

Intervention Area	Current Year (2010)	Planned (within next 5 years)
Case Management		
<u>Diagnosis</u>		
National diagnosis policy (confirmed, clinical)	Test all fever cases with confirmed microscopy in 7 high risk districts and five seasonal districts; supported by deployment of malaria technicians to Basic Health Units (BHU) and hospitals; RDT used if microscopy not available	
Tools (microscopy, RDT, PCR, parasite genotype, algorithm for clinical diagnosis)	Improved Diagnosis – RDT used to supplement microscopy; 10% overall annual blood examination rate (ABER)	Plans for 100% case confirmation by microscopy; will expand quality diagnostic facilities through provision of RDTs and microscopes for border screening and antenatal clinics (ANC)
Monitoring/ QA	QA microscopy – Currently 10% of negative slides and 25% of the positive slides sent to VDCP; endemic areas (perennial transmission) compulsory to send each month, some non-endemic (seasonal and malaria-free) do not send reports, those that do send monthly slides; challenges consist of overburdened QA staff and broken slides	Will continue microscopy QA/QC; develop a national external quality assurance system framework QA for RDTs; aim to strengthen existing national reference laboratory via external training of lab technicians
<u>Treatment</u>		
<i>P. vivax</i> – 1 st line treatment protocol (radical cure, type, unit, dose); contraindicated populations (type, unit dose)	Chloroquine (3 days) and primaquine (0.25mg/kg body weight) (14 days) outpatient; Early case Detection and Prompt Treatment (EDPT); free services for nationals at Basic Health Unit (subdistrict level) or hospital	Plans for Early Diagnosis & Prompt Treatment (EDPT) to be given to all fever patients within first hour after arrival at health facility and within 24 hours after onset of fever; patients will be followed during 14 day treatment of Primaquine; plan to introduce quality control/assurance of diagnostic and anti-malarial drugs
<i>P. vivax</i> – 2 nd line treatment protocol		
<i>P. falciparum</i> – National treatment protocol/policy (type, unit dose)	Three day ACT (artemether and lumefantrine (Coartem)) and single dose primaquine (0.75mg/kg body weight); Early Diagnosis & Prompt Treatment (EDPT); Pf cases hospitalized (mandatory) for three days	Will increase malaria cases to 90% treated; Early Diagnosis & Prompt Treatment (EDPT) to be given to all fever patients within first hour after arrival at health facility and within 24 hours after onset of fever; will ensure radical cure of Pf by adding stat dose of primaquine
<i>P. falciparum</i> – Complicated Malaria	Artemether and quinine	Continue drug policy

Mixed infections – National treatment protocol/policy (type, unit dose)	ACT and Primaquine for 14 days	
Directly Observed Therapy (DOT) and Case Follow-up (drug adherence)	All Pf cases admitted for 3 days; standard case follow up for Pf (30 days); no follow up for primaquine treatment for Pv	Continue DOTS treatment policy for Pf with additional stat dose of primaquine for anti-gametocytal effect; continue Pf case follow up (30 days); initiate follow up of Pv for 14 days to ensure completion of treatment
G6PD screening	None completed	None planned
G6PD prevalence survey	Unknown prevalence	TBD – possibility of conducting a G6PD prevalence survey
Mass screening & treatment/Focal screening	None	Plan to screen 90% of migrant workers; pregnant women in risk areas screened in antenatal clinics (ANC) during first visit and if presenting with fever
Focused Mass Drug Administration (MDA)	None	None
Monitoring/QA	Over the counter malaria drugs banned	
Chemoprophylaxis		
Prophylaxis - travellers	Not recommended	Not recommended
Prophylaxis – high risk populations	None	None
Prophylaxis – pregnant women	None	None
Intermittent Preventive Treatment – infants (IPTi), Children (IPTc) or in Pregnancy (IPTp)	None	None
Prevention		
Vector Control		
IRS Strategy (e.g., spatial or temporal rotation)	Biannual IRS in high transmission (perennial) districts; no IRS in seasonal districts (low transmission); general population coverage currently 55% ; focal IRS when: Pf cases above 30% for three years, slide positivity rate (SPR) above 10%, annual parasite incidence (API) above 10/1000 and local deaths	Continue IRS in perennial districts; will introduce case-based, focal IRS in seasonal districts and conduct IRS within 1km of all positive cases; aim to spray 95% of houses in malaria foci in seasonal districts and perennial districts sprayed twice a year
Insecticides	Cyfluthrin used for IRS	Same to be continued
LLIN	93.9% with one bed net, 90% bed net utilization (LLIN & ITN); to date 200,000 LLINs distributed and additional nets for hard to reach areas	Plan to sustain greater than 90% usage (target is population at risk, at least 2 nets per family); will distribute LLIN to longer-term migrant workers at construction projects, mainly in seasonal

		districts; future aim: total of 50,000 LLINs in year 1, 5,000 for years 2-5 for seasonal districts and 147,000 for perennial districts; will replace 2010 LLINs in 2013
Expired LLIN collection & replacement		Urgent need for replacement of expired LLINs and ITNs in 2010 and to establish system for collection and disposal of used nets
ITN (and insecticides used)	Insecticide used in LLIN is deltamethrin	Aim to sustain greater than 90% usage; will obtain chemicals from other funding agencies (in addition to the Global Fund) and the government of India
Larval control & environmental modification		Will implement larval control measures, such as larvivorous fish
QA	None	Will ensure availability and quality of entomological equipment and supplies, including insecticides, protective gear and biocides; will increase quality control of surveillance and vector control activities
Other		
Advocacy & Education		
Mass media	Some mass media; annual world malaria events in endemic districts; billboards, banners, malaria CD, annual BBC radio and TV awareness campaigns during rainy season	Aim to change population knowledge, behavior, and practice on malaria and malaria control; will focus on treatment-seeking and adherence to treatment of Pv with primaquine (14 day regimen) in general population
IEC/BCC campaigns	IEC with community education program; inadequate IEC materials in Basic Health Units and hospitals; currently no comprehensive coordination of IEC activities	Will focus future IEC on migrant workers from high transmission areas; will update key malaria messages; plan to develop and distribute job aids for health workers to increase effectiveness; will increase production and distribution of malaria IEC materials; plan to better engage other sectors and vulnerable populations; use community leaders, village health workers (VHW), Non Formal Education Instructors (NFEI) and local healers emphasizing importance of early diagnosis and treatment
Community-based interventions	Advocacy conducted regularly by VDCP and the	Goal to increase community interactions to

	MOH with district and local leaders; local health workers and Basic Health Units workers hold meetings to disseminate messages; limited number of Community Action Groups	support behavior change; Community Action Groups (CAGs) will be formed; community-directed educational interventions and will build awareness of school health coordinators; plan to conduct outreach by health workers, teachers and students; World Malaria Day activities/events in all districts
Surveillance		
Case detection and reporting		
Case reporting system	Weekly fever reporting from all health facilities in perennial districts; monthly malaria morbidity and mortality reporting by all health facilities; quarterly disease monitoring and feedback system, and monthly quality control monitoring of diagnostics; comprehensive monthly malaria line reporting systems with more than 15 variables	National reporting information system and notification to be integrated to strengthen surveillance and case detection for effective diagnoses and will switch from weekly and monthly line reporting to case-based 24 hour reporting; cases to be analysed by place of infection (not place of detection) and notification to occur between Basic Health Units and through the districts to allow for investigation of causes and prevention of onward transmission
Active case detection (ACD)	Some use of RDTs	Mobile malaria clinics to be used to identify/treat symptomatic and asymptomatic carriers; will strengthen use of RDTs in Active Case Detection
Passive case detection (PCD)	Functioning health care system captures symptomatic patients	Will strengthen use of RDTs
Case investigation or “re-active surveillance”	None	Will improve household investigation by forming rapid response teams to provide outbreak detection and response (see “Outbreak Prediction and Response”)
Other surveillance (e.g., surveys)	Annual household survey by Basic Health Units to update malaria risk population by village; malaria indicator survey every 2-3 years; Knowledge, Attitudes and Practices survey 2009 described usage of LLIN; GIS used to map cases and vector breeding sites in limited number of perennial districts (1-3)	Will create GIS database of malaria cases and vector density levels and expand GIS skills and functionality to facilitate early reporting and mapping of cases and vector surveillance data; will conduct spot mapping of all positive cases in 2008-2009

<u>Outbreak (Epidemic) detection and response</u>		
Outbreak/Epidemic Prediction & Response	Report all malaria cases within 24 hours to District Health Officer (DHO) and VDCP; weekly surveillance with thresholds of means and 3 rd quartile are in place for outbreak warning; seasonal health workers in rapid response teams	Plan to implement an outbreak preparedness and rapid response strategy for early containment of outbreaks; will correlate malaria data with historical meteorological data to identify associations to establish methods for forecasting outbreaks; will collaborate with the meteorological service to strengthen epidemic forecasting capabilities; will establish rapid response teams at the district level for seasonal districts; will include parasitological screening of whole village and suspected areas of outbreak and treat and follow up all cases; will include focal IRS, fogging and larval source control for 1km radius
<u>Entomological Surveillance</u>		
Surveillance vector species, behaviour, or densities	Monthly vector surveillance with investigation of larval breeding sites	Entomological surveillance to be conducted, extending to upper reaches of the seasonal and perennial regions; will train all district technicians in vector surveillance; conduct pilot study of possible vector control measures
<u>Resistance monitoring</u>		
Insecticide and drug resistance activities	Conducts bioassays and susceptibility studies to measure insecticide resistance at three sentinel sites in perennial districts only, none in seasonal districts; no reported resistance to ACT; Resistance monitoring conducted routinely around the year at 5 sentinel sites for <i>Pf</i> ; some resistance monitoring for <i>Pv</i>	Need for ensuring that chemicals for IRS are effective through monitoring of insecticide resistance in sentinel sites in both seasonal and perennial (introduce in seasonal districts); will create and maintain database on insecticide resistance; plan to detect anti-malarial drug resistance through monitoring therapeutic efficacy studies
Drug efficacy		In seasonal districts, therapeutic efficacy studies will be conducted for all cases; in perennial districts, therapeutic efficacy studies will be done in five sentinel sites
<u>Prevention of reintroduction (POR)</u>		
High risk populations	Immigrants from endemic countries; migrant workers, farmers and students; pregnant	Health and malaria impact assessment to be conducted and migration interventions put

	women because of reduced immunity	place; VDCP technicians will be deployed to conduct screening and active case detection in migrant workforce; all pregnant women in risk areas to be screened at antenatal clinics (ANC)
Border screening	No data collection on positive border cases and border cases not included into district and national case reporting system; compulsory medical screening for migrant workers hired by construction companies; no reported malaria testing	90% of migrant workers to be screened; will use of RDTs for border screening; data collection of cases needed; will explore collaborations with other ministries to institute malaria prevention modules in infrastructure development
Cross border collaborations	Annual cross border collaborative meetings between Bhutan and India	Aim to develop cross border implementation strategic plan with India; plan to develop proposal with follow up joint service delivery in target border districts
Vector-control specific POR activities	Houses in perennial transmission areas sprayed every six months	
Program Management and health systems		
<u>Program Finance</u>		
National elimination goal (by province, district)	District level	Goal to eliminate and achieve zero indigenous transmission in nine seasonal transmission districts and strengthen control activities in seven perennial transmission districts; no mortality by 2016
Funding sources and funding budget from each source	WHO; Global Fund Round 7, applied for Round 10 for phased elimination but was not approved	Global Fund, Round 7 Royal Government of Bhutan: \$581,689/yr Government of India: \$177,777/yr World Health Organization: \$75,000/yr Global Environmental Fund: \$28,000/yr Asia Pacific Malaria Elimination Network (APMEN): estimated \$10,000
<u>Stratification</u>		
Stratification strategies for defining risk areas, to allocate resources & activities	Please see attached map. Country is stratified based on type of transmission, including perennial, seasonal, and malaria-free districts	
<u>Program structure and organization management</u>		
Program management		Plan to strengthen program management and capacity building by conducting program reviews,

		develop program strategies and policies; will strengthen supervision overall
Procurement & supply management	Procurement and storekeeping through MOH national systems; procurement done 6-8 months in advance, order buffer stocks; warehouse in southern district, distributed to all Basic Health Units; reallocation within or among districts during stock-outs	Plan to ensure availability and quality of entomological equipment and supplies, including protective gear, insecticides, biocides; further coordination needed for efficient storekeeping of supplies, and training for storekeepers
Financial management		
<u>Program integration</u>		
Level of integration of malaria elimination into public health		Integration of malaria case reporting into national information system; national level sensitization workshop
<u>Personnel</u>		
Reorientation, retraining, or restaffing & capacity development	Refresher trainings for lab technicians (microscopy)	Will continue strengthening diagnostic skills; aim to enhance understanding of practitioners of treatment guidelines; human resource development and capacity building for programme management to occur; basic and in-service training programmes for health cadres in Bhutan and overseas to be implemented
<u>Legal Framework</u>		
Frameworks/policies/regulation/strategic plans	Gross National Happiness is the national development framework; National Strategic Plan for Malaria Elimination 2011-2016 currently being updated	Will promote legislation to cover health and malaria control of population in and around development projects; will prepare malaria policy document to support pre-elimination
Standard Operating Procedures (SOP) – list subject	Lab manual for Basic Health Unit health workers, 2009	
<u>Private sector – Providers</u>		
Engagement with formal providers (case management, reporting, other)	None	Will reorient health providers and other stakeholders to new malaria goals of elimination; need to train new health care providers and core professionals
Engagement with informal providers (case management, reporting, other)		
Training		
Other		

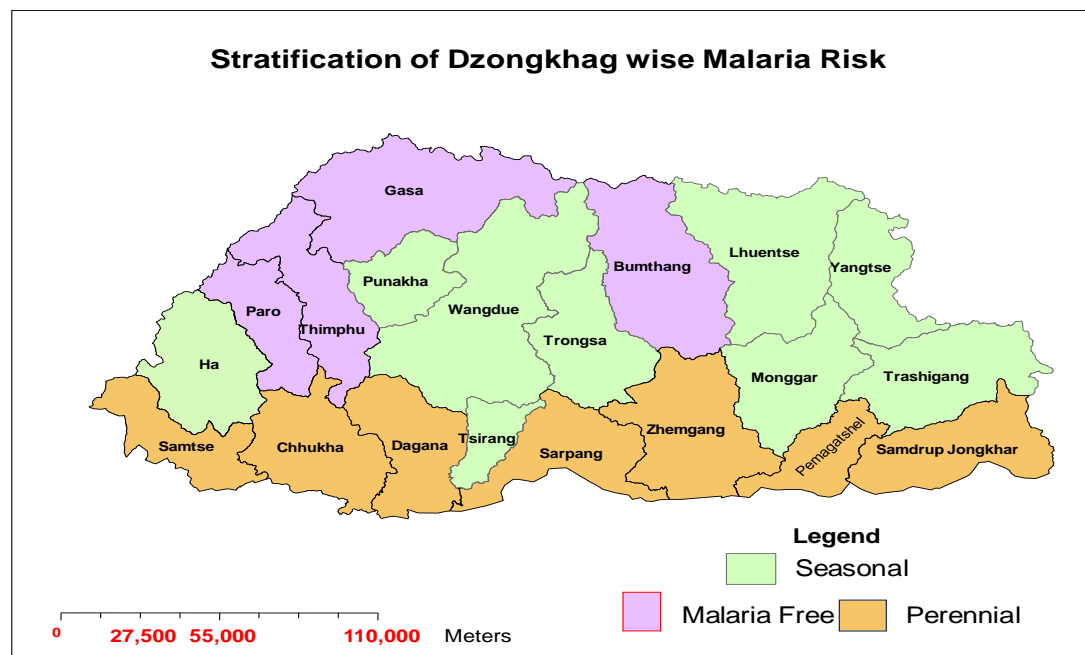
Monitoring and QA			
Private sector – Companies/Businesses			
Employee or community programs (e.g., medical services, bed net campaigns)			Private sector sub-recipient will be engaged by strengthening private sector role in BCC
Partners			
Funding		Financial support from Government of India since inception of 9 th five-year plan, mainly for procuring insecticides, GFATM (Rd 4 and 7); WHO	GFATM; Government of India, APMEN, Global Environmental Fund, WHO
Implementation (list partners and type of collaboration)			Will increase advocacy for political commitment and developing partners to enhance community participation; will work with national and non-governmental CBO and NGO representatives; plan to increase role of private sector
M&E			
M&E Elimination Plan, indicator development		M&E framework plan developed in 2007; no computerized inventory system, training modules, training evaluation system or electronic data dissemination system; no data collection on positive border cases; current national information system in place for data collection and reporting	Will update M&E framework plan; diagnostic monitoring quality control will be strengthened and drug quality will be monitored
QA/QC (diagnosis, supply chain, etc)		Currently no QA system in place	Will enhance QA for diagnosis
Operational Research	Research in Past 5-10 years	Present Research Projects	Planned Research Projects
Parasitological research projects, in particular for <i>P. vivax</i> ; list major outcomes and please cite publications when relevant		Study chloroquine response to Pv and ACT /in vitro drug response to Pf; study asymptomatic <i>falciparum</i> carriers in the community through cross-sectional surveys	Will conduct a Malaria Indicator Survey (MIS); exploratory studies on parasite strain to be conducted; conduct G6PD prevalence survey in 2011
Entomological research projects; list major outcomes and please cite publications when relevant			Will conduct research on transmission related to vector biology and the role of insect growth regulators in larvivorious fish; plan to conduct studies on the use of repellents in farmers for prevention
Behavioural research projects; list major outcomes and please cite publications when relevant		Investigation into drug compliance and ethnomedical practices in the community; study treatment-	

		seeking behavior of communities	
Other research projects; list major outcomes and please cite publications when relevant			
Research Partners (national, regional and international) in operational research projects			Plan to create a Centre for Tropical and Zoonotic Disease and Operational Research; studies on prevalence of haemoglobinopathies and their role in clinical manifestation of the disease

Quantitative Data			
Variable	Data	Source	Notes (include year if not 2010)
Total population	697,331	World Health Organization, World Malaria Report 2010	2009
Population at risk (PAR): Low	425,372	World Health Organization, World Malaria Report 2010	2009
Medium	0		
High	90,653		
	401,180	Global Fund Proposal Round 10	2009
Total malaria deaths, Total estimated deaths	4	Malaria Program Review, 2010	2009
Total malaria cases	972	Malaria Program Review, 2010	2009
Total positive slides – <i>P. vivax</i>	413	Global Fund Proposal Round 10	2009
Total positive slides – <i>P. falciparum</i>	559	Global Fund Proposal Round 10	2009
Total suspected cases	62,790	World Health Organization, World Malaria Report 2010	2009
G6PD deficiency % population			
# imported malaria cases (national)	126	Bhutan VDCP Report (exported Epi Info)	2009
Slide positivity rate (SPR)	Between 1-3	Malaria Program Review, 2010	2009
Annual blood examination rate (ABER)	12.6%	Global Fund Proposal Round 10	2009
Annual parasite index (API)	4/1000	National Control Strategy	2009
Available parasite prevalence data	20% of migrant workers	Global Fund Proposal Round 10	Migrant worker

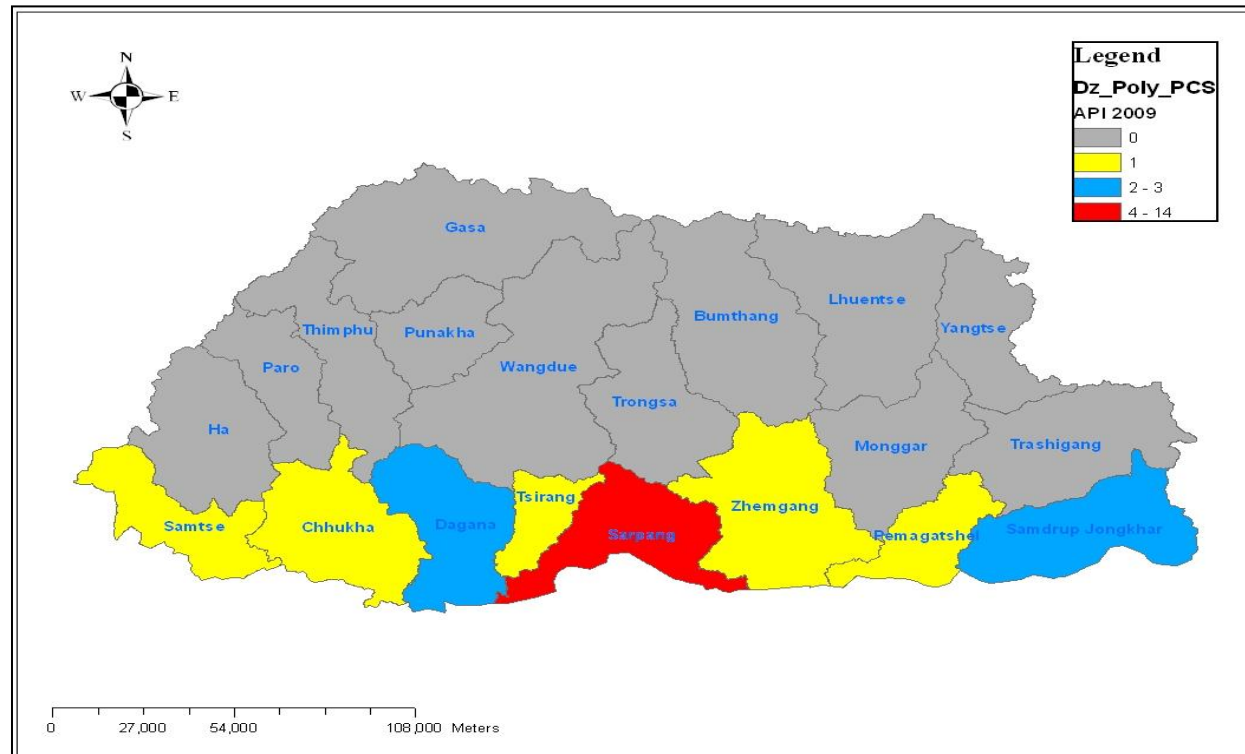
Main Sources (list up to five main sources):
1. Global Fund to Fight AIDS, Tuberculosis, and Malaria, Round 10 Proposal (2010). "Elimination of malaria in seasonal transmission districts and strengthening of control activities in perennial transmission districts of Bhutan."
2. National Malaria Control Programme of Bhutan (2010). Bhutan Malaria Program Review: Towards a Malaria Free Bhutan, March 2010, Aide Mémoire and Summary (draft document).
3. National Malaria Control Programme of Bhutan (2010). Strategic Plan for Phased Elimination of Malaria, 2011-2016 (draft document).
4. Vector-borne Disease Control Programme (VDCP) Bhutan (2008). Bhutan National Malaria Control Strategy, 2008-2013.
5. World Health Organization. World Malaria Report, 2010.

DISTRICT-WISE STRATIFICATION OF MALARIA



* Vector-borne Disease Control Programme (VDCP) Bhutan (2010). Global Fund Proposal Round 10.

DISTRICT-WISE STRATIFICATION BY API



**Stakeholders' Meeting, Round 10 Global Fund, 15th April 2010, Thimphu