

# Free Distribution or Cost-Sharing ?: Evidence from a Randomized Malaria Prevention Experiment

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# Subsidizing Public Goods

- Generally accepted that products with positive health externalities (e.g. vaccines) should be publicly-funded
- I confer benefit to others by getting the vaccine, but I don't take that value into account when I decide if I want it or not
  - Implies that demand for public health products too low
- Public finance theory: government should subsidize the product to increase demand and thus social welfare

# How should we price public health products?

- How much should it be subsidized?
  - “Optimal” subsidy depends on private costs/benefits relative to social benefit
- Figuring out the “correct” subsidy, when possible, is time-consuming and expensive
- So with most public health products, use rules of thumb and trial/error for pricing...

# Free Distribution vs. Cost-Sharing

- Two common models for public health programs in Africa are full-subsidization (zero financial price) and moderate cost-sharing (user fees)
- Arguments for and against both of these models have been advanced

# Example: ITNs

- Public health product (used to prevent malaria) w/ private benefits and proven externality
  - Sleeping under ITN repeatedly been shown to be highly effective at preventing infant mortality, maternal anemia and poor birth outcomes
  - Helps avert substantial direct and indirect costs of malaria on lost income
  - Health benefits of ITNs for non-users as long as enough users in vicinity
  - Rand. trial in Kenya shows that impact of ITNs on child mortality, etc. was as strong in control villages w/in 300m of covered villages as in covered themselves (Gimnig 2003, Hawley 2003)

# ITNs (Cont.)

- ITNs cost about \$6 in Kenya (vs. \$360 GDP/cap)
- Many of the most vulnerable populations (esp. pregnant women & children in rural areas) cannot afford
- General consensus that ITNs should be subsidized...but how much?
  - Distribution to vulnerable populations has primarily taken the form of free distribution and cost-sharing

# Arguments for Cost-Sharing: Sustainability

- Cost-recovery allows program to be run longer, be taken up by communities with limited budgets
- Allows potential retail sector to emerge/persist
  - Some populations can afford to pay more
- What if donor money dries up or government initiative goes elsewhere?

# Arguments for Cost-Sharing:

## Usage Intensity & Need

- Selection: positive prices induce selection of people who value the product more/are more likely to use it
- Psychological: paying more may *induce* usage
  - Sunk Cost Effect/Cognitive Dissonance
  - Prices act as signal of importance or quality
- Similar argument about need: those willing to pay more are probably sicker (more vulnerable to malaria) and more in need of ITN
- Are resources wasted on those receiving ITNs free?  
Are those that pay more likely to use it and need it?

# Arguments for Full Subsidization:

## Demand and Externality

- Coverage may be much lower under cost-sharing than free distribution
- Some evidence that the elasticity of demand near zero price is large (Kremer and Miguel 2007)
- Change in demand may overwhelm the benefits coming from positive selection
- Even if higher prices induce selection of people more likely to need & use, what happens to “effective coverage”?
- Effective coverage is particularly important w/ ITNs because of the form of the externality: 50% coverage necessary for strong social benefits to emerge

# Arguments for Full Subsidization: Willingness vs. Ability to Pay

- Rather than screening out people who value the product less, positive price might just screen out those who can't afford it
  - Particularly problematic in context of credit constraints & gender inequality in control of household resources
- If ability to pay negatively correlated with health, positive price may screen out those who value the product most and would use it more intensively
- Subsidy for ITNs has to be low enough to discourage those w/ low valuation from getting it, but high enough for those who value it but cannot afford

# Our Approach: Randomized Trial with ITNs

- Field experiment in Western Kenya (4 districts), area of endemic malaria
- Randomized price at which prenatal clinics (20 of them) could sell LL ITNs to pregnant women
- 4 **control** clinics, 5 clinics **0Ksh**, 5 clinics **10Ksh** (\$.15), 3 clinics **20Ksh**, 3 clinics **40Ksh** (90% subsidy)
  - Highest price is \$0.15 below prevailing cost-sharing price in this region (PSI)
  - Ave. daily wage in area is \$1.50
- Clinics chosen from about 70 in the area based on size, services offered, and so that they were far apart
- Program lasted 3+ months

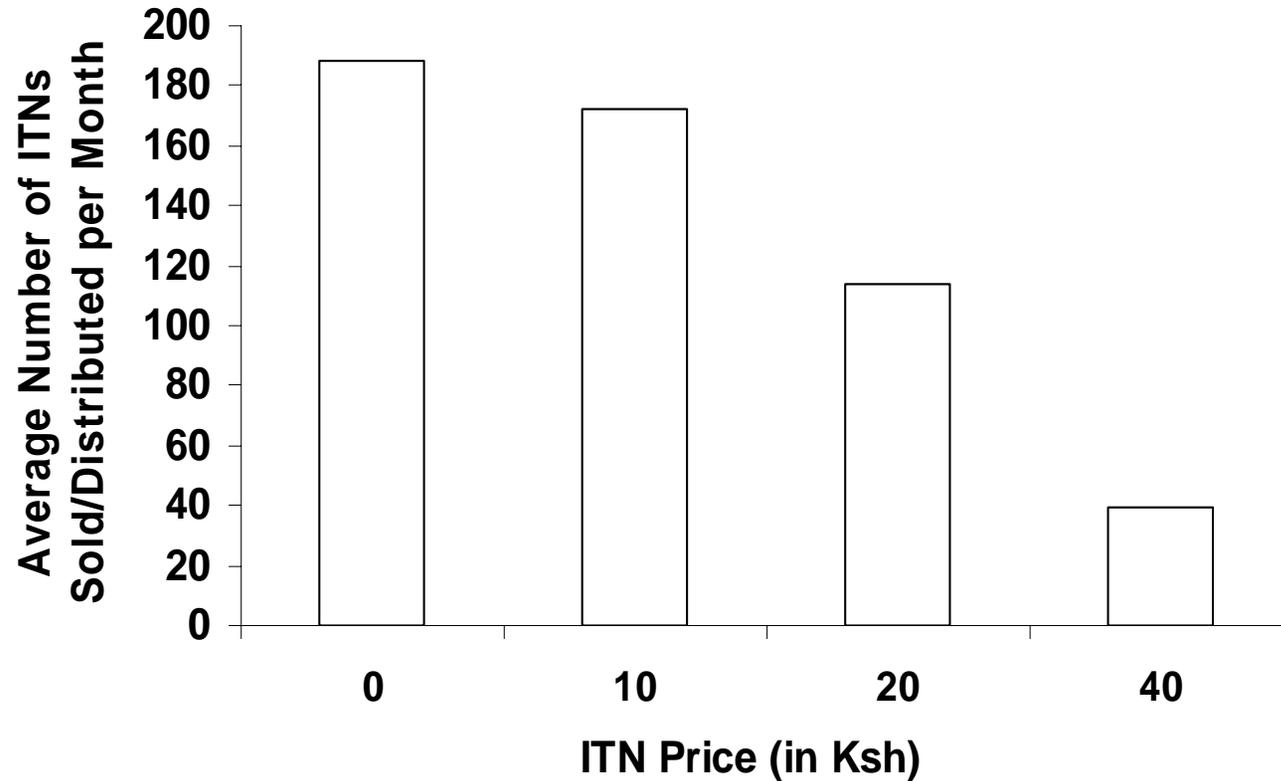
# Outcomes Measured

- Want to know how variation in price affects:
  - (1) **Demand/Uptake**
  - (2) **Usage** (measured with home visits 1- 2 months after purchase)
  - (3) **“Effective Coverage”** = uptake x usage
  - (4) **Need** (measured with hemoglobin at time of visit)

# Results

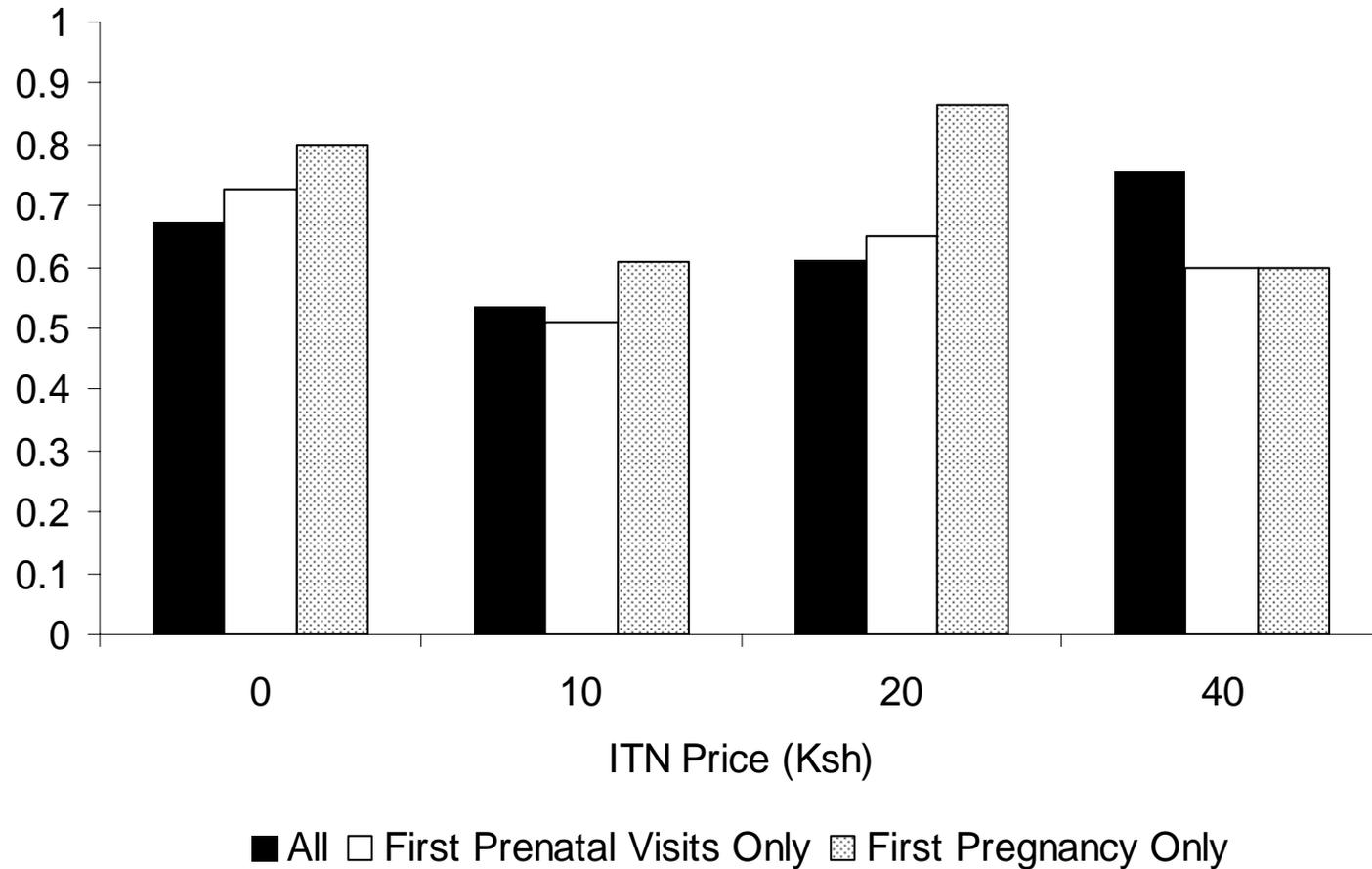
# Results: Demand

## Monthly Net Sales by ITN Price



# Results: Usage

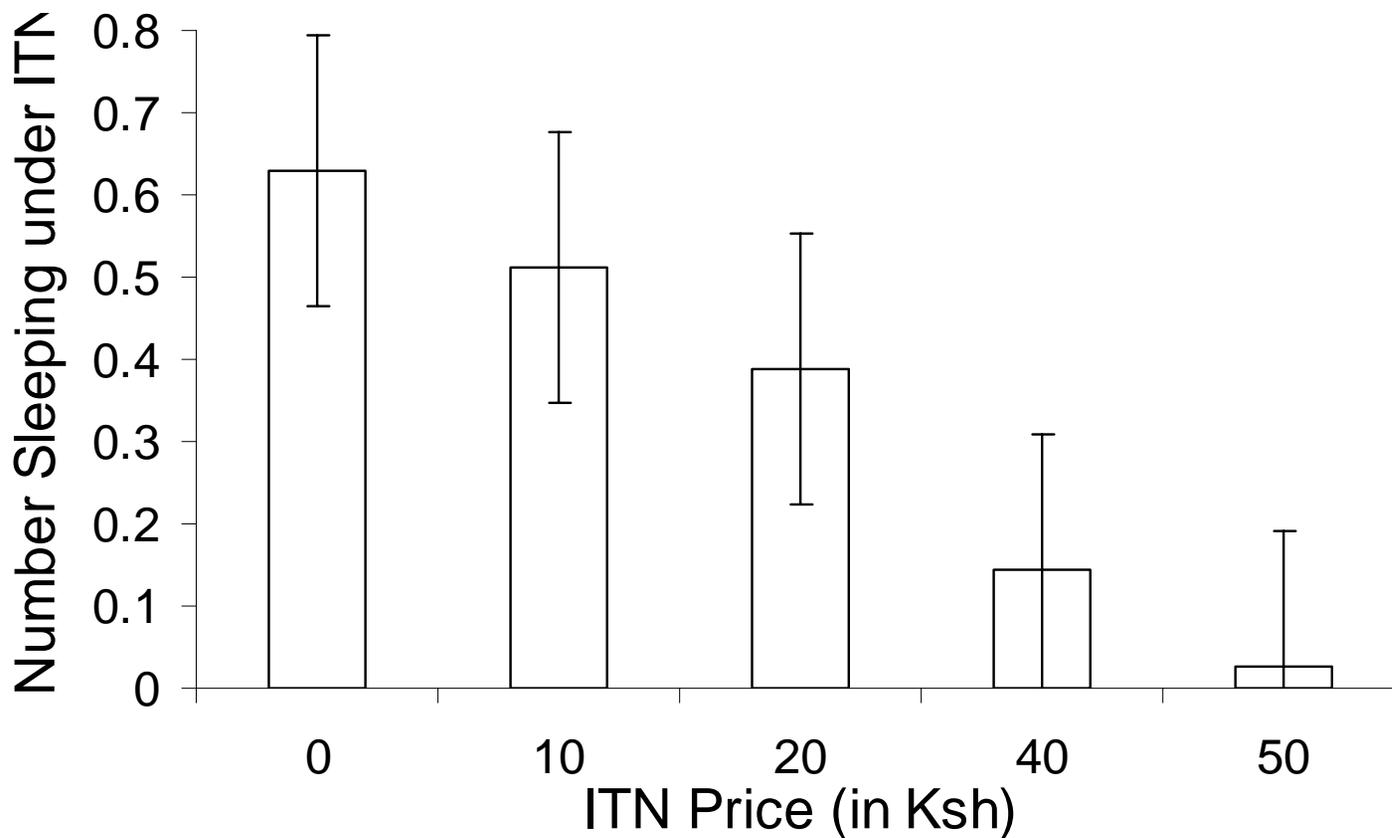
## Share Reporting Using ITN



# Results: Usage

- Combining uptake and usage: 63% of women covered by ITN under free distribution, versus 14% at 40Ksh

# Effective Coverage: Share of Prenatal Clients Sleeping Under ITN, by Price



# Selection Effects of Price on Health

- Want to know whether higher ITN prices induce selection of more vulnerable women (i.e. sickest)
- We use hemoglobin at clinic visit as measure of need
  - Hb is morbidity measure sensitive to presence of malaria in pregnant women
  - Anemic women likely to be those with most exposure & least resistance to malaria

# Results on Selection

- Compare hemoglobin of women buying/receiving net at each price to that of control group
- Higher prices do not select sicker women, but free net selects healthier women). Why?
  - Strong incentive effect of low price ITNs on prenatal attendance
  - Appears that women coming for free net came back for revisit sooner, and walk further/paid more for visit than control

# Cost-Effectiveness Analysis

- Combine uptake and usage estimates in C/E model incorporating private and social benefits of ITNs
  - Measure effectiveness and cost-effectiveness of each subsidy level in reduction of child mortality
  - Many other benefits to ITNs (e.g. prenatal attendance) so estimates should be conservative
- We assume that only difference in cost is the subsidy
  - Could be that transport/storage expenses higher for free distr. (b/c of higher demand), unless economies of scale
  - Could also be that supervision/accounting expenses higher for cost-sharing

# Cost-Effectiveness Results

- Due to demand response, number of child lives saved under each scenario is highest under free distribution
- Because of the externality, free distribution can be more effective than cost-sharing

# Summary of Findings

- Find no evidence that cost-sharing reduces wastage on those who will not use the product
  - Those who receive free ITN not less likely to use it than those who paid higher prices
- Also find no evidence that cost-sharing induces selection of those who need net more
  - Those paying higher prices appear no sicker (in terms of measured anemia) than control group
- Cost-sharing does considerably dampen demand
  - Uptake drops by 75% from zero to prevailing C/S price
- Combine estimates in cost-effectiveness model w/ private and social benefits to ITN use on child mortality
  - In some settings free distr. may be as cost-effective as C/S

# External Validity/Context

- Conducted in context of high valuation of ITNs
  - Vulnerable population, incurred costs to come to clinic (less targeted distribution or different product might have different results)
  - ITNs have been socially-marketed and are sold in shops so value is known
- Conducted in area of high poverty and severe credit/cash constraints, ability to pay is low

# Conclusions

- This evaluation sought to fill two gaps in policy debate:
  - (1) Is it true that free distribution leads to wastage in the case of ITNs?
  - (2) How do benefits from price targeting combine with demand response to yield effective coverage rates?
- We find that cost-sharing for ITNs cannot offset what is lost in demand by improved targeting toward those who value it most
- Results suggest that in this context, free distribution is more effective, and possibly more cost-effective than cost-sharing

# Policy Impact

- Shared results with Kenya MoH – Division of Malaria Control
  - Very good reception
  - Say their “*challenge is 1.) to find funding to continue free distribution and 2.) to convince those on the outside that this is the strategy to employ.*”
  - Hope our results can help convince donor community and NGOs

# Policy Impact

- Shared results with PSI Kenya
  - Email Response:
  - *“I just got the draft copy of your great study. I was so happy to receive this because in 2008 we are changing the clinic model to dispensing free nets, and your paper gave me some wonderful evidence to support this decision. I wonder if either of you is currently in Kenya, or will be in Kenya soon. If so I would like to invite you to come and present your findings to my team, and to the PSI Malaria technical team, so that we can discuss it more.*

*I want to reassure you that you will not be walking into a hostile environment at all. PSI’s institutional position on malaria urges country programs to adopt a multitude of strategies for distribution—including free delivery through ANC and vaccination services.”*

# Policy Impact

- Reaction of Private Donors / Foundations
  - Less positive
  - *“I have heard major methodologic critiques of this study from PSI”*

# Policy Impact: Challenges

- Can be difficult to distinguish good evidence from bad evidence
- Easy to discard evidence that goes against one's belief on the ground that it's not good
- One of the role that the WB has taken on recently is to train donors / policy makers on impact evaluation and measurement
- Incredibly useful initiative, hope it continues