Kingdom of Cambodia

Ministry of Health

DRAFT EXECUTIVE SUMMARY

Strategic Plan

For

Elimination of Malaria in Cambodia

2011-2025

February 2011

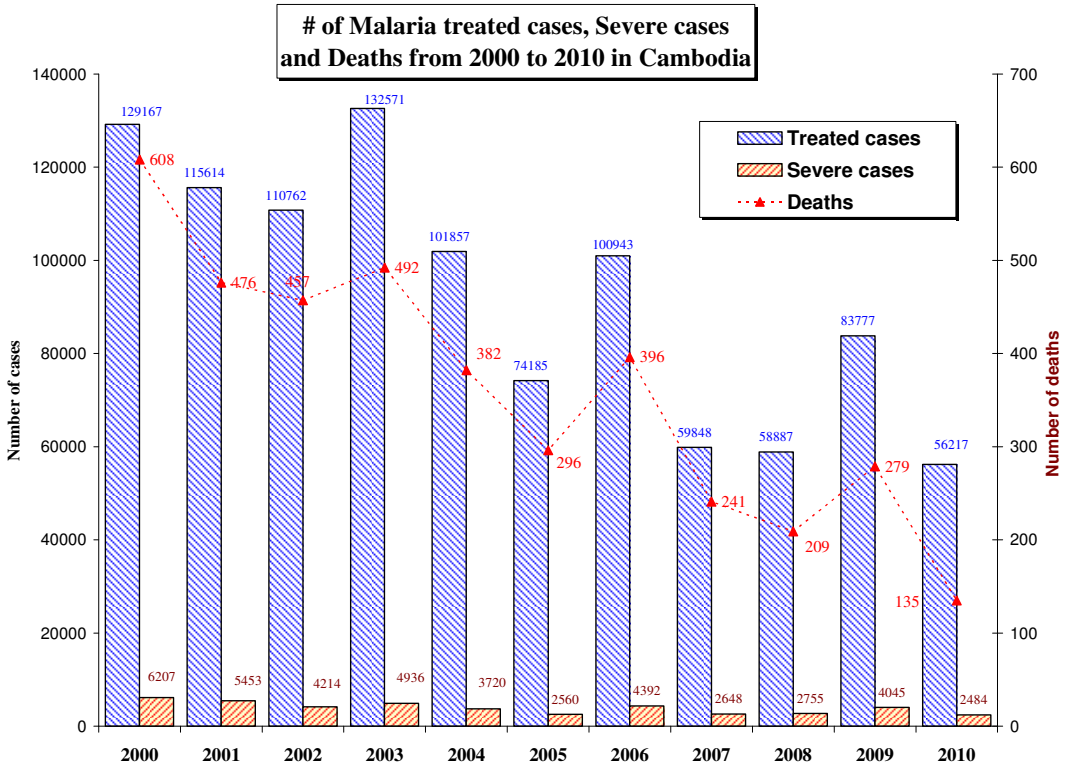
National Strategic Plan for Elimination of Malaria in the Kingdom of Cambodia

EXECUTIVE SUMMARY

Background

Malaria with an incidence (treated cases in public health facilities) of 6.2 per 1,000 population and 279 deaths in 2009 (Figures 1 and 2) continues to be a major cause for public health and economic burden in Cambodia and hence malaria control is given high priority by the government and donor agencies. The Ministry of Health has founded and designated a specialized institution, the "National Center for Parasitology, Entomology and Malaria Control (CNM)" to develop and execute a nation-wide malaria control strategy.

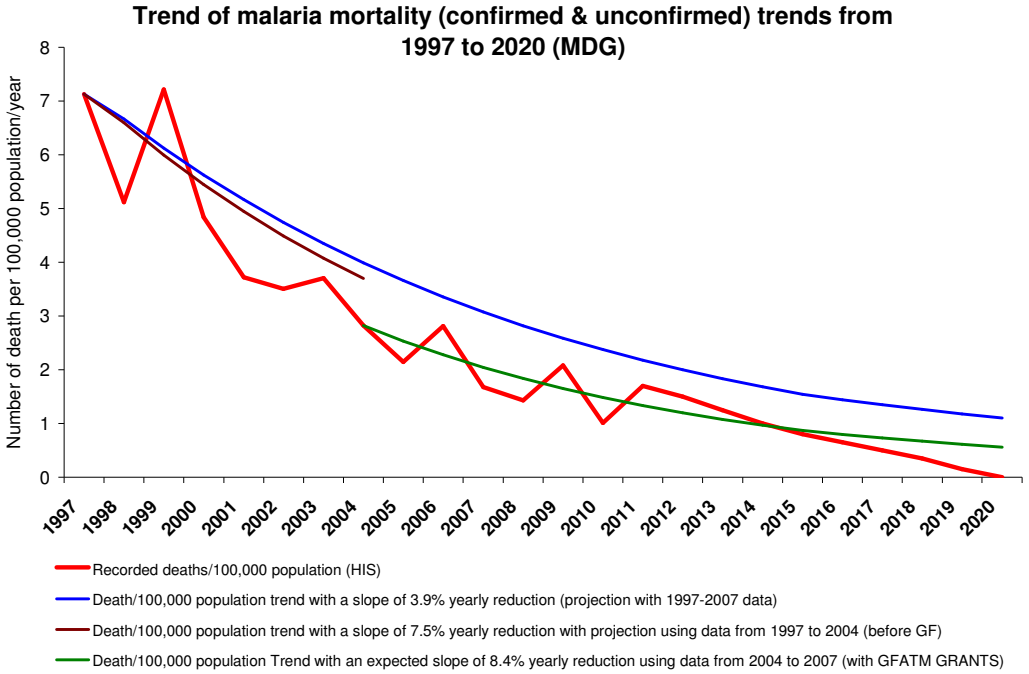
Figure 1: Malaria Morbidity & Mortality Trends in Cambodia (2000-10)



Recent evidence from the BMGF funded Artemisinin Resistance Confirmation, Characterization and Containment ARC3) project and other studies indicates that artemisinin tolerant Plasmodium falciparum parasites are present on the Thai-Cambodian border, implying that the parasite may be developing resistance to artemisinins, which form the basis of the most effective recommended treatment for falciparum malaria. The spread of artemisinin resistance, through Asia to Africa would be a catastrophic setback to global efforts to control malaria, as there are not yet any equally effective alternative drugs. Cambodia has responded promptly to the new challenge by developing short-term and medium-term containment strategies with the assistance of technical partners such as the WHO and mobilized funding support from the Bill and Melinda Gates for implementing the short-term strategy in the form of a containment project. More than $100m USD have been committed by GF under Round 9 grant for 'moving towards pre-elimination' from 2010 to

2015. The aim of the National Strategic Plan for Elimination of Malaria (2011-2025) is to ensure that no artemisinin resistant malaria parasites are detected in Cambodia by 2015, to achieve elimination of falciparum malaria by 2020 and elimination of vivax malaria by 2025.

Figure 2: Past and Predicted Malaria Mortality Trends in Cambodia (1997-2015)



Strategic Vision

Our long-term vision is of a Cambodia totally free from the burden of malaria.

By 2015, the malaria-specific Millennium Development Goal (MDG) is achieved, and malaria is no longer a major cause of mortality and no longer a barrier to social and economic development and growth anywhere in the country. All citizens will have universal access to malaria prevention (ITNs) as well as treatment with Artemisinin-based Combination Therapy (ACT).

Beyond 2015, the Royal Government of Cambodia and its partners sustain their political and financial commitment to malaria control efforts and ensure partial elimination of malaria by 2020 and total elimination by 2025. There is no malaria infection in any part of the country. Malaria control efforts can be minimized with a focus on prevention of 'Reintroduction'.

In the long term (beyond 2030), malaria eradication is achieved in the country along with the rest of the world.

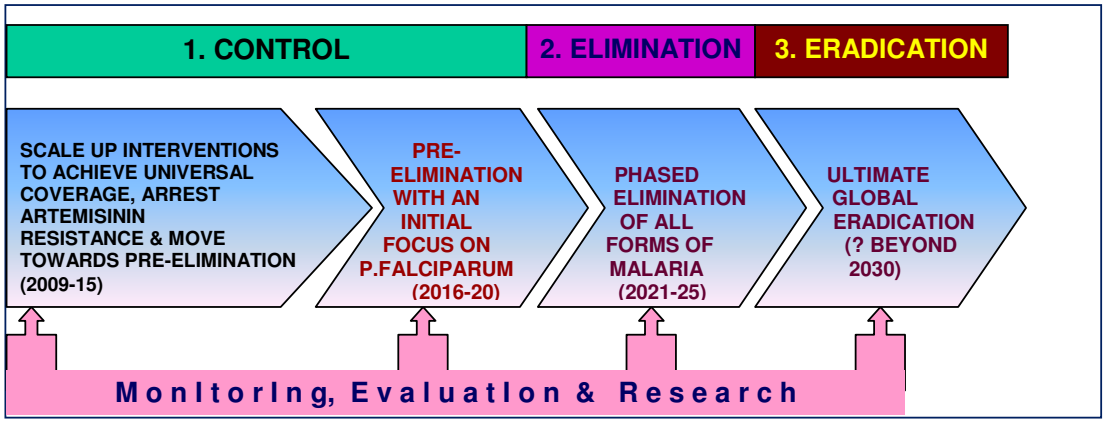
Strategic Mission

To work together with all relevant partners and the communities themselves to enable sustained delivery and use of the most effective prevention and treatment for those affected most by malaria by mobilizing all the required resources and ensuring compliance with all national standards and guidelines for key malaria interventions.

Components of NMCP'S Long Term Strategy

CNM's current long-term strategy is to scale-up interventions to achieve universal coverage, arrest artemisinin resistance and move towards pre-elimination during the period 2011-2015, undertake pre-elimination while ensuring zero deaths from malaria during the period 2016-2020, and achieve phased elimination of all forms of malaria during 2021-2025 (as illustrated in Figure 3). Figures 4 and 5 depict the current and envisaged malaria maps of Cambodia. Based on the current global malaria epidemiology, it is difficult to expect global eradication prior to 2030; however Cambodia expects to be fully involved in the global eradication efforts whenever they commence in the future. New drugs, diagnostics, vaccines, and other tools, together with widespread political stability, will be essential for eradication to be finally achieved.

Figure 3: Long-term Strategy of Cambodia's NMCP



Strategic Fit with National and Global Commitments

Since reducing malaria mortality and morbidity is considered essential for accelerating growth and promoting social development in Cambodia, the main strategic objectives of the NMCP are completely aligned with broader country-level development frameworks, such as the Poverty Reduction Strategy Papers (PRSP), the Rectangular Strategy for Growth, Employment, Equity and Efficiency (RS), National Strategic Development Plan 2006-10 (NSDP) and the Millennium Development Goals (MDG) as well as the Health Sector Strategic Plan 2008-15 (HSP2). Malaria control and elimination efforts in Cambodia directed through this strategy will continue to play an important role in helping the country reach the targets for its global commitments such as the Millennium Development Goals, particularly Goal # 6, the RBM Strategic Plan (2005-2015), the Global Malaria Action Plan (August 2008), the WHA resolution (1977) on primary health care, etc. .

Strategic Goals

- ***Short –Term (by 2015)***
  To move towards pre-elimination of malaria across Cambodia with special efforts to contain artemisinin resistant P.falciparum malaria.

- ***Medium –Term (by 2020)***
  To move towards elimination of malaria across Cambodia with an initial focus on P.falciparum malaria and ensure zero deaths from malaria.

- ***Long-Term (by 2025)***
  To achieve phased elimination of all forms of malaria in Cambodia.

Strategic Objectives

NMCP intends to achieve the following strategic objectives through the implementation of a specific long-term elimination strategy.

1. To ensure universal access to early malaria diagnosis and treatment services with an emphasis on detection of all malaria cases (including among mobile/migrant populations) and ensure effective treatment including clearance of P. *falciparum* gametocytes and dormant liver stage of *P. vivax*.
2. To halt drug pressure for selection of artemisinin resistant malaria parasites by improving access to appropriate treatment and preventing use of monotherapies and substandard drugs in both public and private sectors.
3. To ensure universal access to preventive measures and specifically prevents transmission of artemisinin resistant malaria parasites among target populations (including mobile/migrant populations) by mosquito control, personal protection and environmental manipulation.
4. To ensure universal community awareness and behavior change among the population at risk and support the containment of artemisinin resistant parasites and eliminate all forms of malaria through comprehensive behavior change communication (BCC), community mobilization, and advocacy.
5. To provide effective management (including information systems and surveillance) and coordination to enable rapid and high quality implementation of the elimination strategy.

Sequential Elimination of Malaria

Since both infections occur in Cambodia, the NMCP will first aim at *P.falciparum elimination, because:*

- more severe problem. Because of artemesinin drug resistance observed in parts of the country in the recent past, it is expected that the last few Pf cases will be the most resistant & hardest to eliminate.
- more vulnerable
- Anti *P.falciparum activities also affect P.vivax*

However Elimination of Vivax Malaria will also be planned in order that this is achieved within 5 years of achieving P.falciparum elimination. Figure 4 illustrates the current malaria incidence of confirmed malaria cases in Cambodia. Figure 5 depicts the proposed phased elimination of malaria in Cambodia by Operational District (OD). Figures 6 and 7 show the proposed phased elimination by OD of Plasmodium Falciparum Malaria and Vivax Malaria respectively.

Coverage of areas with factors favourable for elimination

Areas with the following favourable factors will be included in the initial phases of elimination.

- ❑ Low or moderate basic reproduction rates of malaria
- ❑ Important seasonal fluctuations of transmission
- ❑ Majority of areas with hypo- or meso-endemicity
- ❑ Presence of natural boundaries of malaria transmission
- ❑ Relatively high development of peripheral health care infrastructure with good prospects for further growth
- ❑ Relatively high affluence associated with high literacy rate of the population

Not only the populations targeted by the artemisinin containment efforts but also the more isolated populations such as military and security forces and the remote populations of the northeast will be targeted for elimination in the initial phases. A key component will be the operation of the surveillance system in these areas. The intense efforts to eliminate malaria

locally to achieve containment of artemisinin resistance in the northwest will still be the earliest stage, and will provide extremely useful lessons for later phases in other parts of Cambodia.

Figure 4: Current Map of Malaria Incidence in Cambodia

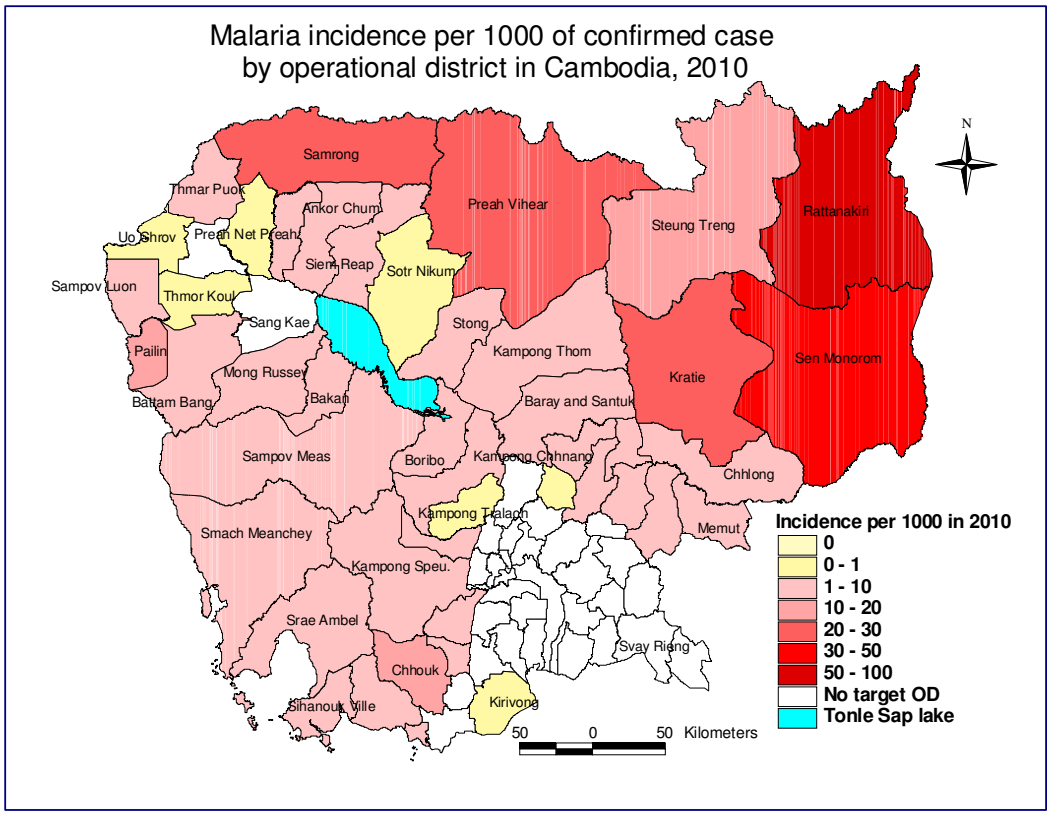


Figure 5: Proposed Malaria Elimination Status by OD by 2025

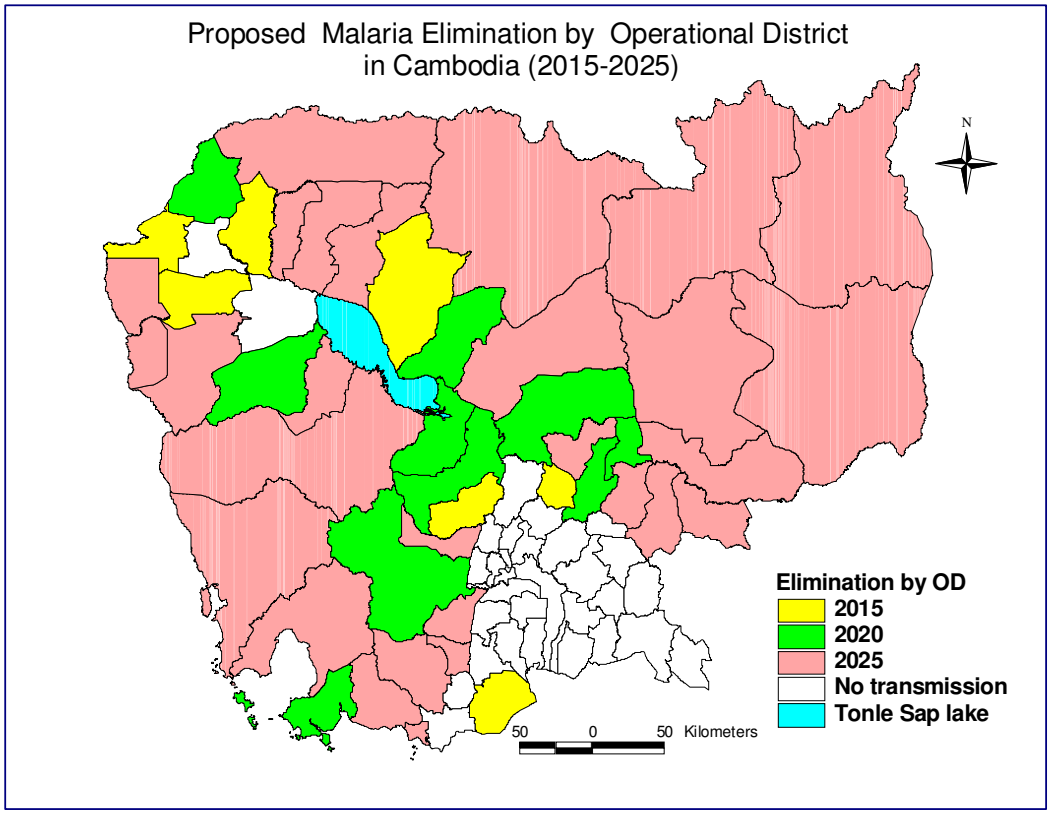


Figure 6: **Proposed *Pf* Malaria Elimination Status by OD by 2020**

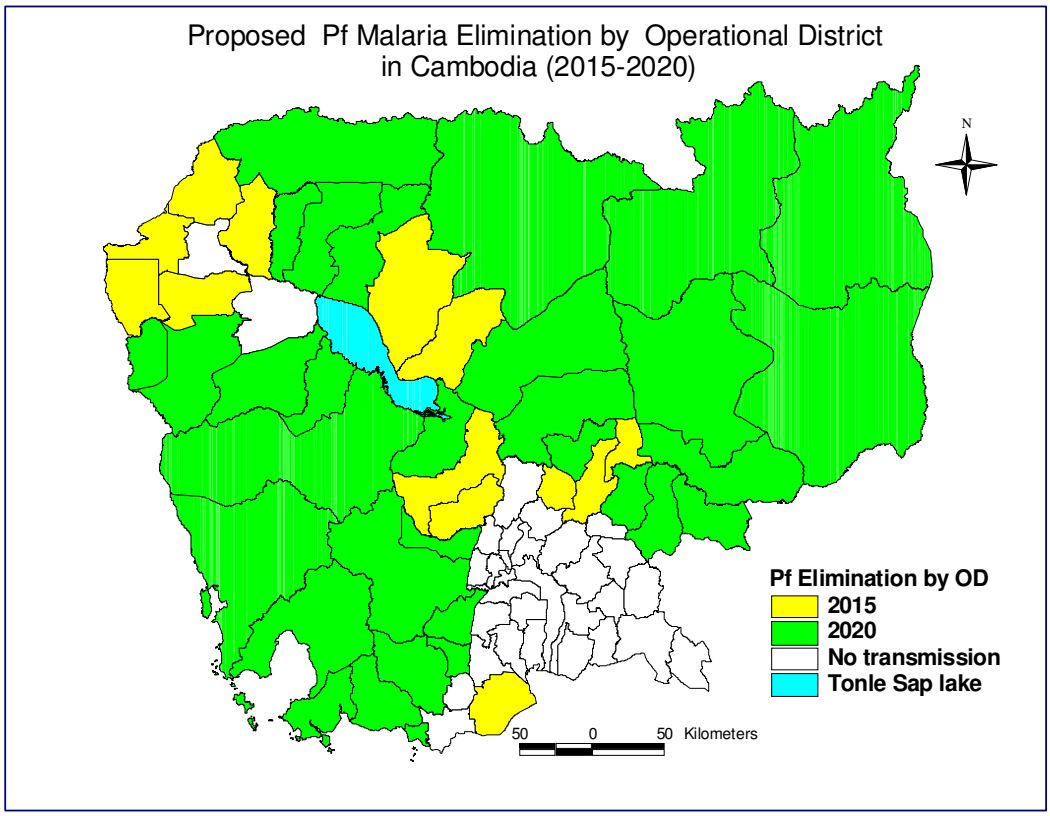
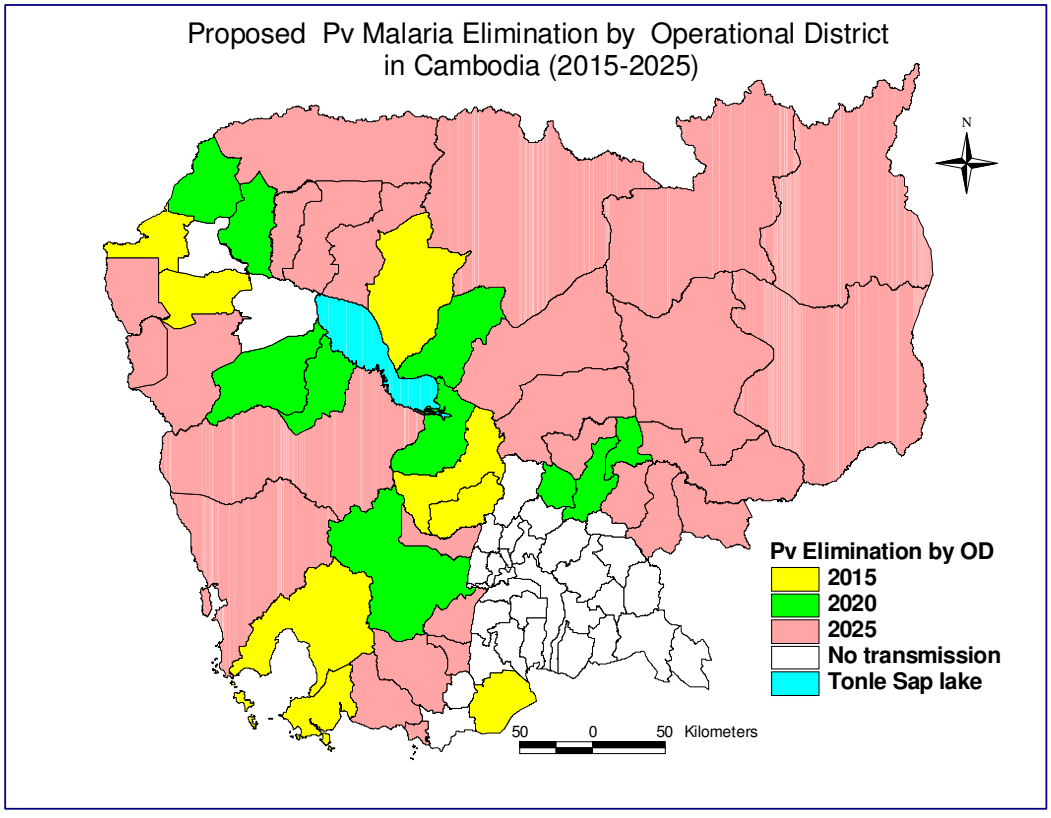


Figure 7: Proposed P*v* Malaria Elimination Status by OD by 2025



Coverage of areas with factors unfavourable for elimination

Areas with the following unfavourable factors will be included in the final phases of elimination.

- more efficient vectors and a longer transmission season than in the rest of the country
- poor overall development, marginalized populations and weak health systems with inadequate coverage
- common borders with neighbouring countries with a high burden
- intense cross-border population movement and a high immigration rate from (usually well-identified) endemic countries
- inaccessibility due to geographical or political reasons

Interventions during Pre-elimination Stage (2011-15)

- All people have full and ready access to reliable health services (totally free of charge)
- Case confirmation by Giemsa-stained quality assured microscopy (or vivax-specific combo RDTs?)
- Role and scope for G6PD testing
- Drug policy change to include antigametocyte treatment for *P.falciparum*
- Information system covers all health facilities
- Active case detection in foci & among high risk groups
- Piloting and scaling up of MDA/FSAT
- Immediate notification of each case
- Surveillance staff visit, investigate and classify each case
- Control over the private sector
- Complete control over antimalarial drug supply, which means:
  - ❖ All antimalarial drugs provided free of charge in the public health sector
  - ❖ No home management (except through VMWs), Only antimalarials recommended in the National Treatment Guidelines allowed to be sold in shops & pharmacies
  - ❖ Regulation of malaria activities in the private sector
- Geographical reconnaissance
- GIS database on foci, vectors, cases, genotyping
- Central records and isolate bank, genotyping
- Trained, qualified staff availability
- Special motivation of staff involved in pre-elimination strategy (consideration of appropriate incentives)
- Mobilize domestic funding
- Regional initiatives
- Intersectoral Coordination and Collaboration (including Provincial Governors, District Governors, MoF&E, MoWA, MoEYS, MoI, MoND, etc.)

Interventions during Elimination Stage (2016-20)

- Free diagnosis and treatment in all sectors (public, private and community level)
- Routine G6PD testing
- Detection of cases, including:
  - ❖ Confirmation of all malaria cases by quality malaria microscopy *(gradual phasing out of RDTs except for use by VMWs)*
  - ❖ Strong malaria information system covering all health facilities, case notification
  - ❖ Active case detection

- Prevention of onward transmission, including:
  - ❖ Full coverage by effective antimalarial drugs given free of charge to all patients
- Routine expert microscopy
- Routine genotyping
- Implementation of new drug policy
- Piloting and scaling up of MDA/FSAT
- Full cooperation of private sector
- Immediate notification of cases
- Active case detection
- Case investigation and classification
- Foci investigation and classification
- Management of malaria foci (investigation and classification), including:
  - ❖ Geographical reconnaissance
  - ❖ Classification of all cases and all foci with their present functional status (in real time)
  - ❖ Total coverage by ITNs as the main prevention measure in all malaria endemic areas (coverage >95%)
  - ❖ Increasingly strong general health services to take on vigilance tasks
- Management of importation of parasites, including intercountry coordination
- Prevention of malaria in travelers.
- Intersectoral Coordination and Collaboration (including Provincial Governors, District Governors, MoF&E, MoWA, MoEYS, MoI, MoND, etc.)
- Special motivation of staff involved in elimination strategy (consideration of appropriate incentives)

Key Strategic Targets

Table 1 depicts the targets against the key strategic indicators during the three phases of pre-elimination, Pf elimination and total elimination of malaria in Cambodia.

Table 1: Key Strategic Targets for Elimination of Malaria in Cambodia

Impact indicators	Baseline			Pre-elimination by 2015	Pf Elimination by 2020	Total Elimination by 2025
	Value	Year	Source			
Malaria mortality rate: Annual malaria deaths per100,000 mid-year population reported in public health facilities	2.05	2009	HIS	0.80	0	0
Malaria Incidence: Annual malaria cases per 1000 mid-year population reported in public health facilities.	6.16	2009	HIS	2.00	2.00	0
Percentage of households at risk of malaria living in the targeted villages with at least one insecticide- treated net (LLIN/ conventional treated net) and/or sprayed by IRS in the last 12 months	42.6%	2007	Cambodia Malaria Survey	95%	95%	95%
Number and percentage of health facilities with no reported stock-outs of nationally recommended antimalarial drugs (ACTs) lasting more than 1 week at any time during past 3 months.	61.5%	2007	Cambodia Malaria Survey	75%	95%	100%

Key Interventions and Tactical Approaches

Table 3 summarizes the actions needed to be carried out during the next 15 years (from 2011 to 2025) in order to achieve elimination of malaria in Cambodia.

Table 3: Actions needed to be carried out in the next 15 years in order to achieve malaria elimination in Cambodia

No.	Intervention Package	Tactical Approaches
1	Vector control and malaria prevention	▪ Transmission reduction through high population coverage of ITN/LLIN and focal IRS ▪ Integrated vector management, including monitoring of insecticide resistance ▪ IVM and ITN/LLIN as complementary measures in specific situations ▪ Geographical reconnaissance ▪ Entomological surveillance ▪ Epidemic preparedness and response
2	Case management	▪ Drug policy change to: o radical treatment for P. vivax o ACT and gametocyte treatment for P. falciparum ▪ 100% case confirmation by microscopy/RDT ▪ Clinical diagnosis acceptable only in certain situations ▪ QA/QC of laboratory diagnosis (microscopy/RDT) ▪ Monitoring antimalarial drug resistance
3	Behaviour Change Communication (BCC)	▪ Health education ▪ Public relations ▪ Advocacy
4	Containment/Pre-elimination	▪ Access to diagnostics ▪ Access to treatment ▪ Health system strengthening (coverage, private and public sectors, QA) ▪ Engaging private sector ▪ Control of OTC (Over The Counter) sale of antimalarial medicines ▪ Strict enforcement of ban on monotherapy, counterfeit and substandard drugs ▪ Availability of qualified staff round the clock at health facilities ▪ Piloting and scaling up of MDA/FSAT
5	Research and surveillance	▪ Improve surveillance and national coverage ▪ Update country profile ▪ Cambodia Malaria Surveys (2012, 2014, 2016, 2018 and 2020) ▪ Geographical information collection ▪ GIS-based database on cases and vectors ▪ Pre-elimination and elimination databases ▪ Immediate notification of cases ▪ Independent assessment of reaching milestones ▪ Operational research
6	Program management	▪ Human resources development ▪ Procurement, supply management ▪ Participation in regional initiatives ▪ Legislation ▪ Pharmacovigilance ▪ Adherence to the “Three Ones” principles (for M&E) ▪ Integration with other health programmes for delivery of interventions, e.g. ITN/LLIN ▪ Resource mobilization including domestic/external funding ▪ Pre-Elimination and Elimination programme development ▪ Convene meetings of Containment/Elimination Task Forces ▪ Reorientation of health facility staff ▪ Technical and operational coordination, including intra- and intersectoral collaboration, both within the country and with neighboring countries

Key Beneficiaries and Targets under Elimination Strategy

Table 4 summarizes the consolidated targets for target groups and beneficiaries under the pre-elimination and elimination phases.

Table 4: Consolidated Targets for Target Groups/Beneficiaries

Target Groups/Beneficiaries	Consolidated targets nder Pre-Elimination Phase (2011-15)	Consolidated targets under Elimination Phase (2015-25)
Villages with Village Malaria Workers (VMWs) for EDAT*	1,500	To be filled
Number of Mobile Malaria Workers (MMWs) for EDAT	450	
Villages with Village Health Volunteers (VHVs) for BCC Activities	3,296	
Target population for Long Lasting Insecticidal Nets (LLINs)	2.85M All Pop. <2km from the forest	
Target population for Long Lasting Insecticidal Hammock Nets (LLIHNs)	537,484 (Among Pop. <2km from the forest)	
# of Health Centres (HCs) with Early Diagnosis & Treatment (EDAT)	Focus on further rengthening 274 HC in 43 endemic ODs	
# of Health Posts with EDAT	89	
# of HCs targeting Pregnant women	274	
# of Mobile Video Unit (MVU) shows conducted	522	
# of private sector health facilities and drug shops inspected by drug inspectors	3,780	
# of combo-RDTs distributed to private sector health facilities and drug outlets in malaria endemic provinces.	869,300	
# of hospitals where admitted D3 positive patients are actively followed up (treated and epidemiological investigation carried out)	65	
# of malaria patients actively followed up to collect tolerance data for prescribed ACTs	7,440	
# of trained public and private sector providers on early diagnosis and treatment of malaria based on revised NTGs	Private: 3,200 Public: 2,355 Total: 5,555	

National Malaria Policies

Pre-amble:
Malaria prevention and treatment services shall be provided free of charge since user fees continues to be a big barrier to access to prevention and treatment of malaria particularly for poor and vulnerable populations.

- **Diagnosis:**
  - All suspected malaria cases should receive parasite-based diagnosis before treatment, in all sectors. "*Diagnosis before treatment*".

- Free and prompt parasitological diagnosis prior to treatment should be made available in all public health facilities/VMWs/MMWs, (plus military and police forces)
- Pre-elimination Phase (2011-2015): Use of combo-RDTs at public health centers and by VMWs. Microscopy at former district hospitals and Referral Hospitals. Social Marketing of "Malacheck" combo-RDTs in the Private sector through PSI.
- Elimination Phase (2016-2025): 100% microscopy diagnosis in public health facilities (including military and police forces) (excluding VMWs) – Exceptions (power cuts, night service, etc). Limit malaria diagnosis to selected private facilities that comply with MOH regulations.

- **Treatment:**
  - All providers must follow National Treatment Guidelines for malaria. Treatment should be offered free of cost at all public health facilities (for both simple and severe malaria) and at community through VMWs/MMWs (only simple malaria and referral of severe malaria).
  - All malaria cases should be treated with a co-formulated Artemisinin Combination Therapy (ACT). **Pf**: DHA+Piperaquine plus anti-gametocyte treatment (Primaquine single dose if 45mg safety is demonstrated) in all sectors – public (including military and police forces), private and community. For **Pv**: DHA-PIP + PQ (8wks- if PQ 45mg safety is demonstrated/30mg-14 days- based on negative G6PD test)
  - Private Sector: Pre-elimination Phase (2011-2015): Ban of sale of monotherapy in the private sector. "Malarine" social marketing through PSI. Transition to AMFm model once eligible ACT is available.
  - Elimination Phase (2016-2025): Ban sale of all antimalarials through the private sector outlets. Prohibit treatment of malaria at all private facilities except selected private facilities that comply with MOH regulations.

- **Vector Control:**
  - *Public sector:* LLINs (1 net per person) and LLIHNs (1 net per family) in villages at risk (based on stratification of malaria cases) plus re-treatment of existing conventional nets with long-lasting insecticide. Focal IRS following Day 3 Positive surveillance.
  - *Police, Military*: LLINs/ LLIHNs (1 net per person) distributed free.
  - *Mobile/Migrant Population*: LLINs/ LLIHNs distributed free or on loan.
  - Other vector control tools (e.g. repellents) to be provided free based on research findings.
  - *Private Sector*: Bundling strategy (treatment of bed nets imported/distributed) by PSI.

- **BCC**:
  - Combination of mass media (TV, radio, video and audio spots), group education (through VHVs/VMWs/MMWs as well as MoND, MOI, MoWA staff) and interpersonal communication (through health staff at health facilities).
  - Special emphasis on training of school teachers and health education of school students (with collaboration from MoEYS).

- **M&E**:
  - Elimination Phase (2016-2025): Enforce case notification in the private sector facilities
  - Efficient use of HIS and strengthening of malaria information system and surveillance.
  - Computerization of malaria information at central, provincial and OD levels.

- **Private Sector Cooperation**:
  - Mainly mobilized through NGOs.

- Public Private Mix strategy will be piloted and gradually scaled up
- Involvement of private importers and distributors (through AMFm initiative)

- **Capacity Development/training (Human Resource Development):**
  - Deployment of adequate staff necessary for elimination strategy implementation at all levels
  - Health staff involved in treatment and prevention of malaria should be motivated through a wide range of training, supervision, mentoring & facilitating working environment as well as financial incentives.

Objectives, Sub-Objectives and Key Activities to be undertaken

Table 5 lists all the 5 main objectives, the sub-objectives under each objective and the key activities within each sub-objective that need to be carried out in order to achieve malaria elimination in the country by 2025.

Table 5: Objectives, Sub-Objectives and Key Activities for Elimination of Malaria

Objectives/Sub-Objectives/Activities	Responsible
Objective 1: *To improve access to early malaria diagnosis and treatment services with an emphasis on detection of all malaria cases (including among mobile/migrant populations) and ensure effective treatment and P. falciparum gametocyte clearance.*	
1.1 Regularly review and, if necessary, update national malaria treatment guidelines based on available evidence in the context of elimination where appropriate	
1.1.1. Conduct National Antimalarial Drug Policy Workshop.	CNM and partners
1.1.2. Update and publish National Malaria Treatment Guidelines	CNM and partners with WHO support
1.2. Improve training curricula on early diagnosis and treatment (EDAT)	
1.2.1. Review and revise training curriculum on diagnosis and treatment.	CNM and partners for public sector. CNM, and partners for private sector.
1.3. Free and prompt parasitological diagnosis prior to treatment made available in all public health facilities/VMWs/MMWs (plus military and police forces) by 2012.	
1.3.1. Provide Health Education (BCC/IEC) to promote diagnosis for users and providers	CNM and BCC partners
1.3.2. Train all providers on prompt and accurate parasitological diagnosis	CNM and partners
1.3.3. Update NTGs to recommend 100% confirmed diagnosis prior to treatment	CNM and partners with WHO support
1.4 Aim for 100% microscopy diagnosis in public health facilities (including military and police forces) by 2020 (excluding VMWs). Exceptions (power cuts, night service etc)	
1.4.1 Improve health facility infrastructure (e.g. electricity supply),	MoH
1.4.2 Training for microscopists	CNM
1.4.3 Quality assurance	CNM and partners
1.4.4 Introduction of G6PD testing	CNM and partners
1.4.5 Ensure uninterrupted supply of key commodities	CNM and CMS
1.4.6 Monitoring & Supervision.	CNM and partners
1.5. Strengthen and improve the quality of diagnostic services	
1.5.1. Train all public providers especially at HC level and monitor their performance.	CNM
1.5.2. Follow up and mentor trained public providers especially at HC level.	CNM
1.5.3. Train selected private providers and follow-up practices.	CNM and partners
1.5.4. Follow up and mentor trained private providers.	CNM and partners
1.5.5. Strengthen public diagnostic capabilities by providing necessary equipment and supplies for GLP.	CNM
1.5.6. Carry out QA of microscopy.	CNM
1.5.7. Carry out quality monitoring on RDT utilization in public and private sectors.	CNM
1.6. Improve malaria case management at public sector facilities: All malaria cases are treated with a co-formulated Artemisinin Combination Therapy (ACT) plus anti-gametocyte treatment by 2011 in all sectors –	

Objectives/Sub-Objectives/Activities	Responsible
public (including military and police forces), private and community.	
1.6.1. Train public health care providers.	CNM.
1.6.2. Train selected doctors from RH with high malaria mortality on severe case management.	CNM and partners
1.6.3 Cambodia to transition to co-formulated ACT	CNM
1.6.4 Introduction of primaquine following operations research studies	CNM with support from WHO
1.6.5. Ensure continuous public sector supply of recommended antimalarials.	CNM and CMS
1.6.6 Provide free effective first-line malaria treatment including treatment for Pf gametocyte clearance in public health facilities and communities: All providers must follow National Treatment Guidelines for malaria	CNM
1.6.7 Sustain fully functioning HCs in zone 1, better functioning HCs in zone 2, and introduce malaria focal staff into each HC in the malaria endemic areas.	CNM.
1.7. Improve malaria case management and reporting of malaria in the private sector: Affordable and effective diagnosis and treatment available in the formal private sector (2011-2015)	
1.7.1. Revise, develop and implement EDAT communications.	CNM and partners, IEC/BCC technical working group (TWG).
1.7.2. Train private health care providers.	CNM and partners.
1.7.3. Provide supportive supervision for private health care providers.	CNM and partners
1.74 Strengthen regulation and law enforcement efforts to eliminate unregistered private providers, enforce ban on oral artemisinin monotherpies, counterfeit and substandard anti-malarials	CNM and DDF, Justice Police
1.7.5 Supportive supervision, and monitoring for private providers. Training on case management, referral, rational use for private providers.	CNM and partners
1.7.6 Ensure reporting of key malaria data (cases tested, treated etc) from private providers	CNM and partners
1.8. Limit malaria diagnosis and treatment to selected private facilities that comply with MOH regulations (2016-2020+)	CNM and partners
1.8.1 Enforce case notification in the private sector facilities,	CNM and partners
1.8.2 Employ key interventions as in 1.7 for selected facilities.	CNM and partners
1.9. Improve referral services for malaria patients from both the public and private providers: Timely referral of all under fives and severe malaria cases to appropriate level public sector facility.	
1.9.1. Improve referral systems and pre-referral treatment of severe cases in the remote areas.	CNM and partners
1.9.2. Improve quality of referral services provided by referral hospitals.	CNM and partners with Directors of referral hospitals
1.5.3 Introduce and implement a robust scheme for reimbursement of transportation costs for referred malaria patients	CNM and partners
1.10. Strengthen malaria screening during pregnancy.	
1.6.1. Implement antenatal screening for malaria for women at HC level.	CNM.
1.11. Improve malaria case management at community level by expanding the VMW approach: Ensure that all the villages (>5km) from the public health facilities located in malaria risk areas are provided with the services of Village Malaria Workers	CNM
1.11.1 Identify the villages that are located >5 km from the public health facilities in the malaria risk areas.	CNM, PHD, OD and HC
1.11.2 Select 2 persons VMW team per village in the newly identified villages.	CNM, PHD, OD and HC
1.11.3. Review and revise training curriculum on diagnosis and treatment.	CNM and partners for public sector.
1.11.4 Train/refresh all VMW/MMWs at the community level and monitor their performance.	CNM, PHD, OD and HC
1.11.5. Carry out quality monitoring on RDT utilization in VMWs/ MMWs.	CNM and partners
1.11.6. Train/refresh VMW/MMW including candidates in newly identified target areas.	CNM in collaboration with the MoH Child Health Department (CHD) and WHO.
1.11.7. Provide regular supplies and supportive supervision to VMWs.	CNM and CHD.
1.11.8. Improve coverage of passive case detection through maintaining support of current VMWs and the expansion of community-based diagnosis through Village Malaria Workers (using Pf/Pv RDTs) and treatment with ACTs.	CNM and CHD.
1.11.9. Improve referral systems of severe cases from the remote villages to the health facilities.	CNM and partners
1.11.10 Maintain and scale up antenatal screening for malaria for women at community level.	CNM and partners
1.12. Improve malaria case management in the MoI and MoND health	

Objectives/Sub-Objectives/Activities	Responsible
facilities.	
1.12.1. Train military and police health care providers.	CNM in collaboration with the MoI and MoND Health Departments.
1.12.2 Ensure uninterrupted supply of diagnostic commodities and ACTs	CNM in collaboration with the MoI and MoND Health Departments.
1.13. Intensify efforts to provide free EDAT services to the mobile/migrant populations through trained MMWs recruited from long-term migrants, including case detection activities.	
1.13.1. Support Health centre mobile teams to reach forest workers and immigrants.	CNM.
1.13.2. Provide diagnosis and treatment to mobile/migrant populations through trained MMWs recruited from long-term migrants, including case detection activities.	CNM.
1.14. Enhance malaria control activities along borders.	
1. 14.1 Identify the risk areas for establishment of malaria post along the border/high endemic areas (Number of malaria posts?)	CNM
1.14.2. Expand community level EDAT services to cross-border population.	CNM
1.14.3. Offer EDAT and health promotion services at border check-points.	CNM.
1.15. Strengthen Information Systems and Surveillance in order to detect all malaria cases and ensure effective treatment.	
1.15.1. Conduct Active Case Investigation of Day 3 (and Day 7 and Day 21 if necessary) Positives.	CNM.
1.15.2. Conduct Active Case Detection at Community Level.	CNM.
1.16. Strengthen malaria drug resistance monitoring and operations research.	
1.16.1. Strengthen routine monitoring of drug resistance including P.vivax.	CNM and partners
1.16.2. Conduct operational research.	CNM and partners
1.16.3. Conduct focused screening and treatment (FSAT).	CNM and partners
1.16.4. Implement MDA in the selected areas	CNM and partners
1.16.5 Develop and implement appropriate strategies to address G6PD deficiency in P. vivax radical cure treatment	CNM with support from WHO
Objective 2: *To decrease drug pressure for selection of artemisinin resistant malaria parasites by improving access to appropriate treatment and preventing use of monotherapies and substandard drugs in both public and private sectors.*	
2.1. Support and strengthen the supply chain for malaria diagnostics and treatment in both public and private sectors.	
2.1.1. Strengthen HIS and link to ODDID to improve forecasting of drug needs.	Department of Drug and Food (DDF)
2.1.2. Improve storage facilities at provincial, OD and HC levels.	DDF
2.1.3. Procure appropriate and good quality ACTs and RDTs for public and private use.	CNM and partners
2.1.4. Produce packaging and local language instructions for private sector RDTs.	CNM and partners
2.1.5. Develop and use appropriate delivery channels to ensure adequacy of supplies for testing and treatment.	CNM and partners
2.1.6. Procure and supply cooler boxes to recognized private sector facilities.	CNM.
2.1.7. Establish emergency fund for local redistribution of ACTs and RDTs.	CNM.
2.1.8. Strengthen the supply chain for malaria diagnostics and treatment in the private sector.	CNM and partners
2.1.8.1. Train importers and wholesalers:	CNM and partners
2.1.8.2. Implement market creation targeting retailers (Phase 1).	CNM and partners
2.1.8.3. Implement outlet maintenance targeting retailers (Phase 2).	CNM and partners
2.1.8.4. Implement follow on blitz (Phase 3).	CNM and partners
2.2. Improve quality of antimalarial drugs and prevent use of monotherapy, counterfeit and substandard drugs in both the public and private sectors.	
2.2.1. Review, revise and implement regulatory and policy guidelines on antimalarial drugs.	
2.2.1.1. Oversee provincial and district drug inspectors.	DDF.
2.2.1.2. Train provincial and district drug inspectors.	DDF with WHO support.
2.2.1.3. Inspect private sector facilities/outlets.	DDF.
2.2.1.4. Prevent illegal AMT imports over land.	DDF and Anti-Economic Police (MoI).
2.2.1.5 Support appropriate actions in case substandard or counterfeit	

Objectives/Sub-Objectives/Activities	Responsible
antimalarials are found, including enforcement of legislation	
2.2.2. Maintain effective post-marketing surveillance system for antimalarial drugs.	DDF and CNM.
2.2.3. Provide quality assurance of antimalarial drugs in the private sector.	CNM and partners incl. DDF.
2.2.3.1. Collect ACT samples from public and private sources.	NHPQCC.
2.2.3.2. Implement quality testing of ACTs collected from public and private sources.	NHPQCC.
2.2.4. Maintain system for monitoring adverse drug reactions.	Essential Drug Bureau (EDB) (office within DDF) with support from USP-DQI and WHO.
2.2.4.1. Strengthen PV oversight and protocols.	EDB with WHO support.
2.2.4.2. Train Pharmacovigilance staff.	EDB.
2.2.4.3. Promote Pharmacovigilance activities to public and private providers.	EDB.
2.2.4.4. Collect patient data from public and private providers.	CNM and partners in association with EDB.
2.2.4.5. Manage pharmacovigilance data.	EDB.
2.2.4.6. Communicate and feedback to providers and drug sellers.	EDB.
2.2.5. Strengthen intersectoral committee at provincial level to combat counterfeit drugs.	EDB.
2.2.6. Develop and deliver IEC on fake drugs to providers and the public.	EDB
2.3. Improve rational use of antimalarial drugs.	
2.3.1. Train public and private providers in rational drug use including curriculum revision.	DDF and WHO.
2.3.2. Monitor public and private providers' practices together with PHDs.	CNM and partners
2.4. Intensify malaria control activities in western border provinces.	
2.4.1. Conduct regular cross-border meetings to share information and to develop joint control strategies.	CNM and DDF.
2.5. Scale up the Public-Private Mix (PPM) strategy for malaria through effective coordination and partnerships.	
2.5.1. Establish national and provincial PPM coordination committees.	CNM and DDF.
2.5.2. Develop detailed PPM strategy.	CNM with partners
2.5.3. Implement training of trainers.	CNM and partners
2.5.4. Conduct census of private sector outlets in pilot ODs.	CNM (through health staff at Operational District and Health Centre levels).
2.5.5. Hold sensitization workshop and signing of MoU.	CNM.
2.5.6. Train private sector providers on case reporting procedures.	CNM and partners
2.5.7. Conduct regular supportive supervision and monitoring trips to private clinics and drug shops.	CNM (through health staff at Operational District and Health Centre levels).
2.5.8. Introduce awards and sanctions measures to strengthen the provision of care by public and private providers.	CNM and partners with support from DDF.
2.5.9. Hold bi-annual workshop and award ceremony.	CNM and partners
2.5.10. Conduct research on engaging the private sector, such as social research on attitudes and practice regarding diagnostic tests.	CNM and partners
Objective 3: *To improve access to preventive measures and specifically prevent transmission of artemisinin resistant malaria parasites among target populations (including mobile/migrant populations) by mosquito control and personal protection.*	
3.1. Achieve universal coverage of LLINs among at-risk populations.	
3.1.1. Conduct re-stratification and mapping of high risk villages and target groups for LLINs.	CNM in cooperation with Provincial Health Departments (PHDs).
3.1.2. Procure required LLINs.	CNM.
3.1.3. Develop and print training manuals on ITN distribution.	CNM.
3.1.4. Train and retrain PHD, OD, HC, VHV, VMW, local authorities and women leaders on proper use of LLINs and IEC use.	CNM and partners
3.1.5. Distribute LLINs to target population through integrated campaigns and health facilities and maintain full coverage with LLINs in all transmission areas.	CNM with support from CMS and NGOs.
3.1.6. Provide free LLINs and LLIHNs to mobile/migrant populations, including cross-border, seasonal workers, and new settlers) coming from outside CNM's malaria target zone of 'within 2 km of a forest'.	CNM with support from CMS and NGOs
3.1.7. Provide personal protection against malaria for military, police and other organizations working in forested areas along the Thai-Cambodia border.	CNM in collaboration with the MoI and MoND Health Departments
3.2. Achieve universal coverage of LLIHNs among at-risk populations.	
3.2.1. Distribute free LLIHNs, LLINs and/or repellents.	CNM with support from CMS and NGOs
3.3. Improve coverage of re-treatment of mosquito nets.	

Objectives/Sub-Objectives/Activities	Responsible
3.3.1. Carry out re-treatment of existing conventional nets at village level through public sector (whole country).	CNM.
3.3.2. Ensure that commercially supplied nets and hammock nets are given long lasting treatment: (a) before sale at main source of supply chain to protect populations visiting rather than living in transmission areas and (b) at village level through public sector (whole country).	CNM and partners
3.3. Carry out Indoor Residual Spraying.	
3.3.1. Develop standard operating procedures.	CNM.
3.3.2 Conduct geographical reconnaissance, planning and quantification of needs.	CNM
3.3.3 Procure insecticides and equipment.	CNM
3.3.4 Develop human resources as necessary.	CNM
3.3.5 Conduct quality assurance for insecticides and equipment.	CNM
3.3.6Implement indoor residual spraying as appropriate.	CNM
3.3.7 Monitor quality and coverage of indoor residual spraying.	CNM
3.3.8. Expand IRS to areas beyond Zones 1 and 2 (if applicable) and develop a program to evaluate effectiveness.	CNM.
3.4 Strengthen management and judicious use of public health insecticides	
3.4.1 Develop and periodically review quality assurance for vector control products using standard protocols (World Health Organization Pesticide Evaluation Scheme, Global Malaria Programme	CNM
3.5. Undertake appropriate operational research studies	CNM
3.5.1 Conduct research on acceptability of all net types; entomological study in areas of changing forest ecology; particularly in relation to the use of insecticides for IRS; assess additional protection of using repellents	CNM
3.4. Educate consumers and the general public on prevention measures through effective BCC approaches.	
3.4.1. Further develop IEC materials on proper prevention with emphasis on utilization of ITN.	CNM and partners
3.4.2. Organize massive health promotion & community mobilization to ensure high turnout for ITN campaign and to promote appropriate use of nets (whole country).	CNM with support from NGOs
3.1.8. Conduct research on acceptability of all net types; entomological study in areas of changing forest ecology; particularly in relation to the use of insecticides for IRS; assess additional protection of using repellents.	CNM and partners
Objective 4: *To increase community awareness and behavior change among the population at risk and support the containment of artemisinin resistant parasites through comprehensive behavior change communication (BCC), community mobilization, and advocacy.*	
4.1. Increase people's knowledge and practices related to malaria prevention and control through effective BCC approaches particularly in endemic areas.	
4.1.1. Expand BCC activities to reach vulnerable populations.	CNM
4.1.2. Undertake training on comprehensive BCC packages at all levels.	CNM
4.1.3. Implement comprehensive BCC/IEC including inter-personal communications campaigns, community mobilization, and regular media communications with input and assistance from relevant sectors such as education, women welfare, defense, interior, etc…	CNM
4.1.4. Deliver community-based prevention measures through Village Volunteers (VHVs/ VHSGs/ VMWs/ MMWs).	CNM
4.1.5. Continue BCC activities including school-based health education (video shows, quiz shows, drama, lucky draws, games and etc.).	CNM
4.1.6. Continue ongoing monitoring of BCC implementation and undertake periodic survey to measure impact and behavior change outcomes.	CNM
4.1.7. Inform incoming and outgoing mobile/migrant populations about malaria risk, prevention and diagnosis and treatment, through peer education (MMWs) and targeted BCC campaigns at source communities and through employers and agents at work sites.	CNM
4.1.8. Harmonize and coordinate BCC for cross-border mobile/migrant populations in cooperation with Thai counterparts and other partners.	CNM
4.1.9. Develop and assess effectiveness of interventions with mobile/migrants population movement and behaviour in collaboration with relevant partners.	CNM
4.1.10. Conduct social research: Cultural norms towards antimalarial treatment and preventive methods among the people.	CNM
4.2. Strengthen BCC efforts directed at malaria EDAT.	
4.2.1. Design, develop, print and distribute IEC/BCC materials.	CNM and partners
4.3. Promote rational use of antimalarial drugs among at risk-populations	

Objectives/Sub-Objectives/Activities	Responsible
through comprehensive BCC efforts.	
4.3.1. Develop and implement IEC for the public on rational drug use for malaria treatment.	CNM and partners
4.4. Change old behaviours that are conducive to the spread of resistant parasites and encourage demand for proper diagnosis and treatment using new co-paid ACT.	
4.4.1. Engage BCC working group.	CNM.
4.4.2. Produce and disseminate targeted messages.	CNM and partners
4.4.3. Execute AMFm kick-off events in all 20 malaria endemic provinces.	CNM and NGO partners.
4.4.4. Promote quality logo for ACT packaging.	CNM and partners
4.4.5. ProduceTV campaign.	CNM and partners
4.4.6. Produce radio campaign.	CNM and partners
4.4.7. Create mid-media materials.	CNM and partners
4.4.8. Design and place billboards with key messages.	CNM
4.4.9. Design and produce 10,000 flipcharts on rational drug use.	CNM
4.4.10. Produce job aids and promotional materials.	CNM and partners
Objective 5: *To strengthen the institutional capacity of the national malaria control program at all levels and provide effective management (including information systems and surveillance) and coordination to enable rapid and high quality implementation.*	
5.1. Strengthen human resource management through addressing human resource gaps and undertaking a wide range of capacity building activities at central and peripheral levels.	
5.1.1. Identify and address human resource gaps.	CNM.
5.1.2. Strengthen human resources.	CNM.
5.1.3. Build capacity of human resources.	CNM.
5.2. Strengthen Monitoring and Evaluation activities at central and peripheral levels.	
5.2.1. Maintain and strengthen M&E activities.	CNM.
5.2.2. Intensify supportive supervision.	CNM.
5.2.3 Conduct regular malaria programme reviews	CNM
5.3. Strengthen information management at all levels.	
5.3.1. Provide training on epidemiology to all levels including data management, analysis and mapping.	CNM and partners
5.3.2. Develop and maintain national malaria database (including HIS data, ITN data, drug monitoring, surveys, trained staff and etc.).	CNM.
5.3.3. Train OD level staff on data management and reporting.	CNM.
5.3.4. Computerize data for reporting at provincial and OD levels.	CNM.
5.3.5. Support data analysis, interpretation and report writing in the periphery.	CNM.
5.3.6. Maintain and expand a comprehensive malaria surveillance and active case investigation system with a cross border component.	CNM.
5.3.7. Strengthen surveillance systems to obtain and exchange essential information regarding malaria and mobile/migrant populations.	CNM
5.3.8. Improve data collection on case management practices in the private sector (sentinel sites, surveys, routine follow up).	CNM and partners
5.4. Strengthen operations research and conduct needs based operational research.	
5.4.1. Conduct insecticide resistance monitoring and research.	CNM.
5.4.2. Develop and strengthen entomological skill at national and provincial levels.	CNM.
5.4.3. Disseminate operational research findings and develop a strategic plan aimed at targeting mobile populations more effectively.	CNM and partners
5.4.4. Conduct 'TraC' surveys to assess EDAT compliance and prevention behaviours amongst target populations.	CNM and partners
5.4.5. Conduct study to compare sensitivity, specificity, practicality and cost of various RDTs.	CNM.
5.4.6. Strengthen research capacity (including training and equipment based on needs assessment).	CNM with support from WHO
5.5. Strengthen coordination and partnership development at HC and community level.	
5.5.1. *Support participatory planning efforts for malaria control activities at commune level.*	CNM and partners
5.5.2. *Engage stakeholders at community level to carry out malaria control activities including referral.*	CNM and partners
5.6. Strengthen coordination and partnership development at OD level.	
5.6.1. Support regular malaria workshops at provincial and OD levels including study tours between provinces.	CNM and partners
5.6.2 Hold coordination meetings at provincial level (especially to update	CNM

Objectives/Sub-Objectives/Activities	Responsible
malaria stratification by village and district).	
5.7. Strengthen coordination and partnership development at central level.	
5.7.1. Establish National Malaria Steering Committee and hold annual meetings to review and address technical challenges.	CNM.
5.7.2. Ensure overall and technical coordination of containment operations, including regular meetings of the Artemisinin Tolerance Containment Task Force.	CNM.
5.7.3. Implement sensitization and advocacy for political support for containment/elimination of artemisinin tolerant parasites, including regular advocacy meetings with community leaders at international, national, provincial, and district levels.	CNM.
5.7.4. Support dissemination of research results and information exchange, including through annual meetings.	CNM.
5.7.5. Undertake reconstruction work on the national malaria centre headquarters to allow it to function as a regional learning centre.	CNM.

Strategy to mitigate initial unintended consequences

The HSP2 addresses all of the health weaknesses identified by MoH earlier, but to varying degrees of priority with different time frames. In order to maximize malaria control outcomes, some health system weaknesses need to be addressed via disease specific activities. These disease specific responses to health system weaknesses are in line with the overall HSP2 strategy which in turn should minimize conflicts with overall health systems strengthening. The following efforts are being taken to further ensure that disruptive consequences are avoided during the implementation of the elimination strategy:

- As the VMWs are part of the network of Village Health Support Group, where possible scale-up of malaria services provided by these community volunteer workers will be piggybacked with services such as child survival interventions (ARI, diarrhea), community DOTS for TB and care of PLW HIV, etc. to ensure there is not detraction from these equally important health services.
- Training of DDF officers in enforcement of drug quality will not be limited to malaria drugs.
- Decentralization of managerial responsibilities and supervision will be sector wide, not only for malaria provision staff.
- Performance-based incentives are not limited to malaria activities of HC staff but rather increased provision and improved performance of all basic services. For example, incentives will be provided for provision for 24 hour health services.
- Scale-up of border activities and cross-border coordination may start with a malaria focus with the hopes of expanding to encompass other cross-border health issues especially TB and HIV.
- Successful public-private synergies as a result of malaria based activities will be shared with other programs.
- Operational research, M&E and efforts to increase available data will take advantage of common platforms (facility-based surveys, household surveys, community based studies, etc.)
- Increased communication links between CNM and the Central Medical Stores (CMS) to help to improve stream-lining of drug supply systems and information systems for other disease-specific drugs as well. CNM will work with other GF supported Principal Recipients (namely MoH, NCHADS and CENAT) and CMS to carry out an assessment of storage conditions, formulation and implementation of a storage improvement plan.

Estimation of Financial Needs and Identification of Financial Gaps

CNM has made preliminary estimates of the financial needs (Table 6) for implementing the strategies for elimination of malaria in the country based on:

1. The burden of malaria disease and death in the country
2. The strategic priorities for malaria control in the country
3. The absorptive capacity of the country
4. The technical and management capacity of the different partners likely to be involved.

Table 6: Summary Budget by Cost Category

Cost Category	Total cost of Elimination Strategy (US $)	Total Committed Budget (2010-2015)(US $)	Total Budget Gap (2011-2025) (US $)
1.Human Resources	65,183,350	18,797,015	46,386,334
2.Technical and Management Assistance	14,516,928	3,880,883	10,636,045
3.Training	43,809,300	12,633,350	31,175,950
4.Health Products and Health Equipment	178,542,288	48,345,434	130,196,854
5.Pharmaceutical Products (Medicines)	100,375,966	5,807,584	94,568,382
6.Procurement and Supply Management Costs (PSM)	94,359,327	5,459,472	88,899,855
7.Infrastructure and Other Equipment	12,945,471	3,086,848	9,858,622
8.Communication Materials	46,160,471	7,312,550	38,847,921
9.Monitoring and Evaluation (M&E)	130,210,742	11,322,673	118,888,069
10.Living Support to Clients/Target Population	13,443,842	4,026,911	9,416,931
11.Planning and Administration	14,266,156	3,401,766	10,864,390
12.Overheads	35,565,673	5,871,452	29,694,221
13.Other	5,939,374	1,794,305	4,145,069
TOTAL	**755,318,886**	**131,740,244**	**623,578,643**

More detailed and accurate estimates of the needs will be made through the creation of working groups within the CNM and involving prospective partners in malaria control, the expatriate malaria advisors available within CNM and WHO and hired international experts for specific aspects. Each working group will map out the priorities and interventions needed in different parts of the country, review which partner is in the best position to deliver the services in different priority provinces, and estimate the costs using a standardized unit costs approach as far as possible.

The needs will be categorized into two groups: those that need to be addressed immediately utilizing the existing funds from the Government, GFATM Round 6 and SSF grants, BMGF, USAID, etc., but keeping in mind the absorptive capacity of the country in general and the technical and managerial capacity of the key partners involved in the response to the disease; and those needs which could be addressed in the intermediate and long term by approaching other potential donors as well as submitting proposals at future GFATM Rounds.

CNM will endeavour to mobilize the resources required to address unmet need or the financial gap (obtained by subtracting the available resources from the total needs) for implementing the elimination strategy through clear and rational funding proposals.

Multi-sectoral Efforts

All the activities described in this elimination strategy will be attained through collaborative inter-sectoral efforts to benefit from each entity's strengths to maximize malaria elimination outcomes as well as overall health system strengthening. The Provincial and District Governors will take the lead by chairing Provincial and District Task Forces for Elimination of Malaria.

Role of Private Sector

The private sector plays a significant role in the diagnosis and treatment of uncomplicated malaria. Approximately two thirds of respondents in a 2007 survey reported seeking treatment for febrile illness in the private sector. Recognizing this, the CNM is implementing several key interventions that engage the private sector in malaria control and elimination as per the national strategy. In the near term (2011-2015), the private sector will play a critical role in malaria control and pre-elimination.

CNM is employing a three-pronged approach to private sector engagement; 1) Strengthening Regulatory and Law Enforcement efforts including enforcement of the ban on oral artemisinin monotherapies, and elimination of counterfeits, 2) Establishing a Public-Private Mix (PPM) initiative to improve case management in the private sector, including appropriate referral and reporting to the public sector and, 3) Increasing access to affordable and effective ACTs in the private sector through the Affordable Medicines Facility for malaria (AMFm).

As Cambodia moves towards elimination, the formal private sector can play an important role in case notification and surveillance. CNM will leverage private institutions that comply with MOH regulations to contribute to elimination efforts.

Vector Control Strategy

CNM plans to use the following stratification (based on incidence and risk of transmission) in instituting appropriate vector control interventions.

Table 7: New Stratification for Implementation of Key Vector Control Interventions

Category	Characteristics	Key Vector Control Interventions
A1	high transmission	LLIN, LLIHN (and EDAT)
A2	medium tranmission SPR > 5%	LLIN, LLIHN (and EDAT)
B1	low transmission, SPR < 5%	LLIN, LLIHN, focal IRS
B2	no transmission, < 1 / 1000	LLIN, focal IRS
C	non-malarious, only imported cases	Surveillance

The target groups for the key vector control interventions are shown in Table 7.

Table 8: Target Groups for the Key Vector Control Interventions

Intervention	Target Groups	Comments
LLIN	pop-at-risk, mobile, police & military	
LLIHN	pop-at-risk, police & military	
Mobile pop	loaning scheme-seasonal migrants	Identify through existing VHV/VMWS
	new settlers-not recognized villages	Identify through mobile surveillance staff at each HC w/motorcycle, establish MMWs as needed
	tourists	instructions/guidelines given at border checkpoints
IRS	transmission foci	any cluster of cases indicating indigenous transmission
	Day 3 positives	any indication of Day 3 positive in Artemisinin Resistance zone

Table 9: INDICATOR MATRIX FOR ELIMINATION STRATEGY

Indicator	Base-line	TARGETS														Comments
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Malaria mortality rate: Annual probable and confirmed malaria deaths per100,000 mid-year population reported in public health facilities		1.70	1.50	1.25	1.00	0.80	0.65	0.50	0.35	0.15	0.00	0.00	0.00	0.00	0.00	0.00	The aim is to reach 0 mortality by 2020
Annual Malaria Incidence	4.20	5.60	4.90	4.00	2.90	2.00	1.85	1.65	1.45	1.25	1.05	**0.85**	**0.65**	**0.40**	**0.15**	**0.00**	The aim is to reach 0 incidence by 2025
Annual confirmed malaria cases per 1000 mid-year population reported in public health facilities.	3.44	5.04	4.51	3.80	2.76	2.00	1.85	1.65	1.45	1.25	1.05	**0.85**	**0.65**	**0.40**	**0.15**	**0.00**	The aim is to reach 0 incidence by 2025
# of ODs (out of a total of 43 endemic districts) that reach pre-elimination status (<5% side/RDT positivity rate or <1/1000 incidence rate of confirmed malaria, all species, among the midyear OD population) at public health facilities	5 11%	8 18%	10 23%	12 27%	14 32%	18 42%	24 56%	31 72%	38 88%	41 95%	43 100%	43 100%	43 100%	43 100%	43 100%	**43** 100%	The aim is to reach the pre-elimination status in a phased manner to reach all the 43 endemic ODs by 2020.
# of ODs (out of a total of 43 endemic districts) that reach elimination status (0 incidence rate of confirmed malaria) at public health facilities	0 0%	0 0%	0 0%	0 0%	0 0%	7 16%	9 21%	12 27%	14 32%	16 38%	17 40%	24 56%	31 72%	38 88%	41 95%	43 100%	The aim is to reduce the malaria burden to an incidence of 0 confirmed cases per 1,000 in a phased manner to reach all the 43 endemic ODs by 2025.
Proportion of Falciparum, Vivax and other types of Malaria among confirmed malaria cases treated in public health facilities	PF= 59% PV= 29% Mix= 12%	PF=63% PV=30% Mix= 7%	PF= 57% PV= 35% Mix= 8%	PF=51% PV=40% Mix= 9%	PF=45% PV=45% Mix= 10%	PF=39% PV=50% Mix= 11%	PF=30% PV=58% Mix= 12%	PF= 21% PV= 66% Mix=13%	PF= 12% PV=76% Mix=12%	PF=3% PV=86% Mix= 11%	PF= 0% PV= 90% Mix= 10%	PF= 0% PV= 90% Mix=10%	PF= 0% PV= 90% Mix=10%	PF= 0% PV=90% Mix=10%	PF= 0% PV= 90% Mix= 10%	PF= 0% PV= 0% Mix= 0%	The aim is to reduce the Pf malaria burden 0% by 2020 and Pv burden to 0% by 2025.

Indicator	Base-line	TARGETS															Comments
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Percentage of households at risk of malaria living in the targeted villages with at least one insecticide-treated net (LLIN/ conventional treated net) and/or sprayed by IRS in the last 12 months	NA		85%		95%		95%		95%		95%		95%		95%		
Percentage of population at risk of malaria living in the targeted villages who slept under an insecticide-treated net (LLIHN/ LLIN/ conventional treated net) during the previous night	NA		70%		85%		90%		95%		95%		95%		95%		
% of people in the target areas with fever in the last two weeks who received antimalaria treatment according to national policy within 24 hrs of the onset of fever.	NA		70%		80%		85%		90%		95%		95%		95%		
# and % of Health facilities with microscopy and/or rapid diagnostic testing capability	NA		80%		85%		90%		100%		100%		100%		100%		
# and % of Health facilities with no reported stock-outs of nationally recommended ACTs lasting more than 1 week at any time during past 3 months.			70%		75%		90%		95%		95%		100%		100%		

Conditions Required for Successful Elimination

Table 10 summarizes the requirements for successful elimination of malaria from a country, Cambodia's current status with regard to these requirements and what needs to be done in the 15 years in order to eliminate all forms of malaria from Cambodia.

Table 10: Actions needed to be carried out in the next 15 years in order to achieve malaria elimination in Cambodia

REQUIREMENT	CAMBODIA's CURRENT STATUS	WHAT NEEDS TO BE DONE IN THE NEXT 15 YEARS
Political and financial stability	Cambodia is relatively politically and financially stable	Cambodia should continue to make further strides in achieving financial stability and socio-economic development
Clearly articulated political will to embark on such a programme	Prime Minister's pro-active interest	Advocacy efforts should be directed towards sustaining political interest and will.
Operational maturity and efficacy of malaria control	NMCP is one of the oldest national health programs in Cambodia	Elimination efforts should commence with a technical, operational and financial (including cost-effectiveness) feasibility study.
Well developed health care infrastructure throughout the operational area	Health Sector Reform ongoing-considerable progress made, challenges remain	MoH to ensure that the operational districts targeted for malaria elimination during the initial phases are accorded priority for expansion of physical infrastructure and human resource development.
Successful implementation of full coverage by epidemiological surveillance	Epidemiological surveillance only recently rolled out	Number and geographical spread of sentinel sites should be expanded. Further rapid scaling up of Day 3 (and if required Day 7 and Day 21) positive surveillance and active case investigations
Availability of an efficient technical infrastructure for all parts of the operations	Malaria Supervisors in position in PHDs and ODs. However, no entomological teams at provincial level	Resources will need to be mobilized to set up entomological teams at provincial level and malaria drug depots/malaria posts in villages located at more than 5kms from public health facilities
Relatively modest migration between areas of high and low malaria endemicity	Very high levels of migration and mobility have characterised population dynamics in Cambodia in recent years	All efforts will need to be made to track all incoming migrants/mobile population groups in endemic areas and provide them with LLINs/LLIHNs, EDAT and BCC.
Programme discipline	Monitoring, supervision and auditing being strengthened at all levels	Micro planning at OD level should be rapidly scaled up to ensure total decentralization and deconcentration of malaria activities. Monitoring, supervision and internal auditing should be further strengthened. Strong advocacy from provincial governors and district governors and other local authorities to be ensured.