

**Insecticide treated wall liner:  
Cost-effectiveness of a new tool for  
malaria prevention**  
**[Abstract 291037]**

Presented at the American Public Health Association  
Boston, MA, Session 4120.0  
November 5, 2013

Donald S. Shepard and Elizabeth Glaser  
*Heller school for Social Policy and Management  
Brandeis University  
Waltham, MA, United States*



1

**All authors**

Donald S. Shepard<sup>1</sup>, Elizabeth Glaser<sup>1</sup>,  
George Olang<sup>2</sup>, Nabie Bayoh<sup>2</sup>,  
Frank Odhiambo<sup>2</sup>, Vincent Were<sup>2</sup>,  
Peter Otieno<sup>2</sup>, Simon Kariuki<sup>2</sup>,  
Kayla Laserson<sup>2</sup>, Meghna Desai<sup>2</sup>,  
John Gimnig<sup>4</sup>, Mary J Hamel<sup>4</sup>,  
Aggrey Kihombo<sup>3</sup>, Angelique Rwiyereka<sup>1</sup>

*Brandeis University, Waltham, MA, United States,  
2 Kenya Medical Research Institute (KEMRI), Kisumu, Kenya,  
3 Mzumbe University, Mzumbe, Tanzania,  
4 Centers for Disease Control and Prevention, Atlanta, GA, USA*



### **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

3

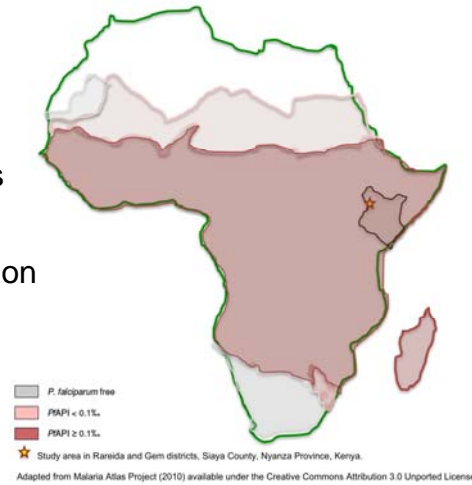
### **Objective: Are supplements to ITN cost-effective?**

- 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

4

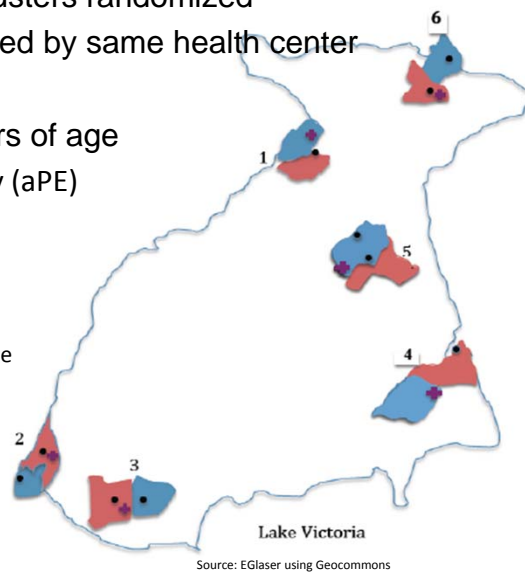
## Setting: near Lake Victoria, Kenya

- 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



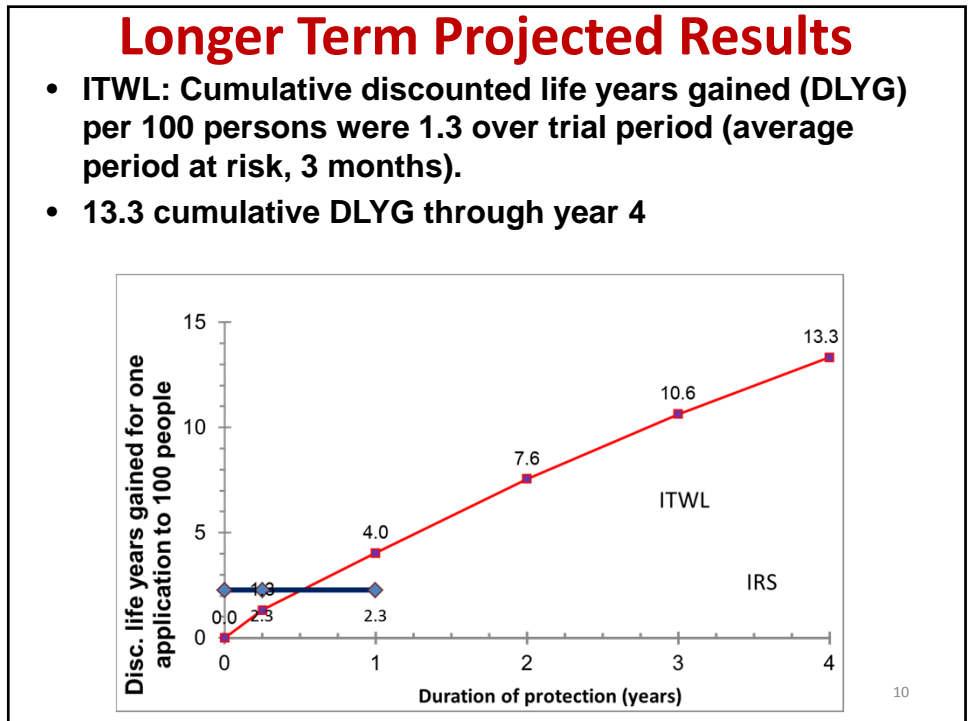
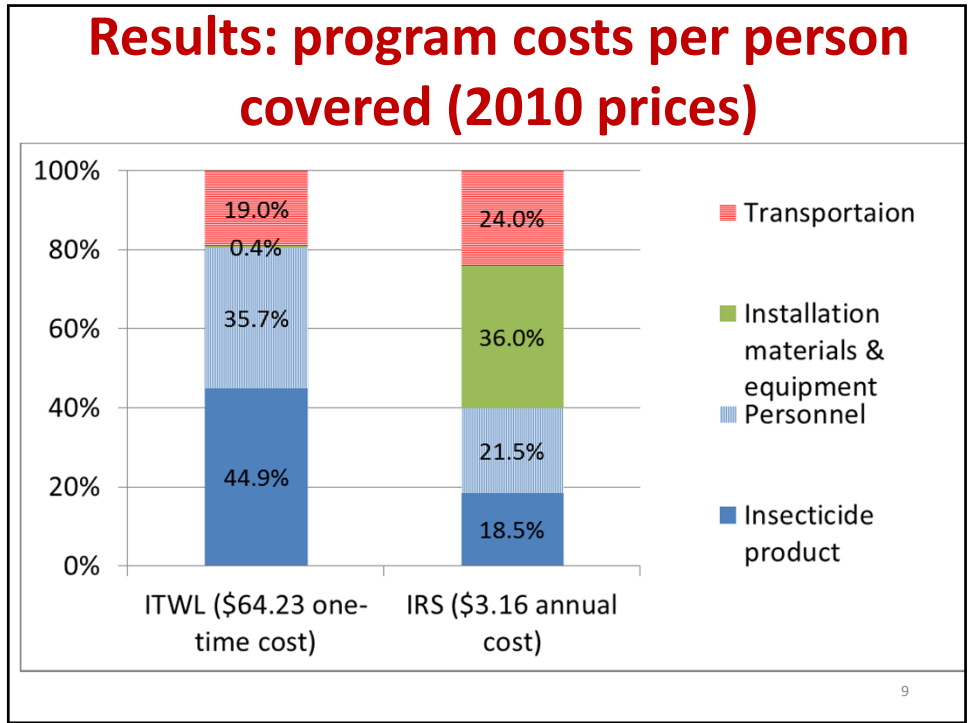
## Questions

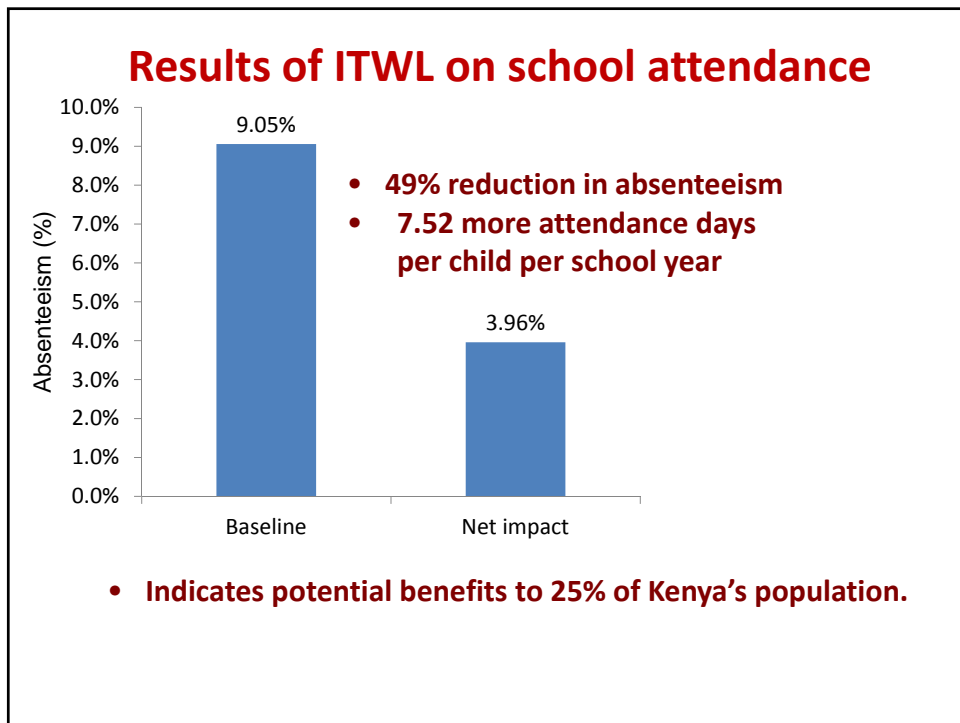
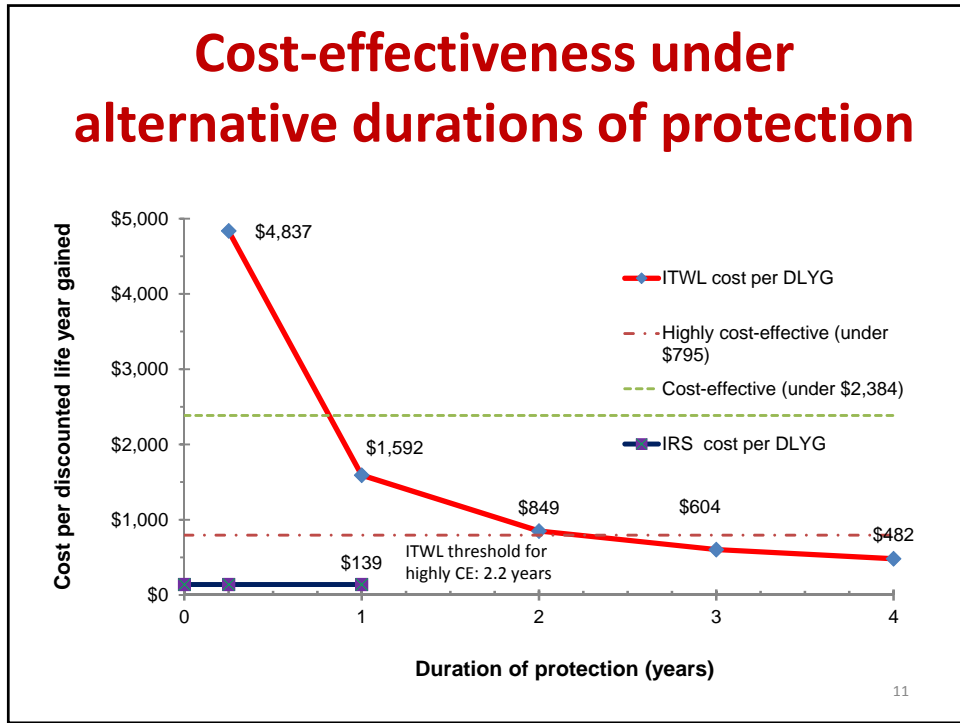
1. Is ITWL a cost-effective supplement to ITN for reducing mortality?
2. Does ITWL improve school attendance?
3. Is ITWL a cost-effective supplement compared to IRS?

7

## 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





## 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

13

## 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

14

## 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

15

## Acknowledgements

- Supported by grant 1038575 from Bill and Melinda Gates Foundation
- Many thanks to: John Vulule, John Williamson, Jane Odhiambo, Clare Hurley, Jenipher Adhiambo Ochieng, Job Osewe, Penny Phillips-Howard, Judith Akinyi,
- Findings and conclusions solely those of authors and do not necessarily represent views of US Centers for Disease Control and Prevention, the Kenya Medical Research Institute, or Tanzania National Institute for Medical Research

16



## References

- Feikin DR, et al. (2011) PLoS ONE 6(1): e16085
- Gimnig JE. (2011) Am. J. Trop. Med. Hyg., 85: S199.
- Glaser E. Kenya\_asebo\_gem\_study\_schoolsV02, 2013. Geocommons <http://geocommons.com/maps/274540#edit>, accessed June 26 2013.
- Hamel MJ, et al. (2011) Am. J. Trop. Med. Hyg., 85(6),pp.1080–1086.
- Open Kenya. Kenya GDP per capita, 2010. <https://opendata.go.ke/Financial-Sector/IMF-World-Economic-Outlook-2011-Kenya-GDP-Per-Capi/m57k-5r2b>, accessed November 7, 2012.
- Shepard DS, Glaser E, Olang G, et al. (2012) Am. J. Trop Med.Hyg., 87 (Suppl 1) : LB-215
- WHO (2012) Global plan for insecticide resistance management in malaria vectors.

17

## Thank you

shepard@brandeis.edu  
eglaser@brandeis.edu

18