166***	1.683***	1.706***
	(0.091)	(0.091)	(0.083)	(0.085)	(0.116)	(0.118)
100% subsidy	6.582***	6.591***	6.514***	6.523***	9.805***	9.819***
	(0.149)	(0.150)	(0.160)	(0.163)	(0.227)	(0.230)
Urban commune	-0.096	-0.071	-0.005	0.000	-0.053	-0.035
	(0.133)	(0.137)	(0.136)	(0.143)	(0.198)	(0.205)
MAÏA already present	0.284*	0.250	0.189	0.173	0.331	0.298
	(0.148)	(0.159)	(0.157)	(0.165)	(0.222)	(0.235)
Material poverty index		0.003		0.013		0.014
		(0.018)		(0.017)		(0.024)
Household size		0.025*		0.012		0.024
		(0.014)		(0.012)		(0.017)
At least one episode of malaria last year		0.135		0.214**		0.281**
		(0.091)		(0.083)		(0.119)
Number of bednets reported		0.039		0.039		0.058
		(0.029)		(0.031)		(0.043)
No household member slept under bednet last night		-0.019		-0.018		-0.027
		(0.075)		(0.073)		(0.101)
Used a mosquito repellent ointment last rainy season		0.013		0.004		0.011
		(0.072)		(0.076)		(0.100)
MAÏA is known in the household		0.222**		0.155*		0.266**
		(0.087)		(0.092)		(0.120)
Used an untreated net last rainy season		0.036		0.033		0.051
		(0.104)		(0.116)		(0.159)
Used a treated net last rainy season		0.052		0.027		0.053
		(0.087)		(0.094)		(0.129)
Female household head		0.108		-0.037		0.017
		(0.111)		(0.112)		(0.152)
Age in years of household head		0.003		0.002		0.004
		(0.003)		(0.003)		(0.004)
Very good or good household head health status		-0.022		-0.060		-0.072
		(0.078)		(0.080)		(0.109)
Household head attended primary school at least		0.003		-0.041		-0.040
		(0.072)		(0.068)		(0.096)
Distance to MAÏA point of sale in meters		-0.000		-0.000		-0.000
		(0.000)		(0.000)		(0.000)
Constant	0.345***	-0.078	0.053	-0.275	0.225***	-0.314
	(0.062)	(0.206)	(0.054)	(0.218)	(0.078)	(0.290)
Mean in 0% subsidy group	0.378	0.372	0.098	0.095	0.287	0.281
Adjusted R^2	0.793	0.796	0.793	0.793	0.821	0.822
N	2,986	2,902	2,986	2,902	2,986	2,902

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household. All coefficients from linear probability models are reported (full version of Table 4). All regressions use data from the redeemed vouchers database at endline and control for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study.

Table B2. Price Effects on declared use of mosquito-repellent ointment

	(1)	(2)	(3)	(4)	(5)	(6)
	Use last 30 days				Use MAÏA last 30 days	
Unit of analysis:	*Household*		*Individual*		*Household*	
50% subsidy	0.275***	0.276***	0.260***	0.257***	0.312***	0.313***
	(0.030)	(0.029)	(0.029)	(0.028)	(0.032)	(0.030)
100% subsidy	0.570***	0.572***	0.580***	0.580***	0.630***	0.631***
	(0.021)	(0.021)	(0.022)	(0.021)	(0.023)	(0.023)
Urban commune	−0.008	−0.001	−0.004	0.000	−0.013	0.002
	(0.021)	(0.020)	(0.021)	(0.019)	(0.022)	(0.021)
MAÏA already present	0.013	0.005	0.007	0.002	−0.003	0.004
	(0.024)	(0.025)	(0.022)	(0.023)	(0.026)	(0.026)
Midline 2 survey	0.093***	0.094***	0.107***	0.108***	0.098***	0.099***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.010)	(0.010)
Endline survey	0.151***	0.151***	0.112***	0.113***	0.163***	0.163***
	(0.014)	(0.014)	(0.015)	(0.015)	(0.014)	(0.014)
Material poverty index		−0.001		−0.004		−0.009***
		(0.003)		(0.003)		(0.004)
Household size		0.005		−0.005*		0.003
		(0.003)		(0.003)		(0.003)
At least one episode of malaria last year		0.018		0.008		0.024
		(0.018)		(0.018)		(0.019)
Number of bednets reported		0.012*		0.009		0.015**
		(0.006)		(0.006)		(0.006)
No household member slept under bednet last night		−0.041**		−0.040**		−0.033*
		(0.018)		(0.020)		(0.018)
Used a mosquito repellent ointment last rainy season		0.019		0.018		0.004
		(0.017)		(0.018)		(0.017)
MAÏA is known in the household		0.047**		0.053***		0.045**
		(0.019)		(0.018)		(0.020)
Used an untreated net last rainy season		0.005		−0.002		0.006
		(0.020)		(0.018)		(0.021)
Used a treated net last rainy season		0.007		−0.016		0.007
		(0.021)		(0.020)		(0.021)
Female household head		−0.008		−0.009		−0.004
		(0.021)		(0.026)		(0.021)
Age in years of household head		0.000		−0.001		0.000
		(0.001)		(0.001)		(0.001)
Very good or good household head health status		0.022		0.018		0.021
		(0.019)		(0.019)		(0.019)
Household head attended primary school at least		0.013		0.010		0.014
		(0.014)		(0.014)		(0.014)
Distance to MAÏA point of sale in meters		0.000**		0.000		0.000*
		(0.000)		(0.000)		(0.000)
Constant	0.325***	0.278***	0.276***	0.332***	0.263***	0.201***
	(0.025)	(0.050)	(0.025)	(0.048)	(0.026)	(0.053)
Mean in 0% subsidy group	0.406	0.405	0.349	0.349	0.344	0.342
Adjusted R^2	0.271	0.279	0.253	0.260	0.314	0.322
N	8,945	8,693	53,946	52,408	8,945	8,693

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is either a household (columns 1, 2, 5, and 6) or an individual (columns 3 and 4). All coefficients from linear probability models are reported (full version of Table 6 Panel A). All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study.

Table B3. Price Effects on declared use of mosquito-repellent ointment conditional on acquisition

	(1)	(2)	(3)	(4)	(5)	(6)
	Use last 30 days				Use MAÏA last 30 days	
Unit of analysis:	*Household*		*Individual*		*Household*	
50% subsidy	0.013	0.016	0.043	0.036	0.025	0.027
	(0.024)	(0.023)	(0.031)	(0.030)	(0.025)	(0.025)
100% subsidy	0.161***	0.164***	0.229***	0.223***	0.181***	0.184***
	(0.021)	(0.020)	(0.028)	(0.026)	(0.022)	(0.022)
Urban commune	−0.003	0.001	0.007	0.005	0.001	0.006
	(0.012)	(0.012)	(0.017)	(0.018)	(0.012)	(0.012)
MAÏA already present	−0.021	−0.022	−0.025	−0.023	−0.022	−0.019
	(0.015)	(0.017)	(0.019)	(0.019)	(0.016)	(0.017)
Midline 2 survey	0.119***	0.119***	0.138***	0.139***	0.126***	0.126***
	(0.013)	(0.013)	(0.015)	(0.015)	(0.014)	(0.014)
Endline survey	0.111***	0.111***	0.082***	0.084***	0.120***	0.120***
	(0.015)	(0.015)	(0.017)	(0.017)	(0.016)	(0.016)
Material poverty index		−0.002		−0.005		−0.004
		(0.003)		(0.003)		(0.003)
Household size		0.001		−0.008***		0.001
		(0.002)		(0.003)		(0.002)
At least one episode of malaria last year		−0.003		0.005		−0.005
		(0.013)		(0.014)		(0.014)
Number of bednets reported		0.004		0.005		0.005
		(0.004)		(0.005)		(0.005)
No household member slept under bednet last night		−0.015		−0.022		−0.015
		(0.013)		(0.016)		(0.013)
Used a mosquito repellent ointment last rainy season		0.016		0.023		0.015
		(0.012)		(0.015)		(0.013)
MAÏA is known in the household		0.004		0.022		0.001
		(0.014)		(0.015)		(0.015)
Used an untreated net last rainy season		0.014		−0.011		0.006
		(0.015)		(0.017)		(0.016)
Used a treated net last rainy season		0.025		0.002		0.024
		(0.018)		(0.018)		(0.018)
Female household head		0.015		0.020		0.016
		(0.013)		(0.018)		(0.014)
Age in years of household head		0.000		−0.001		0.000
		(0.000)		(0.001)		(0.000)
Very good or good household head health status		0.021		0.029*		0.019
		(0.013)		(0.015)		(0.014)
Household head attended primary school at least		−0.001		−0.006		0.003
		(0.010)		(0.011)		(0.011)
Distance to MAÏA point of sale in meters		0.000		0.000		0.000
		(0.000)		(0.000)		(0.000)
Constant	0.744***	0.708***	0.629***	0.690***	0.715***	0.677***
	(0.024)	(0.036)	(0.031)	(0.044)	(0.025)	(0.039)
Mean in 0% subsidy group	0.818	0.818	0.700	0.705	0.796	0.796
Adjusted R^2	0.097	0.099	0.093	0.104	0.104	0.106
N	5,852	5,657	35,644	34,421	5,852	5,657

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is either a household (columns 1, 2, 5, and 6) or an individual (columns 3 and 4) living in a household that acquired at least one jar of mosquito-repellent ointment during the intervention period according to the registers. All coefficients from linear probability models are reported (full version of Table 6 Panel B). All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study.

C. Main results in panel with survey round interactions

Table C1. Price Effects on number of jars acquired during the intervention with second register interaction

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of small jars		Number of large jars		Total number of jars (large-jar equivalent)	
50% subsidy	0.855***	0.859***	0.841***	0.852***	1.268***	1.282***
	(0.073)	(0.073)	(0.061)	(0.061)	(0.087)	(0.087)
50% subsidy × Second register	−0.638***	−0.640***	−0.535***	−0.538***	−0.854***	−0.858***
	(0.083)	(0.084)	(0.067)	(0.068)	(0.099)	(0.100)
100% subsidy	3.548***	3.559***	3.716***	3.728***	5.490***	5.507***
	(0.084)	(0.086)	(0.076)	(0.079)	(0.116)	(0.120)
100% subsidy × Second register	−0.514***	−0.527***	−0.919***	−0.932***	−1.176***	−1.195***
	(0.143)	(0.145)	(0.139)	(0.141)	(0.204)	(0.207)
Second register	−0.140***	−0.135***	−0.043***	−0.043***	−0.114***	−0.111***
	(0.032)	(0.032)	(0.016)	(0.016)	(0.026)	(0.026)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group in Register 1	0.259	0.253	0.071	0.069	0.200	0.196
Mean in 0% subsidy group in Register 2	0.119	0.118	0.027	0.026	0.087	0.085
Adjusted R^2	0.693	0.695	0.702	0.702	0.737	0.737
N	5,972	5,804	5,972	5,804	5,972	5,804

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household and observations are at the household × register level. Coefficients from linear probability models are reported. All regressions use data from the redeemed vouchers database and control for a register dummy identifying which register the information comes from, as well as the stratification variables. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table C2. Price Effects on declared use of mosquito-repellent ointment with survey round interactions

	(1)	(2)	(3)	(4)	(5)	(6)
	Use last 30 days				Use MAÏA last 30 days	
Unit of analysis:	*Household*		*Individual*		*Household*	
50% subsidy	0.237***	0.236***	0.205***	0.199***	0.278***	0.278***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.038)	(0.037)
50% subsidy × Midline 2	0.091***	0.092***	0.110***	0.111***	0.089***	0.089***
	(0.032)	(0.032)	(0.030)	(0.031)	(0.026)	(0.026)
50% subsidy × Endline	0.025	0.027	0.055	0.061*	0.014	0.017
	(0.036)	(0.036)	(0.036)	(0.036)	(0.035)	(0.035)
100% subsidy	0.644***	0.645***	0.636***	0.635***	0.714***	0.715***
	(0.027)	(0.027)	(0.027)	(0.028)	(0.027)	(0.026)
100% subsidy × Midline 2	−0.043	−0.041	−0.018	−0.018	−0.053***	−0.051**
	(0.027)	(0.027)	(0.025)	(0.025)	(0.020)	(0.020)
100% subsidy × Endline	−0.181***	−0.180***	−0.154***	−0.151***	−0.201***	−0.199***
	(0.029)	(0.029)	(0.029)	(0.029)	(0.026)	(0.026)
Midline 2 survey	0.078***	0.077***	0.076***	0.077***	0.087***	0.087***
	(0.025)	(0.026)	(0.022)	(0.022)	(0.018)	(0.018)
Endline survey	0.203***	0.202***	0.144***	0.142***	0.225***	0.224***
	(0.026)	(0.026)	(0.024)	(0.024)	(0.023)	(0.023)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group at Midline 1	0.313	0.312	0.276	0.277	0.240	0.239
Mean in 0% subsidy group at Midline 2	0.391	0.389	0.352	0.354	0.327	0.325
Mean in 0% subsidy group at Endline	0.516	0.514	0.421	0.419	0.466	0.463
Adjusted R^2	0.278	0.287	0.259	0.266	0.322	0.330
N	8,945	8,693	53,946	52,408	8,945	8,693

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is either a household (columns 1, 2, 5, and 6) or an individual (columns 3 and 4) in Panel A, and is restricted to households or individuals living in a household that acquired at least one jar of mosquito-repellent ointment during the intervention period according to the registers in Panel B. Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification variables. Columns 2, 4, and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

D. Main results controlling for social desirability score

Table D1. Price Effects on declared use of mosquito-repellent ointment controlling for social desirability score

	(1)	(2)	(3)	(4)	(5)	(6)
	Use last 30 days				Use MAÏA last 30 days	
Unit of analysis:	*Household*		*Individual*		*Household*	
Panel A. *Analysis not conditional on the acquisition of at least one jar*						
50% subsidy	0.275***	0.276***	0.261***	0.258***	0.312***	0.313***
	(0.030)	(0.029)	(0.029)	(0.028)	(0.032)	(0.031)
100% subsidy	0.569***	0.568***	0.582***	0.581***	0.630***	0.629***
	(0.021)	(0.021)	(0.020)	(0.020)	(0.023)	(0.023)
Social desirability score	0.002	0.001	−0.004	−0.004	0.001	−0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.408	0.407	0.354	0.354	0.345	0.343
Adjusted R^2	0.268	0.278	0.255	0.261	0.313	0.322
N	7,932	7,707	46,915	45,553	7,932	7,707
Panel B. *Analysis conditional on the acquisition of a jar*						
50% subsidy	0.009	0.011	0.036	0.028	0.018	0.020
	(0.022)	(0.022)	(0.028)	(0.027)	(0.025)	(0.025)
100% subsidy	0.154***	0.156***	0.222***	0.215***	0.173***	0.175***
	(0.019)	(0.019)	(0.024)	(0.023)	(0.022)	(0.022)
Social desirability score	−0.002	−0.003	−0.006*	−0.007**	−0.002	−0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.826	0.825	0.715	0.720	0.805	0.806
Adjusted R^2	0.092	0.093	0.093	0.101	0.100	0.101
N	5,180	5,008	31,035	29,956	5,180	5,008

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is either a household (columns 1, 2, 5, and 6) or an individual (columns 3 and 4) in Panel A, and is restricted to households or individuals living in a household that acquired at least one jar of mosquito-repellent ointment during the intervention period according to the registers in Panel B. Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification variables. Columns 2, 4, and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale as in Table 6.

E. Heterogeneous price effects on declared willingness-to-pay

Table E1. Heterogeneous price effects on WTP (unconditional on baseline value)

Outcome:	Willingness-to-pay - Desired price						
Panel A. *Household characteristics at baseline*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
X:	Female	Female head of household	Household head primary education at least	Spouse of household head primary education at least	Household has the habit to shop at the point of sale	Household head present during presentation of the point of sale	Spouse of household head present during presentation of the point of sale
50% subsidy	−31.092**	−28.554*	−17.354	−24.504	−98.033***	−43.544**	−25.018
	(14.976)	(14.520)	(15.564)	(16.619)	(34.006)	(20.866)	(25.668)
100% subsidy	18.686	14.175	20.879	11.800	−29.675	12.304	28.163
	(15.760)	(14.528)	(15.466)	(15.128)	(31.614)	(21.297)	(29.731)
50% subsidy × X	5.812	14.476	−25.475	−3.461	84.013**	25.605	−2.105
	(10.625)	(39.882)	(17.544)	(17.420)	(35.959)	(22.972)	(28.006)
100% subsidy × X	−7.832	6.398	−15.675	1.821	55.077	6.054	−17.426
	(10.261)	(30.065)	(18.534)	(18.305)	(33.533)	(22.895)	(30.878)
X	−27.084***	−7.807	29.258**	31.782**	−58.364**	−36.764**	6.252
	(7.284)	(23.015)	(13.620)	(13.092)	(27.466)	(16.016)	(21.478)
Urban commune	−15.956	−15.731	−17.195	−17.842	−20.963	−16.104	−16.944
	(15.736)	(15.750)	(15.529)	(15.610)	(14.863)	(15.121)	(15.915)
MAIA already present	18.330	18.396	14.641	16.737	21.638	13.374	23.139
	(16.241)	(16.371)	(16.463)	(16.608)	(16.028)	(15.602)	(16.554)
Constant	495.985***	480.896***	469.478***	467.199***	529.299***	503.915***	474.883***
	(11.048)	(10.240)	(10.534)	(11.071)	(26.224)	(15.091)	(20.203)
Mean in 0% subsidy group with X=0	494.324	479.274	466.814	464.388	522.307	501.178	474.896
Mean in 0% subsidy group with X=1	467.306	473.333	495.376	496.293	469.185	464.219	480.053
Adjusted R^2	0.011	0.007	0.009	0.012	0.011	0.011	0.007
N	5,933	5,933	5,931	5,557	5,922	5,922	5,550
Share with X=1	0.566	0.058	0.435	0.455	0.860	0.601	0.861

Panel B. *Prevention behaviors at baseline and locality characteristics*

	(7)	(8)	(9)	(10)	(11)
X:	Used untreated net last rainy season	Used insecticide-treated net last rainy season	Already used mosquito repellent ointment at baseline	Urban locality	MAÏA already sold by the point of sale
50% subsidy	−28.155**	−40.048	−24.480*	−5.456	−31.051*
	(14.160)	(33.945)	(14.580)	(18.165)	(17.272)
100% subsidy	19.167	−8.440	15.699	25.618	11.913
	(14.980)	(23.327)	(13.884)	(15.924)	(16.012)
50% subsidy × X	1.287	13.928	−30.574	−58.852**	13.845
	(31.668)	(32.735)	(29.140)	(28.587)	(28.048)
100% subsidy × X	−29.003	26.591	−8.046	−29.760	10.953
	(24.519)	(23.681)	(31.188)	(30.178)	(32.331)
X	21.680	−14.968	2.196	14.090	10.040
	(19.539)	(19.017)	(24.413)	(22.619)	(24.326)
Urban commune	−16.818	−15.586	−15.659	0.000	−15.683
	(15.805)	(15.793)	(15.766)	(0)	(15.691)
MAIA already present	18.155	17.953	17.841	17.949	0.000
	(16.279)	(16.311)	(16.287)	(15.932)	(0)
Constant	477.347***	493.275***	480.228***	469.436***	482.443***
	(10.703)	(18.525)	(10.130)	(10.459)	(10.788)
Mean in 0% subsidy group with X=0	475.335	491.897	478.511	470.280	479.023
Mean in 0% subsidy group with X=1	497.154	476.697	481.271	493.487	478.747
Adjusted R^2	0.008	0.007	0.008	0.010	0.007
N	5,928	5,928	5,928	5,933	5,933
Share with X=1	0.156	0.871	0.140	0.377	0.234

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from ordinary least squares models are reported. All regressions use endline data and control for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study.

Table E2. Heterogeneous price effects on WTP (conditional on baseline value)

Outcome:	Willingness-to-pay - Desired price						
Panel A. *Household characteristics at baseline*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
X:	Female	Female head of household	Household head primary education at least	Spouse of household head primary education at least	Household has the habit to shop at the point of sale	Household head present during presentation of the point of sale	Spouse of household head present during presentation of the point of sale
Willing price	0.042***	0.046***	0.044***	0.043***	0.046***	0.046***	0.048***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)	(0.014)
50% subsidy	−35.641**	−24.247*	−15.635	−23.733	−76.446**	−33.452	−10.711
	(15.328)	(14.637)	(15.748)	(17.022)	(29.728)	(21.362)	(25.687)
100% subsidy	20.348	20.029	23.995	14.250	0.738	12.940	35.682
	(16.522)	(14.294)	(15.354)	(15.220)	(31.233)	(20.853)	(29.928)
50% subsidy × X	22.064*	28.061	−17.414	4.450	63.266**	16.447	−13.467
	(11.837)	(41.998)	(17.013)	(17.290)	(31.836)	(23.656)	(27.829)
100% subsidy × X	0.414	12.037	−8.386	10.070	25.618	14.180	−18.616
	(10.990)	(32.327)	(17.484)	(18.911)	(32.475)	(22.613)	(30.758)
X	−30.980***	−13.612	17.815	26.430**	−33.279	−30.569*	11.756
	(7.329)	(24.276)	(11.962)	(12.529)	(22.991)	(15.548)	(20.392)
Urban commune	−19.966	−19.847	−20.642	−22.485	−22.814	−20.166	−21.892
	(15.034)	(15.007)	(14.983)	(15.051)	(14.672)	(14.655)	(15.275)
MAIA already present	24.260	24.039	21.558	21.220	26.103	20.198	27.355*
	(15.952)	(15.948)	(16.127)	(16.196)	(16.089)	(15.504)	(16.164)
Constant	470.825***	451.530***	444.897***	442.320***	478.997***	470.493***	440.274***
	(12.637)	(11.030)	(11.509)	(12.172)	(22.352)	(15.231)	(19.786)
Mean in 0% subsidy group with X=0	492.413	474.104	464.066	459.457	497.903	492.916	464.844
Mean in 0% subsidy group with X=1	459.418	462.338	485.411	489.670	467.981	460.625	475.580
Adjusted R^2	0.015	0.012	0.012	0.017	0.014	0.015	0.012
N	5,037	5,037	5,035	4,758	5,027	5,027	4,751
Share with X=1	0.568	0.049	0.457	0.473	0.857	0.594	0.867

Panel B. *Prevention behaviors at baseline and locality characteristics*					
	(7)	(8)	(9)	(10)	(11)
X:	Used untreated net last rainy season	Used insecticide-treated net last rainy season	Already used mosquito repellent ointment at baseline	Urban locality	MAÏA already sold by the point of sale
Willing price	0.047***	0.045***	0.045***	0.044***	0.046***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)
50% subsidy	−22.645	−31.673	−20.563	0.648	−26.536
	(13.912)	(34.809)	(14.654)	(18.774)	(17.343)
100% subsidy	27.438*	−5.417	20.616	30.954*	17.163
	(14.666)	(23.344)	(13.755)	(15.900)	(15.613)
50% subsidy × X	−4.561	9.951	−21.967	−60.250**	14.405
	(31.135)	(33.257)	(27.273)	(28.498)	(29.215)
100% subsidy × X	−42.501*	30.080	−0.570	−27.045	13.665
	(24.348)	(23.023)	(30.362)	(29.511)	(33.423)
X	35.231*	−14.258	−6.472	9.750	14.697
	(18.433)	(17.910)	(22.794)	(20.765)	(23.865)
Urban commune	−21.262	−19.523	−19.659	0.000	−19.739
	(15.062)	(15.091)	(15.027)	(0)	(14.928)
MAIA already present	24.102	23.846	23.772	23.431	0.000
	(15.905)	(15.983)	(15.920)	(15.564)	(0)
Constant	445.263***	463.827***	452.309***	440.645***	453.211***
	(11.071)	(18.831)	(11.004)	(11.701)	(11.307)
Mean in 0% subsidy group with X=0	468.141	486.709	474.409	464.133	472.430
Mean in 0% subsidy group with X=1	501.389	471.344	468.981	488.629	476.891
Adjusted R^2	0.014	0.012	0.012	0.015	0.012
N	5,033	5,033	5,033	5,037	5,037
Share with X=1	0.161	0.868	0.147	0.391	0.244

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from ordinary least squares models are reported. All regressions use endline data and control for the baseline value of the outcome as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study.

Online Appendix

for

Willingness-to-pay for a new mosquito-repellent ointment: Experimental evidence from Burkina Faso

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This version: January 31, 2024

Tables

Table S1. Correlation between the number of vouchers redeemed and information from the registers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Register 1			Register 2			All
	Small jars	Large jars	All	Small jars	Large jars	All	
Series 1 - Small jars	0.805						
Series 1 - Large jars		0.827					
Series 1 - Total			0.831				
Series 2 - Small jars				0.825			
Series 2 - Large jars					0.811		
Series 2 - Total						0.830	
All							0.957

Notes: This table reports the correlation coefficients between the number of redeemed vouchers collected and information from the registers. The unit of analysis is a household from a subsidized group. Register 1 was distributed to points of sale at the same time as the first series of coupons was distributed to households. Register 2 was distributed to points of sale at the same time as the second series of coupons was distributed to households.

Table S2. Price Effects on declared use of mosquito-repellent ointment for alternative recall periods

	(1)	(2)	(3)	(4)
	Use last 7 days		Use yesterday	
Unit of analysis:	*Household*		*Household*	
Panel A. *Analysis not conditional on the acquisition of at least one jar*				
50% subsidy	0.286***	0.287***	0.293***	0.293***
	(0.029)	(0.028)	(0.029)	(0.028)
100% subsidy	0.598***	0.599***	0.613***	0.614***
	(0.021)	(0.021)	(0.021)	(0.020)
Household covariates at baseline		✓		✓
Point of sales covariates		✓		✓
Mean in 0% subsidy group	0.375	0.374	0.358	0.357
Adjusted R^2	0.281	0.288	0.289	0.296
N	8,945	8,693	8,945	8,693
Panel B. *Analysis conditional on the acquisition of a jar*				
50% subsidy	0.024	0.026	0.041*	0.042*
	(0.024)	(0.023)	(0.024)	(0.024)
100% subsidy	0.189***	0.192***	0.215***	0.216***
	(0.021)	(0.021)	(0.022)	(0.022)
Household covariates at baseline		✓		✓
Point of sales covariates		✓		✓
Mean in 0% subsidy group	0.785	0.784	0.757	0.757
Adjusted R^2	0.098	0.100	0.102	0.104
N	5,852	5,657	5,852	5,657

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household (Panel A) or a household that acquired at least one jar of mosquito-repellent ointment during the intervention period according to the registers (Panel B). Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Columns 2 and 4 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table S3. Price Effects on declared use of mosquito-repellent ointment using food consumption score instead of material poverty index

	(1)	(2)	(3)	(4)	(5)	(6)
	Use last 30 days				Use MAÏA last 30 days	
Unit of analysis:	*Household*		*Individual*		*Household*	
50% subsidy	0.275***	0.277***	0.260***	0.259***	0.312***	0.315***
	(0.030)	(0.029)	(0.029)	(0.029)	(0.032)	(0.031)
100% subsidy	0.570***	0.573***	0.580***	0.582***	0.630***	0.633***
	(0.021)	(0.021)	(0.022)	(0.021)	(0.023)	(0.023)
Urban commune	−0.008	−0.001	−0.004	−0.002	−0.013	−0.004
	(0.021)	(0.020)	(0.021)	(0.020)	(0.022)	(0.021)
MAÏA already present	0.013	0.005	0.007	−0.001	−0.003	−0.002
	(0.024)	(0.024)	(0.022)	(0.023)	(0.026)	(0.025)
Midline 2 survey	0.093***	0.094***	0.107***	0.108***	0.098***	0.099***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.010)	(0.010)
Endline survey	0.151***	0.152***	0.112***	0.113***	0.163***	0.163***
	(0.014)	(0.015)	(0.015)	(0.015)	(0.014)	(0.014)
Food consumption score		0.000		0.000		−0.001***
		(0.000)		(0.000)		(0.000)
Household size		0.004		−0.005*		0.003
		(0.003)		(0.003)		(0.003)
At least one episode of malaria last year		0.017		0.011		0.029
		(0.018)		(0.018)		(0.019)
Number of bednets reported		0.012**		0.009		0.014**
		(0.006)		(0.006)		(0.006)
No household member slept under bednet last night		−0.040**		−0.040**		−0.035*
		(0.018)		(0.020)		(0.018)
Used a mosquito repellent ointment last rainy season		0.020		0.019		0.004
		(0.017)		(0.019)		(0.017)
MAÏA is known in the household		0.047**		0.051***		0.042**
		(0.019)		(0.018)		(0.020)
Used an untreated net last rainy season		0.008		0.000		0.009
		(0.020)		(0.019)		(0.021)
Used a treated net last rainy season		0.004		−0.018		0.005
		(0.021)		(0.020)		(0.021)
Female household head		−0.009		−0.010		−0.005
		(0.022)		(0.026)		(0.021)
Age in years of household head		0.000		−0.001		0.000
		(0.001)		(0.001)		(0.001)
Very good or good household head health status		0.023		0.019		0.023
		(0.019)		(0.019)		(0.019)
Household head attended primary school at least		0.012		0.006		0.007
		(0.013)		(0.013)		(0.013)
Distance to MAÏA point of sale in meters		0.000**		0.000		0.000*
		(0.000)		(0.000)		(0.000)
Constant	0.325***	0.293***	0.276***	0.351***	0.263***	0.249***
	(0.025)	(0.052)	(0.025)	(0.051)	(0.026)	(0.054)
Mean in 0% subsidy group	0.406	0.405	0.349	0.349	0.344	0.343
Adjusted R^2	0.271	0.280	0.253	0.260	0.314	0.322
N	8,945	8,693	53,946	52,435	8,945	8,693

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is either a household (columns 1, 2, 5, and 6) or an individual (columns 3 and 4). Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Columns 2, 4, and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale as in Table 6.

Table S4. Price Effects on declared use of mosquito-repellent ointment using Household Food Insecurity Access Scale (HFIAS) score instead of material poverty index

	(1)	(2)	(3)	(4)	(5)	(6)
	Use last 30 days				Use MAÏA last 30 days	
Unit of analysis:	*Household*		*Individual*		*Household*	
50% subsidy	0.275***	0.277***	0.260***	0.259***	0.312***	0.315***
	(0.030)	(0.029)	(0.029)	(0.029)	(0.032)	(0.031)
100% subsidy	0.570***	0.573***	0.580***	0.581***	0.630***	0.632***
	(0.021)	(0.021)	(0.022)	(0.021)	(0.023)	(0.023)
Urban commune	−0.008	−0.001	−0.004	−0.003	−0.013	−0.005
	(0.021)	(0.020)	(0.021)	(0.020)	(0.022)	(0.021)
MAÏA already present	0.013	0.002	0.007	−0.004	−0.003	−0.009
	(0.024)	(0.024)	(0.022)	(0.022)	(0.026)	(0.026)
Midline 2 survey	0.093***	0.094***	0.107***	0.108***	0.098***	0.099***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.010)	(0.010)
Endline survey	0.151***	0.152***	0.112***	0.113***	0.163***	0.164***
	(0.014)	(0.015)	(0.015)	(0.015)	(0.014)	(0.014)
Household Food Insecurity Access Scale (HFIAS) score		−0.002		−0.001		0.000
		(0.001)		(0.001)		(0.001)
Household size		0.005*		−0.005*		0.003
		(0.003)		(0.003)		(0.003)
At least one episode of malaria last year		0.016		0.009		0.025
		(0.018)		(0.018)		(0.019)
Number of bednets reported		0.011*		0.008		0.014**
		(0.006)		(0.006)		(0.006)
No household member slept under bednet last night		−0.039**		−0.039**		−0.034*
		(0.018)		(0.020)		(0.018)
Used a mosquito repellent ointment last rainy season		0.018		0.017		0.000
		(0.017)		(0.018)		(0.017)
MAÏA is known in the household		0.044**		0.048***		0.036*
		(0.019)		(0.018)		(0.020)
Used an untreated net last rainy season		0.009		0.000		0.008
		(0.020)		(0.018)		(0.021)
Used a treated net last rainy season		0.005		−0.017		0.006
		(0.021)		(0.019)		(0.021)
Female household head		−0.006		−0.008		−0.001
		(0.022)		(0.026)		(0.021)
Age in years of household head		0.000		−0.001		0.000
		(0.001)		(0.001)		(0.001)
Very good or good household head health status		0.017		0.016		0.018
		(0.019)		(0.019)		(0.019)
Household head attended primary school at least		0.008		0.003		0.000
		(0.013)		(0.013)		(0.013)
Distance to MAÏA point of sale in meters		0.000**		0.000		0.000
		(0.000)		(0.000)		(0.000)
Constant	0.325***	0.294***	0.276***	0.342***	0.263***	0.219***
	(0.025)	(0.050)	(0.025)	(0.049)	(0.026)	(0.053)
Mean in 0% subsidy group	0.406	0.405	0.349	0.349	0.344	0.343
Adjusted R^2	0.271	0.280	0.253	0.260	0.314	0.321
N	8,945	8,693	53,946	52,435	8,945	8,693

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is either a household (columns 1, 2, 5, and 6) or an individual (columns 3 and 4). Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Columns 2, 4, and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale as in Table 6.

Table S5. Price Effects on presence of mosquito-repellent ointment jars in household (using presence of jars observed during the survey instead of data from the registers)

	(1)	(2)	(3)	(4)	(5)	(6)
	Any jar		Any small jar		Any large jar	
50% subsidy	0.333***	0.337***	0.182***	0.181***	0.311***	0.315***
	(0.031)	(0.030)	(0.028)	(0.026)	(0.023)	(0.022)
100% subsidy	0.679***	0.681***	0.610***	0.611***	0.870***	0.872***
	(0.022)	(0.022)	(0.023)	(0.022)	(0.012)	(0.012)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.292	0.290	0.238	0.236	0.073	0.072
Adjusted R^2	0.345	0.354	0.268	0.274	0.527	0.531
N	8,505	8,268	8,505	8,268	8,505	8,268

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household. Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table S6. Price Effects on presence of mosquito-repellent ointment jars in household with missing values at the endline survey (using presence of jars observed during the survey instead of data from the registers)

	(1)	(2)	(3)	(4)	(5)	(6)
	Any jar		Any small jar		Any large jar	
50% subsidy	0.302***	0.304***	0.153***	0.152***	0.314***	0.318***
	(0.029)	(0.028)	(0.027)	(0.026)	(0.023)	(0.023)
100% subsidy	0.596***	0.599***	0.547***	0.550***	0.843***	0.846***
	(0.021)	(0.021)	(0.023)	(0.022)	(0.013)	(0.013)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.347	0.345	0.283	0.280	0.087	0.086
Adjusted R^2	0.357	0.364	0.255	0.261	0.517	0.521
N	7,877	7,654	7,877	7,654	7,877	7,654

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household. Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table S7. Price Effects on the number of mosquito-repellent ointment jars present in household (using presence of jars observed during the survey instead of data from the registers)

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of jars		Number of small jars		Number of large jars	
50% subsidy	0.796***	0.803***	0.346***	0.347***	0.450***	0.457***
	(0.064)	(0.062)	(0.044)	(0.042)	(0.036)	(0.036)
100% subsidy	4.143***	4.147***	1.830***	1.832***	2.313***	2.316***
	(0.129)	(0.126)	(0.072)	(0.070)	(0.062)	(0.062)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.412	0.408	0.321	0.318	0.092	0.090
Adjusted R^2	0.503	0.511	0.353	0.361	0.534	0.540
N	8,505	8,268	8,505	8,268	8,505	8,268

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household. Coefficients from ordinary least squares models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table S8. Price Effects on the number of mosquito-repellent ointment jars present in household with missing values at the endline survey (using presence of jars observed during the survey instead of data from the registers)

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of jars		Number of small jars		Number of large jars	
50% subsidy	0.716***	0.723***	0.286***	0.287***	0.430***	0.436***
	(0.059)	(0.057)	(0.042)	(0.040)	(0.037)	(0.036)
100% subsidy	3.944***	3.953***	1.705***	1.710***	2.238***	2.243***
	(0.127)	(0.125)	(0.071)	(0.069)	(0.062)	(0.062)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	0.489	0.485	0.381	0.377	0.109	0.107
Adjusted R^2	0.499	0.507	0.348	0.356	0.529	0.534
N	7,877	7,654	7,877	7,654	7,877	7,654

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household. Coefficients from ordinary least squares models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table S9. Price Effects on declared use of mosquito-repellent ointment for alternative recall periods with survey round interactions

	(1)	(2)	(3)	(4)
	Use last 7 days		Use yesterday	
Unit of analysis:	*Household*		*Household*	
50% subsidy	0.246***	0.245***	0.260***	0.259***
	(0.038)	(0.037)	(0.037)	(0.037)
50% subsidy × Midline 2	0.095***	0.096***	0.084**	0.084**
	(0.032)	(0.032)	(0.032)	(0.032)
50% subsidy × Endline	0.028	0.029	0.016	0.016
	(0.037)	(0.038)	(0.038)	(0.038)
100% subsidy	0.656***	0.656***	0.671***	0.672***
	(0.027)	(0.027)	(0.026)	(0.026)
100% subsidy × Midline 2	−0.037	−0.035	−0.043	−0.042
	(0.026)	(0.027)	(0.027)	(0.027)
100% subsidy × Endline	−0.137***	−0.137***	−0.131***	−0.131***
	(0.029)	(0.029)	(0.028)	(0.029)
Midline 2 survey	0.073***	0.072***	0.080***	0.080***
	(0.025)	(0.025)	(0.026)	(0.026)
Endline survey	0.151***	0.151***	0.141***	0.140***
	(0.026)	(0.026)	(0.025)	(0.025)
Household covariates at baseline		✓		✓
Point of sales covariates		✓		✓
Mean in 0% subsidy group at Midline 1	0.301	0.300	0.285	0.283
Mean in 0% subsidy group at Midline 2	0.373	0.372	0.364	0.364
Mean in 0% subsidy group at Endline	0.451	0.450	0.425	0.424
Adjusted R^2	0.286	0.293	0.293	0.300
N	8,945	8,693	8,945	8,693

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the enumeration area level are in parentheses. The unit of analysis is a household (Panel A) or a household that acquired at least one jar of mosquito-repellent ointment during the intervention period according to the registers (Panel B). Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Columns 2 and 4 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table S10. Price effects on individual declared use of mosquito-repellent ointment (clustering the SE at the household level)

Outcome:	Individual use last 30 days			
	(1)	(2)	(3)	(4)
X:	Under-5 children	Female	Pregnant	Malaria episode last rainy season
50% subsidy	0.258***	0.263***	0.271***	0.256***
	(0.018)	(0.018)	(0.019)	(0.020)
100% subsidy	0.584***	0.583***	0.593***	0.581***
	(0.013)	(0.014)	(0.014)	(0.015)
50% subsidy × X	0.024**	0.001	−0.072	0.011
	(0.011)	(0.012)	(0.047)	(0.021)
100% subsidy × X	0.008	0.005	−0.055	0.004
	(0.009)	(0.009)	(0.038)	(0.015)
X	0.016**	0.022***	0.010	0.014
	(0.008)	(0.008)	(0.033)	(0.014)
Mean in 0% subsidy group				
Mean in 0% subsidy group with X=0	0.350	0.343	0.362	0.344
Mean in 0% subsidy group with X=1	0.366	0.365	0.373	0.357
Adjusted R^2	0.264	0.263	0.268	0.256
N	52,751	52,934	12,628	50,045
Share with X=1	0.258	0.526	0.080	0.513

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the household level are in parentheses. The unit of analysis is an individual (columns 1, 2, and 4) or a female between 15 and 49 years old (column 3). Coefficients from linear probability models are reported. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study.

Table S11. Price Effects on declared willingness-to-pay for mosquito-repellent ointment (clustering the SE at the household level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Minimum price		Maximum price		Desired price	
Panel A. *Analysis not conditional on baseline willingness-to-pay*						
50% subsidy	-27.545^{***}	-27.951^{***}	-31.785^{*}	-33.696^{*}	-27.794^{***}	-29.172^{***}
	(6.717)	(6.653)	(18.953)	(19.887)	(8.880)	(8.899)
100% subsidy	11.004^{*}	11.745^{*}	6.668	6.586	14.492^{*}	14.580^{*}
	(6.628)	(6.594)	(16.201)	(16.101)	(8.664)	(8.708)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	408.198	407.609	690.497	689.315	478.957	478.673
Adjusted R^2	0.010	0.035	0.002	0.009	0.007	0.022
N	5,944	5,775	5,948	5,780	5,933	5,764
Panel B. *Analysis conditional on baseline willingness-to-pay*						
50% subsidy	-26.373^{***}	-25.322^{***}	-14.733	-13.063	-22.954^{**}	-22.583^{**}
	(6.767)	(6.813)	(19.812)	(21.249)	(8.908)	(8.902)
100% subsidy	14.105^{**}	15.406^{**}	24.596	25.050	20.569^{**}	21.635^{**}
	(6.684)	(6.716)	(16.493)	(16.476)	(8.632)	(8.736)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	406.627	405.466	679.338	676.977	473.561	472.599
Adjusted R^2	0.021	0.036	0.004	0.009	0.012	0.025
N	5,062	4,943	5,060	4,941	5,037	4,918

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the household level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from ordinary least squares models are reported. All regressions use endline data and control for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Panel B also controls for the baseline value of the outcome. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

Table S12. Effect of acquisition measured by information from the registers on declared willingness-to-pay for mosquito-repellent ointment (2SLS) (clustering the SE at the household level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Minimum price		Maximum price		Desired price	
Panel A. *Analysis not conditional on baseline willingness-to-pay*						
Number of vouchers redeemed (sum 1 for large jars, 0.5 for small)	2.278***	2.362***	1.969	2.022	2.659***	2.707***
	(0.616)	(0.616)	(1.617)	(1.625)	(0.816)	(0.819)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	408.198	407.609	690.497	689.315	478.957	478.673
Kleibergen-Paap F-Statistic	6324.688	5996.319	6346.469	6016.886	6347.779	6022.966
N	5,944	5,775	5,948	5,780	5,933	5,764
Panel B. *Analysis conditional on baseline willingness-to-pay*						
Number of vouchers redeemed (sum 1 for large jars, 0.5 for small)	2.559***	2.653***	3.248*	3.227*	3.125***	3.218***
	(0.631)	(0.634)	(1.737)	(1.757)	(0.832)	(0.840)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	406.627	405.466	679.338	676.977	473.561	472.599
Kleibergen-Paap F-Statistic	6066.557	5876.516	6084.642	5896.967	6097.092	5912.610
N	5,062	4,943	5,060	4,941	5,037	4,918

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the household level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from two-stage least squares models are reported. All regressions use endline data and control for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Panel B also controls for the baseline value of the outcome. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

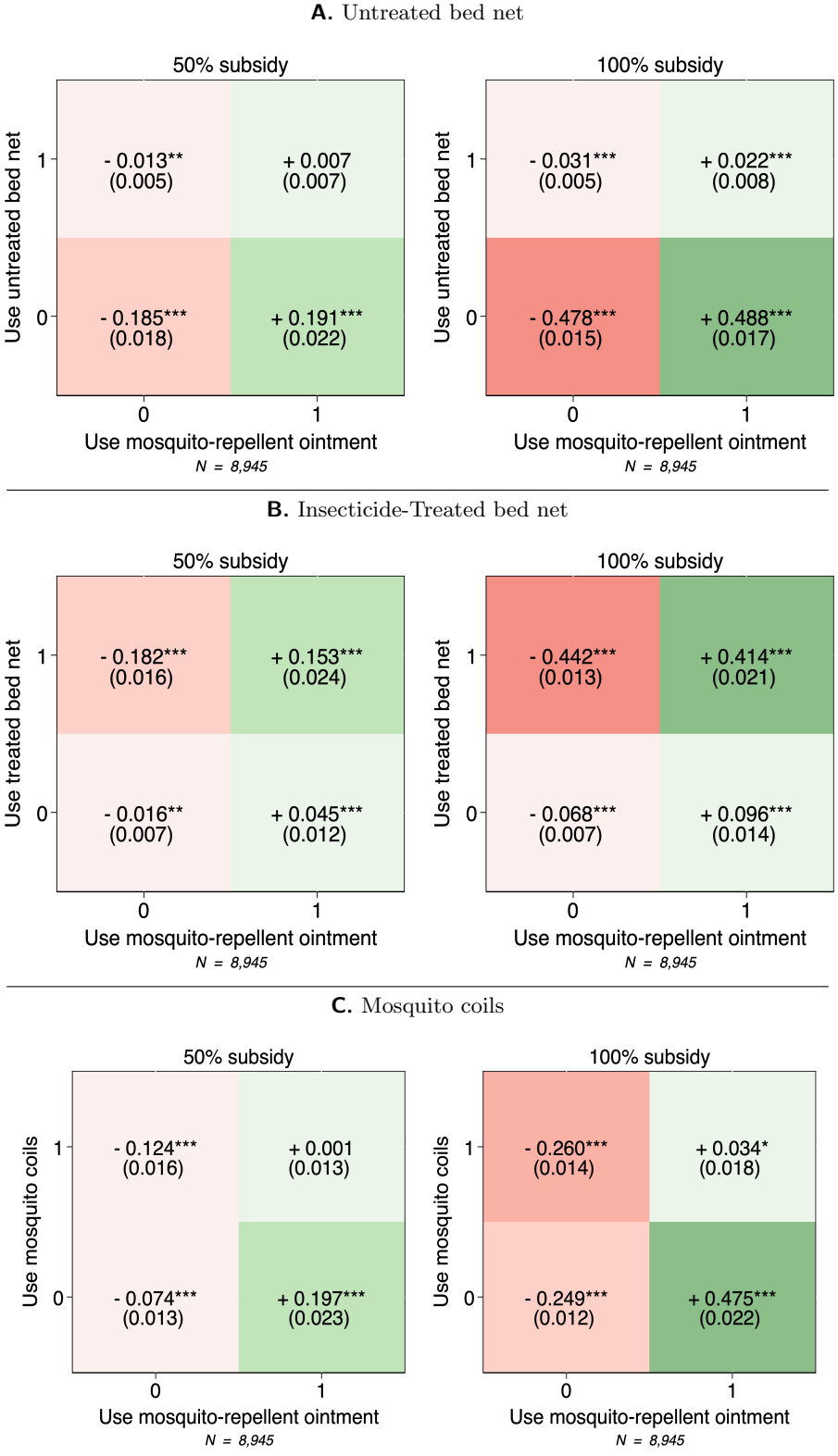
Table S13. Effect of acquisition measured by declared usage on declared willingness-to-pay for mosquito-repellent ointment (2SLS) (clustering the SE at the household level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Minimum price		Maximum price		Desired price	
Panel A. *Analysis not conditional on baseline willingness-to-pay*						
Use last 30 days at each wave	23.139**	24.152***	17.604	17.823	28.178**	28.416**
	(9.008)	(8.932)	(22.534)	(22.335)	(11.828)	(11.807)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	408.198	407.609	690.497	689.315	478.957	478.673
Kleibergen-Paap F-Statistic	1050.632	1044.125	1048.687	1042.430	1047.505	1041.102
N	5,944	5,775	5,948	5,780	5,933	5,764
Panel B. *Analysis conditional on baseline willingness-to-pay*						
Use last 30 days at each wave	26.806***	28.483***	39.554*	39.816*	35.394***	36.803***
	(9.126)	(9.128)	(23.358)	(23.315)	(11.835)	(11.912)
Household covariates at baseline		✓		✓		✓
Point of sales covariates		✓		✓		✓
Mean in 0% subsidy group	406.627	405.466	679.338	676.977	473.561	472.599
Kleibergen-Paap F-Statistic	1033.492	1023.906	1023.131	1015.219	1031.702	1024.031
N	5,062	4,943	5,060	4,941	5,037	4,918

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the household level are in parentheses. The unit of analysis is a parent of an under-five children. Coefficients from two-stage least squares models are reported. All regressions use endline data and control for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. Panel B also controls for the baseline value of the outcome. Columns 2, 4 and 6 additionally control for household characteristics observed at baseline and characteristics of the point of sale.

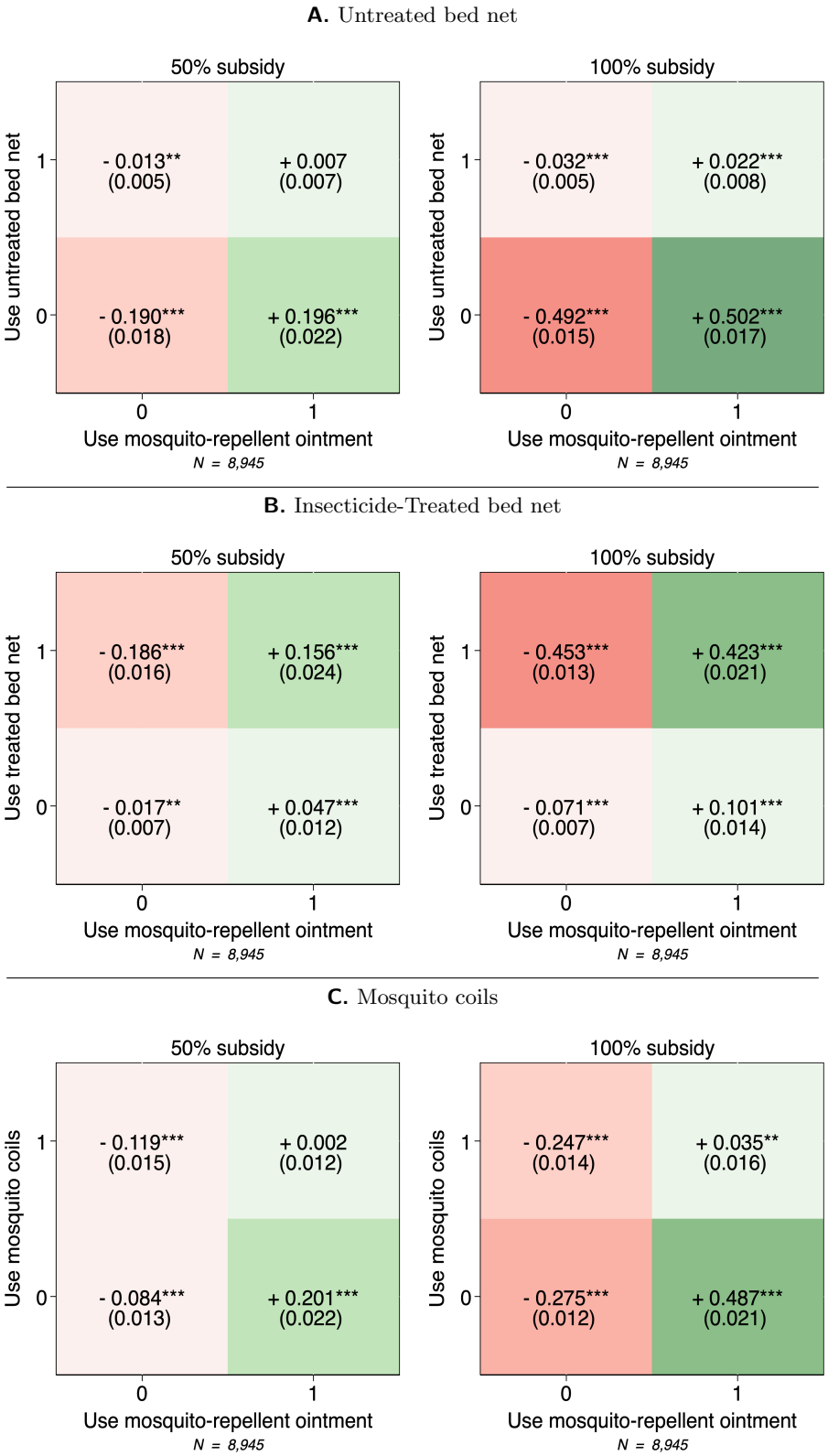
Figures

Figure S1. Bivariate Probit estimates of complementarity and substitution effects with other prevention tools over the last 7 days



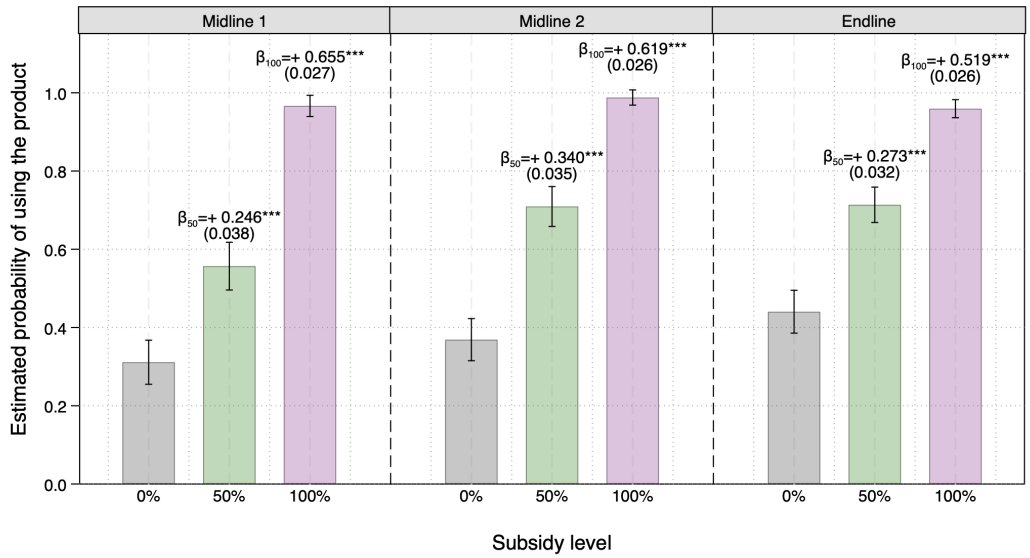
Notes: These matrices represent the marginal effects obtained from bivariate probit estimation of the effect of each subsidy level on the use of a mosquito-repellent ointment and of another prevention tool over the last 7 days. Standard errors clustered at the enumeration area level are in parentheses. Each panel corresponds to a single bivariate probit estimation. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study.

Figure S2. Bivariate Probit estimates of complementarity and substitution effects with other prevention tools the day before the interview



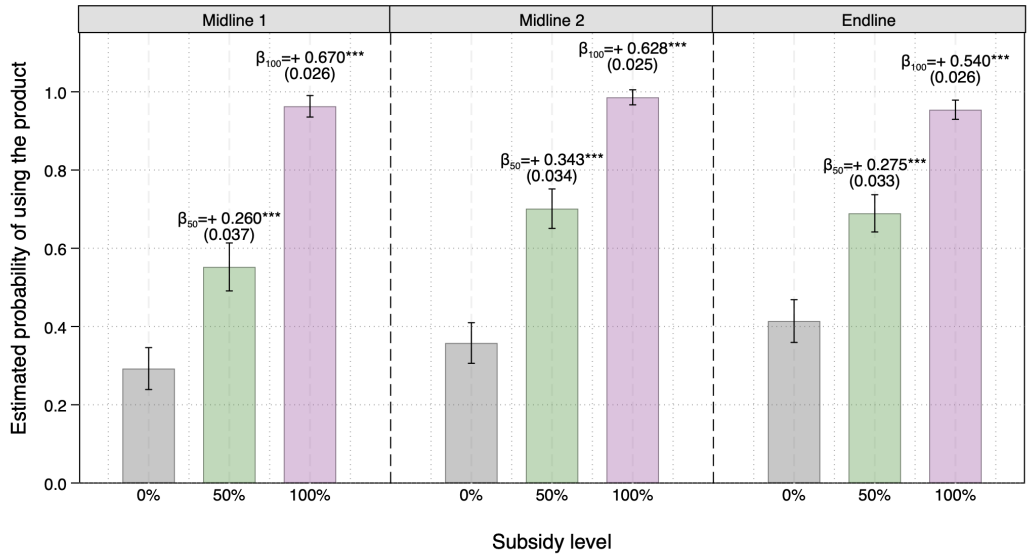
Notes: These matrices represent the marginal effects obtained from bivariate probit estimation of the effect of each subsidy level on the use of a mosquito-repellent ointment and of another prevention tool the day before the interview. Standard errors clustered at the enumeration area level are in parentheses. Each panel corresponds to a single bivariate probit estimation. All regressions use pooled data and control for survey round dummies, as well as for the stratification characteristics used in the randomization process, namely the urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study.

Figure S3. Price Effects on declared use of mosquito-repellent ointment last 7 days by survey round



Notes: These estimations replicate column 1 of Table 6 by survey wave, controlling for urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. The figure shows the point estimates of β_{50} and β_{100} along with the estimated conditional proportions of households declaring that they used a mosquito-repellent ointment during the last 7 days. Standard errors clustered at the enumeration area level are in parentheses.

Figure S4. Price Effects on declared use of mosquito-repellent ointment yesterday by survey round



Notes: These estimations replicate column 1 of Table 6 by survey wave, controlling for urban status of the locality and a dummy for whether MAÏA was already sold by the point of sale before the study. The figure shows the point estimates of β_{50} and β_{100} along with the estimated conditional proportions of households declaring that they used a mosquito-repellent ointment the day before the survey. Standard errors clustered at the enumeration area level are in parentheses.