SCOPE OF WORK TO BE PERFORMED WHEN A MALARIA PATIENT IS REPORTED

Anti Malaria Campaign
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Anti-Malaria Campaign (AMC)
SCOPE OF WORK TO BE PERFORMED WHEN A MALARIA PATIENT IS REPORTED

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Approved by:		Director - AMC	24.03.2016

Background

With no indigenous malaria cases being reported since November 2012, Sri Lanka is currently in the prevention of re-introduction phase of malaria elimination. However, imported malaria patients continue to be reported and vector mosquitoes are highly prevalent in the dry and intermediate zones of the country. Early diagnosis and treatment of malaria cases and case-based preventive measures have become the highest priority for prevention of re-introduction of malaria.

Objectives

This scope of work outlines the activities to be performed at the level of medical institutions, Regional Malaria Offices and Anti Malaria Campaign Headquarters (AMC HQ), when a malaria patient is detected. The objectives of these activities are:

- To ensure rapid and complete elimination of the malaria parasite from the patient's blood in order to prevent
  - the progression of uncomplicated malaria to severe disease or death.
  - the emergence and spread of resistance to anti-malarial medicines.
- To prevent onward transmission of the infection to others by reducing the infectious reservoir and vector mosquitoes
- To ensure compliance with WHO requirements for certification of Sri Lanka as having eliminated malaria, and thereafter, to sustain the malaria-free status. This would require quality assured diagnostic, treatment, management and documentation procedures as specified by WHO and outlined here.

Activities

1. Confirmation of diagnosis

1.1 At medical institution

1.1.1 In every suspected case of malaria, laboratory confirmation by microscopic examination of blood smears and/or Rapid Diagnostic Test (RDT) is mandatory prior to initiation of anti-malarial treatment.

1.1.2 Blood should be collected for further investigations prior to the administration of anti-malarial medicines in:

- all malaria patients diagnosed by microscopy or RDT.
- patients who have to be treated on the basis of clinical suspicion as a life saving measure without laboratory confirmation of malaria.

Blood should be collected according to the guidelines issued by the Department of Health

(General Circular No. 02-112/2014 issued by the Director General of Health Services).

1.1.3 If microscopy and RDT are negative but the clinical features are strongly suggestive of malaria, a minimum of three blood smears/RDTs should be examined on three consecutive days and whenever possible the diagnosis needs to be verified by PCR test.

1.2 At Regional Malaria Office

Whenever a malaria patient has been reported, the Regional Malaria Officer (RMO) should take measures to confirm the diagnosis by microscopic examination of blood smears and Rapid Diagnostic Test (RDT).

1.2.1 If a blood smear has been examined, RMO should validate the result by the regional Public Health Lab Technician trained on Quality Assurance and Quality Control of malaria microscopy (QA/QC PHLT) and send the blood smear with the comments of the QA/QC PHLT to the AMC HQ reference laboratory. Blood for PCR should also be collected and sent to AMC reference laboratory.

1.2.2 If only a RDT has been performed the result has to be confirmed by microscopy and if necessary by PCR. RMO staff should immediately prepare blood smears, perform another RDT and collect blood for PCR. RMO should send the performed RDTs, blood smears and blood for PCR to the AMC HQ.

1.2.3 In the event of any patient being treated without laboratory diagnosis blood should be tested by RDT and microscopy and collected for PCR as early as possible.

1.3 At Anti Malaria Campaign Headquarters

Laboratory results of every patient reported in the country should be re-confirmed at the AMC HQ.

1.3.1 If the initial positive blood smear is available (with or without RDT result), the presence of malaria parasite, species and density must be confirmed at AMC reference laboratory. Any discrepant result with initial microscopy and/or regional validation should be resolved by PCR.

1.3.2 If the initial blood smear is negative, and the RDT performed at that time is positive, they should be cross checked at AMC reference laboratory. If the discrepancy persists, RDT result should be verified by PCR.

Microscopy, RDT, collection of blood for PCR should be performed according to the current SOPs and guidelines issued by the Department of Health (General Circular No. 02-112/2014 issued by the Director General of Health Services).

2. Treatment

2.1 At Medical Institution

Patient should be treated with anti-malarials if the initial blood smear /RDT performed by an authorized trained person is positive.

2.1.1 Treat the malaria positive patient according to the guidelines issued by the Department of Health (General Circular No. 02-112/2014 issued by the Director General of Health Services). Please note that as per the above circular it is mandatory to treat all malaria patients as inward patients for a minimum of three days.

2.1.2 It is preferable to test for G6PD deficiency prior to administration of primaquine as anti relapse therapy in P vivax patients. If it is not possible, all precautions for preventing haemolysis should be taken (Annex I).

2.1.3 Blood smears should be examined daily as stated in the General Circular No. 02-112/2014 issued by the Director General of Health Services to ensure effective parasitological response to anti-malarial drugs.

2.1.4 Patient should be managed under a mosquito net until parasitaemia clears.

2.1.5 On discharge, patient should be made aware of

- subsequent follow up visits arranged by the AMC and
- the importance of taking primaquine for 14 days in the case of P. vivax /P. ovale patients.

2.1.6 Patients who give a history of malaria overseas within 6 weeks of arrival in Sri Lanka should be managed as stated in Annex II.

2.2 Coordination by AMC HQ/RMO

2.2.1 The AMC should ensure timely availability of appropriate anti-malarial medicines for the treatment of patients.

2.2.2 The Consultants/MOO-AMC/RMO should coordinate the treatment process and provide guidance if required.

2.2.3 The parasitologist-AMC/RMO should ensure the examination the blood smears as stated in section 2.1.3.

2.2.4 Follow up arrangement should be decided after discussing with the patient and a diagnosis card should be given to him/her with dates of follow up.

3. Notification and recording

3.1 At medical institution

3.1.1 Any patient suspected/diagnosed of having malaria should immediately be notified via telephone to the Regional Malaria Officer (RMO) and AMC HQ by the ward doctor/lab technician. In addition, it should be notified to the Medical Officer of Health (MOH) of the area where the patient resides following the standard notification procedure (Form H544).

The contact numbers of the AMC Headquarters and the RMOs are given in Annex III.

3.1.2 Laboratory Technician in the institution should enter the details of the diagnosed malaria patients in the Positive Case Register maintained at the institution / laboratory and initiate entering the H/AMC/P4 and H/AMC/P 5 forms.

3.2 At RMO Office /AMC HQ

3.2.1 Basic details of the diagnosed patients should be entered in the web-based database within 24 hours by the area RMO/ Surveillance Medical Officer–AMC. The database should be updated and completed as and when the RMO gets further details

3.2.2 All malaria patients should also be notified to RMOO/ MOOH of the areas where patient had stayed at least one night during;

a. the present clinical illness before the completion of initial three days of anti-malarial medicines

b. the two weeks preceding the onset of current clinical episode.

by the area RMO/Surveillance Medical Officer – AMC HQ as early as possible, at least within 48 hours.

3.2.3 If the patient is staying in a different RMO region during the follow up period (up to 42 days in P. falciparum malaria and up to 1 year in P. vivax malaria), the RMO of that region should be informed by the RMO/Surveillance Medical Officer-AMC HQ who provided care for the patient during the current episode of malaria.

3.2.4 Patient information should be entered into the Positive Case Register maintained at the RMO Office (in the case of patients reported to AMC HQ, Parasitologist should enter the data into the Positive Case Register maintained at Central laboratory). In addition H/AMC/P4 and 5 forms should be maintained.

3.2.5 Information on all malaria patients should be entered in the National Malaria Case Register maintained at the AMC HQ with a unique identification number assigned to each case and a file should be maintained for each case with all the relevant information. Information pertaining to all the patients reported /followed up in a particular RMO region should also be maintained at that RMO office.

3.2.6 Each case should reviewed by the Case Review Sub Committee of the Technical Supportive Group and case classification should to be certified by them.

4. Case investigation and response

Each notified case of confirmed malaria should lead to a case investigation in the field. The field investigation consists of:

- Obtaining the details of the confirmed case
- Reviewing the details of cases reported previously in the same locality
- Active case detection in the populations in relation to the malaria case, thought likely to habour parasites
- Obtaining information on potential malaria vectors from the vicinity of the case

4.1 Responsibility and Coordination

4.1.1 Case investigation should be initiated within 24 hours following the notification of the case.

The relevant officers (area RMO/ where RMOO are not available, Surveillance Medical Officer – AMC HQ) in the district where patient was staying at the time of notification should take the responsibility of the initial case investigation. H-M/Sur-01 form should be used for entering data from the case investigation.

4.1.2 All malaria patients should also be investigated by the relevant staff in areas where patient had stayed at least one night during period mentioned in section 3.2.2.

4.1.3 Coordinators of the regions at AMC HQ should assist and facilitate the case investigation activities.

4.1.4 Duly filled case investigation form (H-M/Sur-01) should be submitted to AMC HQ within two weeks of the case notification.

4.2 Classification of the case

4.2.1 Each malaria case should be classified as an indigenous/ imported/ induced/introduced or

a relapse case subjected to confirmation by the Case Review Committee.

4.3 Parasitological surveillance

4.3.1 Screening for malaria parasites through the examination of blood smears or malaria antigen by RDT in all household contacts and neighbourhood residents living in approximately one kilometre radius should be done in all receptive areas as stated in section 3.2.2.

Screening should be repeated after 3-4 weeks to detect secondary cases.

4.3.2 When investigating imported malaria patients, every effort should be taken to trace contacts who had visited malaria endemic countries with the patient and screen them for malaria.

4.3.3 Steps should be taken to strengthen malaria surveillance among the fever patients visiting government and private health institutions in the respective area.

4.4 Entomological surveillance and vector control

4.4.1 Entomological investigations and necessary vector control activities in the area should be performed according to the "Guidelines on Entomological Surveillance and Vector Control when a malaria case is reported" (Annex IV) by relevant RMO/AMC HQ. The entomological investigation has to be initiated within 48 hours of reporting the case, in an area of approximately 1 km radius of the residence of malaria patient.

4.4.2 Vector control activities should be conducted according to the said guidelines, if adult or larvae of vector mosquito is detected in the entomological investigations conducted.

4.5 Other activities

4.5.1 Health education should be provided on important aspects of malaria such as early detection, importance of compliance to anti-malarial treatment/follow up visits and protective measures against malaria – to patient/contacts/other relevant persons by relevant staff of AMC and the medical institution in which the patient is being treated.

4.5.2 The GPS coordinates where the patient resided in, on the night prior to date of diagnosis and perimeter of screening must be recorded and informed, to AMC HQ.

5. Follow up

5.1 A blood smear and a finger prick filter paper sample should be obtained daily over the three days that the patient was hospitalized. If parasitaemia persists beyond 3 days, blood smears should be taken daily until parasitaemia clears.

5.2 Subsequently repeated examination of blood smears and collection of blood samples for PCR should be arranged by relevant RMO/Surveillance Medical Officer AMC as follows (considering the date of diagnosis as Day 0);

- in *P.vivax* malaria: on Day- 7, 14, 21, 28, 42 and then monthly for 1 year

- in *P.falciparum* malaria: on Day- 7,14,21, 28 and 42

H/AMC/P4 form should be completed during these visits.

Check for malaria if patient develops fever in between these follow up visits.

5.3 The completion of Primaquine treatment for 14 days by patients who had P.vivax malaria should be ensured in the follow up visits. This should be done by assessing the number of tablets remaining with the patient and number of days left for the completion of the full course of Primaquine. It should be ensured that a minimum of three doses of Primaquine are administered under direct observation during case investigation/ follow up visits (on date of discharge, Day 7, Day14).

6. Maintaining the slide bank and genotyping

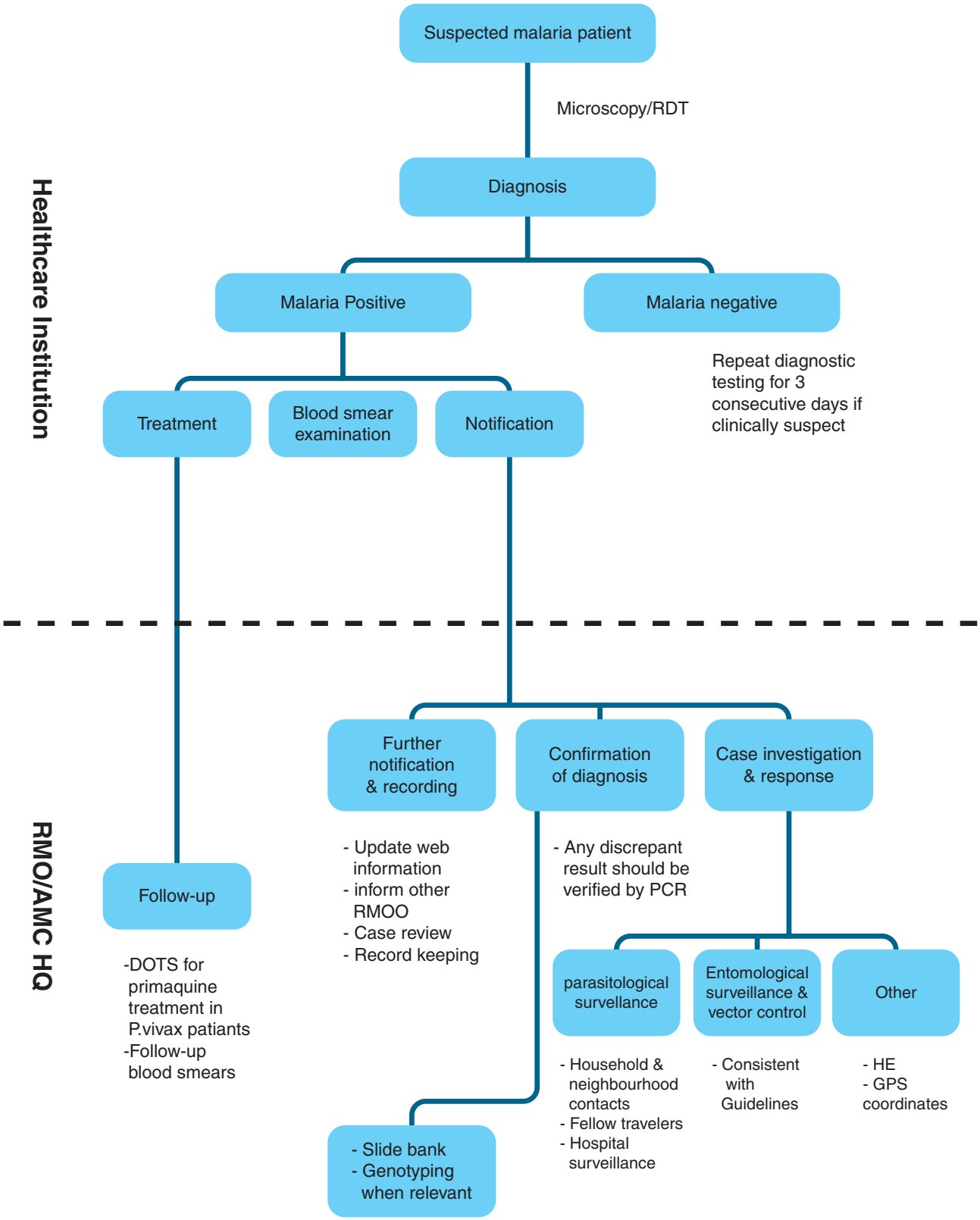
6.1 RMO

RMO should send the positive slide on which the diagnosis was based and at least two more slides taken prior to treatment, and follow-up slides with relevant H/AMC/P4 and 5 forms to the AMC HQ.

6.2 AMC HQ

6.2.1 Parasitologist AMC should maintain a slide bank of all positive malaria patients at AMC reference laboratory. All initial blood smears should be labelled according to the serial number of the National Malaria Case Register. All available follow-up slides should be maintained separately.

6.2.2 Genotyping of parasites to be done when relevant, consistent with the current WHO guidelines, for any suspected introduced or indigenous case, recrudescence, relapses and the index case.


Healthcare Institution
Suspected malaria patient
Microscopy/RDT
Diagnosis
Malaria Positive
Malaria negative
Repeat diagnostic testing for 3 consecutive days if clinically suspect
Treatment
Blood smear examination
Notification
RMO/AMC HQ
Follow-up
-DOTS for primaquine treatment in P.vivax patiants
-Follow-up blood smears
Further notification & recording
- Update web information
- inform other RMOO
- Case review
- Record keeping
Confirmation of diagnosis
- Any discrepant result should be verified by PCR
Case investigation & response
parasitological survellance
- Household & neighbourhood contacts
- Fellow travelers
- Hospital surveillance
Entomological surveillance & vector control
- Consistent with Guidelines
Other
- HE
- GPS coordinates
- Slide bank
- Genotyping when relevant

Annex I

Precautions with Primaquine anti- relapse therapy

Primaquine anti-relapse therapy for 14 days is recommended by WHO for *P.vivax /P.ovale* patients after testing negative for G6PD deficiency. If, however, testing is not available, and primaquine must be administered then all precautions should be taken to prevent an acute haemolytic anaemia if the patient is G6PD deficient, as follows:

- A history should be taken to exclude the possibility of the patient being G6PD deficient by way of:
  - A past history of haemolysis in response to a medicine (passing dark coloured urine).
  - A family history of haemolysis with primaquine
- The patient and the care giver should be advised of the possibility of a haemolytic reaction after taking the medicine, and the early signs of haemolysis described – i.e. symptoms of excessive tiredness, weakness, passing red (dark) coloured urine, fever, and in the event of such symptoms advised to:
  - Stop the medicine immediately and
  - Report to the nearest health facility
- Patient should have access to health facilities with capacity for safe blood transfusion (in the event of an acute haemolytic event)

Annex II

Managing patients who give a history of malaria overseas within 6 weeks of arrival in Sri Lanka

A person who has arrived in Sri Lanka following a stay abroad in a malaria endemic country, and who tests positive on microscopy or RDT within six weeks of arrival should be radically treated.

A person who is microscopy negative and RDT negative but gives a history of having malaria within six weeks in a foreign country and there is no evidence of a complete course of antimalarial treatment given (includes cases of partial treatment or no treatment), the patient should be treated radically as per national treatment guidelines. Such a patient though provided with radical treatment will not be considered a case.

A person who is microscopy negative and RDT negative but gives a history of having malaria within six weeks in a foreign country, and there is evidence of complete antimalarial treatment against asexual blood stages, but no evidence of treatment with primaquine, the patient should be treated with primaquine depending on the species after testing for G6PDd in the case of *P.vivax* and *P.ovale* infections. In cases where the infecting species is unknown, a decision on the dose and duration of primaquine therapy should be based on the prevalent species in the country in which the infection was acquired. Such a patient will not be considered a case.

Annex III

Anti Malaria Campaign Headquarters

Tele: (011) 2588408, (011) 2368173 Hotline: (011) 7626626
Web: www.malariacampaign.gov.lk e-mail: antimalariacampaignsl@gmail.com

Regional Malaria Offices

Ampara	(063) 2223464	Kandy	(081) 2210687	Monaragala	(055) 2276698
Anuradhapura	(025) 2221844	Kegalle	(035) 2222549	Mullaitivu	(021) 2060007
Badulla	(055) 2229560	Kilinochchi	(021) 2285517	Polonnaruwa	(027) 2226018
Batticaloa	(065) 2222931	Kurunegala	(037) 2222193	Puttalam	(032) 2265319
Hambanthota	(047) 2220135	Maho	(037) 2275254	Ratnapura	(047) 2230301
Jaffna	(021) 2227924	Mannar	(023) 2250515	Trincomalee	(026) 2222584
Kalmunai	(067) 2220206	Matale	(066) 2222295	Vavuniya	(024) 2222954

Guidelines on Entomological Surveillance & Vector Control when a malaria patient is reported

Malaria case is reported

Entomological Surveillance (Reactive)

Carry out entomological investigations in all the ares, where the patient has stayed at least one night within the previous two week since onset of fever/ clinical features and until diagnosed. This should be initiated within 48 hours the case being reported

Carry out a comprehensive larvel survey covering different types of potential Anopheles mosquito breeding sites in area of approximately 1km radius of the location of the case.

If *Anopheles* larvae are not detected or potential breeding sites of known vectors are not detected in the area of approximately 1km radius of the location of the case, adult mosquito surveys & vector control may be exempted as decided by the relevant authority.

If potential anopheline mosquito breeding sites are availible in approximately 1 km radius area (of the location of the case, carry out adult mosquito collection techniques preferably indoor hand collections / spray sheet collections and human landing catches (preferably full night collection).

Priamry and/ or secondary vector detected

Carry out salivary gland dissections for malaria parasites and send mosquitoes for PCR technique to be performed at AMC HQ.

Appropriate vector control interventions selected from the following should be carried out taking into account the bionomics of vector based on a current analysis and local evidence.

Vector control interventions

1. Indoor Residual Spraying (IRS) of all houses and dwellings should be done within approximatery 1 km radius of the location of the case.
2. if the entomologycal surveillance conducted for the reported case or previous entomological surveys conducted in the same area indicated that the vector population in the area is exophillic / exophagic, then two rounds of fogging (one week apart) need to be done.
3. LLIN distribution within appoximately 1 km radius of the location of the case.
4. Larval control :-a). Chemical Control

   Application of larvicides to all possible *vector mosquito* breeding places within approximatery 1 km radius of the location in the case. When Temephos EC is used a second round of larvicide should be applied to the same breeding places 10-12 days the first round.

   b). Other vector control including bio environmental measures applied if relevent.

Review the entomological surveillance & vector control activaties as required and decided by the relevent authority.

**** There may be alternations according to availible local evidance as decided by the relevant authority**

Amendment to the entomological surveillance & vector control activities when a malaria patient is reported: Annex IV of Scope of work to be performed when a malaria patient is reported

This document should be in line with guidelines on entomological surveillance & vector control when a malaria patient is reported in the scope of work to be performed when a malaria case is detected where primary and/or secondary vector detected.

List of Malaria vectors of Sri Lanka

Primary malaria vector is *Anopheles culicifacies* while 10 other species have been implicated in malaria transmission at field level. They are *Anopheles subpictus, Anopheles annularis, Anopheles varuna, Anopheles vagus, Anopheles tessellatus, Anopheles nigerrimus, Anopheles peditaeniatus, Anopheles pallidus, Anopheles barbirostris* and *Anopheles jamesii* (Konradsen *et al.*, 2000). The recently reported *Anopheles stephensi* is considered as an invasive potential vector in Sri Lanka.

Table 1. Selected characteristics of malaria vectors in Sri Lanka based on entomological data of Anti Malaria Campaign collected during last four years

Species	Indoor resting behaviour	Man biting behaviour	Seasonality	Malariogenic potential	Distribution
An.culicifacies	++	+++	+	+++	Dry & intermediate zones
An.subpictus	+++	++	++	++	Dry & intermediate zones
An.annularis	+	++	++	++	Dry & intermediate zones
An.varuna	++	++	+	++	Wet, dry & intermediate zones
An.vagus	++	++	++	++	Wet, dry & intermediate zones
An.tessellatus	+	++	++	++	Wet, dry & intermediate zones
An.nigerrimus	++	+	+	+	Wet, dry & intermediate zones
An.peditaeniatus	+	+	+	+	Wet, dry & intermediate zones
An.pallidus	+	+	+	+	Dry & intermediate zones
An.barbirostris	+	+	+	+	Wet, dry & intermediate zones
An.jamesii	+	+	+	+	Wet, dry & intermediate zones
An. stephensi	-	++	++	++	Dry zone

+++ High ++ Moderate + Low

Depending on the above analysis, of the species found with moderate and high malariogenic potential and distribution in the country, six species (*An. culicifacies, An. subpictus, An. annularis, An. varuna, An. vagus* and *An. tessellatus*) are considered for the reactive vector control actions. If *An. stephensi* is found, consider as an invasive potential species for reactive response. Details of the vector control actions for above seven species are shown in table 2.

Table 2. Reactive vector control interventions[1] to be carried out for each of malaria vector species which are considered as having high or moderate malariogenic potential

Vectorial status	**Species**	**Reactive Vector Control Interventions[2,3]**
Primary vector	*An. culicifacies*	IRS, LLIN distribution, larviciding & focal fogging
Secondary vector	*An. subpictus*	If any of two of following factors are present take appropriate vector control actions 1. Previous malaria endemic area 2. Presence of gametocytes by microscopy 3. Presence of human biting
Secondary vector	*An. annularis*	
Secondary vector	*An. varuna*	
Secondary vector	*An. vagus*	
Secondary vector	*An. tessellatus*	
Invasive potential vector	*An. stephensi*	Larval control and source reduction, focal fogging and IRS depending on the insecticide susceptibility status.

[1] Reactive vector control should be always as per the guidelines on entomological surveillance & vector control when a malaria patient is reported in the scope of work to be performed when a malaria case is detected (last page).

[2] In addition to above seven species if any Anopheline species has shown human biting behavior in a reactive surveillance, appropriate vector control actions to be taken.

[3] Any deviations from the above are accepted according to available local evidence as decided by the Regional Director of Health Services in consultation with Director, Anti Malaria Campaign and relevant RMO.

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Director
Anti Malaria Campaign

21/05/2014

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Date