

## **External Evaluation**

### **- Malaria Control project in Bukit Batu -**

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## I. INTRODUCTION

Yayasan Usaha Mulia (YUM) in cooperation with the Provincial Government of Central Kalimantan is currently implementing a comprehensive Malaria Control Project in the sub-district of Bukit Batu, Palangka Raya, Central Kalimantan.

The following health institutions are involved in the project:

- Palangkaraya Municipal Health Office,
- Tangkiling Primary Health Centre (Puskesmas) and
- Provincial Health Office of Central Kalimantan with the support of the Sub-Directorate of Malaria (Directorate General of Diseases Control and Environmental Health, Ministry of Health Republic of Indonesia).

Through cooperation with the local sub-district and village administrators, the project is also supported by the active participation of local community organizations including *Posyandu* cadres, *Posmaldes* cadres, *Juru Malaria Desa (JMD)* cadres, Village Midwives, trained teams of house sprayers and bed-net distributors, as well as local schools.

The malaria control project began in January 2008 in the villages of Marang and Habaring Hurung. In October 2008 the project expanded into Tumbang Tahai and Sei Gohong and will continue to grow into two more villages; Banturung and Tangkiling.

The project activities include the identification and treatment of malaria patients through Passive Case Detection (PCD) and Active Case Detection (ACD) systems, eradication of vectors through indoor residual spraying of houses and larvaciding, the distribution of insecticide treated mosquito nets, health promotion and education, monitoring, recording and reporting.

Following the activities of the malaria control project to date, an annual evaluation was conducted to assess the results attained and to identify any problems in the field during implementation of the project.

## II. PURPOSE

### A. General Purpose

To evaluate the results of the malaria control project during its first year of operation and to identify any problems encountered with the implementation of activities within the field.

### B. Specific Purposes

1. To assess the implementation of PCD and ACD, especially in terms of case finding mechanism through lab confirmation, case management, performance of Pustu nurses (Pustu is Sub-Puskesmas at village level) and JMDs (Village Malaria cadres), as well as the proper implementation of the recording and reporting system.
2. To assess malaria prevalence in locations where the basic survey was conducted last year.

3. To assess the ownership and utilization of long-lasting insecticide treated nets (LLiN) among families who have received the nets.
4. To assess the density of vector population and the likelihood that malaria will still be transmitted in the locations where intensive vector control activities have been carried out.
5. To assess the level of knowledge, attitudes and behaviours of community members and cadres in terms of motivation to prevent, seek medication and contain malaria.

### **III. METHOD**

The evaluation was carried out through the analysis of reports and available data, as well as field surveys as follows:

1. Interview with Puskesmas medical doctor, Pustu nurses and JMD cadres, as well as data analysis and report on malaria patient detection and treatment
2. Malariometric survey
3. Survey of ownership and use of mosquito nets (LLiN)
4. Malaria vector survey (Entomology)
5. Focus Group Discussions (FGD)

### **IV. THE EXECUTION OF EVALUATION**

The evaluation was performed by a team of external professional evaluators from health institutions including malaria experts from the Sub Directorate of Malaria including the Directorate General of Disease Control and Environmental Health and Ministry of Health - Republic of Indonesia, as well as team members from the Provincial Health Office of Central Kalimantan, Municipal Health Office of the Palangka Raya Municipality, Tangkiling Primary Health Center and YUM.

The team of professional experts provided the following technical support:

1. Interview with health officials and related data analysis:
  - Dr. Niken Wastu Palupi (Medical Doctor, Sub-Directorate of Malaria, MOH, R.I.)
  - Rita, SKM, MSi. (Central Kalimantan Health Office)
2. Malariometric Survey:
  - Edi Harianto, SKM, MSi (Entomologist; Sub-Directorate of Malaria, MOH, R.I.)
  - Marsudi Damar Jati (Palangkaraya Municipality Health Office)
  - Haili (Microscopist, Tangkiling Primary Health Center)
  - Soniasi (Health Program Officer, YUM Kalimantan)
3. Survey of the ownership and use of mosquito nets (LLiN):
  - Edi Harianto, SKM, MSi (Entomologist; Malaria Sub-Directorate, MOH, R.I.)
  - Soniasi (Health Program Officer, YUM Kalimantan)
  - M. Khotib (Field Assistant, YUM Kalimantan)
  - Lucy E. Thallon, MPH (Health Promotion specialist, AYAD)
  - Budi Irwanto (Tangkiling Primary Health Center)
4. Malaria Vector Survey (Entomology):
  - Sarjono (Entomologist, Sub-Directorate of Vector Control, MOH, R.I.)

- M. Khotib (Field Assistant, YUM Kalimantan)
  - Soniasi (Health Program Officer, YUM Kalimantan)
  - Lucy E. Thallon, MPH (Health Promotion Specialist, AYAD)
5. Focus Group Discussions (FGD):
- Dr. S. Sinto, MPH (Health Program Coordinator, YUM Jakarta)
  - Rita, SKM, MSc. (Entomologist, Central Kalimantan Province Health Office)
  - Budi Irwanto (Tangkiling Primary Health Center)
  - Amiarty (YUM Kalimantan)

## **V. PERIOD OF EVALUATION**

The evaluation of the project was carried out from 18th–22nd of March 2009, with three of these days spent in the field.

## **VI. RESULTS AND DISCUSSIONS**

### **A. Interview with Health Officials and Data Analysis**

19th March 2009

1. Result of interview and data analysis at Tangkiling Community Health Center
  - Not all of the clinical malaria cases have been confirmed through laboratory examination. On one hand this is caused by the inadequate number of paramedics at Pustu and Puskesmas; and on the other hand, it's due to the limited authority given to JMDs who are not allowed to take blood samples.
  - Pustu and Puskesmas staff have not yet completed training on malaria case management procedures based on the new Federal Ministry of Health policy.
  - The Palangka Raya Municipal Health Office issued a formal regulation which states that malaria treatment using the Artemisinin Combined Therapy (ACT) will start as of February 2009. Since the implementation of ACT side effects have been reported. These side effects include generalised rashes, weakness and vomiting, lasting approximately three days after treatment.
  - Limited supply of Primaquine.
  - Malaria treatment for pregnant mothers has not been properly socialized because health staff have not participated in the training on malaria case management based on the Central Ministry of Health's new policy.
  - Cross check of blood supply from Puskesmas to the Municipality and Provincial Health Offices has not been done.
  - Until the end of 2008, the Central Kalimantan Health Office had not adopted the new recording and reporting system as issued by the Central Ministry of Health.

2. Result of interview with Marang Pustu nurse and JMD cadres.
  - A small number of malaria cases were not detected by the JMDs, particularly when patients sought treatment outside the working hours of the Pustu, as the patients went straight to Puskesmas for treatment with the hope to receive direct treatment from the doctor or medical staff.
  - It was reported that Pustu's did not travel to see all patients within their area, as a result not all clinical malaria cases were confirmed through blood samples and clinical medication was given without face to face consultation between Pustu's and patients.
  - JMDs report clinical malaria cases to YUM twice a week, every Monday and Thursday.
  - Between June 2008 and the evaluation process no new clinical malaria cases were reported, presumably because the prevalence of malaria is decreasing.
3. Result of interview with Habaring Hurung Pustu nurse and JMD cadres.
  - Clinical malaria cases found by JMDs were brought to Pustu for blood sampling. However, if patients are unable to walk, they must wait for Pustu staff to come and take a blood sample. This activity doesn't always run to a definite schedule as Pustu staff are limited and very busy with field duties.
  - Some malaria cases come from inhabitants who work outside the village, up to 60 km away. When they come home they are frequently suffering from 'imported' cases of malaria.

### **Data analysis.**

From the above interviews and data analysis, the following points need to be looked into further.

1. Identification of malaria patients through ACD by JMD is currently not too effective for the following reasons:
  - As JMDs are not authorized to take blood samples, a time lag is often common between diagnosis and treatment. Currently each clinical malaria case identified by a JMD must be reported to a Pustu, after which the Pustu staff take a blood sample which is delivered to the Puskesmas and checked by the Puskesmas microscopist. If the result is positive, the Puskesmas must notify the Pustu staff so ACT treatment can commence. This process can last anywhere between three and five days which is of concern because a case of malaria may progress to a more severe illness in this time.
  - Due to health problems within local communities and other external field duties, Pustu staff are busy and seldom available at their station during working hours causing longer delays in taking blood samples.

The delay in ACD may be overcome in the following ways:

- Since JMD cadres are not allowed to take blood samples, they would better function like a common Posyandu cadre where one cadre is needed for each community group/block (ideally a *Desa Wisma* cadre is needed where one cadre serves 20 households). Their duties could be expanded to report when someone in the community is suffering from malaria, keep an eye on mosquito breeding places and do larvaciding when necessary. The cadres need to be trained for this additional duty, as well as much needed intensive socialization within the community.
  - It is necessary that the Palangkaraya Municipality Health Office, Central Kalimantan Health Offices and the Malaria Sub-Directorate give clear explanations to their field staff stressing that taking blood samples and examination of malaria patients is *free of charge*.
  - If the Pustu staff are too busy, the local Poslindes staff or Village midwife can be involved in the ACD process, as long as they have had proper training.
  - To speed up the lab confirmation process, it is recommended that YUM provide the Rapid Diagnostic Test (RDT) to Pustus and Polindes.
  - With the current system, an additional YUM Kalimantan staff member is required with a motorcycle to bridge JMD or cadres with Pustu and Polindes staff. The YUM staff member is responsible for conducting routine field visits, confirming malaria cases with RDT and treating confirmed cases with ACT in a speedy and accurate manner.
2. The practice of malaria case management is still not compatible with guidelines from the Ministry of Health because officers and staff at the Puskesmas, Pustu and Poslindes have not yet received training on the Ministry of Health's new malaria program.

To overcome this problem, training or socialization based on the new policy of the Ministry of Health needs to be carried as soon as possible. During the training it's essential that recording and reporting of case detection and management is covered.

## **B. Entomologic survey on Malaria Vector**

The vector survey was conducted in two locations: Habaring Hurung and Marang.

### **1. Results of vector survey at Habaring Hurung**

Mosquitoes were caught by means of body bait for a period of 12 hours between 18.00 and 06.00. Only one *Anopheles letifer* bit inside the house (Man Hour Density / MHD= 0,04) and two *Anopheles letifer* bit outside the house (MHD = 0,08).

No Anopheles were found on the walls of the houses surveyed. During the larvae survey, no Anopheles larvae were found. This means that the density of the anopheles vector at Habaring Hurung is very low.

## 2. Result of vector survey in Marang

After 12 hours of mosquito catching (with body bait) 17 *Anopheles letifer* that bit inside the house (MHD = 0,71) were caught, and 20 mosquitoes of the same species that bit outside the house (MHD = 0,83) were caught.

From the 37 samples of *Anopheles letifer* of which the ovarium were dissected, seven were found to be parous (had laid eggs); the Parity Rate being 18,92%.

Based on the said Parity Rate figure, the age of the mosquitoes can be calculated at the time the survey was done with the following mathematical approach:

$$P = \sqrt[A]{B}$$

P = daily life probability of mosquito

A = length of gonotropik cycle (about three days)

B = Parity Rate

$$P = \sqrt[3]{0,1892} = 0,5741$$

$$\text{Estimated mosquito life time} = \frac{1}{-\text{Ln } P} = \frac{1}{-\text{Ln } 0,5741} = \frac{1}{0,5549}$$

$$= 1,8 \text{ days}$$

Therefore with the estimated vector lifetime that was less than two days at the time of the survey, the probability is very small for a malaria disease transmission in that particular location.

This result is most probably due to the positive impact of vector control activities which have been carried out by YUM: Indoor residual spraying of houses, the distribution of insecticide treated mosquito nets and larvaciding.

Seven *Anopheles letifer* were found resting on house walls at night, indicating the need for house spraying to eradicate vectors in this location.

A larvae survey conducted in the vicinity of the mosquito catching site found low numbers of anopheles larvae within the neglected fishponds and marshes.

For the neglected fishponds and marshes with Anopheles larvae, *kepala timah* fish need to be added and bred, in addition to larvaciding. The breeding of kepala timah fish can extend the time needed between larvaciding.

### C. Survey on ownership and use of mosquito nets

According to available data, the use of Long Lasting Insecticidal Nets (LLINs) in four villages is as follows:

No	Village	Family	People	Distributed LLIN	Distribution Date
1	Marang	218	881	196	12-13 May 2008
2	Habaring Hurung	246	878	246	15 May 2008
3	Tumbang Tahai	608	2.013	582	25-26 Nov 2008
4	Sei Gohong	348	1.373	335	19-11 Dec 2008
	<b>Total</b>	<b>1.420</b>	<b>5.145</b>	<b>1.359</b>	

The above table shows that not all families received LLIN, as priority had been given to pregnant women, babies and children under five.

To better protect everyone living in the four villages against malaria infection, the outstanding need for mosquito nets is equal to total population divided by two, minus the number already distributed. Thus there is still a need for LLIN amounting to:

$$\frac{5145}{2} - 1359 = 1214.$$

YUM implemented a survey of net ownership to collect accurate data on:

- Number of pregnant women sleeping within the net
- Number of babies and children under five sleeping within the net
- Number of population sleeping within the net
- Knowledge, attitude and behaviour of people in the use and maintenance of LLIN

*The survey was done using the systematic random sampling method with the following sample units: Family/house with sample size/number 10% of total family/house receiving a mosquito net.*

*The survey was done using the survey format of the Ministry of Health. The survey was undertaken by YUM Kalimantan staff in cooperation with staff from the Puskesmas in Tangkiling, who have been trained and guided by officials from the Central Government. YUM is still awaiting the survey report from the Ministry of Health.*

## **RAW DATA**

The survey of the ownership of bed-nets was conducted in the following villages:

1. Marang :
2. Sei Gohong
3. Tumbang Tahai
4. Habaring Hurung.

Results of the bed-net survey:

ANALYSIS OF THE BEDNET OWNERSHIP SURVEY RESULTS								
Name of Village	Village population	Amount of Families surveyed	Ownership of bed-nets/ family	% of families with bed-nets purchased on their own	% Bed-nets distributed	% Amount of Family member using bed-net	% Children protected by bed-net	% Pregnant woman protected by bed-net
1. Marang	881	21	2	56,9	43,1	94,5	92,3	100
2. Tumbang Tahai	2.013	49	2	51,8	48,2	82,2	95,8	60
3. Sei Gohong	1.373	30	3	57,8	42,2	86,7	100,0	100
4. Habaring Hurung	878	27	2	44,2	55,8	90,2	100,0	0
Total amount	5.145	127	2	53,0	47,0	86,8	97,0	62,5

From the above table, it is revealed that:

- The average ownership of bed-nets for every family is 2 (two) bed-nets/family.
- From community-owned bed-nets, 47% of them were obtained from the distribution, while the rest were purchased on their own.
- Of 127 families surveyed, the number of family members who sleep with bed-nets is 86.8%.
- The percentage of babies who sleep under bed-nets is 97%.
- Percentage of Pregnant women who sleep under bed-nets is 62.5%.

BED-NET OWNERSHIP AND PRESERVATION SURVEY RESULTS

Name of Village	Village population	Amount of Families surveyed	Number of bed-nets owned			Member of Family			Children			Pregnant Women		
			Number of nets owned	Bed-nets purchased on their own	Bed-nets distributed	Amount	Sleep in a normal family	Sleep in LLiNs	Amount	Sleep in normal family	Sleep in LLiNs	Amount	Sleep in normal family	Sleep in LLiNs
1. Marang	881	21	51	29	22	91	56	30	13	7	5	1	1	
2. Tumbang Tahai	2.013	49	114	59	55	241	113	85	24	5	18	5	1	2
3. Sei Gohong	1.373	30	83	48	35	135	71	46	12	6	6	1	1	
4. Habaring Hurung	878	27	52	23	29	122	51	59	18	9	9	1	0	0
Total amount	5.145	127	300	159	141	589	291	220	67	27	38	8	3	2

#### D. Malarimetric Survey

A malarimetric survey was carried out in the two villages of Tangkiling and Habaring Hurung.

The survey started at the village's primary school and continued to the settlement of village people, targeting children below the age of nine years old for examination of blood sample and children between two-nine years old for spleen investigation.

The results of the survey are as follows:

##### 1. Tangkiling Village (limpa=spleen)

Age range	Spleen Investigation		Blood Sample Examination	
	Examined	Children with enlarged spleen	Examined	Malaria Positive
0 – 11 months	-	-	8	0
12 – 23 months	-	-	10	0
2 – 9 years	157	0	157	0
> 9 years	-	-	2	0
Total	157	0	177	0

The spleens of 157 children from two–nine years of age were investigated, with nil showing signs of enlargement (inflammation).

Blood samples from 175 children under the age of nine were taken and examined, all tested negative to the malaria parasite.

All blood samples were sent to Jakarta and were analyzed by a professional microscopist at the Sub-Directorate of Malaria, in the Central Ministry of Health.

##### 2. Habaring Hurung Village

Age range	Spleen Investigation		Blood Sample Examination	
	Examined	Children with enlarged spleen	Examined	Malaria Positive
0 – 11 months	-	-	7	0
12 – 23 months	-	-	8	0
2 – 9 years	91	0	91	0

> 9 years	-	-	-	-
Total	91	0	106	0

The spleens of 91 children from two–nine years of age were investigated, with nil showing signs of enlargement (inflammation).

Blood samples from 106 children under the age of nine were taken and examined, all tests were negative to the malaria parasite.

Compared to results during the Basic Survey done before the malaria control effort began, endemicity has decreased from Meso Endemic (Spleen Rate at Tangkiling 23% and Habaring Hurung 30,5%) to *Hypo Endemic* (Spleen Rate = 0 – 10%).

While in the age group of less than nine years old contamination was preventable in the two locations surveyed.

Although the scope is still inadequate, it seems that vector control has a significant contribution in the prevention of the spread of malaria in the location, in addition to malaria case identification and treatment.

This is also supported by vector data which shows that the average life span of a vector is short lived, less than two days.

In future, to prevent the spread of malaria to all people living in the four villages of Marang, Habaring Hurung, Tumbang Tahai and Sei Gohong, 1,214 more insecticidal mosquito nets need to be immediately distributed for the following reasons:

1. Survey results on ownership and use of mosquito nets during the period of guidance of YUM and Puskesmas staffs, shows that the community is willing to accept the nets and sleep with them regularly.
2. The results of house spraying cycle II between 8<sup>th</sup>-20<sup>th</sup> November 2008 showed that spraying did not cover all houses with an inadequate result as the consequence.
3. In Habaring Hurung from a total of 204 available houses, 138 houses (67,6%) were completely sprayed, 24 (11,8%) houses were partly sprayed and 42 (20,6%) houses were not sprayed at all.

In Marang, from 104 houses, 39 (37,5%) were sprayed completely, 28 (26,9%) houses were partly sprayed and 37 (35,6%) were not sprayed at all.

Some of the reasons as to why some houses were not sprayed at all, included permission from the residents and residents not

being home to permit access to the house for the sprayers. Moving forward the target number of houses receiving complete spraying should reach 90%.

Referring to the above findings, spraying is still needed but the quality of implementation must be enhanced. At least one spraying must be done before the distribution of LLIN, with the assurance that the mosquito net is used by community members to protect them from malaria mosquito bites.

4. Larvaciding is regarded to have not covered all places of potential breeding places because the wide spread locations have not been completely mapped.

The spawning of *kepala timah* fish at neglected fishponds and marshes will be imperative. The use of larvicides should be considered if the larvae density is high, when there are more than five larvae per scoop.

## **E. Focus Group Discussions (FGD)**

### **Location:**

- FGDs took place in the following three villages:
  1. Habaring Hurung and Marang on March 20<sup>th</sup> 2009,
  2. Tumbang Tahai on March 21st 2009.

### **Target:**

- In each village, interviews were conducted with three groups of ten women, ten men and ten cadres of Posmaldes or Posyandu respectively. Attendees included community members who had contracted malaria in the past.
- In total interviews were done with 30 women, 30 men, and 30 cadres of Posyandu/Posmaldes.

### **Interviewers:**

- Rita, SKM, MSc. (Central Kalimantan Provincial Health Office).
- Dr. S. Sinto, MPH. (Project Coordinator, YUM Jakarta).

### **Note-takers:**

- Budi Irwanto (Primary Health Care, Tangkiling)
- Amiarty (YUM Kalimantan)

### **Summary of Focus Group Discussions:**

- Most public participants vs cadres adequately understood almost all aspects about malaria disease, covering: *understanding, symptoms, means of spreading, risks and dangers, ways to obtain treatment and efforts on malaria disease prevention.*
- Most cadres understood the various aspects on malaria disease, covering: *aspects on knowledge and skill in conveying information to*

*communities, attitude, conduct, the feeling of self confidence as a cadre, self and community empowerment, partnership with communities, the use of media and the handling of environment.*

- Generally it seems that women understood more about each aspect of malaria compared to men.
- Overall, compared to the initial basic survey in 2007, the response of women and cadres on the various aspects queried in the questionnaire of the current FGDs shows much improvement.

### **Community hopes and expectations**

- The community expects that Pustu staff should be present at the clinics, especially during working hours, so that patients may immediately obtain health services and treatment.
- Politely requested that the number of bed-nets distributed be increased in order for each family to have two bed-nets.
- It is hoped that mosquito spraying and larvaciding will be provided again.
- It is hoped that visits from the health team to Posyandu or village could be done more often.
- At present, routine activities of Posyandu were done more frequently, therefore it is hoped that midwives and other Primary Health Care staff could attend Posyandu meetings more often.
- Cadres expect to have more training in order for them to improve their knowledge and have more skills.
- It is hoped that in addition to the malaria program, YUM will also develop other health programs.
- The SUBUD road (entrance to Subud complex at Marang village) that has been neglected for a long time should be cleared and repaired in order to keep the environment healthier. Currently this road is physically damaged with many holes and still water, which is very unhealthy to its surroundings.
- The community needs more access to information, and specifically information on health. This could happen for example through the availability of brochures, books and access to a library. YUM needs to improve socialization with the local community about the new library it has built in Suka Mulia (Tangkiling) to encourage greater access from the public.
- With regards to health education, local women need more skills, knowledge, tools, materials and methods of health education so that

audiences/participants in the Posyandu meetings will benefit from these monthly sessions and will be more encouraged to attend.

- Some Posyandus have no weighing scales and must borrow from other Posyandus. If possible, weighing scales for babies and adults could be provided by YUM for all posyandus.
- Neighborhood and Community units (RW and RT) should be involved in health/social programs as far as possible and should support and encourage health promoting activities for their communities.

## **VII. CONCLUSION AND RECOMMENDATIONS**

### **A. Conclusion**

1. Implementation of ACD by JMD cadres was found to be somewhat ineffective given the current regulation stipulating that JMD cadres are not allowed to take blood samples, thus causing time delays in case management and treatment.
2. Government health staff have not yet been trained on new guidelines from the Ministry of Health and as such the implementation of malaria case management is not working inline with the Ministry of Health.
3. Based on vector data and malariometric survey, results indicate that rates of malaria transmission in the survey area are now very low.
4. The community at large has a better understanding regarding malaria treatment, by directly going to health facilities, such as their Primary Health Center, Pustu, Polindes and private health services instead of going to traditional healers ("dukun").
5. LLiN bed-nets have shown a significant contribution to the prevention of malaria, though not all community members have received them yet.
6. Based on the results of the bed-net ownership and preservation survey, the average of bed-nets owned by community is 2 bed-nets per family.
7. Percentage of family members sleeping under bed-net is 86.8%
8. The percentage of babies sleeping under bed-net is 97%
9. The percentage of pregnant women sleeping under bed-net is 62.5%
10. There are still members of the community and cadres who have not properly understood the issues of malaria and health in general.

## **B. Recommendations**

1. As our evaluation has indicated that our ACD system is not so effective, it was proposed to replace it with the PCD system; where in order to accelerate the laboratory examination time YUM will provide Rapid Diagnostic Test (RDT) at Pustu.
2. In order to further enhance the performance of Pustu, YUM will need to:
  - a. Provide training to the cadres in order to improve the process of Information, Education and Communication (IEC) about malaria, in Posmaldes/Posyandu.
  - b. Train the cadres on how to monitor the existence of malaria breeding sites and report it to Pustu for proper handlings.
  - c. To further develop Health Promotion Programs in collaboration with Puskesmas, Pustu, Polindes, schools and community organizations.
  - d. Train the cadres to monitor the existence of malaria patients and advise the patient to go to Pustu or report it to Pustu for proper handling.
3. Clarification from the Palangkaraya Municipality Health Office and the Central Kalimantan Health Office is needed to firmly explain to all their field workers that taking blood samples and examinations, as well as medication for malaria patients should be free of charge.
4. Firm supervision is needed by Puskesmas and the Municipality Health Office of Pustu and Polindes, as well as strong supervision from YUM on JMD cadres, about malaria surveillance and health promotion.
5. Training of new malaria case management for government health personnel such as doctors, midwives and nurses at Puskesmas, Pustu and Polindes/Village Midwives is urgently needed.
6. Health Education/Promotion ought to be enhanced through improved methods, techniques, and demonstration tools.
7. Counseling/health promotions should be further improved; especially on the use of bed-nets by pregnant mothers so that all pregnant mothers and babies are well protected by the nets, by the means of better promotional techniques and supporting tools.
8. The use of LLINs is regarded to be most effective and efficient to prevent the spread of malaria in the location. For this purpose, an addition of 1,214 nets is needed for the four villages where LLINs have so far been distributed in order to protect all persons at the location.

## VIII. GLOSSARY

### **Active Case Detection (ACD)**

A type of case finding method where health personnel or cadres actively travel to see suspected malaria cases and follow up each case in accordance with a set of guidelines.

### **Anopheles Letifer**

Anopheles Letifer is a type of Anopheles mosquito which is a common vector (hosts and transmits) of malaria within Indonesia.

### **Artemisinin Combination Therapy (ACT)**

A highly active combination therapy used to treat malaria and recommended by the World Health Organisation.

### **Basic survey**

Prior to the project implementation, a team of surveyors from the Ministry of Health and local health office, coordinated by YUM Consultant Djohar Kusumahdiharja, performed a basic survey to collect related data and information. Period of survey was 9 – 12 November 2006.

### **Cadres**

Local community volunteers, mostly women, who have been trained by the staff at YUM to have specific health knowledge and skills. There are different types of Cadres, for example, Posyandu Cadre, Posmaldes Cadre, and JMD Cadres.

### **Entomological Survey**

A survey which looks at mosquitoes, their patterns of behaviour, breeding, life span, and the density of population in a specific area. This helps to determine the numbers of mosquitoes in an area which are capable of transmitting diseases such as malaria.

### **Juru Malaria Desa (JMD) Cadres**

JMD Cadres have been trained by the YUM staff to have specific health knowledge and skills, particularly in regards to malaria. They assist YUM's Malaria Control Project within the villages and work as a part of Active Case Detection.

### **Larvaciding**

Larvaciding is a method of eradicating anopheles mosquito larvae. This process involves a systematic examination of stagnant water areas (potential mosquito breeding sites) where staff from YUM and community cadres look at the water and in areas where anopheles larvae are identified an insecticide is added to the water. The staff and cadres are trained in this process and the insecticide used targets the larvae without affecting the surrounding eco system.

### **Long Lasting Insecticide Nets (LLIN)**

A type of long lasting mosquito net that has been treated (impregnated) with a user-friendly insecticide. When used it prevents people from being

bitten by mosquitoes whilst they are sleeping. The nets are recommended by the World Health Organisation as a method of vector control.

### **Malariometric Survey**

A survey which is carried out to look at the number of positive cases of malaria within a population. The technique involves taking blood samples and examining the spleen (looking for inflammation) from a chosen population where malaria is suspected.

### **Parity rate**

The rate at which a mosquito multiplies (breeds) can be determined by looking at its parous state. During an entomological survey an entomologist will examine a female anopheles mosquito under a microscope and is able to determine whether or not that mosquito has been breeding.

### **Passive Case Detection (PCD)**

Is a type of case finding method where health personnel wait for the patient to visit their health centre (e.g Pustu) rather than actively seeking suspected cases as in ACD.

### **Polindes – Pos Persalinan Desa**

Poslindes are managed by a midwife and assisted by a nurse(s) to provide the delivery of maternal health services to a village.

### **Posmaldes - Pos Malaria Desa**

Posmaldes Cadres are trained by YUM staff with the knowledge and skills to address malaria issues within their respective villages. Posmaldes are mostly run by women volunteers and are managed by local community cadres.

### **Posyandu – Pos Pelayanan Terpadu**

A posyandu is a community health group (post) which gathers once per month in each respective village. This group is run by cadres who are local women and specifically look at issues relating to maternal and child health.

### **Puskemas – Pusat Kesehatan Masyarakat**

A central Community Health Centre that provides health care and oversees the health management of a sub-district and all the village health posts.

### **Pustu - Puskesmas Pembantu**

A Pustu is a small community health post which is run by a nurse and managed by the Puskesmas. There is at least one Pustu based in each village.

### **Pustu Nurse**

A Pustu Nurse is a nurse from the Puskesmas who manages a Pustu and is similar to a paramedic. Their role is important in supporting the health of each respective village.

**Primaquine**

Primaquine is a drug which is used as a malaria treatment, and is often used in combination with other anti-malaria drugs such as ACT.

**Rapid Diagnostic Test (RDT)**

An antigen detection test which can be used in areas where microscopy is not available and staff are not experienced at malaria diagnosis. These tests only require a finger prick of blood, and the completed test only takes about 15-20 minutes as a laboratory is not needed. These tests have been specifically designed and field tested and are an accurate convenient way to diagnose malaria, specifically in remote areas.