IMPACT OF INSECTICIDE TREATED PLASTIC SHEETING (ITPS) ON MALARIA RELATED MORBIDITY: A PHASE III DOUBLE-BLIND COHORT OBSERVATIONAL TRIAL, CONDUCTED IN AN ACUTE EMERGENCY PHASE REFUGEE SETTING IN SIERRA LEONE.

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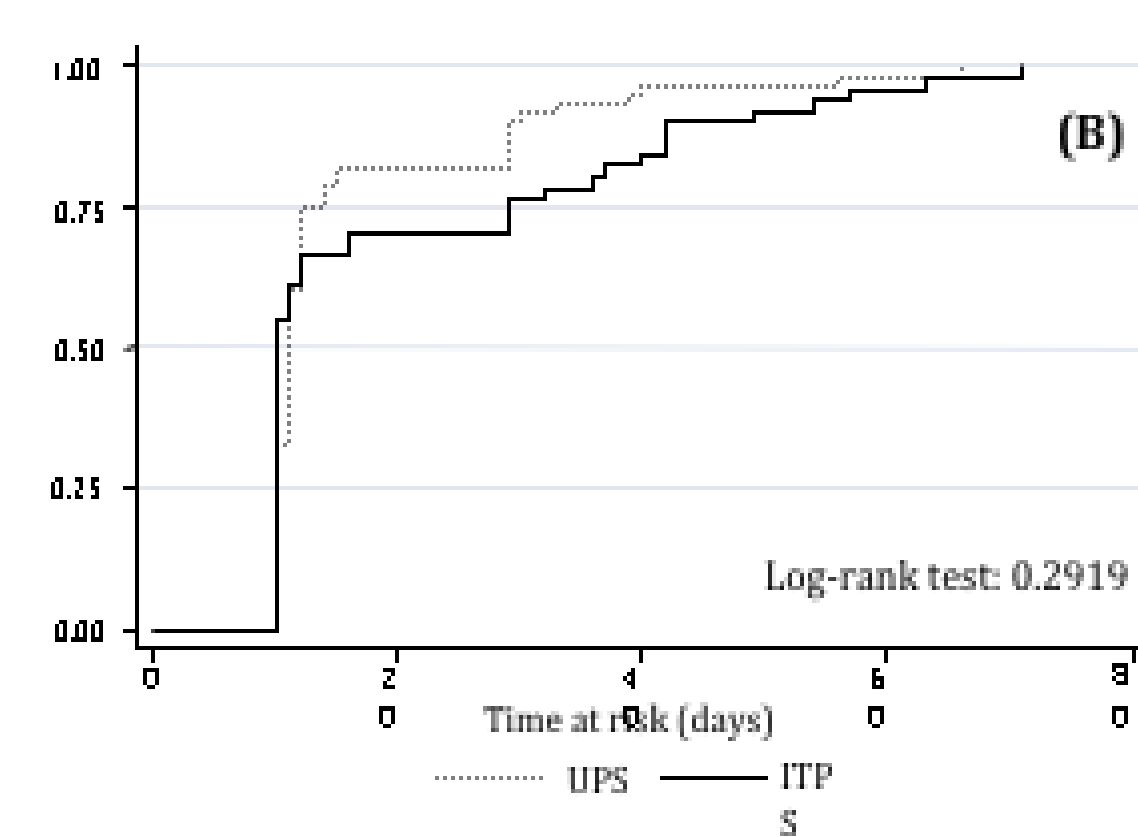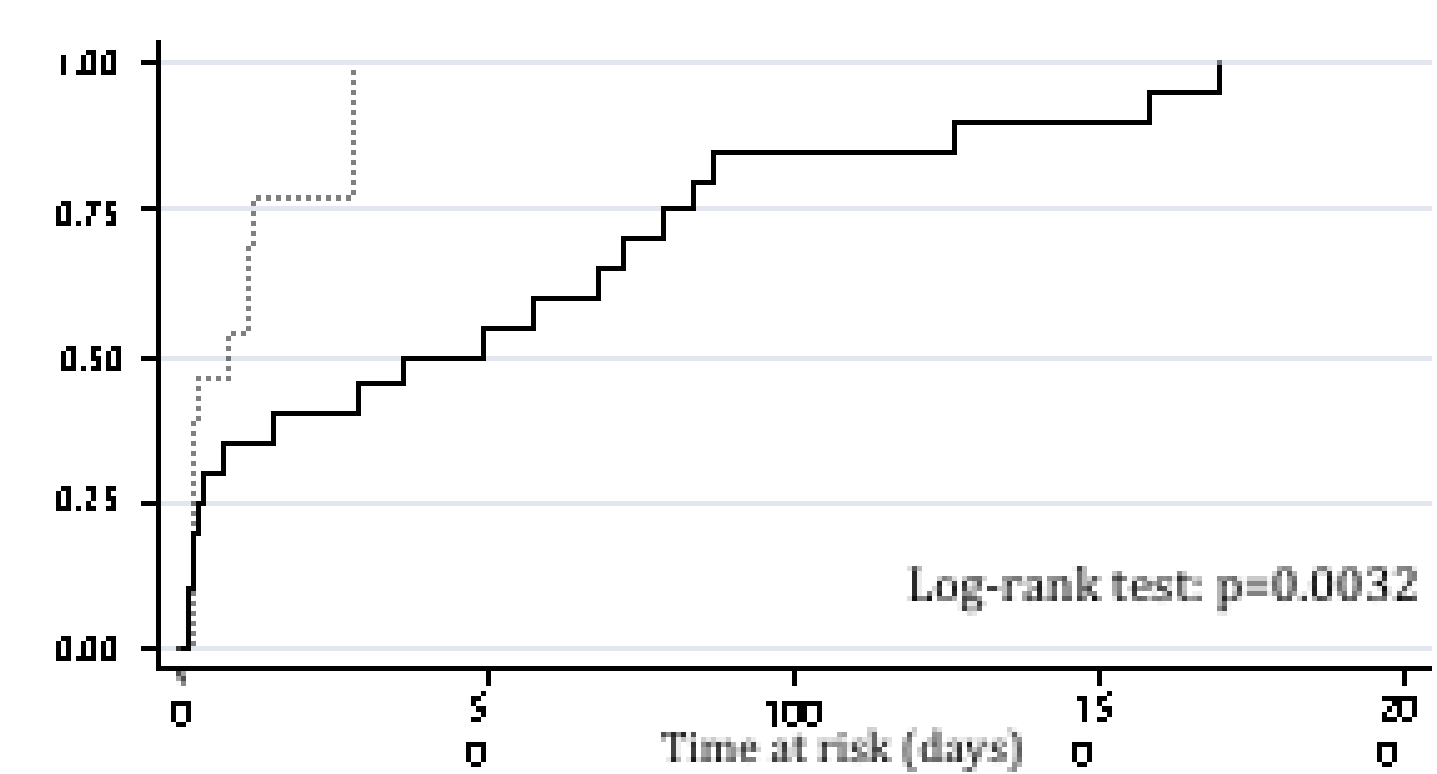[1] Wageningen University, [2]The MENTOR Initiative, United Kingdom

INTRODUCTION: Humanitarian crises displace millions of people annually, forcing many to live in temporary camp shelters. Malaria is commonly the first cause of death and suffering in these settings. Traditional malaria prevention tools are poorly adapted for use in such settings. Insecticide treated plastic sheeting (ITPS) is an innovative new tool designed to meet both temporary shelter needs and malaria prevention needs for the displaced.

METHODS: A double blind Phase III evaluation with prospective cohort observational design was conducted in two Liberian refugee camps in Sierra Leone. In Largo (7500 refugees) ITPS or Untreated plastic sheeting (UPS) was attached to the walls and ceiling of shelters in defined camp sections. In Tobanda (7000 refugees) ITPS or UPS formed the roof. Children (4months-3yrs) in both were monitored for 7 months following blanket treatment with Artesunate + Amodiaquine.
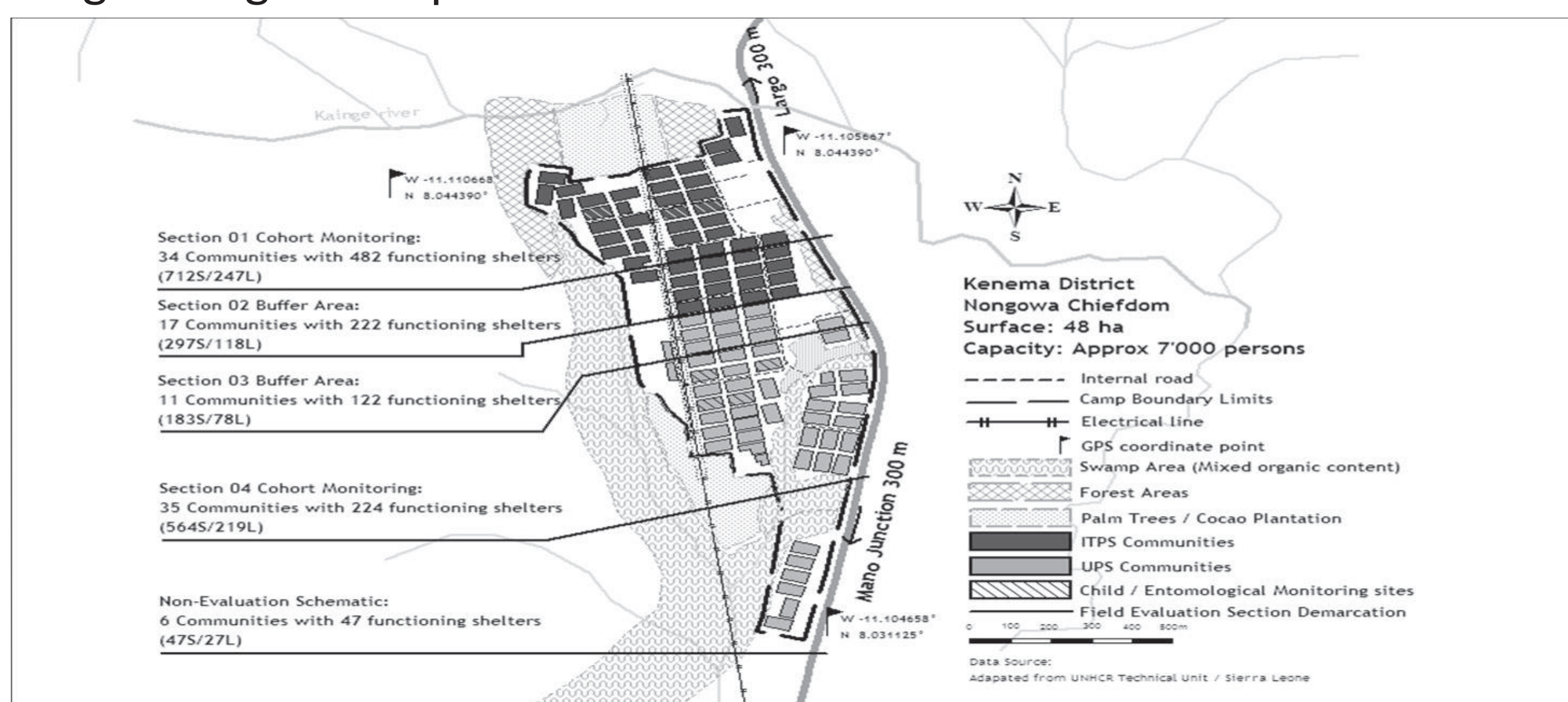
Largo Refugee Camp

Tobanda Refugee Camp

ITPS Roofing

RESULTS:
Time to event survival analysis estimated the at risk time range of contracting malaria was 170 and 28 days respectively for children sleeping under shelters lined with ITPS or UPS (Log rank test = 0.0032). No significant difference was observed in Tobanda. The protective efficacy of ITPS compared to UPS was 61% (p<0.001) and 15% (p=0.008) respectively in Largo and Tobanda.
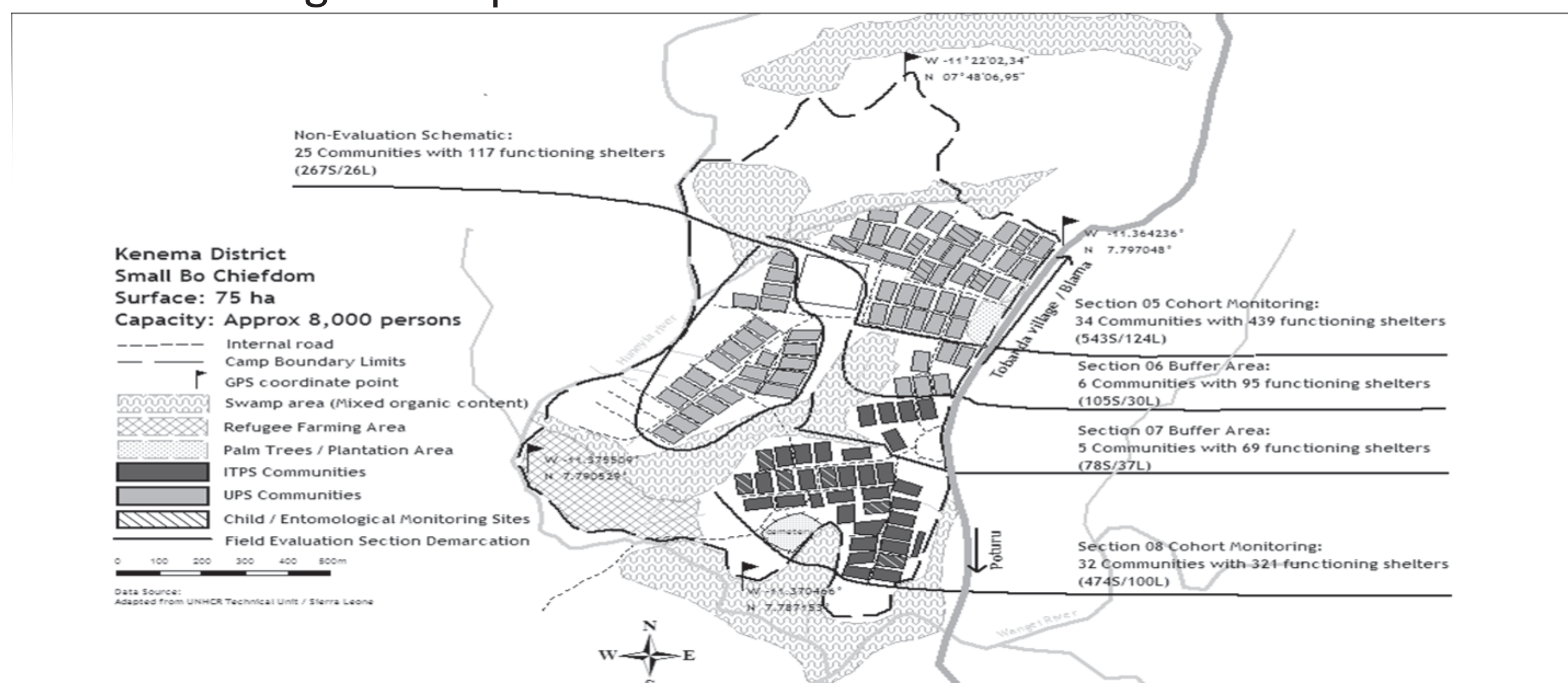
Kaplan-Meier survival estimates for time to re-infection with P. falciparum amongst children 4 months-3 years in (A) Largo refugee camp (ITPS, N= 51; UPS, N= 49) and (B) Tobanda refugee camp (ITPS, N=55; UPS, N=67)

Incidence rates and ratios of malaria infection among control and intervention groups in Largo and Tobanda camps, estimated from the random effects Poisson regression model

	Child-years	IR[a] (95% CI)	IRR[b] (95% CI)	PE[c] (%) (95% CI)	Wald-test p-value	AIRR* (95% CI)	APE* (%)	Wald-test p-value
Largo								
UPS	2421	163.57 (157.20-169.17)	1	–		1	–	
ITPS	2720	63.16 (52.10-75.78)	0.39 (0.36-0.41)	61.4 (59.1-63.5)	<0.001	0.4 (0.33-0.47)	60.2	<0.001
Tobanda								
UPS	3003	157.48 (147.28-167.10)	1	–		1	–	
ITPS	2314	133.9 (120.0-148.45)	0.85 (0.81-0.89)	15 (11.0-18.78)	0.008	0.85 (0.75-0.95)	15.1	0.008

[a] incidence rate per 100 child-years; [b] incidence rate ratio; [c] protective efficacy adjusted for age and sex

CONCLUSIONS:
 ITPS had a substantive impact on childhood malaria incidence. As ITPS shelters were constructed several months prior to the start of the monitoring period suggesting that ITPS is a significantly longer lasting alternative to IRS. Focus should now address the standardised, monitored (Phase IV) use of ITPS in emergency settings.

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