Insecticide treated wall liner: Cost-effectiveness of a new tool for malaria prevention

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Context: ITN good but insufficient

- Long-life insecticide treated nets (ITN) have contributed to substantial reductions in malaria mortality and morbidity but insufficient
  - Mosquitos bite at other times
  - ITNs not used consistently
- School-age children especially vulnerable
  - up late in evening or arise early in am when biting mosquitos are present
  - ITN may be reserved for younger sibs

Objective: Are supplements to ITN cost-effective?

- Indoor residual spraying (IRS), an established technology
- Insecticide treated wall liner (ITWL), a new technology
  - Mesh-like textile
  - Impregnated with deltamethrin, a pyrethroid
  - Affixed to walls in sleeping areas of homes
  - Secured via nails and plastic washers
Setting: near Lake Victoria, Kenya

- ITWL: efficacy builds on cluster randomized trial (Gimnig, 2011)
  - ITWL plus ITN
  - ITN alone
- IRS: efficacy observational study in 2 adjacent districts
- In Nyanza Province, Kenya
- Intense perennial transmission

ITWL efficacy study design and results

- 12 villages (6 pairs) or clusters randomized
- Villages in each pair served by same health center
- Enrolled 1592 children
- Ages 6 months to 11 years of age
- Adjusted protective efficacy (aPE)
  - 31% <5 years
  - 42% 5-11 years
  - 38% overall

Source: EGleizer using Geocommons
Questions

1. Is ITWL a cost-effective supplement to ITN for reducing mortality?

2. Does ITWL improve school attendance?

3. Is ITWL a cost-effective supplement compared to IRS?

Methods

Q1. Cost effectiveness of ITWL
   – Micro-costing in year 2010 prices
   – Modeling effectiveness from trial and literature
   – Feiken (2012) and Hamel (2011), HDSS

Q2. School attendance
   – School registers pre- and post-trial

Q3. Cost effectiveness of ITWL compared to IRS
   – Micro-costing in year 2010 prices
   – Modeling effectiveness from trial and literature
   – Feiken (2012) and Hamel (2011), Kenya Census
Results: program costs per person covered (2010 prices)

- **ITWL ($64.23 one-time cost)**
  - Transportation: 19.0%
  - Installation materials & equipment: 35.7%
  - Personnel: 44.9%

- **IRS ($3.16 annual cost)**
  - Transportation: 24.0%
  - Installation materials & equipment: 36.0%
  - Personnel: 21.5%
  - Insecticide product: 18.5%

Longer Term Projected Results

- **ITWL**: Cumulative discounted life years gained (DLYG) per 100 persons were 1.3 over trial period (average period at risk, 3 months).
- **13.3 cumulative DLYG through year 4**
Cost-effectiveness under alternative durations of protection

Results of ITWL on school attendance

- 49% reduction in absenteeism
- 7.52 more attendance days per child per school year

- Indicates potential benefits to 25% of Kenya’s population.
Discussion

- ITWL advantages
  - Lower prices expected with scale up
  - Easier implementation
  - Single installation may last for 4 years

- ITWL challenge
  - Possible resistance to insecticide in future

- Study limitations
  - Modeling needed for longer term results
  - IRS and ITWL installed in different districts
  - Many gaps in school registers

- 3-arm study now starting in Tanzania

Conclusions

1. IRS is a highly cost-effective supplement to ITN

2. ITWL also a highly cost-effective supplement to ITN provided ITWL protects 2.2 years or more

3. Regular use of ITN must be continued despite addition of IRS and ITWL; otherwise, net benefits reduced or eliminated
Conclusions

Q1. ITWL also a highly cost-effective supplement to ITN provided ITWL protects 2.2 years or more

Q2. ITWL improved school attendance significantly

Q3. IRS is a highly cost-effective supplement to ITN

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References


Thank you

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