

Impact of IRS and LLINs combined interventions on entomological factors for malaria prevention in Ethiopia

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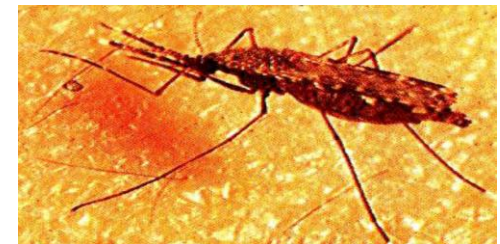
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Introduction

- IRS and LLINs are the key frontline malaria vector interventions in Ethiopia
- There is contradictory evidence that the two interventions combined are better than each intervention alone
- Can IRS+LLINs significantly reduce human biting rates and density of *An. arabiensis* versus LLINs or IRS?
- The IRS+LLINs will significantly lower biting rates and density of *An. arabiensis*

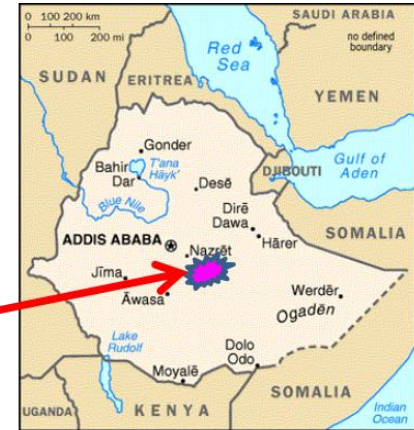
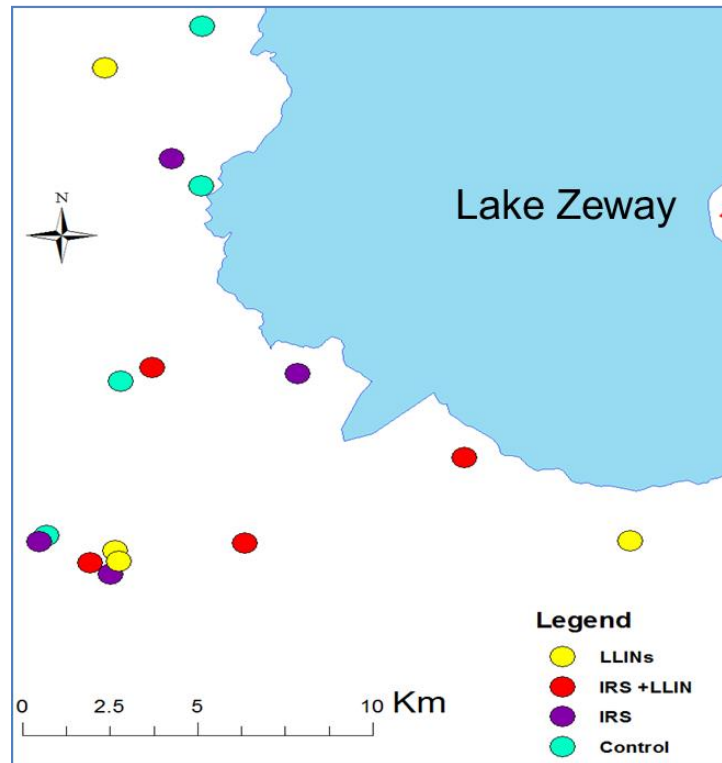


Objectives

- ❑ Assess the impact of IRS+LLINs combined versus either intervention alone on
 - Human biting rates of *An. arabiensis*
 - Density of *An. arabiensis*

Methods

Study area



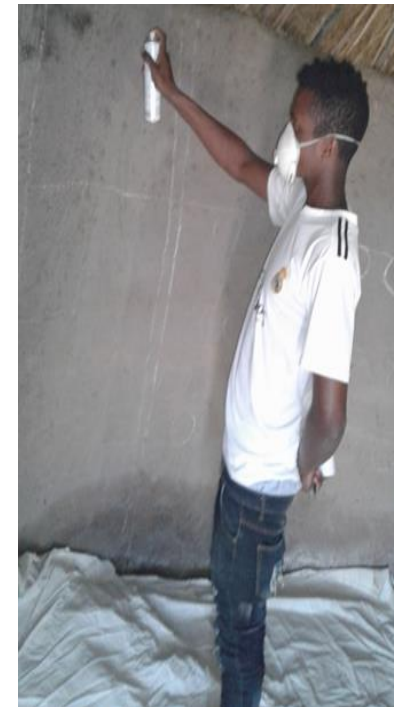
Study design, randomization & intervention

- Cluster randomization: IRS+LLINs, IRS, LLINs and Control
- Four clusters (villages) per arm was randomly selected
- All households in the IRS+LLINs and LLINs arms received new Perma Net 2.0
- IRS with propoxur was applied in LLINs+IRS and IRS arms



Mosquito collection

- ❑ **Light trap catch (LTC):** assess mosquito host-seeking density (HSD)
- ❑ **Pyrethrum spray catch (PSC):** Indoor resting density (IRD)



Mosquito collection...

- ❑ **Artificial Pit shelter (PIT):** Outdoor resting density (ORD)
- ❑ **Human landing catch (HLC):** Vector biting behaviours



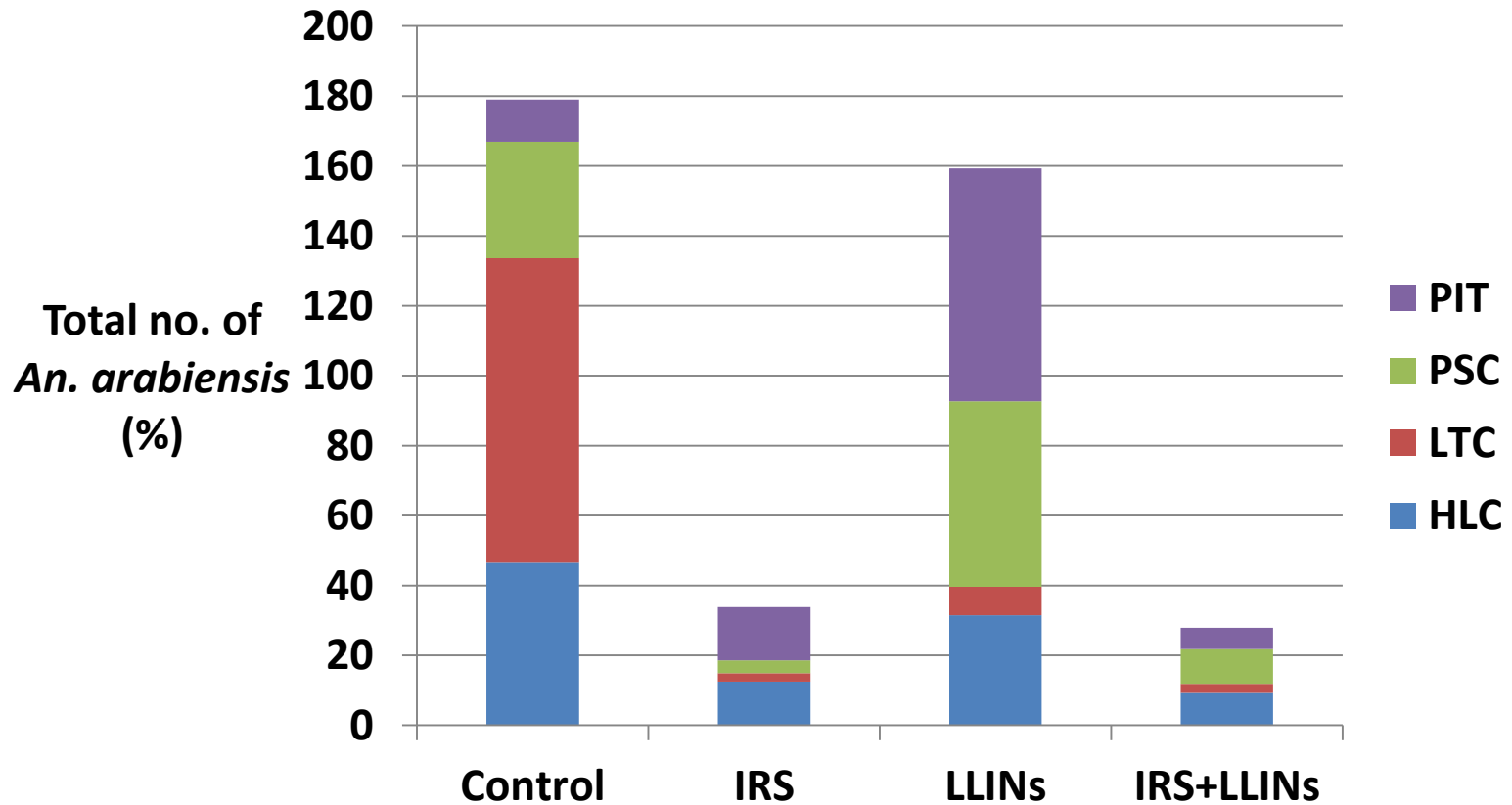
Mosquito processing

- Blood meal sources and malaria infections were tested by enzyme linked immunosorbent assay (ELISA)
- Mean vector human biting rates and densities were compared between arms using Negative Binomial Regression (NBR)

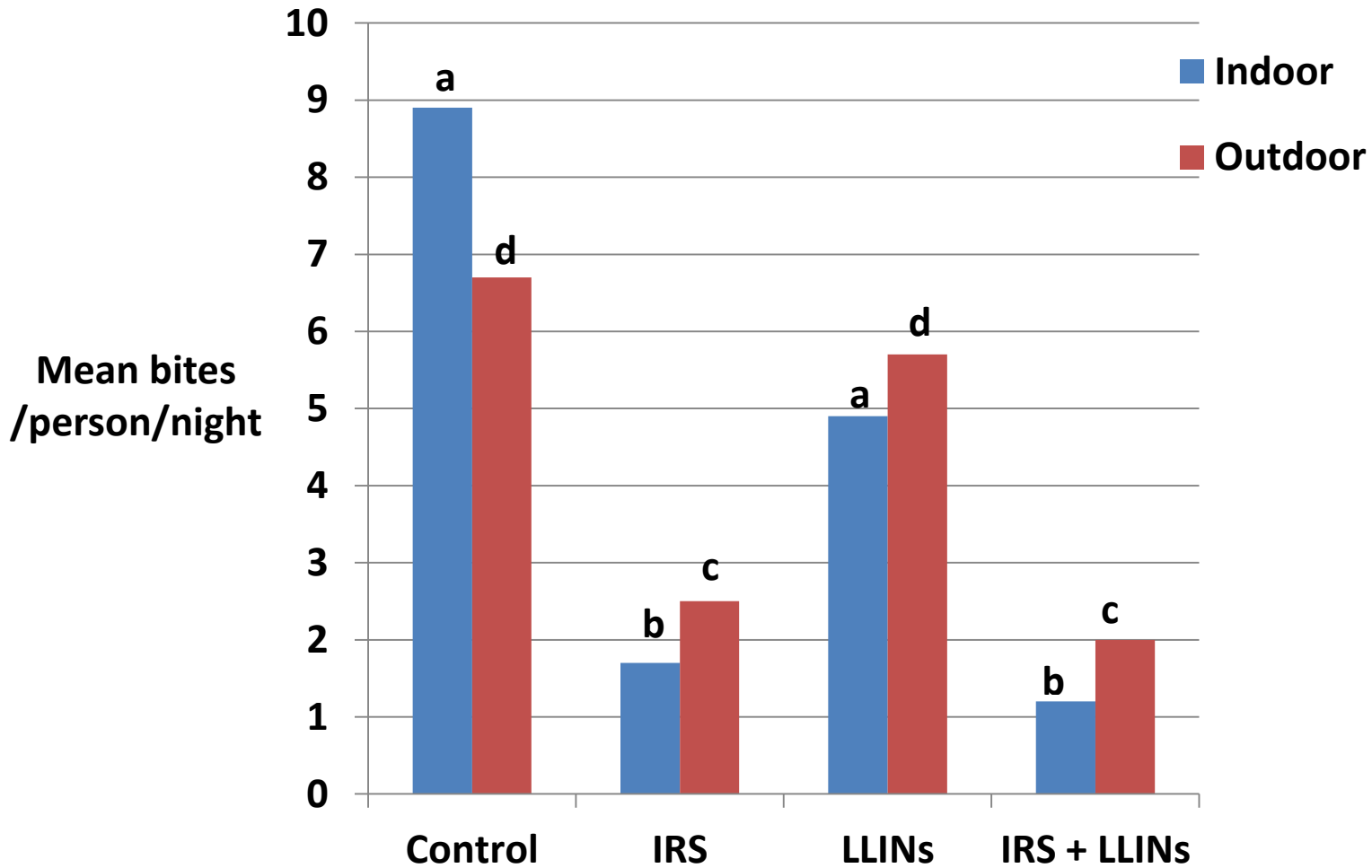


Results

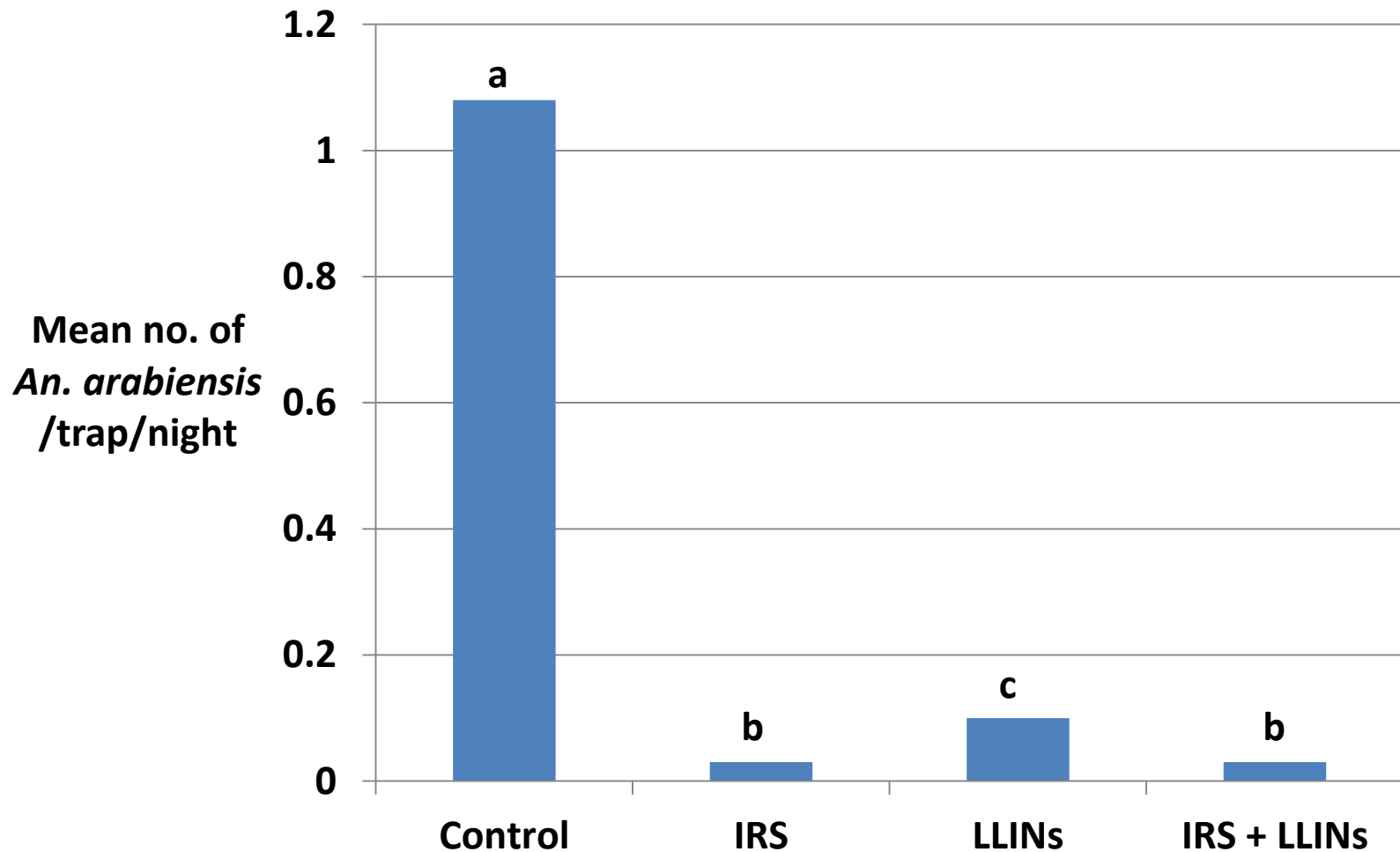
Anopheles arabiensis abundance



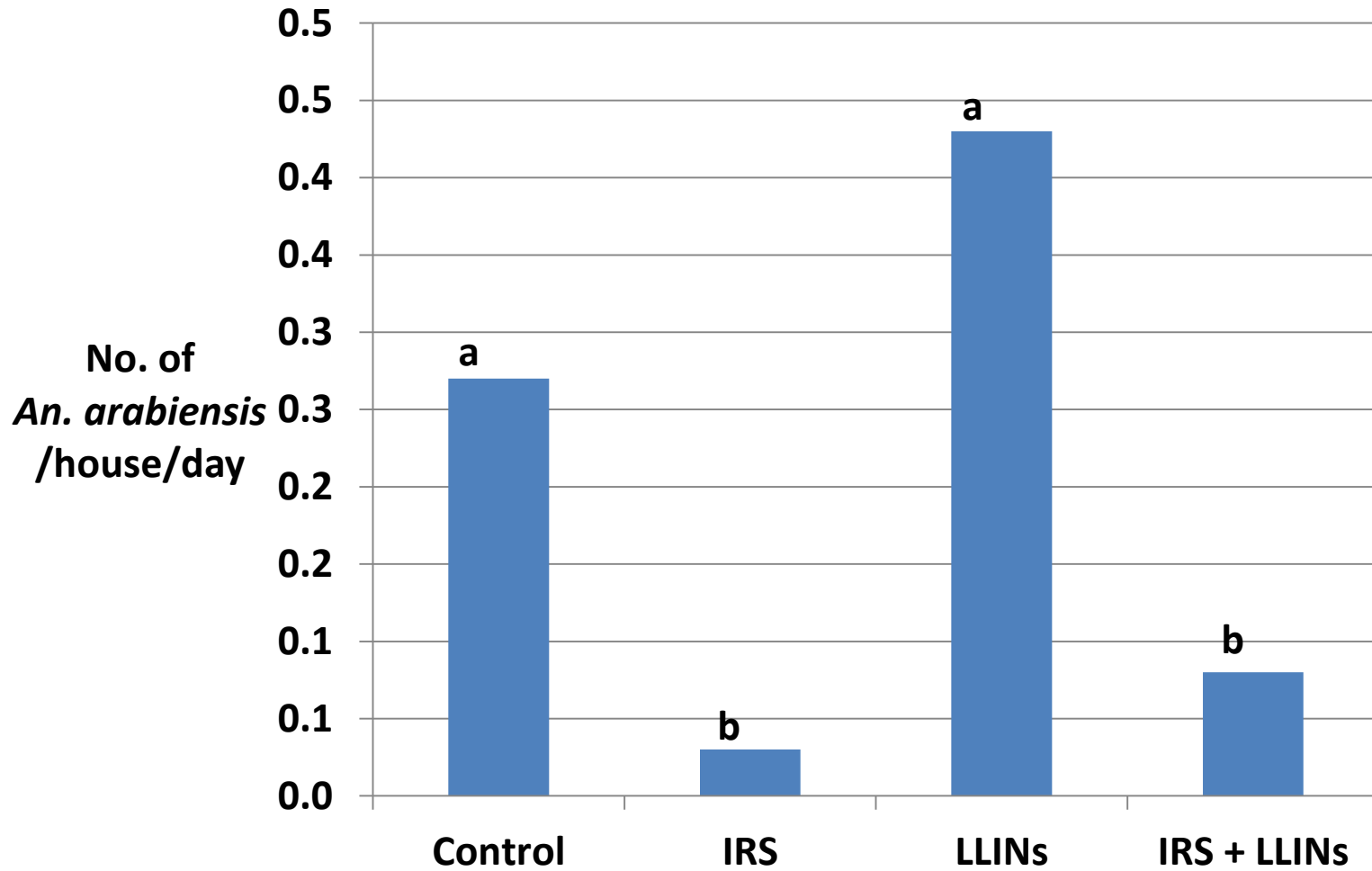
Human biting rate (HBR)



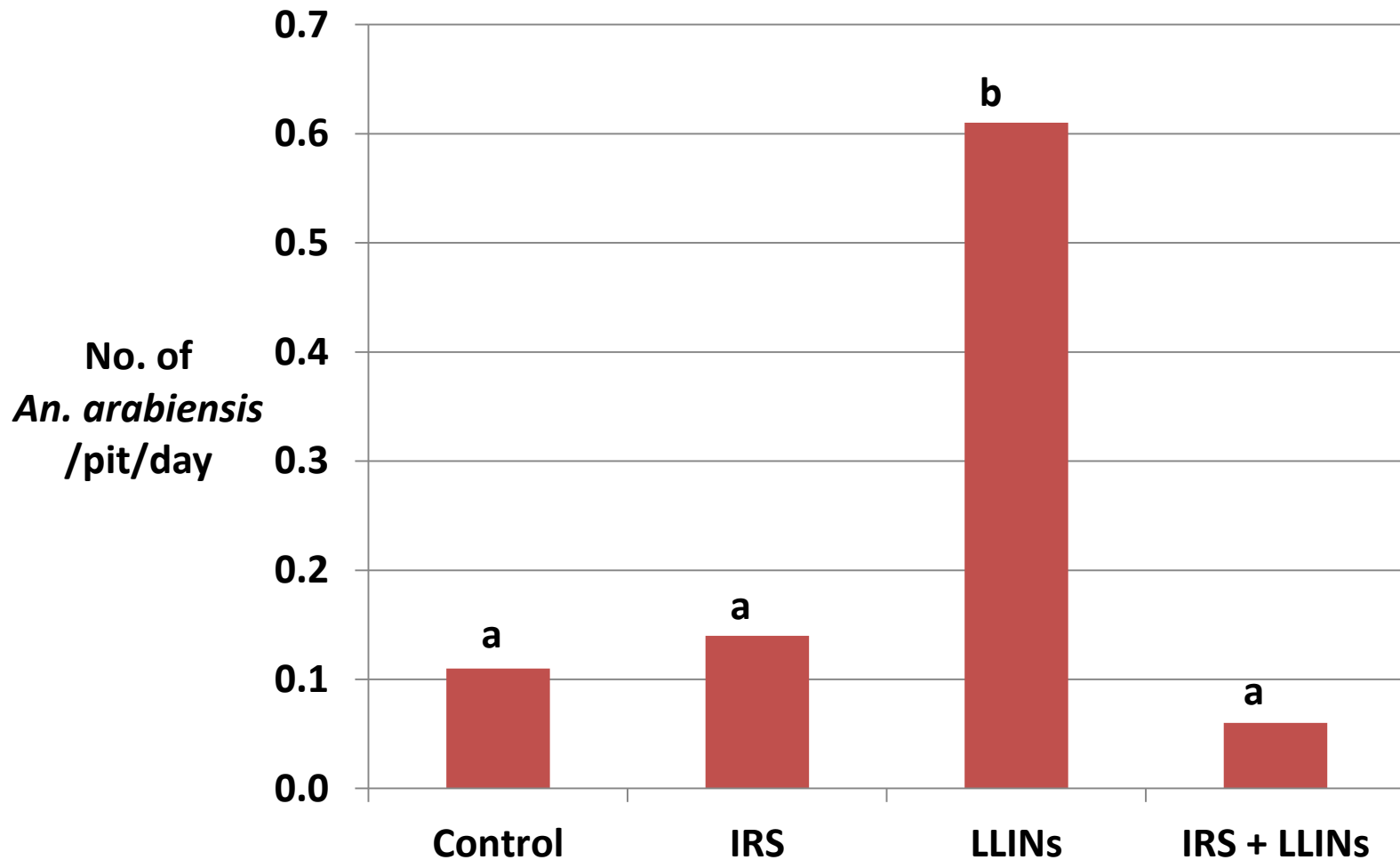
Host seeking density (HSD)



Indoor resting density (IRD)



Outdoor resting density (ORD)



Blood meal sources (host blood index)

Study arm	Blood fed n(%)	Human n(HBI)	Bovine n(BBI)	Other host
Control	8 (19.1)	3 (0.07)	5 (0.12)	0
IRS	1 (2.4)	0 (0.00)	1 (0.02)	0
LLINs	31 (73.8)	10 (0.24)	18 (0.43)	3
IRS + LLINs	2 (4.8)	2 (0.05)	0 (0.00)	0
Total	42 (100.0)	15 (36.0)	24 (57.0)	3 (7.0)

Sporozoite infection

- Of 574 mosquito specimen tested for sporozoites, none was found positive for *Plasmodium* species.

Conclusions and implications

- IRS alone was as effective as IRS+LLINs in reducing densities and human biting rates of *An. arabiensis*
- Added impact of the combination against malaria infectivity rate of *An. arabiensis* remains unknown
- The LLINs alone had poor effectiveness in reducing densities and human biting rates of *An. arabiensis*

Acknowledgments

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THANK YOU !

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Galatoomaa!



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