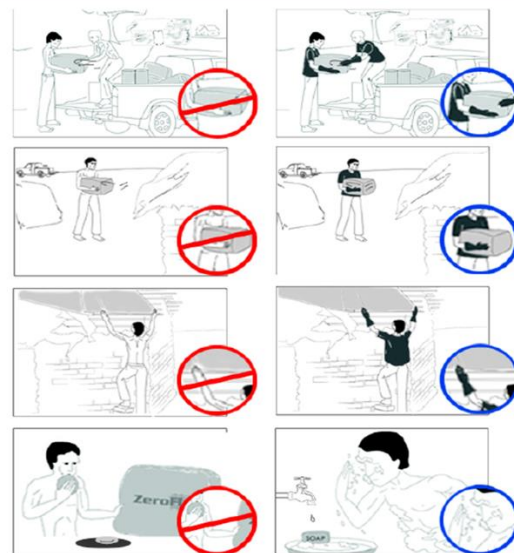




REDUCING DEATHS AND SUFFERING  
FROM TROPICAL DISEASES



Pixnio/James Stewart, USCDCP



# Insecticide-Treated Plastic Sheeting (ITPS)

# Objectives

- Understand where and why ITPS can be used
- Understand how to use ITPS for combined shelter and vector control in emergencies



# The Operational Challenge



Where standard  
tools are too slow,  
unfeasible or  
impractical

# Purpose of ITPS

Dual purpose tool to:

- Save delivery time
- Reduce dependency on specialised control teams
- Improve acceptability and compliance and target whole household (like IRS)
- Long lasting
- Cost effective: shelter & malaria control

# ITPS: FIELD APPLICATION



# Development

	Country	Year	Author	Journal	Title
1	-	2002	Graham K, et al.	Med Vet Entomol	Insecticide-treated plastic tarpaulins for control of malaria vectors in refugee camps
2	-	2003	Allan R, et al.	International Aid and Trade Journal	Motivating the private and public sector to establish common goals
3	-	2003	Allan R, et al.	PATH Canada Journal	Waging war on malaria
4	-	2004	Graham K, et al.	Journal Royal Soc Promo Health	New tools to control malaria in refugee camps
5	-	2004	Allan R & Burnham G	Lancet– Extreme Medicine	Medicine for Refugees, 2004
6		2005	Burns M	Humanitarian Exchange	Evaluating insecticide-treated polyethylene sheeting for malaria control in complex emergencies: an intersectoral approach
7	Indonesia	2005	Allan R & Muriuki D	Humanitarian Exchange	Emergency malaria and dengue fever control: lessons from the tsunami in Aceh
8	-	2005	WHO	-	Guidelines for control of communicable diseases in the tsunami
9	Burkina Faso	2006	Diabate A, et al.	Trop Med Int Health	The indoor use of plastic sheeting pre-impregnated with insecticide for control of malaria vectors
10	Benin	2009	Djenontin A, et al.	Malar Journal	Managing insecticide resistance in malaria vectors by combining carbamate-treated plastic wall sheeting and pyrethroid-treated bed nets

# Development

- Consequently, WHO recommended ITPS use for combined shelter and vector control in the tsunami and other crises and requested NGOs to monitor and report on acceptability and feasibility
- WHO emergencies network summary report for ITPS and some new malaria control tools disseminated in November 2006

# Development

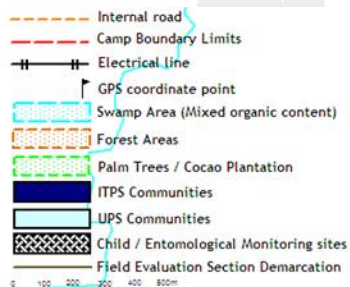
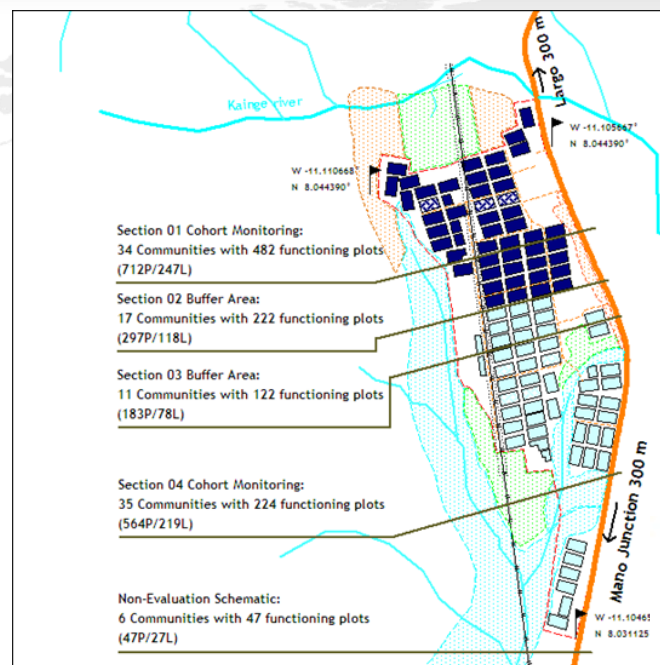
	Country	Year	Author	Journal	Title
11	India	2009	Sharma SK	Indian Journal Med Research	Field evaluation of ZeroFly--an insecticide incorporated plastic sheeting against malaria vectors & its impact on malaria transmission in tribal area of northern Orissa
12	Burkina Faso	2010	Djenontin A, et al.	Am J Trop Med Hyg	Indoor use of plastic sheeting impregnated with carbamate combined with long-lasting insecticidal mosquito nets for the control of pyrethroid-resistant malaria vectors
13	Burkina Faso	2010	Chandre F	Parasites & Vectors	Field efficacy of pyrethroid treated plastic sheeting (durable lining) in combination with long lasting insecticidal nets against malaria vectors
14	Ghana	2010	Stiles-Ocran J, et al.	Int J Infect Dis	Field evaluation of ZeroVector™ DurableLining as an alternative to indoor residual spraying (IRS) for the control <i>Anopheles</i> vectors of malaria in rural villages of Obuasi, Ghana
15	India	2011	Mittal PK, et al.	Journal of Vector Borne Diseases	Evaluation of the impact of ZeroFly(R), an insecticide incorporated plastic sheeting on malaria incidence in two temporary labour shelters in India
16	-	2011	WHO	-	Public health risk assessment and interventions, The Horn of Africa: Drought and famine crisis
17	Sierra Leone	2012	Burns M, et al.	Am J Trop Med Hyg	Insecticide-treated plastic sheeting for emergency malaria prevention and shelter among displaced populations: an observational cohort study in a refugee setting in Sierra Leone
18	Angola	2012	Brosseau L, et al.	PLoS One	Human antibody response to <i>Anopheles</i> saliva for comparing the efficacy of three malaria vector control methods in Balombo, Angola

# Development

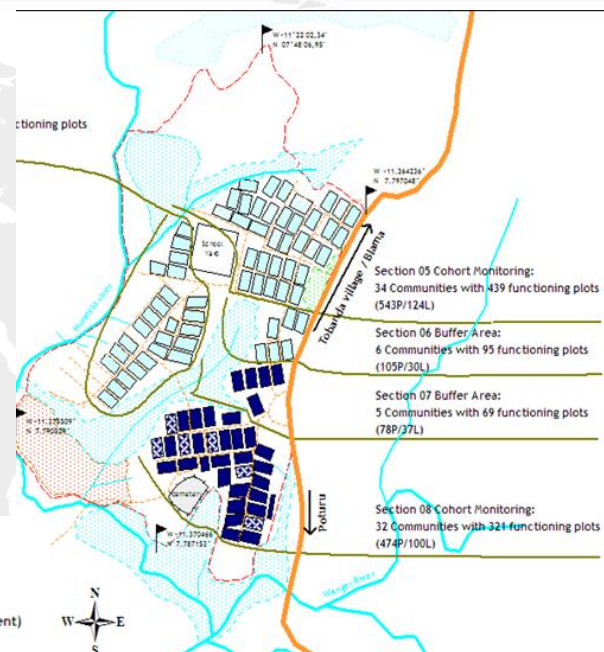
	Country	Year	Author	Journal	Title
17	Sierra Leone	2012	Burns M, et al.	Am J Trop Med Hyg	Insecticide-treated plastic sheeting for emergency malaria prevention and shelter among displaced populations: an observational cohort study in a refugee setting in Sierra Leone

Double-blind phase III trial using ITPS or untreated polyethylene sheeting (UPS) randomly deployed to defined sectors of two camps. Buffer section demarcation included. Refugees treated with ACT to clear all malaria infections. Children up to 3 years of age monitored for 8 months.

# Development



Data Source:  
Adapted from UNHCR Technical Unit / Sierra Leone



# Development – Study Outcome

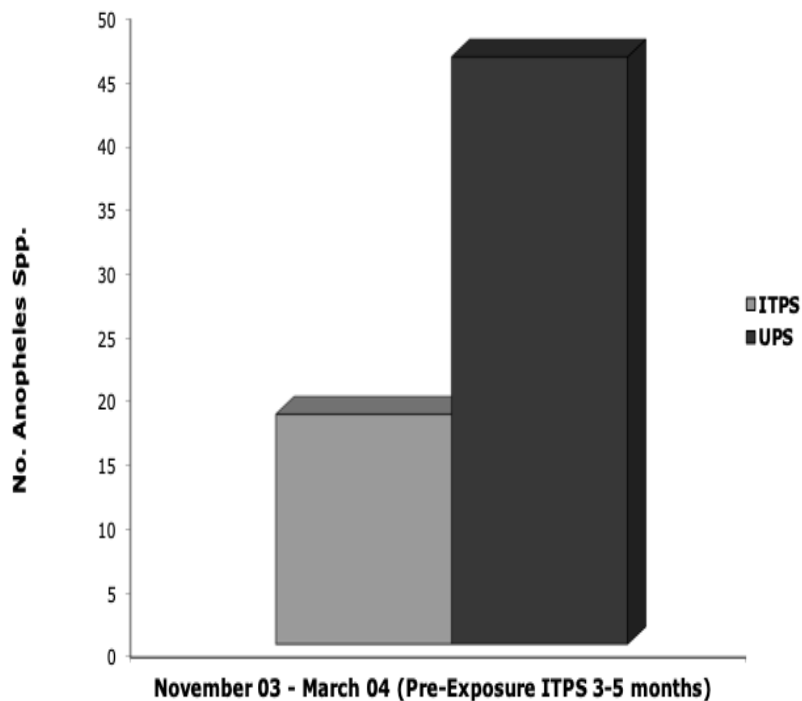
Refugee camp	Coverage	Pf incidence rate (per 100 person-years)		Protective efficacy of ITPS
		ITPS	UPS	
Largo	Full (inner wall and ceiling)	63	163	61%
Tobanda	Partial (ceilings and/or roof)	134	157	15%

- Anaemia rates: improved under ITPS in both camps
- This tool proved to be a convenient, safe, and long-lasting method of malaria control when used as a full shelter lining in an emergency setting

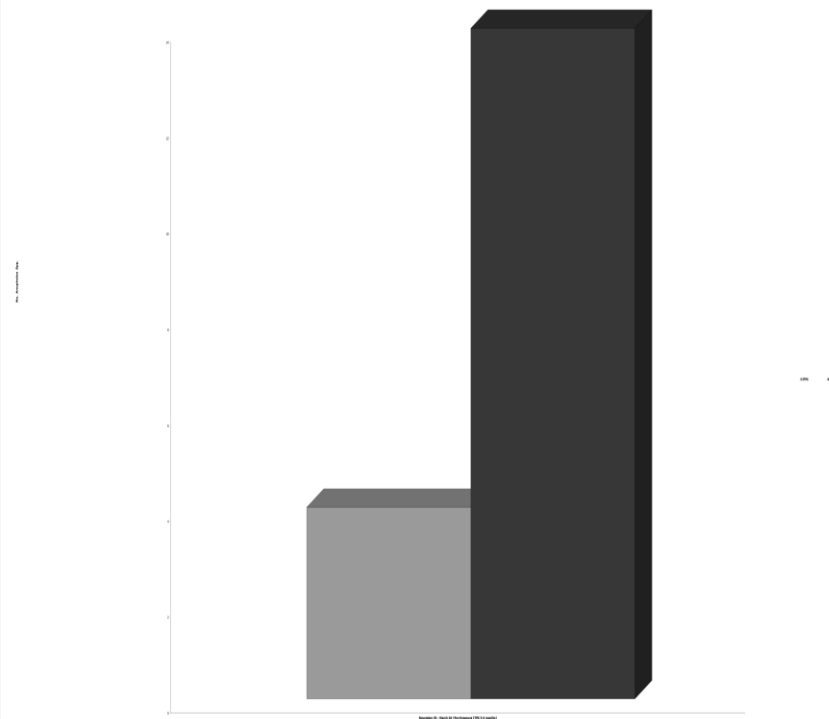
## MOSQUITOES IN TOBANDA

- ENTOMOLOGICAL EVIDENCE (HUMAN LANDING CATCHES & INDOOR RESTING CATCHES)
- PAIR MATCHED COMMUNITIES (CONTROL AND INTERVENTION BASED ON SWAMP LAND DISTANCES)

**Human Landing Catches; Tobanda Refugee Camp  
(Plastic Only Roof)**



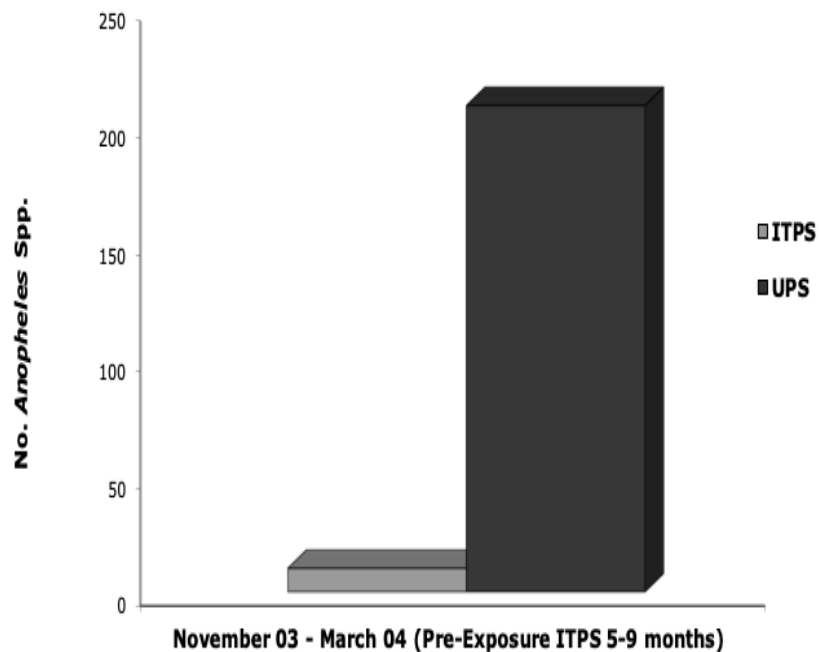
Indoor Resting Catches; Tobanda Refugee Camp (Plastic Only Roof)



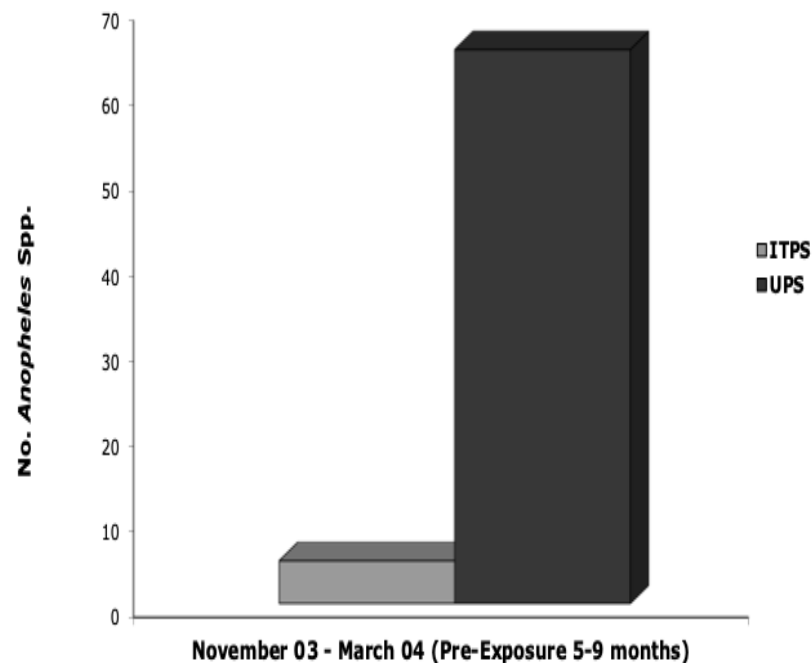
# MOSQUITOES IN LARGO

- ENTOMOLOGICAL EVIDENCE (HUMAN LANDING CATCHES & INDOOR RESTING CATCHES)
- PAIR MATCHED COMMUNITIES (CONTROL AND INTERVENTION BASED ON SWAMP LAND DISTANCES)

**Human Landing Catches; Largo Refugee Camp  
(Internal lining of plastic)**

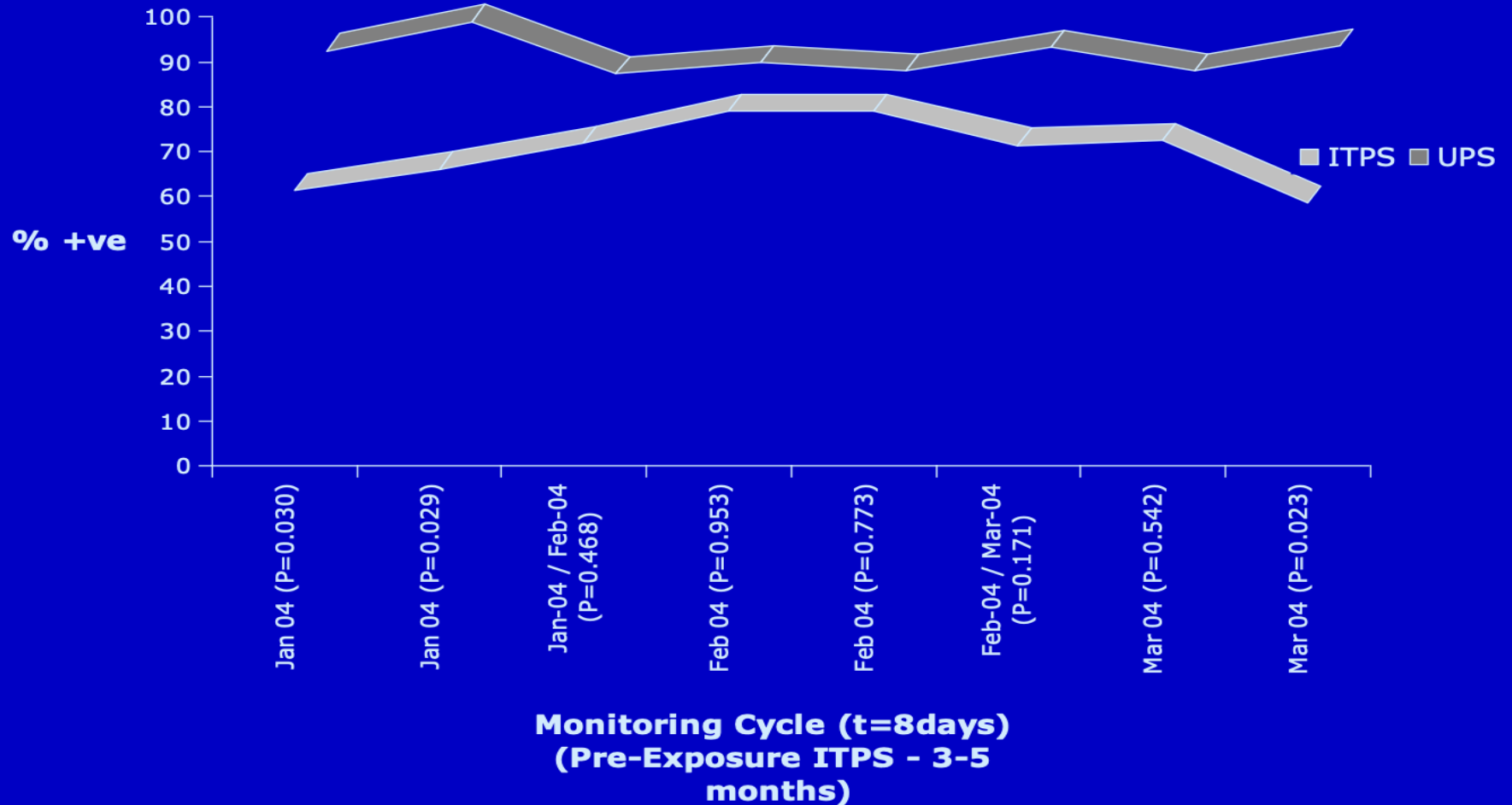


**Endophilic Resting Catches; Largo Refugee Camp  
(Internal lining of plastic)**



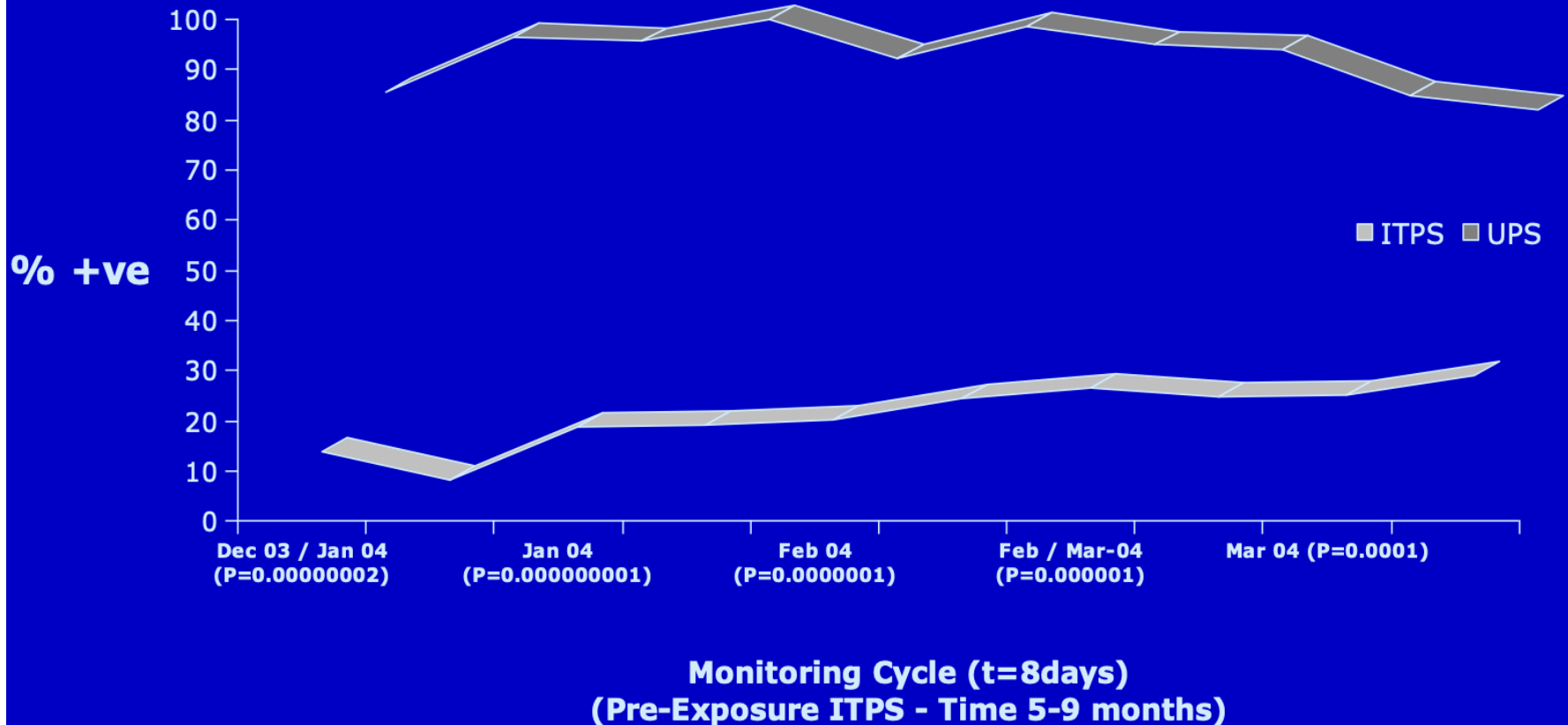
# Malaria in Tobanda

## Mean Monitoring Cycle RDT positivity rates; Tobanda Refugee Camp (Plastic Only Roof)



# Malaria in Largo

## Mean Monitoring Cycle RDT positivity rates; Largo Refugee Camp (Internal Lining)



## ITPS Use in Emergencies to Date

- 14000 Liberian refugees housed in 2 camps in Sierra Leone (2003-2005/6) (MENTOR/UNHCR)
- 13000 Liberian IDPs housed in 2 camps in Liberia (2003-2005) (IRC & other NGOs)
- Also used by NGOs in Darfur (MSF H) and Haiti (ICRC)
- Tsunami (Indonesia) 120,000 people housed along the Aceh west coast (+ 550,000 under IRS): MENTOR, + 12 NGOs (PCI, IRC, IMC, WV, SCF, etc)

# ITPS Use in Emergencies to Date

- 2006: Earth quake victims protected in Java



# ITPS Use in Emergencies to Date

- In all cases of shelter construction, the MENTOR team would build a “model” shelter to teach the community the appropriate construction techniques, thus transferring skills
- Families and communities would then proceed to construct their own frames with bamboo or salvaged wood while MENTOR provided the ITPS
- MENTOR also provided communities with necessary tools and equipment, including gloves, nails, hammers and saws



# ITPS Use in Emergencies to Date



# ITPS Use in Emergencies to Date



# ITPS Use in Emergencies to Date

- ITPS proved feasible to use on varied Indonesian shelter/house designs
- The majority of people built their own shelters after seeing community model
- 82% said that ITPS had a significant impact on insect of all types
- 94.5% reported no incidence of malaria or dengue whilst living under ITPS
- Minor irritation noted by 70% (due to not using gloves)
- 73% said they would be happy live under ITPS again