

## Introduction

- Premise inspections and larval source management of container-breeding *Aedes aegypti* are laborious and resource-intensive.
- The Premise Condition Index (PCI) was developed as a rapid assessment tool to predict household mosquito infestations (1).
- This study aims to assess the correlation between PCI scores or other housing variables and the presence of *Aedes aegypti* mosquitoes in areas of Kampong Cham, Cambodia.

## Methods

### Study site

The study site includes 30 clusters with approximately 200 households per cluster. Kampong Cham was purposively selected as it has one of the highest dengue incidence rates in Cambodia, and the environmental characteristics are similar to most dengue-endemic areas of Cambodia.



Figure 1: Map of clusters within study site

### Data collection

Each house was scored from 1 to 3 on each of three categories: shade condition, house condition, and yard condition. PCI rapid assessments and detailed household questionnaires were completed. Samples of immature and adult mosquitoes were collected from 1,200 households (40 randomised households in each of 30 clusters) at baseline.

### Data analysis

Both linear and logistic regression models were used to examine the association between PCI scores or other housing variables, and the presence or number of adult and/or immature *Aedes aegypti* mosquitoes present in the household.

## Results

- Association found between overall PCI score and presence and/or number of adult female *Aedes aegypti* mosquitoes.
- Of the three PCI criteria, shade condition is the only one positively associated with the presence and/or number of adult mosquitoes and pupae.
- Latrine use versus flush toilets is significantly positively associated with the presence of pupae.
- The use of long lasting insecticidal nets is significantly negatively associated with presence and/or number of adult mosquitoes.

Table 1. Association between number of *A. aegypti* and PCI score or other housing variables (Linear Regression)

Housing Variable	Adult Females Present per House				Number of Pupae Present per House			
	Model 1 (St. Error)	Model 2 (St. Error)	Model 3 (St. Error)	Model 4 (St. Error)	Model 5 (St. Error)	Model 6 (St. Error)	Model 7 (St. Error)	Model 8 (St. Error)
PCI Score (3-9)	0.0391*	(0.0206)			-0.428	(0.565)		
PCI - House Condition (ref=good, score=1)								
Moderate (score=2)	0.0272	(0.0616)		0.0192	(0.0780)		-0.507	(1.516)
Poor (score=3)	0.148	(0.100)		0.128	(0.119)		-1.806	(1.328)
PCI - Yard Condition (ref=clean, score=1)								
Moderately clean (score=2)	-0.116	(0.0809)		-0.142	(0.0867)		-0.994	(1.636)
Poorly maintained (score=3)	-0.119	(0.107)		-0.178	(0.113)		-1.318	(1.573)
PCI - Shade Condition (ref <25% shade, score=1)								
>25% and <50% shade (score=2)	0.0821**	(0.0398)		0.0585	(0.0431)		0.360	(0.778)
>50% shade (score=3)	0.221**	(0.0975)		0.210**	(0.100)		-0.0197	(1.018)
Ground level (ref=on stilts)			0.0810	(0.0868)	0.0465	(0.0842)		
House Type (ref=cement only)							-0.665	(0.535)
wood	0.127	(0.105)	0.0961	(0.105)			1.013	(1.002)
wood and cement	0.156	(0.110)	0.136	(0.109)			2.053	(1.256)
other material	0.291*	(0.157)	0.247	(0.168)			0.214	(1.174)
Painted Home (ref=not painted)								
exterior painted	-0.0663	(0.0498)	-0.0633	(0.0527)			2.046	(2.112)
interior painted	0.154	(0.0986)	0.162	(0.103)			-0.137	(1.935)
Curtains Present (ref=no curtains)	-0.0896	(0.0851)	-0.0868	(0.0872)			-2.416*	(1.419)
Owens Bed Net (ref=no bed net)								
conventional bed net	-0.00205	(0.0475)	-0.0102	(0.0496)			0.410	(0.868)
LLN bed net	-0.202***	(0.0526)	-0.175***	(0.0566)			-0.850	(0.742)
Uses Bed Net (ref=not used)	0.0523	(0.115)	0.0583	(0.119)			2.161***	(0.729)
Toilet Type (ref=flush toilet)								
latrine	0.0909	(0.0813)	0.0855	(0.0831)			3.447**	(1.598)
other toilet arrangement	0.0233	(0.0458)	0.0154	(0.0446)			1.097	(0.934)
Well/Bored Water (ref= piped)	0.0220	(0.0465)	0.0253	(0.0452)			-0.0695	(1.044)
Main Construct (ref=wood)								
corrugated iron	-0.0376	(0.145)	0.0178	(0.150)			-0.851	(0.676)
concrete/stone	0.0480	(0.0952)	0.0425	(0.0941)			0.453	(1.021)
other material	-0.181	(0.178)	-0.172	(0.176)			-0.208	(1.275)
Constant	0.0241	(0.117)	0.251***	(0.0736)	0.0234	(0.165)	0.108	(0.179)
Observations	1,179		1,179		1,131		1,179	
R-squared	0.003		0.012		0.014		0.025	

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 2. Association between presence of *A. aegypti* and PCI score or other housing variables (logistic regression)

Housing Variable	Presence of Adult Female <i>A. aegypti</i>				Presence of <i>A. aegypti</i> Pupae			
	Model 1 (St. Error)	Model 2 (St. Error)	Model 3 (St. Error)	Model 4 (St. Error)	Model 5 (St. Error)	Model 6 (St. Error)	Model 7 (St. Error)	Model 8 (St. Error)
PCI Score (3-9)	0.171**	(0.0786)			0.0942			
PCI - House Condition (ref=good, score=1)								
Moderate (score=2)	0.0289	(0.257)		0.0563	(0.299)		0.00988	(0.212)
Poor (score=3)	0.522	(0.330)		0.638	(0.397)		-0.373	(0.311)
PCI - Yard Condition (ref=clean, score=1)								
Moderately clean (score=2)	-0.262	(0.259)		-0.348	(0.266)		0.108	(0.237)
Poorly maintained (score=3)	-0.277	(0.334)		-0.488	(0.356)		0.231	(0.301)
PCI - Shade Condition (ref <25% shade, score=1)								
>25% and <50% shade (score=2)	0.250	(0.185)		0.187	(0.193)		0.364**	(0.158)
>50% shade (score=3)	0.812***	(0.309)		0.726**	(0.328)		0.568**	(0.289)
Ground level (ref=on stilts)			0.513	(0.318)	0.382	(0.321)		
House Type (ref=cement only)								
wood	0.931*	(0.543)	0.789	(0.540)			0.353	(0.455)
wood and cement	1.223**	(0.539)	1.150**	(0.532)			0.196	(0.448)
other material	0.840	(0.572)	0.542	(0.608)			0.376	(0.528)
Painted Home (ref=not painted)								
exterior painted	-0.416*	(0.252)	-0.378	(0.274)			-0.149	(0.209)
interior painted	0.652	(0.398)	0.677	(0.416)			0.390	(0.335)
Curtains Present (ref=no curtains)	-0.501	(0.425)	-0.534	(0.443)			0.0414	(0.313)
Owens Bed Net (ref=no bed net)								
conventional bed net	0.0382	(0.215)	-0.0102	(0.222)			-0.102	(0.210)
LLN bed net	-1.484**	(0.737)	-1.391*	(0.733)			-0.321	(0.473)
Uses Bed Net (ref=not used)	0.0777	(0.614)	0.105	(0.625)			0.183	(0.580)
Toilet Type (ref=flush toilet)								
latrine	0.461	(0.312)	0.446	(0.315)			0.876***	(0.279)
other toilet arrangement	0.177	(0.201)	0.106	(0.207)			-0.285	(0.182)
Well/Bored Water (ref= piped)	0.00657	(0.233)	0.0657	(0.236)			-0.0605	(0.208)
Main Construct (ref=wood)								
corrugated iron	0.846	(0.559)	1.130*	(0.578)			-0.322	(0.620)
concrete/stone	0.545	(0.456)	0.512	(0.450)			0.546	(0.421)
other material	0.287	(0.788)	0.365	(0.764)			-1.262	(1.116)
Constant	-2.531***	(0.471)	-1.604***	(0.296)	-2.765***	(0.840)	-2.601***	(0.887)
Observations	1,179		1,179		1,131		1,179	

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Figure 2: Water Jars in Khmer Household



Figure 3: Completing Entomology Survey

## Discussion

PCI and other rapid housing questionnaires may be cost-effective and time-saving tools to quickly identify potential risks for *Aedes aegypti* infestation, thus providing a more targeted focus for vector control and reducing the burden of vector-borne diseases in Cambodia.

References: 1). W Tun-Lin et al (1995). "The Premise Condition Index: a tool for streamlining surveys of *Aedes aegypti*. AJTMH 1995; 53(6):591-4.