DEMAND FOR DRUGS FOR CHILDHOOD MALARIA IN RURAL MOZAMBIQUE

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Outline

- Introduction: Context & Objectives.
- Methods: Study design & Model specification.
  - Wealth Indicator in low-income countries.
- Results: Outcomes and Demand.
- Discussion and conclusions.

Introduction: context

- Malaria: infectious disease transmitted by mosquitoes.
- Treatment: *Artemisinin-based Combination therapy* (ACT). High quality but fairly expensive.
- Market failures for ACTs:
  - Supply: limited availability and unknown quality.
  - Demand: lack of information and low access.

Introduction: objectives

1. Estimate willingness-to-pay (WTP) for ACTs in children.

2. Quantify financial gaps to improve market for ACTs.

3. Evaluate determinants of the demand for treatment.

Introduction: Manhiça

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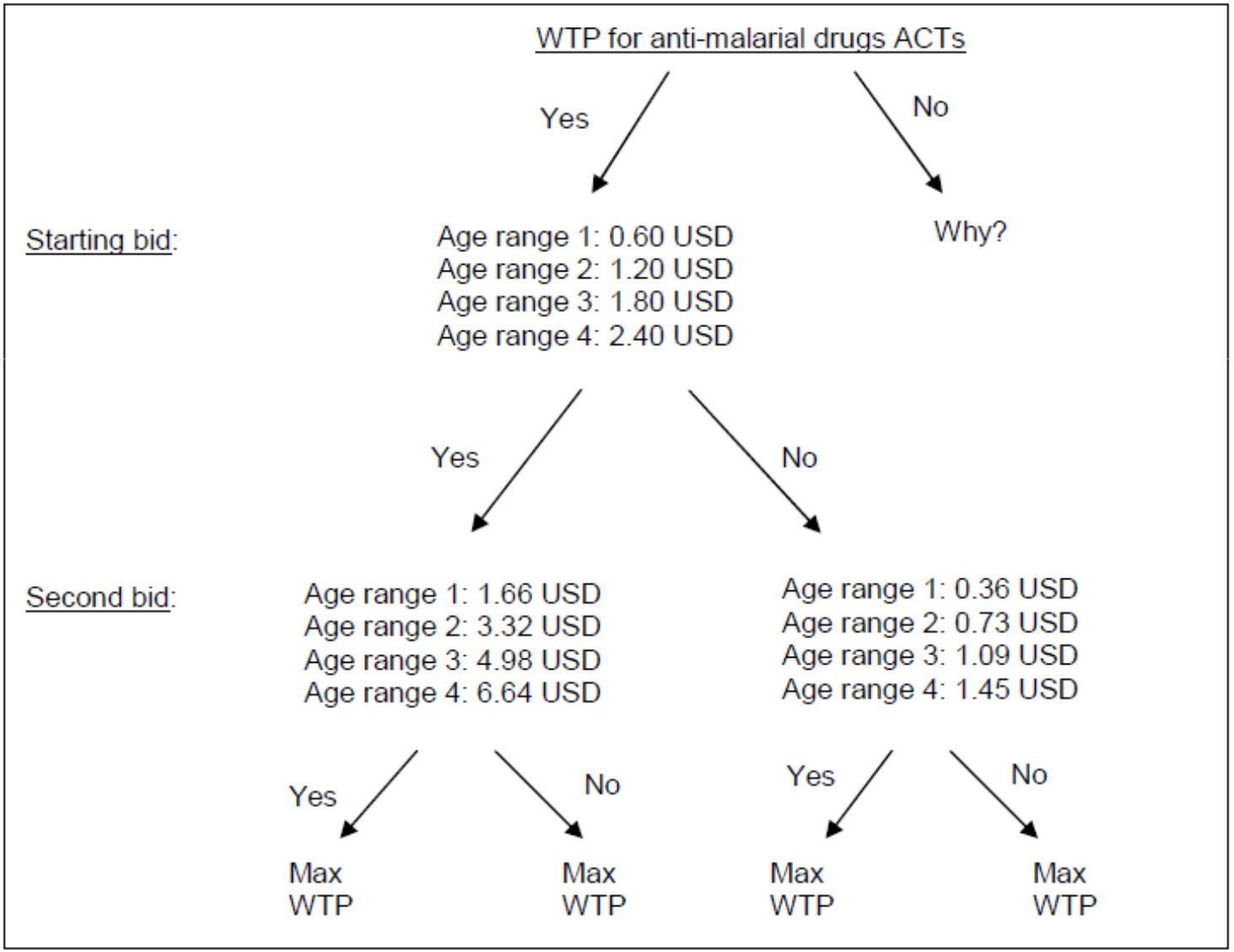
Methods: study design

- Survey carried out (N=**399**) assessing WTP among children with malaria.
- Date: 15th Feb – 11th Apr 2012 (high malaria season).
- Wealth indicator: Multiple correspondence analysis.
- Merging: WTP, Outpatient visits and DSS data.

Methods: bidding game



Methods: specification

- Dependent variable: Willingness-to-pay (WTP)
  - Hypothetical WTP: Highest hypothetical value to pay.
  - Stated WTP: Max. value willing to pay.

- Regression analysis:
  - Count data: coefficients expressed as *incidence rate ratios* (IRR).
  - OLS: log transforming depending variable.

$$lnWTP_i\big(E(WTP|\boldsymbol{x})\big) = \beta_0 + \beta_1 Age_i + \beta_2 Malaria_i + \beta_3 Other\ outpatients + \beta_4 HHMembers_i +$$
$$+\beta_5 Gender_i + \beta_6 Wealth_i + \beta_7 Head\ occupation_i + \beta_8 Head\ education_i + \beta_9 Region_i +$$
$$+\beta_{10} Interviewed_i + \beta_{11} Malariasiblings_i + \beta_{12} Other\ outpatients\ siblings_i$$

Methods: study design

BASETMR (household id)

WTP DB (master)

HABIT (demographic info)

```
*Reshaping basetmr and constructing n_agre in order to locate the current agregado of individua.
use basetmr, replace
local creation = creation[1]
keep perm_id date_birth region family ini_date exit_date
gen str n_agre = region + "-" + family
drop region family
sort perm_id ini_date
by perm_id: gen t=_n
sum t
local max = r(max)
reshape wide ini_date exit_date n_agre, i(perm_id) j(t)
forvalues k=1/`max' {
    replace exit_date`k' = `creation' if ini_date`k' != . & exit_date`k' == .
}
tempfile intervals
save `intervals', replace
*Catching current n_agre from basetmr (to Malmarket database):
use WTP_Sergi, replace
merge m:1 perm_id using `intervals', keepusing(n_agre* ini_date* exit_date*) keep(match master)

gen str n_agre = ""
forvalues k=1/`max' {
 replace n_agre = n_agre`k' if ini_date`k' <= date_interview & date_interview <= exit_date`k'
}
forvalues k=1/`max' {
    drop ini_date`k' exit_date`k' n_agre`k'
}
drop _merge
```

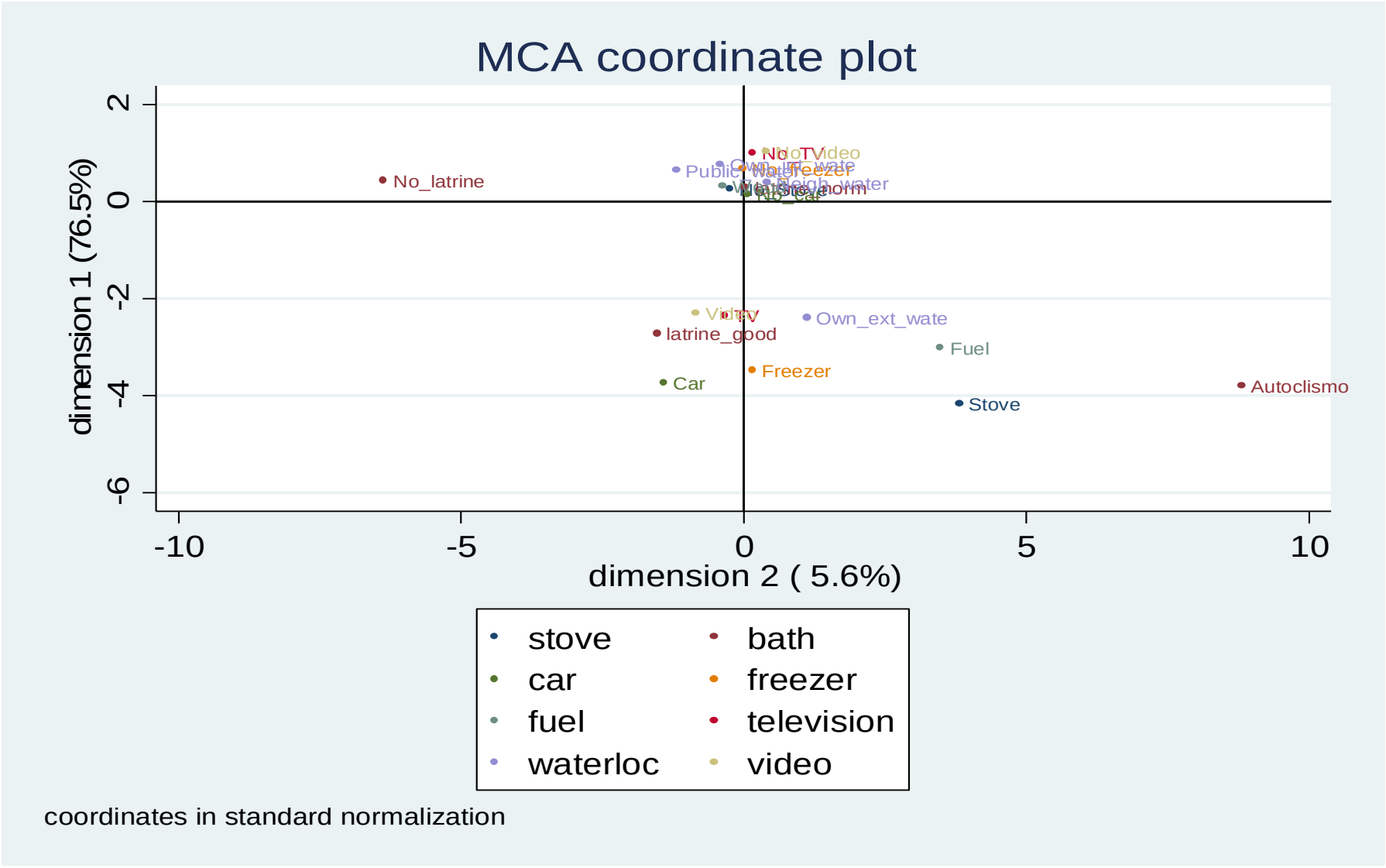
Wealth Index using MCA

- Multiple Correspondence Analysis (MCA):
  - Preferred to Principal Component Analysis (PCA). MCA allows for categorical variables.
  - Data reduction technique to generate a set of uncorrelated principal components.
  - 1st dimension usually used to define a wealth index, but other dimensions may imply other socio-economic indicators.
  - Usually allows a graphical representation for different indicators.
  - Stata uses similar commands for both methodologies:

```
*PRINCIPAL COMPONENT ANALYSIS:
pca t_const kitchen bath fuel divhouse water waterloc electric
predict score, score
xtile ses = score, nq(3)

*MULTIPLE CORRESPONDENCE ANALYSIS:
mca t_const kitchen bath fuel divhouse water waterloc electric
estat coordinates, norm(principal)
predict score, norm(principal)
xtile ses = score, nq(3)
mcaplot, overlay legend(off) xline(0) yline(0) scale(.8) msize(0.5)
```

MCA graphical representation



coordinates in standard normalization

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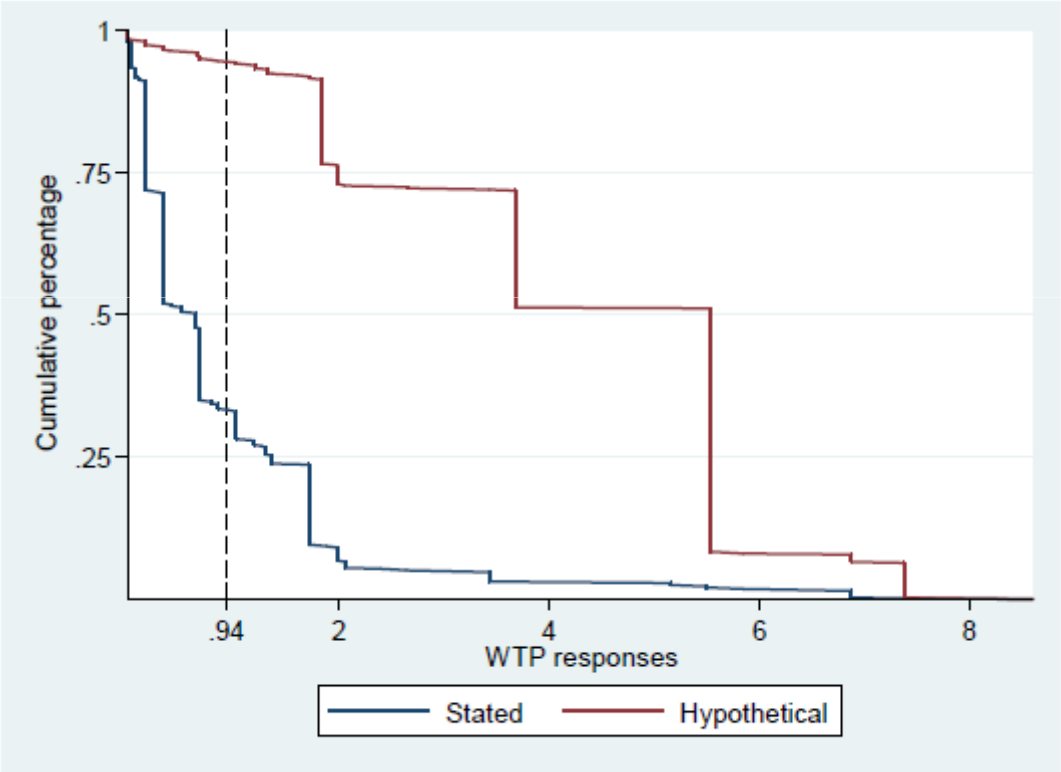
Results

Characteristics	**(%)**			
Gender	Boys (**54.9%**)	Girls (**45.1%**)		
Age	0-2 years (**19.8%**)	2-5 years (**24.1%**)	5-12 years (**50.1%**)	+12 years (**8.0%**)
Head occupation	Agriculture (**33.8%**)	Manufacture & Mining (**39.1%**)		Sales & services (**27.1%**)
Head education	None (**19.7%**)	Literate (**2.6%**)	Primary school (**67.2%**)	High /higher school (**10.4%**)

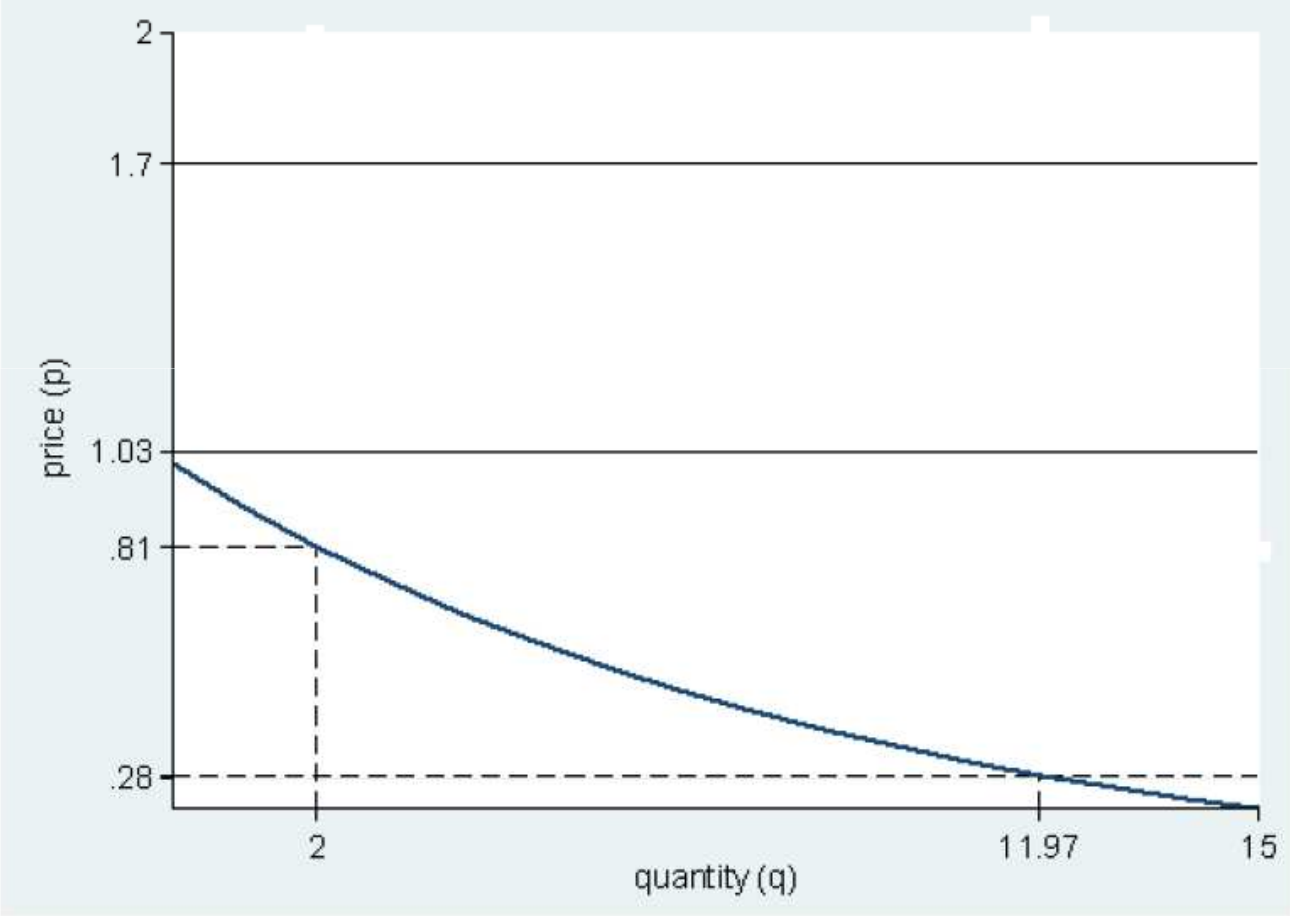
Variable	**Obs.**	**Mean (S.D.)**	**Median (Min – Max)**
Hypothetical WTP	399	4.17 (1.93)	5.53 (0 – 8.60)
Stated WTP	399	0.94 (1.22)	0.65 (0 – 8.60)
High subsidy	399	3.80 (1.85)	3.96 (0 – 7.57)
Median subsidy	399	0.96 (0.78)	1.02 (0 – 2.74)
Low subsidy	399	0.46 (0.48)	0.24 (0 – 1.66)

Results: WTP outcomes



Variables		**Poisson** (N=380)	**Negative Binomial** (N=380)	**OLS** (N=380)
AGE	2-5 years	1.582 (0.301)**	1.572 (0.325)**	0.098 (0.074)
(base: 0-2 years)	5-12 years	1.584 (0.287)**	1.558 (0.305)**	0.113 (0.069)
	≥ 12 years	1.148 (0.320)	1.146 (0.346)	0.019 (0.108)
# EPISODES OF MALARIA		0.899 (0.046)**	0.902 (0.051)*	-0.035 (0.021)*
# OTHER OUTPATIENT VISITS		1.008 (0.037)	1.007 (0.041)	-0.007 (0.015)
GENDER (base: male)	Female	1.130 (0.124)	1.124 (0.136)	0.038 (0.047)
WEALTH STATUS	T2 (poor)	0.743 (0.109)**	0.744 (0.121)*	-0.115 (0.063)*
(base: T1, the most poor)	T3 (least poor)	0.966 (0.135)	0.952 (0.148)	-0.034 (0.064)
HEAD OCCUPATION	Manufacturing & mining	1.292 (0.193)*	1.303 (0.215)	0.118 (0.062)*
(base: agriculture)	Sales & other services	1.409 (0.227)**	1.421 (0.255)**	0.144 (0.070)**
HEAD EDUCATION	Literate	1.085 (0.369)	1.058 (0.408)	0.042 (0.155)
(base: no education)	Primary school	0.946 (0.162)	0.941 (0.177)	-0.049 (0.700)
	High school	0.906 (0.238)	0.906 (0.262)	-0.040 (0.111)
	Higher education	1.106 (0.378)	0.953 (0.395)	-0.122 (0.169)
CONSTANT		0.720 (0.219)	0.733 (0.247)	0.505 (0.125)***
	Alpha	-	-0.214 (0.334)***	-
	LR Chi-squared	41.25	32.81	-
	F statistic	-	-	1.28

Results: demand



Discussion/Conclusion

1. Mean WTP=0.94 USD/treat episode. Lower WTP than for prevention (WTP=2.97 USD/bednet).

2. Important gap between ACT price and WTP. Financial need: subsidy of at least 0.46 USD/episode.

3. Significant WTP determinants: age, number of malaria episodes, wealth and household head occupation.

4. Need to improve market demand.

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THANK YOU!

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