Malaria Strategic Plan-2010-2015

Towards Malaria Elimination

Table of Contents

Acronyms and Abbreviations

ACT	Artemisinin based combination treatment
AL	Artemether - lumefantrine
ANC	Antenatal Clinic
CMS	Central Medical Stores
DDT	Dichloro-Diphenyl-Trichloroethane
DFID	Department For International Development
DHMT	District Health Management Team
DS	Demographic Survey
EPI	Expanded Programme on Immunisation
M o U	Memorandum of Understanding EPI
G-6PD	Glucose-6-Phophatase Dehydrogenase
IDSR	Integrated Disease Surveillance System
IEC	Information, education and communication
HEA	Health Education Assistant
HEO	Health Education Officer
IRS	Indoor Residual Spraying
ITNs	Insecticide Treated Nets
IMCI	Integrated Management of Childhood Illness
IVM	Integrated Vector Management
LLINs	Long lasting insecticidal nets
MoH	Ministry of Health
MoLG	Ministry of Local Government
NDP	National Development Plan
NGO	Non-Governmental Organisation
NMCP	National Malaria Control Programme
PCR	Polymerase Chain Reaction
QA/QC	Quality Assurance/Quality Control
RBM	Roll Back Malaria
RDT	Rapid diagnostic Test
SADC	Southern Africa Development Community
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Foreword

This strategic plan came into being following the achievements by the National Malaria Control Program in co-coordinating and supporting the delivery of effective malaria control interventions through implementation of the 2002-2005 RBM strategic Plan that was followed by the development and implementation of the Malaria Strategic Plan: 2006-11. The implementation of the two documents resulted in the achievement of the overall goal of preventing and greatly reducing morbidity and mortality due to malaria leading to the possible elimination of the disease.

In 2009 the Ministry of Health and its implementing Partners conducted a comprehensive malaria programme review and the recommendations, from the review report have been used to develop this strategic plan which if implemented will drive the country towards malaria elimination in Botswana by 2015.

This strategic plan documents key achievements achieved by previous strategic plans. It then documents the strengths, weaknesses, opportunities, threats and key challenges as identified by the malaria programme review of September 2009. It contains the strategic foundations, guiding principles, objectives, implementation plan, a monitoring and evaluation plan and a budget. The goal is to have a malaria free Botswana by 2015. The following four objectives and their strategies are going to be implemented in order to achieve the goal. These are: a) development of the requisite capacity in the programme at all levels to achieve malaria elimination, b) development of a robust information system for tracking of progress and for decision making, c) achievement of universal coverage of all appropriate interventions in all districts in order to increase the number of malaria free districts and achieve malaria elimination and d) behaviour change and communication through empowering the population to have appropriate knowledge, attitudes, behaviours and practices on malaria.

The implementation of these objectives and their strategies will be monitored through the malaria programme monitoring and evaluation plan. Key indicators to be monitored are summarised in this document. This strategy has been costed and it will be used to advocate for increased resources and for more partner involvement. It is hoped that through implementation of this strategy malaria elimination can be realised in Botswana by 2015 in line with vision 2016.

Deputy Permanent Secretary Preventative Services

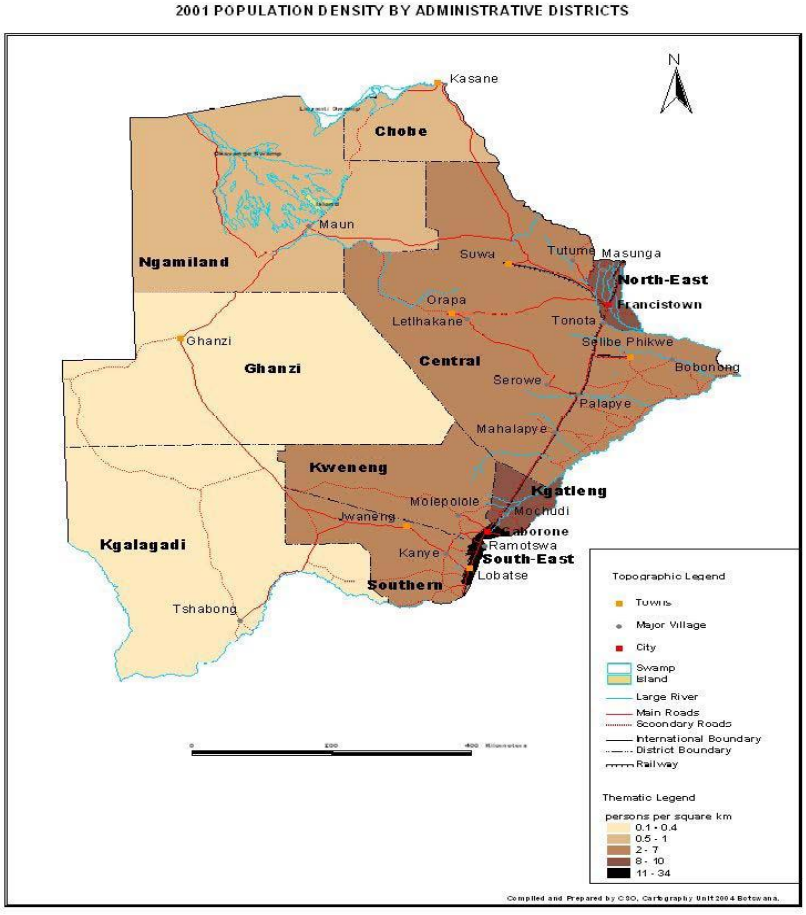
Acknowledgements

The Department of Public Health acknowledge the hard work that went into the development of this strategic plan whose purpose is to drive the elimination vision in Botswana. The contribution of individuals, organisations and partners who participated in the development of this strategy is greatly appreciated. We thank World Health Organisation for the technical guidance throughout the development process of this strategic plan, UNICEF, Clinton Foundation, members of the Malaria Epidemic Preparedness Committee, Botswana Defence Force, Ministry of Local Government – Primary Health Care Services Department, District and Primary Hospitals and everyone who immensely contributed to the development of this important strategic document.

1.0 Chapter One: Background

1.1 Country profile

Botswana is a landlocked country situated in the centre of Southern Africa with a total surface area of 582,000 square kilometers and an estimated population of 1,802, 958[1] for 2009. It shares borders with Zambia, Namibia, Zimbabwe and South Africa. The population is unevenly distributed with the northwestern region comprising Kgalagadi, Ngamiland and Chobe accounting for 61% of Botswana's surface area but is resident of only 13% of the population[2]. Most of the population lives along the eastern part of the country which has better rains and more fertile soils. About 34% of the population is under the age of 15 years and 6% is over the age of 65 years. The population density of urban to rural ratio is 1.2:1.[3]



[1] Central Statistics Office. Population Census 2001
[2] Botswana Malaria Programme Review Report 2009
[3] CSO 2001 Census report

Climate is largely arid or semi-arid. The average daily temperature ranges from 22^{o}C to 33^{o} C in January[4]. The daily minimum temperature ranges from -5^{o}C in July to 19^{o}C in January. More than 90% of rainfall is in summer months from October to April, with the average annual rainfall ranging from 250mm in the southwest to 650mm in the North West[i].

1.2 Overview of the Health System

The public sector through the Ministry of Health (MOH) is responsible for provision of most of health services in the country. The Ministry of Health is responsible for health policy development as well as the provision of preventive, curative and rehabilitative services. Ministry of Local Government, which used to provide primary health care services before 2010, will continue to collaborate with MoH on vector control measures.

TABLE 1: HEALTH INDICATORS IN BOTSWANA

Table 1: Health Indicators in Botswana

Indicator	Both rural and urban	Year
Crude Birth Rate	29.7	2006 (DHS)[5]
Crude Death Rate	11.2	2006 (DHS)
Fertility Rate (*Females 15 – 49)*	3.17	2006 (DHS)
Under 5 Mortality Rate (per 1000)	76	2006 (DHS)
Infant Mortality Rate (per 1000)	48	2006 (DHS)
Life Expectancy at Birth - *Male*	48.8	2006 (DHS)
Life Expectancy at Birth - *Female*	60.0	2006 (DHS)
Annual Growth Rate (%)	2.1	2001[6]
Maternal Mortality Rate (per 100,000)	193.4	2007[7]

N.B: DS – *Demographic Health Survey*

1.3 Accessibility

The government of Botswana has made significant strides in improving access to health over the years. Currently 88% of the population is within 15kms of a health facility, 98% of the urban population are within 8Km radius while in rural areas 83% of the population are within the 15km radius.[8] Patients only pay a nominal fee for services in the public sector and services are not denied

[4] Mete report to Annual Malaria Conference 2008
[5] Botswana Demographic Health Survey 2006: Executive summary page 9
[6] Census 2001
[7] National Health service Situational Analysis Report 2009
[8] National Health Service Situational Report 2007. Ministry of Health

to those who cannot afford. The role of the private sector is growing, especially in the urban centres and MoH will work with them to ensure policies and guidelines are adhered to. At the district level, malaria control activities are implemented at the district level by the District Health Management Team (DHMT) which comprises of the Public Health Specialist, Staff, Matron, Pharmacy Technician, Community Health Nurse, Health Education Officer, Administrator and Health Education Assistants. Within the DHMT, the Public Health Specialist co-ordinates malaria programme activities.. The Community Health Nurse is responsible for the weekly reporting of notifiable diseases as well as malaria IEC and community mobilization which is done jointly with the Health Education Officer.. Supervision and monitoring of case management is the responsibility of the District Medical Officer or the Public Health Specialist. Referral, District and Primary Hospitals and Clinics are also responsible for case management of malaria.

Table 2 List of health institutions in Botswana[9]

Facility Type	Number
Referral Hospitals	3
District hospitals	14
Primary Hospitals	17
Health clinics with maternity	104
Health clinics without maternity	173
Health posts	338
Mobile posts	844
Private Hospitals	6
Private Medical Clinics	167

1.4 Human Resources

This is a core responsibility of the Ministry of Health.

Table 3: Staffing Levels 2008

	Doctors	Nurses	Paramedics	HEAs	EHO	HEO
Total number	446[10]	4468[11]	935[12]	841[13]	160[14]	
No per 10000 population	3.1	24.2		5		

NB: EHO = Environmental Health Officers

[9] Health facility register 2008. Ministry of Health
[10] Botswana statistical year book 2008
[11] Botswana statistical year book 2008
[12] Consolidated Establishment Register for Botswana Local Authorities 2005/2006, April 2005
[13] Botswana statistical year book 2008
[14] Consolidated Establishment Register for Botswana Local Authorities 2005/2006, April 2005

1.5 Procurement and Supply Chain Management

The Central Medical Stores (CMS) Annual Procurement Plan (APP) provides for the forecasting, quantification and procurement of malaria medicines. Central Medical Stores uses morbidity based and average monthly consumption methods to procure malaria medicines and associated commodities as well as the malaria diagnostics.

The current quantification is based mainly on previous consumptions and available budgets. The malaria medicines quantification is by the CMS and is based on past consumption with some adjustments using in-house software. Input from the NMCP regards using target population and morbidity based quantification supports the consumption based quantification. The facility compiles data on the monthly use of each particular drug and use the average to request from CMS. Quantities requested at the facility level may not well meet the quantities at central level and hence there is need for support from the central level and CMS to reconcile quantities.

At the national level, stock control is done by electronic stock control system. At the health facility level manual stock cards are used. There is a policy at all levels on maintaining three months buffer stocks at any one time. At the central level there is adequate reporting on stock levels on malaria medicines to the quarterly meeting of the Malaria Reference Group and monthly meeting of the Malaria Epidemic Preparation and Response Committee

Indoor Residual Spraying chemicals, spray pumps, ITNS, net re-treatment kits and LLIN are quantified by the entomology unit and procured by the NMCP. Financing of anti malarial drugs is the responsibility of the Botswana government and recently some partners are supporting procurement of malaria commodities.

1.6 Malaria elimination within the development agenda

Botswana is committed to implementing regional and international commitments. In 1999, the Ministry of Health embraced the Roll Back Malaria (RBM) global strategy as an initiative to scale up malaria control interventions in the country. Botswana re-affirmed its commitment to the RBM by appending her signature to the Abuja Heads of State Declaration on RBM in 2000. Botswana is signatory to regional and continental declarations which include, the Maputo declaration of 2003, the Abuja call for accelerated action towards universal access to HIV and AIDS, Tuberculosis and Malaria services of 2006 which pledged to accelerate malaria control programmes with the aim to eliminate malaria using effective anti-malaria interventions. She is

also signatory to Millennium Development Goals particularly goal 6; target 8, “halt by 2015 and begin to reverse the incidence of malaria and other diseases

The Government is committed to interrupting malaria transmission in Botswana. And in view of this undertaking, malaria control has been a priority in both the National Development Plans (NDP) 8 and 9 and the current National Development Plan (NDP10). In the current plan elimination targets of reducing the malaria cases from a baseline level of 10/1000 in 2007 to 0/1000 of locally acquired malaria by 2016[15] are clearly stated. Further to that Botswana is one of the four SADC countries targeted for malaria elimination by 2015[16]. In line with this Ministry of Health signed a joint SADC statement on regional malaria control and elimination.

1.7 Malaria Parasites and Vectors

In Botswana, *Plasmodium falciparum* is responsible for over 98% of malaria cases. *Plasmodium vivax* and *Plasmodium malariae* constitute the other 2% of cases[17]. The main vector has been identified as *Anopheles arabiensis.* Historical data suggest that the vectorial system in Botswana consisted of *Anopheles gambiae* s.s*., Anopheles arabiensis* and to a lesser extent *Anopheles funestus.* After years of IRS, two of the species: *An. gambiae s.s.* and *An. funestus* were decimated leaving *An. arabiensis* as the sole malaria vector in the country. *An. arabiensis* breeds in temporary and sunlit freshwater and feeds both indoors and outdoors and rests both indoors and outdoors making it a difficult vector to control with IRS and ITNs[18].

1.8 The Botswana Malaria Programme (National, District, Community)

Malaria Control in Botswana started in the 1950s and was mainly focused on Vector Control during the Malaria Eradication Era. A comprehensive National Malaria Control Programme (NMCP) was launched in 1974 which was initially run as a vertical programme, but later decentralized to the district level in 1998. The programme has offices in Gaborone and Francistown. The Gaborone office is responsible for overall co-ordination of the programme; weekly malaria surveillance system; advocacy and IEC; and case management. The Francistown office is responsible for entomological work, vector control and personal protection. There are structures that support the programme such as the Malaria Reference Group provides technical advice on policy issues and the Malaria Epidemic Preparedness and Response Committee that oversees epidemic preparedness activities and provides logistical support during the transmission season.

[15] NDP10 Plan 2010
[16] SADC Malaria Elimination Strategic Framework 2007
[17] Malaria strategic plan 2006 -11
[18] Malaria programme review report 2009

At the district level malaria control activities are implemented by the District Health Team without a malaria specific focal point. Currently, malaria control at the community level is limited. Health Education Assistants provides a link between clinics/health posts, and the communities. The responsibilities of Health Education Assistants include among others health education on malaria and community mobilization. Formal structures and mechanisms that are used to liaise and work with communities are the Tribal Offices, Village Development Committees and Village Health Committees and informally community leaders and traditional leaders.

1.9 Key Strategies for Malaria Control/Elimination

The following strategies guide the implementation of the malaria control programme:

a) **Information, education and Communication and Advocacy including Community Mobilization** for increased awareness and partner involvement: it includes advocacy for malaria as a public health priority among politicians, partners and civil society; innovative IEC initiatives that raise individual, household and community awareness of malaria and promote positive behavioural change in terms of personal protection, treatment seeking behaviour and community participation; strengthening community-based mechanisms and exploiting entry points that can be used by the communities to take action on malaria issues.

b) **Vector control and Personal Protection** through the use of Indoor residual house spraying and insecticides treated mosquito nets including larviciding and environmental management;

c) **Case Management and Prophylaxis** for prompt diagnosis and early combination treatment including prophylaxis in pregnant women and other risk groups. All suspected malaria case undergo parasitological confirmation with microscopy and/or Rapid Diagnostic Test.

d) **Epidemic Preparedness Response** to ensure prompt and effective management of epidemics. It includes maintaining existing partnerships and creating new ones within EPR, maintaining the epidemic containers, maintaining malaria contingency plan and providing refresher training in epidemic preparedness and response for health workers.

e) **Programme Management and Coordination** for effective programme implementation. The key components of this strategy are: coordination of malaria control activities and training; planning,

monitoring and supervision of activities; periodic review and evaluation of specific programme areas and overall impact of the NMCP.

f) **Monitoring and Evaluation, Surveillance and Research** to monitor programme performance and provide evidence for decision making: it includes weekly surveillance system to detect malaria outbreak through the use of thresholds, evidence gathering from routine information sources, surveys and operation research for evidence-based planning.

1.10 Anti-malaria drug and vector resistance

1.10.1 Anti-malaria drug efficacy

Therapeutic efficacy studies are a prerequisite for rational drug policies development, implementation and monitoring. Botswana has been conducting drug efficacy studies since the mid 1990s following reports of chloroquine failure which was the first line drug for treatment of uncomplicated malaria. The following first line drugs have been studied Chloroquine (CQ): 1994-1997, Sulphamethoxsazol-Pyremethamin (SP): 1998 to 2006 and Artemether-Lumefantrine: 2009 to 2010. Up till the recent policy changes to artemether-lumefantrine in 2007, SP was used as the first line treatment for uncomplicated malaria.

The 2006, SP efficacy study revealed failure rates of 9.4 %[19]. However, the growing SP resistance globally and in the neighbouring countries and the move to malaria elimination in the region, Botswana decided to change the first line drug for the treatment of uncomplicated malaria from SP to artemether-lumefantrine.

In recent years due to the declining burden of malaria cases it has been difficult to recruit a statistically representative sample of participants for the drug efficacy studies. In 2009 the study failed to recruit enough numbers to make significant statistical analysis.

1.10.2 Malaria Vectors Susceptibility to Insecticides

Past and recent studies indicate that there is no resistance of the malaria vector, *Anopheles gambiae s.l*. to DDT but insignificant resistance to pyrethroid. The Entomology Laboratory monitors the susceptibility of the malaria vector across the country. This routine monitoring is conducted in districts that conducts Indoor Residual Spraying. There are no specific sentinel sites for entomology monitoring. Data from 2006 and 2008 shows that malaria vectors were highly susceptible to DDT in

[19] Drug Efficacy Report: Ministry of Health 2006. NMCP

2006 and 2008. Sensitivity of the vector to Lambdacyhalothrin is also high except one village (Moroka) in North East district which showed sensitivity of 74.6 % in 2006[20].

1.11 Malaria Epidemiology

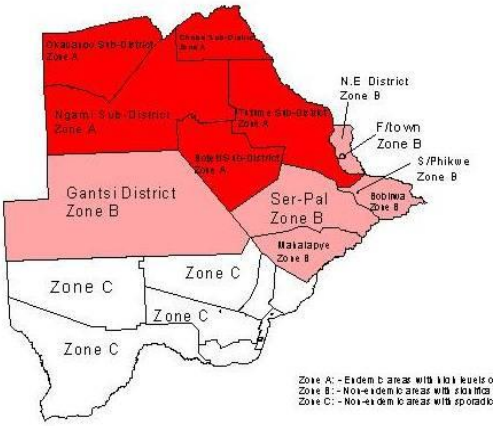
Malaria transmission in Botswana is seasonal and unstable with some recorded sporadic epidemics. Transmission is related to the level and distribution of rainfall, which varies considerably each year. Sporadic epidemics have been experienced with the worst being reported in 1996 and 1997. It is estimated that 28%[21] of the population live in malarious areas. Transmission mostly occurs in the rainy season between November and May with a peak from mid-February to April.

Transmission is most intense in Chobe, Okavango and Ngami and less intense in Boteti and Tutume. Figure 2 below shows malaria stratification in Botswana using data for the years 2000-2009. About 51 % of the population is living in Zone A and B in the northern part of the country. Zone A is endemic with regular and high transmission levels. The five Zone A districts accounts for over 80% of reported malaria cases[22]. Zone B has low transmission with significantly low malaria cases. Zone C experiences sporadic malaria cases. Transmission levels vary significantly within districts. In recent years Bobirwa and Kweneng in Zone B have shown some significant increases in local malaria transmission[23].

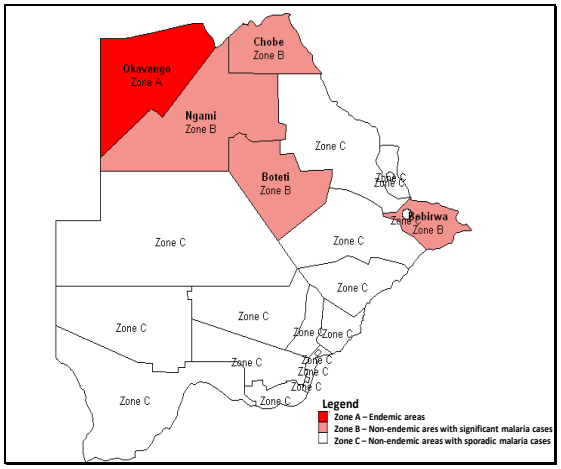
[20] Malaria Programme Review Report 2009
[21] MPR Report 2009
[22] Malaria programme review report 2009
[23] Report on malaria outbreak Bobirwa Sub-District 2009. NMCP

Fig 1: Maps showing malaria epidemiology in Botswana

1997-1999 Malaria cases per 1000pop : Map 1



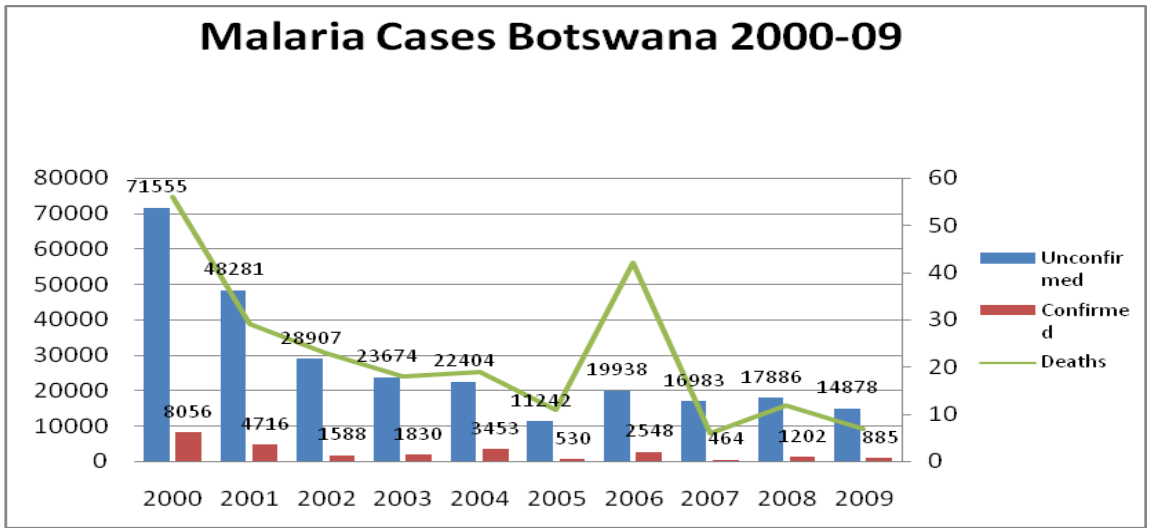
2007-2009 malaria cases per 1000pop: Map 2



1.12 Current Status of Malaria in Botswana

Significant strides have been made in reducing the burden of malaria. In general, over the period 2000-2008 malaria has shown a decreasing trend with marked variations from year to year. Between 2000 and 2008 unconfirmed malaria cases, confirmed malaria and deaths decreased by 75%, 85.1% and 91.1% respectively. Incidence of unconfirmed malaria declined from 42.6/1000 in 2000 to 10/1000 in 2008 a 76.2% decline[24]. Figure 1 below demonstrates remarkable achievements made by the NMCP in reducing the malaria burden in Botswana.

Fig 2 Graph Showing Malaria Cases and Deaths



[24] National malaria programme data base. Ministry of Health Botswana

2 Chapter Two: Overview of Malaria Programme Implementation

In 2005, the NMCP conducted an evaluation of the 2002-2005 Roll Back Malaria Strategic Plan which focused in the following key strategies for malaria control: Vector control using IRS and ITNs),Community mobilisation, Program management and coordination, monitoring of parasite and antimalarial resistance prompt diagnosis and effective treatment and EPR. The evaluation revealed that these interventions were applied with significant measure of success over years evidenced by significant reduction of malaria burden and mortality. However, evaluation also identified areas that required strengthening. The review of the 2002-2005 strategic Plan guided the development of the second generation strategic Plan (2006-2011). These five years strategic plan had the goal of effectively controlling malaria so that it ceases to be a major public health problem. The plan was implemented through the six main interventions areas: a) programme management and coordination, b) vector control and personal protection, c) case management and prophylaxis, d) information, education communication and advocacy including community mobilization, e) monitoring and evaluation as well surveillance and research, and f) epidemic preparedness and response.

Basing on the observed significant reductions in malaria burden since the implementation of the two malaria strategic plans, in 2009 the NMCP with its partners decided to do in-depths performance review of the malaria control programme with a view to redesign and refocus the programme towards malaria elimination.

2.1 Achievements

2.1.1 Progress towards set targets

In April 2008 NMCP with its partners decided to undertake a mid term review of the Malaria strategic plan (2006 - 2011) and the program further decided to do in-depth performance review of the malaria control (MPR) with a view to redesign and refocus the program towards malaria elimination. The Malaria Strategic Plan (2006-2011) had set targets towards malaria control Table 7 indicates the achievements towards those set targets. The 2009 Malaria programme review identified a number of notable achievements during the implementation of the 2006-11 strategic plan. Some of the notable achievements include establishment of a functional weekly surveillance system with a data base for warehousing the malaria data. There is some collaboration with the

meteorological department on use of weather data for predicting epidemics. The programme was able to conduct a malaria indicator survey. Annual programme review and planning meetings were held with partners and stakeholders. Epidemic preparedness and response meetings were held monthly during the transmission season and all outbreaks were detected and responded to within two weeks. Epidemic preparedness containers are being regularly inspected and replaced at strategic locations. Guidelines and protocols were reviewed resulting in ACTs being rolled out to all facilities and malaria deaths are being audited. Drug efficacy studies were also conducted. Annual IRS campaigns were conducted and monitoring of vector susceptibility to insecticide was conducted.

Table 4. Targets and achievements of 2006-11 strategic plan[25]

Target	**Baseline 2005**	**Achievement 2009**	**Target 2011**
Maintain malaria deaths at below 15 per annum	24	7	10
Reduce malaria case fatality rate per 100 malaria confirmed cases by 25%	1.37%	0.791%	0.50%
Maintain parasite prevalence ratios at below 2%	Not available	Not available	2.0%
Reduce incidence of confirmed malaria to below 10 per 1000 population at risk	24	8	10
Decrease malaria endemic districts to 3.	5	5	2
Increase ITNs coverage to above 60%	18%	NA	>60%
Increase IRS coverage to above 80%	65%	72%	>80%

[25] National Malaria Control Programme 2009

2.2 SWOT analysis

A SWOT analysis was done and the findings are summarised in the tables below:

a) **Programme management and coordination**

Strengths

- Supportive Government policy for Primary Health Care strategies.
- Strong political support for malaria control.
- Availability of health infrastructure.
- Decentralisation of malaria control activities to the districts.
- Functional partnerships with Ministries of Local Government, Agriculture, BDF and Meteorological Services
- Policies and guidelines in line with WHO recommendations are available.

Weaknesses

- Shortage of skilled human resources at all levels.
- Lack of Malaria focal persons at District level.
- Inadequate support and supervision of the trained staff
- Weak logistic management and information system
- Poor dissemination of guidelines
- Inadequate public private partnership collaboration

Opportunities

- Existence of potential partners
- Existence of Community Based Organisations.
- Cross border Malaria Initiatives (Trans Zambezi, Trans Limpopo)
- Malaria elimination campaign in the SADC region

Threats

- Other competing health priorities
- Economic recession
- Climate change
- Natural disaster (Floods)
- Counterfeit products

b) Case management

Strengths

- Laboratory facilities for diagnosis of malaria available in all districts
- Annual Monitoring of case management by DHT and NMCP
- Free drug policy
- Deployment of doctors to catchment areas

Weaknesses

- Long turnaround time for laboratory results (7 days) for clinics
- Lack of quality assurance for both microscopy and RDTs
- Poor utilization of pharmacovigilance system

Opportunities

- IMCI programme present in all districts

Threats

- Development of Artemether/ Lumefantrine resistance in Botswana
- High HIV prevalence

c) Epidemic preparedness and response

Strengths

- Epidemic preparedness and response committee in place
- Epidemic preparedness and response committee that meets regularly
- District malaria thresholds available
- Epidemic response containers strategically placed and maintained yearly

Weaknesses

- Inadequate documentation of epidemic postmortems
- Non-use of surveillance data at health facility level i.e. no thresholds at health facilities

Opportunities

- Partnership with WHO, UNICEF and other UN organizations and research institutions
- Cross border collaboration with neighbouring countries e.g. Namibia
- Collaboration with regional climate forecasting institutions

Threats

- Climate change leading to frequent natural disasters

d) Surveillance monitoring and evaluation and Research

Strengths

- Existence of a functional weekly surveillance system
- The existence of an NMCP database

Weaknesses

- Lack of a comprehensive M&E plan
- Poor data analysis and utilization at health facility and district level
- Lack of malaria stratification at sub-district and health facility level
- Poor mapping of malaria cases health facility/village using GIS

Opportunities

- A GIS-based database for mapping is available
- Availability of DHIS

Threats

Community resistance to surveillance activities

e) Malaria Advocacy, IEC and Community Mobilization

Strengths

- Availability malaria advocacy and communication strategy

Weaknesses

- Inadequate operational research including Knowledge Attitude Behaviour Practices (KBAP)
- Irregular Updating of IEC and advocacy materials.
- Shortage of Health Education Officers at district level

Opportunities

- Existence of community structures such as the Village Development Committee (VDC) and Village Health Committees (VHC)
- Engaging existing Community Based Organisations

Threats

f) <u>Vector Control</u>

Strengths

- Vector control activities decentralised to the districts
- Availability of IVM guidelines
- Free IRS/LLINs policy
- Tax exemption on ITNs/LLINs

Weaknesses

- Data not analyzed and used for decision making at district level
- Low coverage of vector control interventions
- No legal binding instrument for refusals for IRS
- Poor vector surveillance

Opportunities

- Availability of mapping tools to improve coverage
- Winter larviciding
- Possibility for malaria elimination due to changing malaria epidemiology

Threats

- Development of insecticide resistance

2.3 Key Challenges

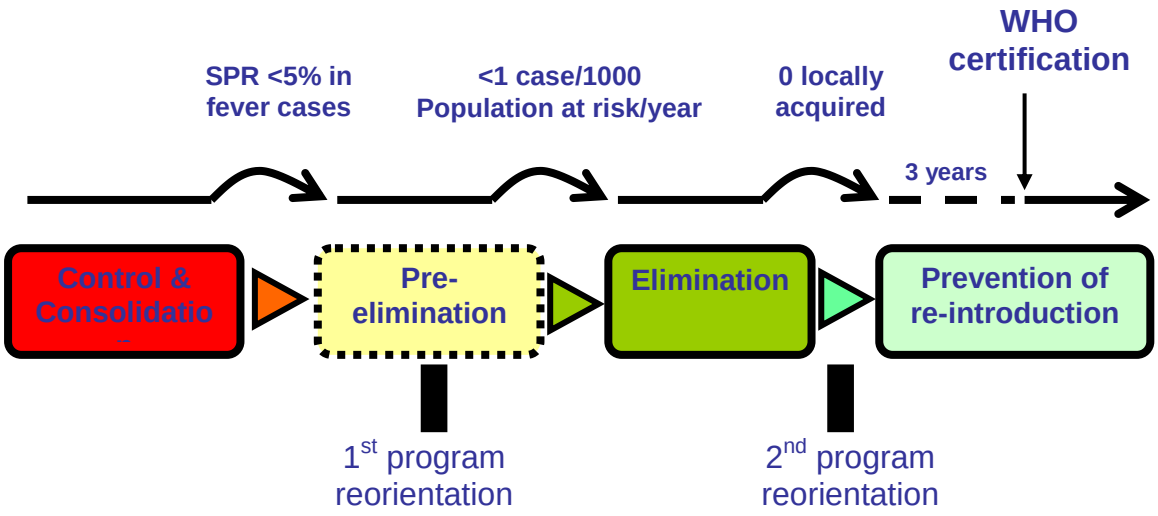
The main challenges identified are the following:

a) Shortage of human resource
b) Lack of Focal points at NMCP i.e. case management, EPR,
c) Lack of Focal persons at district level
d) Poor private sector participation
e) Staff attrition
f) Poor monitoring capacity by DRU
g) Low capacity of CMS to procure and distribute timely adequate anti malarial commodities.
h) Poor quality control of drugs and commodities
i) Lack of programme specific travel budget for external travel
j) Over-reliance on clinical diagnosis
k) Low community acceptance of vector control interventions
l) Cultural factors affecting vector control interventions.
m) Lack of community participation and involvement
n) Communication barriers due to different languages
o) Poor reporting from the private sector

3 Chapter Three: The Malaria Strategy 2010- 2015

The remarkable achievements in malaria control evidenced by significant reductions in malaria transmission over the years made it necessary for the National Malaria Control Programme to develop this new strategy which will lead the country to malaria elimination. Below is a summary of the malaria elimination continuum.

Figure 3: The Malaria Elimination Continuum[26]



SPR: slide or rapid diagnostic test positivity rate

Malaria elimination builds on the foundation laid by intensive malaria control, with universal coverage of intensified, efficacious vector control and case management interventions. According to WHO, malaria elimination can be envisaged when a malaria control programme has been successful in reducing the burden of mortality and morbidity to a marginal level, complemented by evidenced based data on the achievement of successful malaria control and sufficient evidence that transmission can be interrupted by scaling up planned activities[27]. The 2009 MPR report revealed a reduction in morbidity and mortality over years with marked achievements in various malaria intervention areas. Currently the malaria slide positivity rate is below 5% and the programme is re-orienting towards malaria elimination.

[26] WHO Malaria Elimination Guidelines 2009

3.1 Chapter Three: Vision, Mission and Guiding Principles

3.1.1 Vision

Malaria free Botswana

3.1.2 Mission

To achieve and maintain zero malaria local transmission in Botswana through a dedicated skilled workforce and scientifically proven methods on malaria control and elimination.

3.1.3 Guiding Principles

Achievement of overall malaria elimination targets set in this malaria strategic plan will be guided by the following broad principles:

a) The National Malaria programme shall coordinate the consultative planning, implementation, research, monitoring and evaluation of malaria prevention and elimination activities.
b) Building strong mechanisms for partnerships; Public-Private Partnership (PPP) and multisectoral collaboration shall be encouraged during the implementation of this plan to achieve malaria elimination.
c) Partners shall implement activities outlined in this strategic plan or changes made thereof under the leadership and coordination of the National Malaria Program and in line with the National Malaria Policy.
d) All partners involved in malaria control will be required to share information on malaria control interventions delivered in their geographical locations.
e) There shall be efforts to ensure coordinated planning and organization of joint activities with neighbouring countries
f) Targeting of malaria interventions will be based on updated epidemiological stratification
g) There shall be emphasis on communication for behaviour change and community empowerment
h) Community participation shall be encouraged in the planning, management and delivery of malaria services.

3.2 Key Assumptions

The following assumptions are important points that need to happen in order to achieve progress in malaria programme as outlined under the specific objectives but that are beyond the direct control of the Malaria Programme and RBM partnership. However, the partnership will do its part to enhance the likelihood that these assumptions are met.

a) Continued political commitment by leadership at all levels to support the national strategic plan for malaria control
b) Agreement with Ministry of Finance, Planning and Economic Development that allows additional funding for malaria control to be used without negatively affecting other departments or programmes
c) Further improvement of performance of health services (availability of infrastructure, supplies, staff etc)
d) Continued financial and technical support from development partners during the period of the plan and beyond
e) Continued availability of all needed products on the international market needed quantities

3.3 Goal

To achieve zero local malaria transmission in Botswana by 2015.

This will be achieved through strengthening program management and coordination, vector control measures, diagnostic and therapeutic services, epidemiologic and entomological surveillances systems, and operational research.

3.4 Objectives

a) By 2012, develop the requisite capacity in the programme at all levels to achieve malaria elimination and maintain it thereafter.
b) To develop a robust information system for tracking of progress and decision making by 2012.
c) To achieve universal coverage of all appropriate interventions by 2012 in all districts in order to increase the number of malaria free districts to 80% by 2013.
d) By 2013, at least 80% of the population will have appropriate knowledge, attitudes, behaviours and practices on malaria and at least 100% by 2015.

3.4.1 Objective 1: By 2012, develop the requisite capacity in the programme at all levels to achieve malaria elimination.

Strategies

- Strengthen programme management and coordination

Ministry of Health will ensure that there is the required program management capacity for planning, implementation, monitoring and evaluation which is crucial for a sustainable malaria programme in view of elimination.

The country will enact and reinforce legislation and regulations to ensure registration and importation of quality antimalarial medicines in both public and private health facilities, including private pharmacies. Malaria programme partners and private practitioners will have to comply with national drug policy.

Human resource management at all levels is essential in districts as a key feature of the malaria strategy. The NMP will carry out needs assessments in human resource development and provision of enabling working environments. Currently the program has inadequate human resource capacity at all levels especially at a district level where there is no focal point to coordinate and manage malaria activities. Ministry of health will restructure the program to align it with malaria elimination requirements and appoint district malaria focal persons. To support those working in these districts, NMP will ensure continuous support to the field staff to assist in planning, implementation, monitoring and evaluation of malaria control activities.

The program will enhance regular case management training of public and private health care institutions personnel, with special focus on prevention of potential threat of imported cases in malaria free areas. Malaria-free status will be maintained through a well-developed network of basic health services. Free access to health services and selective screening for certain high risk populations in the high risk areas will further contribute to the objective.

NMP will also support the establishment of efficient mechanisms for procurement and distribution of medicines, reagents, insecticides and other essential commodities, through the different responsible agencies. NMP will facilitate/work closely with CMS for the establishment of procurement and distribution mechanisms of malaria commodities. There will also be need for availability of necessary

resources and logistics to provide a firm and sustainable foundation for the successful achievement of malaria elimination. QA and QC system for drugs, insecticides and other commodities will be established to ensure quality.

Government of Botswana will establish National Malaria Reference Laboratory, National Malaria Field Center, and malaria field sentinel sites as well as strengthening the current insectary situated in Francistown to be able to address the needs and challenges that will arise.

Partnership will be a key factor for success for the shift from control to elimination strategy. New partners including governmental sectors, national and international nongovernmental organizations, the private sector, media, bilateral and multilateral agencies, and funding institutions will be harnessed for achievement of the malaria elimination goal. MoH, WHO and partners at country level will continue to promote greater inter-sectoral collaboration among all relevant sectors.

Collaboration with the private sector will be further expanded and promoted through all possible means. To this end NMP will collaborate with partners to identify and upgrade national centres for malaria training and research. The NMP will also identify international centres of excellence in different fields of malaria control in the region and support networking with these centres.

3.4.2 Objective 2: To develop a robust information system for tracking of progress and decision making by 2012

Strategies

- Strengthen Epidemiological surveillance
- Strengthen entomological surveillance
- Strengthen monitoring and evaluation
- Strengthen Epidemic preparedness and Response (EPR)
- Strengthen Operational Research

A robust information system will be established to allow tracking of progress while informing on areas for intensified support. The program will then reinforce the ongoing epidemiological and entomological surveillance, the monitoring and evaluation system, Epidemic preparedness and Response as well as research activities.

Currently there is inadequate information system to track progress made in malaria control programme in the country. This will require revision of the current data collection tools. Strong

epidemiological surveillance system will assist in priority setting, policy and decision-making. This will also aid early detection and control of malaria outbreaks.

The program will conduct genotyping of all local malaria parasite isolates from malaria free areas in order to determine the source of infection, and strengthen contact tracing.

IDSR training will be conducted for health workers to enhance early detection of outbreaks and response activities. Research, such as fever surveys and drug efficacy studies will be conducted to inform the program for appropriate action.

The entomological surveillance will be strengthened through establishing sentinel surveillance sites for entomological studies and functional insectary, conducting bioassay in all spraying districts and vector susceptibility tests

Monitoring the status of foci, with precise identification of their functional status (active or non-active, new or residual), will be a prerequisite for success in interruption of transmission and prevention of reintroduction of malaria.

Currently completeness, timeliness and reliability of the data collected by the health information system are the main challenge for monitoring and evaluation in all districts. The programme will address these challenges through health workers training on IDSR, strengthening of DHMIS, support supervision, review meetings and timely provision of feedback. Periodic review and evaluation of the national malaria program will be conducted during the implementation period.

The programme will develop and implement area specific interventions based on country malaria stratification. Malaria Indicator Surveys for example will be conducted in malaria endemic areas every two to three years. The implementation of the specific interventions will be strictly monitored by the programme at all levels to ensure effectiveness and quality of services.

EPR strategies will be developed and implemented to address the prevention and/or reduction of the impact of epidemics. An effective EPR system will require a cost-effective surveillance system that includes forecasting, early warning, detection and early containment of epidemics through immediate implementation of preventive and control measures. To assist districts in the identification of epidemic-prone areas and populations at risk, the country will embark on the mapping of epidemic-prone areas, develop and track facility level malaria thresholds.

Operational research will continue to be conducted and supported with a view to update national strategies and to address new challenges as well as guide the programme on implementation of interventions. A research agenda will be developed and resources will be mobilized accordingly. Establishment of strong collaboration with research institutions within Botswana and internationally will be promoted. Successful pilots will be scaled up.

3.4.3 Objective 3: To achieve universal coverage of all appropriate interventions by 2012 in all districts in order to increase the number of malaria free districts to 80% by 2013.

Strategies

- Strengthen Vector control
- Strengthen malaria diagnosis
- Strengthen malaria treatment
- Strengthen use of Chemoprophylaxis

Priority will be to rapidly increase coverage of all the major interventions with the aim of decreasing the burden of malaria in a period of two years. This strategy will markedly reduce the burden of malaria in Zone A and assist in reducing the number of cases that are currently causing sporadic outbreaks of malaria in parts of Zone B and C.

Preventing malaria by reducing exposure to infective mosquito bites will be achieved through the use of various vector control measures. The basis for selection of the most appropriate and cost-effective vector control measures will be malariogenic stratification in the country.

Indoor residual spraying is the most effective method that selectively eliminates endophilic mosquitoes feeding on potential parasite carriers, without affecting the exophilic mosquito population.

Quality application of insecticides and supervision will be strengthened, including entomological surveillance for insecticide resistance and vector species composition, biting and resting behaviour in sentinel sites.

The appropriate use of LLINs with high population coverage (as opposed to their use for personal protection), effectively decreases the number of infective mosquito bites and diminishes malaria morbidity and mortality, and all consequences of malaria burden. The current approach is to distribute one LLIN per two persons or one LLIN per sleeping place, free of charge in all the Zone A areas and selected areas of Zone B. Attempts will be made to link distribution of LLINs with other public health programmes, in particular with immunization, antenatal care and maternal and child health services and services provided by nongovernmental organizations.

Larval control is indicated in specific conditions when breeding places are well-defined and limited in size therefore, in the situation of Botswana the intervention will be most applicable in Zone B and C. Environmental management will as well form part of the preventative measures to be implemented.

To prevent the consequences of malaria in pregnancy in Zone A areas, two interventions that are recommended for delivery through antenatal care programmes will be the use of LLINS and chemoprophylaxis with chloroquine and proguanil. At present there is limited evidence of use and effectiveness of chemoprophylaxis in these areas and this will need to be further investigated.

Prompt and accurate diagnosis of malaria is the key to effective disease management and rational use of antimalarial medicines. Parasitological confirmation of malaria with microscopy will be used in malaria free areas, RDTs will continue to be used alongside microscopy in all areas for prompt diagnosis especially where microscopy is not available and for outbreak investigation, and possibly for surveys of parasite prevalence and rapid diagnosis by travelers entering low endemic areas.

In malaria free areas only cases confirmed by microscopy will be considered as malaria cases. All efforts will be made to increase access to laboratory-based diagnosis, primarily microscopy. With microscopy, the presence of both asexual stages and gametocytes will be recorded. This will help to determine the timeliness and accuracy of diagnosis. In all areas, existing laboratory services providing malaria microscopy will be strengthened.

Quality assurance of both microscopy and RDTs will purposely be promoted at all levels of the health sector. This will be through submission of 10% of the sample of slides and RDTs by all testing sites to the next level for quality assurance and control.

Prompt and effective treatment of malaria remains a key intervention in reducing the burden of disease and death from malaria. The major challenge is the relatively low malaria cases that are

parasitologically confirmed due to reluctance by clinicians to use diagnostic tests[28] (RDTs and Microscopy) in Zone A (proportion of those confirmed against unconfirmed was 5.9% in 2009[29]). This will need to be changed through training and strengthened support and supervision. For all those confirmed to have uncomplicated malaria, the current recommended first line treatment will be given and those with complicated malaria will be treated initially with quinine (with follow-up for 42 days) to ensure parasite clearance. Death audits will be carried out on every malaria death to ensure quality of case management. The current first line treatment will be followed by a gametocidal clearing drug (e.g. Primaquine) for those the drug is not contraindicated. All patients should be tested for G-6PD deficiency before being given primaquine. Those found positive will not be given.

The quality of the anti-malarials that come into the country will be adequately assessed for quality by the National QC-laboratory. Previous attempts to conduct drug efficacy studies to monitor efficacy of anti-malarial drugs failed due to low transmission levels, however the plan is to use malaria cases based surveillance monitoring reports to evaluate the efficacy of the antimalarial medicines.

3.4.4 Objective 4: By 2013, at least 80% of the population will have appropriate knowledge, attitudes, behaviours and practices on malaria and at least 100% by 2015.

Strategies

- Strengthen advocacy
- Strengthen BCC/IEC

The MPR revealed inadequate use of appropriate communication channels, insufficient distribution and availability of IEC materials very little inputs from research on development of messages. Low knowledge about malaria was noted in zone C areas, on the other hand, even in areas of relatively high malaria transmission, there was noted low uptake of malaria control interventions (especially IRS) .The first three years of this strategic plan will purposefully try to increase knowledge amongst the population with the aim of improving uptake of the various interventions in areas of high malaria burden and for improved reporting of suspected cases amongst the population in areas of low malaria burden in the country.

The NMP uses multi-media to disseminate IEC and advocacy materials, including brochures, posters, radio jingles, TV, strip adverts, Kgotla meetings and drama performances. IEC and

[28] Malaria progremme review 2009
[29] National Malaria Control Programme Data Base 2009

advocacy materials are mainly produced centrally by the government but the budget for IEC is inadequate, limiting the scope and depth of IEC for malaria prevention. However, opportunities exist for engaging strategic partners to increase IEC availability and accessibility.

A multi pronged approach for this is going to be used targeting different cadres within the population and also different sectors and institutions. These will include sectors like education, mining, agriculture and construction.

Advocacy will be done in the area of resource mobilisation to support the implementation of malaria communication strategy. For this to be effective a high level advocacy approach will be used so as to ensure that malaria elimination remains high on the political agenda. This will be done targeting policy makers including parliamentarians.

Health worker capacity on BCIC will be developed to ensure that they convey appropriate messages on malaria prevention.

The role of the community is very important to malaria elimination. Community mobilisation will be undertaken to promote community participation and increase uptake of malaria interventions. Community members will be motivated to be actively involved in the malaria activities planning and management. Initiatives such as School competitions, Malaria cup football, tournament, and Product completion will be encouraged, and a malaria goodwill ambassador will be appointed. Existing community structures (VDC, VHC, Religious institutions, e.t.c) will be strengthened to disseminate malaria information.

4 : Chapter Four: Implementation plan

4.1 *Table 5: Objective 1: By 2012, develop the requisite capacity in the programme at all levels to achieve malaria elimination.*

Activities	Zone	Target	Responsibility	Collaborating agencies	Timelines						Cost
					2010	2011	2012	2013	2014	2015	
4.1.1 Strategy 1 : Strengthen programme management and coordination											
1.1: Develop malaria program structure to align it with the malaria elimination strategy	All	functional structure in place	NMP			X					
1.2 Identify training needs	All	Report on training needs	IDSR/ NMP	WHO, UNICEF, Clinton Foundation	X	X	X	X	X	X	
1.3 Conduct training of health workers	All	≥80% of health workers trained	NMP, DHMT	WHO, UNICEF	X	X	X	X	X	X	
1.4 Assign malaria focal points at district level	A, B	5 districts with focal points	NMP, Dept Clinical Services		X						
1.5 Identify human resource required for the programme	National	Report of the HR requirements	NMP/Dept of PPME	WHO, UNICEF	X						
1.6 Establish the National Malaria Reference Laboratory	National	A national Malaria Reference lab established	NMP, NHL		X	X					
1.7 Establish collaboration with	National	2 centres collaborating with	NMP	WHO	X	X					

international centres of excellence		NMP									
1.8 Establish a malaria field center for entomological and parasitological purposes	B, C	1 functional field centre established	NMP/NHL	WHO	X						
1.9 Establish functional partnerships	B, C	partners providing resources and expertise	NMP		X	X	X	X	X	X	
1.10 Conduct quarterly consultative meetings with partners	B, C	20 meetings conducted	NMP	WHO, UNICEF	X	X	X	X	X	X	
1.11 Conduct quarterly malaria reference group meetings	National	4 meetings per year	NMP		X	X	X	X	X	X	
1.12 Conduct malaria elimination committee meetings	B, C	No of meetings (2 per year)	NMP			X	X	X	X	X	
1.13 Conduct quarterly support visits	All	No of support visits conducted to all districts	NMP, IDSR		X	X	X	X	X	X	
2.14 Ensure private facilities report weekly	All	100% of private facilities reporting	NMP		X	X	X	X	X	X	
1.15 Develop QA system for insecticides and other commodities	National	Functional QA/QC system nationwide	NMP	WHO	X	X					
1.16 Develop regulation/legislation to stop over the counter sale of antimalarial drugs	A,B,C	Availability of legislation document	NMP, Policy M&E	WHO, UNICEF	X	X					
1.17 Develop and maintain web-based communication on malaria elimination in Botswana	National	No of people accessing the website (to be established)	NMP, Policy M&E		X	X					
1.18 Advocate for	Nation	No of meetings	NMP, Health		X	X					

inclusion of malaria in the curriculum for schools	al		Promotion, MoE								
1.19 Establish cross border initiatives	National	3 cross border initiatives established	MOH, NMP	WHO, SADC	X						
1.20 Conduct quarterly cross border meetings	National A, B	No of meetings conducted (12 per year)	NMCP, DHMT	WHO, SADC	X	X	X	X	X	X	

4.2 *Table 6: Objective 2: To develop a robust information system for tracking of progress and decision making by 2012.*

Activities	Zone	Target	Responsibility	Collaborating agencies	Timelines						Cost
					2010	2011	2012	2013	2014	2015	
4.2.1 Strategy 1 : Strengthen Epidemiological surveillance											
2.1.1 Conduct IDSR training for health workers	All	≥80% of health workers trained	IDSR/NMCP	WHO	X	X	X	X	X	X	
2.1.2 Set up a functional elimination data base with GIS data on foci, cases, vectors and parasite isolates	National	Functional and up to date data base in place	NMP	WHO	X						
2.1.3 Review malaria data collection tools	All	1.Weekly notifiable tool revised 2.MH1049 and MH1048 revised	IDSR/NMP	WHO	X						
2.1.4 Conduct drug efficacy studies	A, B	DES conducted every 2 years	NMP	WHO	X		X		X		
2.1.5 Conduct case investigation/ contact tracing, in malaria free areas	B, C	100% of cases with active surveillance around a confirmed case	NMP	WHO	X	X	X	X	X	X	
2.1.6 Conduct targeted localized fever surveys	B , C	No of surveys conducted	NMP/DHMT	WHO, UB	X	X	X	X	X	X	
Conduct genotyping of all local malaria parasite isolates from malaria free	C	100% of genotype tests done	NMP/NHL	WHO, UB	X	X	X	X	X	X	

areas											
2.1.7 Malaria Death Audit	Natio nal	100% of malaria deaths audited	MRG/NMP	WHO	X	X	X	X	X	X	
4.2.2 Strategy 2 : Strengthen entomological surveillance											
2.2.1Conduct bioassays in all spraying districts	A, B	No of bioassays conducted	NMCP/DHM T	WHO	X	X	X	X	X	X	
2.2.2 Conduct vector susceptibility tests	A, B	All sentinel districts	NMP	WHO	X	X	X	X	X	X	
2.2.3 Establish sentinel surveillance sites for entomological studies	A	6 sentinel sites established	NMP		X	X					
2.2.4 Conduct vector bionomics studies	A	All districts conduct studies	NMP	WHO, UB	X	X	X	X	X	X	
2.2.5 Conduct quality assurance for LLINs and IRS chemicals	A	100% of batches tested	NMP	WHO	X	X	X	X	X	X	
2.2.6 Establish a functional insectary	F/To wn	Functional Insectary in place	NMP	WHO	X	X					
4.2.3 Strategy 3 : Strengthen monitoring and evaluation											
2.3.1 Collect timely and complete weekly and monthly reports on malaria indicators	All	100% timeliness and completeness	IDSR/NMCP/ DHMT		X	X	X	X	X	X	
2.3.2 Analyze weekly data at district and facility and provide feed back	All	100 reports on surveillance are received	DHMT		X	X	X	X	X	X	
2.3.3 Roll out DHIS to all districts	All	100% of districts using DHIS	DSR/IT/ DHMT		X	X	X	X			
2.3.4 Develop and implement a system for monthly reporting of malaria commodity	All	Functional reporting system for malaria	NMP/ DHMT		X	X	X	X	X	X	

consumption and stock levels at district and national level		commodities									
2.3.5 Conduct KAPB survey on malaria interventions	All	3 studies conducted	NMP/DHMT	WHO, UB		X		X		X	
2.3.6 Conduct malaria indicator survey every three years	A	2 surveys conducted over the period	NMP	WHO, UB,		X		X		X	
4.2.4 Strategy 4 : Strengthen Epidemic preparedness and Response (EPR)											
2.4.1 Conduct monthly EPR committee meetings during transmission season	All	No of meetings conducted (8 per year)	NMP/IDSR/ DHMT		X	X	X	X	X	X	
2.4.2 Use monthly rainfall and temperature data to predict epidemics	All	100% of districts using rainfall and temperature	NMP/DHMT	WHO, UB	X	X	X	X	X	X	
2.4.3 Update and implement EPR plans in all districts	All	100% of districts with updated plans 100% of districts implementing EPR plans	NMP/IDSR/ DHMT	UB	X	X	X	X	X	X	
2.4.5 Determine thresholds at health facility level	A, B	100% of health facilities using thresholds	NMP, DHMT		X						
4.2.5 Strategy 5: Strengthen Operational Research											
2.5.1 Establish strong collaboration with research institutions within Botswana and internationally	All	2 institutions collaborating with NMP	NMP/DHMT		X	X					
2.5.2 Develop and	Natio	Malaria	NMP, Health	WHO,	X	X	X	X	X	X	

pursue a malaria research agenda	nal	research agenda outlined	Research, IHS	UNICEF, UB,							
2.5.3 Scale-up successful pilot interventions	National		NMP	WHO, UNICEF	X	X	X	X	X	X	
2.5.4 Mobilize resources for research	National		NMP/DHMT	WHO	X	X	X	X	X	X	

4.3 *Table 7: Objective 3: To achieve universal coverage of all appropriate interventions by 2012 in all districts in order to increase the number of malaria free districts to 80% by 2013..*

Activities	Zone	Target	Responsibility	Collaborating agencies	Timelines						Cost
					2010	2011	2012	2013	2014	2015	
4.3.1 Strategy 1 : Strengthen Vector control											
3.1.1 Procure consumables and equipment to effectively conduct IRS	A, B	100% consumables and equipment procured	NMP/DHMT/ MLG	WHO	X	X	X	X	X	X	
Procure insecticide for IRS	National	DDT – 9 000 kgs Icon – 925 kgs	NMP		X	X	X	X	X	X	
3.1.2 Conduct annual in-door residual spraying in targeted districts/Hotspots	A, B	>90% operational coverage achieved in the targeted areas	NMP/DHMT/ MLG		X	X	X	X	X	X	
3.1.3 Procure sufficient	A, B	100% of	NMP	WHO,	X	X	X	X	X	X	

LLINs for universal coverage in targeted populations		LLINs for universal coverage procured		UNICEF							
3.1.4 Distribute LLINs in targeted areas	A, B	100% households with at least one LLIN	NMP	WHO	X	X	X	X	X	X	
3.1.5 Conduct winter larviciding in selected areas	B, C	100% of selected breeding areas treated with the recommended product(s)	NMP, DHMT, Community		X	X	X	X	X	X	
4.3.2 Strategy 2 : Strengthen malaria diagnosis											
3.2.1 Parasitologically confirm malaria cases by microscopy and/ RDTs	A,B, C	100% of suspected malaria cases confirmed	CMS/NHL/NMCP/DHMT		X	X	X	X	X	X	
3.2.2 Training health workers on the use of laboratory diagnostics annually	A,B, C	>80% of health workers trained	NMCP/IDSR/ NHL/DHMT	WHO	X	X	X	X	X	X	
3.2.3 Introduction of PCR use for malaria diagnosis in malaria free areas	B, C	100% malaria free areas using PCR	NMCP/NHL	WHO	X						
3.2.4 Put in place internal and external QA and QC system for microscopy and RDTs	A, B, C	100% of laboratories conducting QC/QA	NMCP/NHL/ DHMT	WHO	X	X					
4.3.3 Strategy 3 : Strengthen malaria treatment											
3.3.1 Provide stocks of anti-malaria drugs and other commodities	A,B, C	No stock-outs recorded in all health facilities	CMS/DHMT		X	X	X	X	X	X	

3.3.2 Conduct annual training for clinicians on malaria case management including private practitioners	A,B, C	≥80% of health workers trained	NMCP/DHMT		X	X	X	X	X	X	
3.3.3 Provide radical treatment to all cases in malaria free areas	B,C	100% of cases provided with radical treatment	CMS/NMP/DHMT	WHO	X	X	X	X	X	X	
4.3.4 Strategy 4: Strengthen use of Chemoprophylaxis											
3.4.1Provide chemoprophylaxis to all pregnant women	A, B	Consistently >90% of pregnant women provided with chemoprophylaxis	NMP/DHMT/ CMS	WHO	X	X	X	X	X	X	
3.4.2 Improve access to chemoprophylaxis to all travelers to endemic areas (inside and outside Botswana)	A,B, C	100% of travelers provided with chemoprophylaxis	NMP/DHMT		X	X	X	X	X	X	

4.4 *Table 8: Objective 4: By 2013, at least 80% of the population will have appropriate knowledge, attitudes, behaviours and practices on malaria and at least 100% by 2015*

Activities	Zone	Target	Responsibility	Collaborating agencies	Timelines						Cost
					2010	2011	2012	2013	2014	2015	
4.4.1 Strategy 1 : Strengthen advocacy											
4.1.1 Conduct Parliament briefing sessions on malaria	National	Twice yearly briefings	NMCP		X	X	X	X	X	X	
4.1.2 Appoint a malaria goodwill ambassador	B,C	One goodwill ambassador	NMCP		X			X			
4.1.3 Conduct annual malaria elimination briefs at council meetings	B,C	16 briefs conducted	NMCP/IDSR/DHMT		X	X	X	X	X	X	
4.1.4 Commemorate SADC and World Malaria days	A,B,C	100% of districts commemorating SADC MD per yr	NMCP, DHMT	WHO, UNICEF	X	X	X	X	X	X	
4.4.2 Strategy 2: Strengthen BCC/IEC											
4.2.1 Develop and disseminate IEC materials with community input	A, B, C	1. 70% of material developed with community participation 2. 90% of material disseminated to relevant sectors 3. 100% of districts	NMCP/ Health Promotion/ DHMT	WHO, UNICEF	X	X	X	X	X	X	

		oriented on utilization of IEC materials									
4.2.2 Conduct Ntlo ya Dikgosi briefing sessions on malaria	National	2 briefings per year	DHMT		X	X	X	X	X	X	
4.2.3 Conduct Kgotla meetings	A, B	12 kgotla meetings	DHMT		X	X	X	X	X	X	
4.2.4 Conduct KAPB studies three times	B, C	3 KAP studies	NMP, DHMT	WHO, UB	X	X	X	X	X	X	
4.2.4 Conduct malaria elimination competitions • School competitions • Malaria cup football tournament • Product completion Malaria peagent	A,B,C	4 competitions conducted per year	NMP, Health Promotion, MoE, DHMT		X	X	X	X	X	X	
4.2.5 Develop TV and radio messages	A,B,C	52 messages disseminated per year	NMCP, Health Promotion		X	X	X	X	X	X	
4.2.6 Develop factsheets, quarterly bulletins, press releases and billboards	A,B,C	-Fact sheet -Quarterly bulletin -Billboards	NMCP, Health Promotion, IDSR	WHO, UNICEF	X	X	X	X	X	X	
4.2.7 Implement environmental control measures	A,B, C		NMCP, Health Promotion	WHO	X	X	X	X	X	X	

5 Chapter Five: Implementation mechanisms

5.1 Coordination mechanisms

The Ministry of Health in general and the Malaria Programme in particular has the leading role of coordinating efforts to control malaria. The implementation of this strategic plan will be a joint effort by all partners and stakeholders at all levels. The NMP shall coordinate the consultative planning, implementation, research, monitoring and evaluation of malaria prevention and control activities. The programme will also be responsible for reporting strategic plan implementation progress and performance to the Ministry of Health, WHO and RBM. Mechanisms of implementation will be through the public health system and other public services (e.g. Ministry of Defence, Education, tourism) and development partners. All partners involved in malaria control form the Country Roll Back Malaria Partnership. Development partners can be divided into multilateral agencies such as the UN and the World Bank; bilateral organizations such as high commissions, embassies agencies ; private sector organizations such as foundations, funds, trusts.

At District levels, the coordination of malaria control is integrated into the sector-wide partnership coordinating mechanism for each level of the health system District Health Management Team (DHMT) and Village Health Committees (VHC). The major focus of the coordination mechanisms at these levels are planning, resource mobilization and performance monitoring and supervision.

While each implementing partner may have their own rules and regulations regarding implementation, accountability and reporting there is only **one strategic plan** under which all partners work and contribute towards, **one coordination mechanism** to ensure maximum synergy and avoidance of duplications, and **one M&E plan** to measure progress and assess impact (**the three ones**).

5.1.1 Partners and their key roles

This section describes each of the partners in the national efforts towards malaria control and their key roles.

5.1.2 MOH and MoLG

The leading partner is the Malaria Control Programme within the Ministry of Health with the various levels of management and of decentralized implementation through district and sub-health district teams and their malaria focal persons or coordinators and the Vector Control Officers. Other departments within MOH (e.g. Policy and Planning monitoring and Evaluation, Health Promotion and Promotion, Child Health and Reproductive Health, IDSR, Primary Health Care) significantly contribute to a successful implementation.

There roles are to:

a) Provide policy direction on malaria control/elimination and prevention
b) Insure adequate representation of malaria control in national and district plans with technically sound interventions as outlined in the malaria control strategy
c) Deliver quality preventive and curative services.
d) Ensure adequate capacity building of staff
e) Coordinate efforts of implementation as well as M&E with other partners
f) Provide technical support and supervision
g) Ensure quality of products used for malaria control
h) Lead the response in case of outbreaks or epidemics

5.1.3 Other government sister ministries

A number of other line ministries and their structures in the districts are crucial partners including Ministry of Education, Ministry of Defence, Ministry of Agriculture, Ministry of Environment and Tourism, Ministry of Finance, Planning and Economic Development as well as the Army and Police.

There role are to:

a) Integrate malaria control into work plans where this is useful and feasible
b) Contribute to resource mobilization and promotion of behavioural change

5.1.4 Political leaders and decision makers

At national (Cabinet, Parliament, parties) and district levels (Local Councils and Urban Councils)

There roles are to:

a) Provide political leadership and advocate for malaria control as a cross-cutting effort within the context of the national control strategy
b) Ensure adequate resource mobilisation for, and allocation to malaria control
c) Ensure adequate legislation (including bye-laws), regulation and incorporation of malaria concerns where necessary (e.g. construction sites, drainage systems, brick pits).

5.1.5 Civil Society

Civil society organizations comprise international and national NGOs, community- and faith-based organizations (CBO and FBO). They can be divided into two groups, the first are those which provide curative and preventive health services through hospitals and health facilities including emergency situations or difficult to reach populations.

There roles are to:
a) Ensure quality of services according to national treatment guidelines
b) Carry out community outreaches within their catchment populations delivering malaria preventive services as part of an integrated package

The second group are those which work directly with communities in the implementation of a wide range of development programmes or support social mobilization and advocacy at various levels of society.

Their role is to:
a) Integrate technically sound malaria interventions into their activities covering preventive as well as curative aspects
b) Assist in mobilization of resources
c) Contribute to policy formulation
d) Actively participate in coordinated M&E efforts
e) Support national and district levels in the coordination of partners and activities within existing plans
f) Apply and evaluate innovative approaches to deliver core interventions

5.1.6 Private sector

5.1.7 (a) As for the civil society the private sector can be divided into several groups the first comprising of the for-profit health care providers: hospitals, clinics, pharmacies, drug shops, and traditional practitioners and includes also their professional organizations.

Their role is to:

a) Ensure quality of services according to national treatment guidelines
b) Promote behavioural change in treatment seeking and prevention
c) Ensure all malaria cases are reported to national level

5.1.7 (b) The second group are the commercial manufacturers and distributors of health related products such as ITN/LLIN, insecticides, medicines, diagnostics, and spray equipment. It includes also providers of services such as transport, IRS or maintenance of spray equipment.
There role is to:

a) Provide quality products and services that are adequate for the demands
b) Support the development of new or improved products
c) Actively participate in the coordination and planning of the national malaria control efforts

5.1.7 © Large companies and corporations in the banking, mining, industrial, agricultural or service industries.

There role is to:

a) Provide leadership in the fight against malaria
b) Apply innovative ways to provide their staff with means of protection against malaria and advocate for behavioural change

5.1.7 Communities

In addition to the families their organizations (e.g. women groups), leaders (political and religious), and health structures (Village Health Teams) are a crucial partner in the implementation of the malaria strategic plan.

There role is to:

a) Prioritize preventive measures to protect family as well as community with special emphasis towards the risk groups (pregnant women and children)
b) Identify ways how the community can directly or indirectly contribute to the reduction of malaria transmission through community actions

5.1.8 Development Partners

Multi-lateral UN-organizations such as WHO, UNICEF etc. and international finance institutions (e.g. World Bank, ADB, GFATM) together with organizations of bi-lateral cooperation (e.g. USAID BOTUSA, HARVARD, ACHAP, DFID) form the group of development partners.

Their role is to:

a) Support government in providing a sound leadership
b) Provide technical support and guidance, particularly at national level
c) Support the provision of necessary resources for services and commodities through various channels (projects etc)
d) Contribute to M&E efforts, particularly nationally representative surveys

5.1.9 Institutions of higher learning

The rapidly growing community of national researchers from University of Botswana and other universities, institutions such as the Oppenheimer Research Institute, Institute of Higher Sciences (IHS) local and international NGOs form the core of this group. They are supported by international and regional research organizations as well as a number of other universities and public health schools.

There role is to:

a) Play a key role in the coordination and implementation of M&E
b) Carry out essential research that will improve on existing interventions and support their delivery mechanisms
c) Maintain a constant dialogue with RBM partners to ensure that results are communicated adequately and that the research agenda is reflecting the implementation needs.

6 Monitoring and evaluation

Monitoring and evaluation must be regarded as an integral part of malaria control and elimination. The overall implementation of the malaria strategic plan will be monitored by use malaria M&E plan which will be developed, but within the context of the existing M&E plan of the Ministry of Health. In addition, some tools will be developed to allow collection of appropriate malaria data as we move towards malaria elimination. Extra indicators will need to be included on the IDSR indicators and within the context of HMIS for timely collection of information from the districts as the programme moves into pre-elimination.

Key requirements for monitoring are that data be regularly analyzed and fed back to all staff involved, particularly those at facilities and districts which collect data.

6.1 *Use of Indicators*

Proposed indicators given below will address the goal, objectives and activities of this strategic plan. The indicators are output, outcome and impact indicators. During the consolidation phase of the malaria elimination continuum main outcome and impact indicators would be population based eg proportion of population protected by IRS, LLINs, slept under an LLIN etc.

In the second stage of the programme, the set of impact and outcome indicators will be more specific eg looking at % of notified cases investigated, absolute number of cases by species and classification, facility list, vector density etc.

For all incidence rates (including mortality), the population denominator should be the total mid-year population living in the area covered by anti malaria activities of any kind It should include migrants and temporary visitors irrespective of nationality. The population at risk is important in malaria elimination planning and as a denominator for operational indicators.

6.2 Monitoring and Evaluation Framework

Several indicators have been identified to monitor the impact, outcomes and outputs of this strategic plan. The table below is a performance framework by which the plan will be monitored and evaluated. It outlines the key indicators for monitoring this strategic plan. Further a detailed monitoring and evaluation plan to accompany this plan will be developed

Table 10: Framework for monitoring and evaluation key indicators of the National Malaria Strategic Plan

Item	***Indicators***	***Baseline*** *(year)*	***Target*** *(by end of MSP)*	***Sources***	***Frequency***	***Responsibility***
Goal*: To achieve zero local malaria transmission in Botswana by 2015.	1.Total number of locally acquired malaria cases	***14 878 (NMCP 2009)***		*HMIS IDSR Monthly Reports*	*Weekly*	*NMCP, IDSR, DHMT*
	2. Number of laboratory locally confirmed outpatient malaria cases	***885 (NMCP 2009)***	***0***	*HMIS IDSR Monthly Reports*	*Weekly, monthly*	*NMCP, IDSR Health Statistics, DHMT*
	3. All-cause under five mortality rate	***137/1000 live births (Health Statistic 2006)***		*HMIS IDSR Monthly Reports*	*Monthly Annually*	*NMCP, IDSR Health Statistics, DHMT*
	4. Absolute number of cases by species and classification / year		***0***	*HMIS IDSR Monthly Reports Surveys*	*Weekly, Monthly annually*	*NMCP, IDSR Health Statistics, Entomology, DHMT*
	5. Absolute number of foci by classification, and recent transitions / year		***0***	*HMIS IDSR Monthly Reports Surveys*	*Monthly, Quarterly*	*NMCP, IDSR Health Statistics, Entomology*
	6. No of severe malaria cases / 100,000 population / year		***0***	*HMIS IDSR Monthly Reports*	*Weekly, Monthly*	*NMCP, IDSR Health Statistics, DHMT*

	7. % reduction in transmission		***100%***	*HMIS IDSR Monthly Reports MIS, Fever Surveys, Entomological assessment reports*	*Annually*	*NMCP, IDSR Health Statistics, Entomology*
	8. Number of in-patient malaria deaths	***4(NMCP 2009)***	***0***	*HMIS IDSR Monthly Reports*	*Weekly, Monthly*	*NMCP, IDSR Health Statistic, DHMT*
	9. Proportion of deaths attributed to locally acquired malaria	***54/100 000 pop (NMCP 2009)***	***0***	*HMIS IDSR Monthly Reports*	*Monthly*	*NMCP, IDSR Health Statistics, DHMT*
Objectives						
Objective 1**: By 2012, develop the requisite capacity in the programme at all levels to achieve malaria elimination**	Output indicators					
	1. Proportion of health workers trained in laboratory diagnosis (microscopy and RDT)	***100% (NMCP 2009)***	***100%***	*Training reports*	*Annually*	*NMCP, Clinical services, DHMT*
	2. Proportion of staff trained according to national IMCI case management policy		***100%***	*Training reports*	*Annually*	*NMCP, Child Health, Clinical Services, DHMT*
	3. Proportion of health workers trained in vector control			*Reports on training*	*Annually*	*NMCP, Entomology, DHMT*
	4. No of functional partnerships established			*Reports on partnerships*	*Quarterly*	*NMCP*
	5. No of functional cross boarder initiatives	***1(NMCP 2009)***	***4***	*Reports on initiatives*	*Quarterly*	*NMCP, Communications and Public Relations*
	6. Functional QA/QC system		***2011***	*Reports on QA/QC*	*Quarterly*	*NHL, NMCP, Clinical Services, CMS*
	7. Number of support visits conducted		***2 per year***	*Reports on support visits*	*Quarterly*	*NMCP, DHMT*
	8. No of partners meeting conducted	***4(NMCP 2010)***	***4 per year***	*Reports on partnership meetings*	*Quarterly*	*NMCP, DHMT*
	Outcome indicators					
	1. Legislation to stop over the counter sale of medicines	***0***	***2011***	***Act of parliament***		*NMCP, Development Planning, Monitoring and Evaluation, Clinical services*

	2. Malaria elimination programme structure	***0***	***one functional structure by 2011***	***Report on structure***		*NMCP, Development Planning, Monitoring and Evaluation, Clinical services*
	3. Proportion of health facilities with malaria diagnostic equipment	***8.3% (NMCP 2009)***	***100%***	*HMIS IDSR Monthly Reports*	*Weekly, Monthly, Quarterly*	*NMCP, Development Planning, Monitoring and Evaluation, Clinical services*
Objective 2 : To develop a robust information system for tracking of progress and decision making by 2012	**Output indicators**					
	1. Proportion of malaria cases from malaria free areas investigated		***100%***	*HMIS IDSR Monthly Reports Notification reports*	*Weekly, Monthly*	*DHMT, NMCP*
	2. No of malaria cases from malaria free areas genotyped	***0((NMCP2009))***	***100%***	*Reports on PCR analysis*	*Weekly, Monthly*	*NHL, NMCP, DHMT*
	3. No of sites conducting Sensitivity of mosquitoes to IRS chemicals	***100 % - DDT(NMCP2009) 98% - Icon (NMCP2009)***	***100% all chemicals***	*Reports on bio-assays and sensitivity tests*	*Annual Monthly during transmission season*	*DHMT, NMCP*
	4. No of surveys conducted (KABP, MIS, entomological)	***1(2007 MIS)***	***2 MIS 3 KABP***	*Reports on MIS, Surveys*	*Annual*	*DHMT, NMCP,*
	5. No of surveys conducted in collaboration with research institutions	***0 (NMCP 2009)***		*Reports on surveys*	*Annual*	*NMCP, UB, IHS,*
	6. Proportion of epidemics detected and responded to within two weeks	***100%(NMCP 2009)***	***100%***	*Reports on outbreak investigation*	*Annual*	*DHMT, NMCP*
	7. No of sites conducting drug efficacy studies	***5 (NMCP 2009)***	***5***	*Reports on drug efficacy*	*Every two years*	*NMCP*
	Outcome indicators					
	1. Completeness and timeliness of weekly reports	***81% -timeliness 86% - completeness (IDSR 2009)***	***100 % Timeliness and Completeness***	*HMIS IDSR Monthly Reports*	*Weekly, Monthly*	*DHMT, NMCP, IDSR*
	2. Proportion of weekly reports analysed and feedback provided	***100% (IDSR 2009)***	***100%***	*Reports on analysis*	*Weekly, Monthly*	*NMCP, IDSR*
	3. Proportion of facilities using epidemic thresholds	***0(2009)***	***100%***	*Facility reports*	*Weekly, Monthly*	*NMCP, DHMT*
Objective 3 :	**Outcome indicators**					

To achieve universal coverage of all appropriate interventions by 2012 in all districts.	1. Proportion of households with at least one LLIN and or sprayed by IRS in the last two months	***9.4% (2007 MIS)***	***100%***	*MIS*	*Every 3 years*	*NMCP,*
	2. Proportion of targeted houses sprayed with a residual insecticide in the last 12 months	***71%(NMCP 2009)***	***100%***	*IRS spraying reports MIS*	*Annually*	*NMCP, DHMT*
	3. Proportion of population protected by IRS	***46.3% (NMCP 2009)***	***>90%***	*IRS spraying reports MIS*	*Annually*	*NMCP, DHMT*
	4. Proportion of households owning at least two LLINs	***6.3%(2007 MIS)***	***100%***	*MIS Survey reports*	*Every 3 years*	*NMCP, WHO, DHMT*
	5. Proportion of under five year olds who slept under an LLIN the previous night	***6.5%(2007 MIS)***	***>80%***	*MIS Survey reports*	*Every 3 years*	*NMCP, WHO, DHMT*
	6. Proportion of household residents who slept under an LLIN the previous night (general population).		***>80%***	*MIS, Survey reports*	*Every 3 years*	*NMCP, DHMT, WHO*
	7. Proportion of pregnant women who slept under and LLIN the previous night	***3.8%(2007 MIS)***	***>80%***	*MIS, Survey reports*	*Every 3 years*	*NMCP, DHMT, WHO*
	8. Proportion of women in malaria endemic areas who received chemoprophylaxis throughout pregnancy for malaria in ANC visits during their last pregnancy	***37.5% MIS 2007)***	***100%***	*HMIS, IDSR, MIS, Survey reports*	*Every 3 years*	*NMCP, DHMT, WHO*
	9. Proportion of children under 5 years of age with fever in the last 2 weeks who had a finger or heel stick for malaria testing		***100%***	*MIS, Survey reports*	*Every 3 years*	*NMCP, DHMT, WHO*
	10. Proportion of children with fever in the last 2 weeks for whom treatment was sought within 24 hours	***4.1% (MIS 2007)***	***100%***	*MIS, Survey reports*	*Every 3 years*	*NMCP, DHMT, WHO*
	11. Proportion of malaria cases confirmed with laboratory diagnostics (RDT or microscopy)	***5.6% (NMCP 2009)***	***100%***	*HMIS IDSR Monthly Reports*	*Weekly, Monthly*	*DHMT, NMCP, IDSR*
	12. Proportion of children under five years of age with confirmed malaria receiving anti-malarial treatment according to national policy within 24 hours of onset of symptoms	***4.1%(2007 MIS)***	***100%***	*MIS, HMIS IDSR Monthly Reports*	*Weekly, Monthly*	*DHMT, NMCP, IDSR*
	Output indicators					

	1. Proportion of malaria cases from malaria free areas tested with PCR	***0%NMCP 2009)***	***100%***	*HMIS IDSR Monthly Reports*	*Weekly, Monthly*	*DHMT, NMCP, NHL*
	2. Proportion of patients admitted with severe malaria receiving correct treatment at health facilities	***100% (NMCP 2009)***	***100%***	*HMIS IDSR Monthly Reports Death investigation reports*	*Weekly, Monthly*	*DHMT, NMCP, NHL*
	4. Slide positivity rate	***4.3%(NMCP 2009)***	***0%***	*HMIS IDSR Monthly Reports Case investigation reports*	*Weekly, Monthly*	*DHMT, NMCP, NHL*
	16. Proportion of health units with no reported stock outs of nationally recommended anti malaria drugs lasting more than one week at any time during the last 3 months		***100%***	*Monthly stock status reports*	*Monthly, Quarterly*	*DHMT, NMCP, CMS*
	5. Proportion of outpatients receiving (first line) anti malaria treatment according to national policy	***100%(NMCP 2009)***	***100%***	*HMIS IDSR Monthly Reports Stock status reports*	*Weekly, Monthly, Quarterly*	*DHMT, NMCP, CMS*
Objective 4: By 2013, at least 80% of the population will have appropriate knowledge, attitudes, behaviours and practices on malaria.	**Output indicators**					
	1. No of briefings to parliament, full council meetings and Ntlo ya Dikgosi	*2(NMCP 2010)*	*2 per year*	*Briefing reports*	*Half yearly*	*DMHT, NMCP*
	2. Number of IEC materials produced			*Accounts reports*	*Annual*	*NMCP, Health Promotion*
	3. No of KAPB studies conducted	*0*	*3*	*KAPB study reports*	*Annual*	*NMCP, DHMT, UB, IHS*
	4. Number of malaria bulletins produced	*0*	*12 per year*	*Copies of the bulletin*	*Monthly*	*NMCP, Health Promotion*
	5. Number of Malaria related spots produced to broadcast via Radio		*Daily during transmission season*	*Accounts reports*	*Annually*	*NMCP, Health Promotion*
	Outcome indicators					

	1. Proportion of children under five with fever in the last 2 weeks and attended public health services who received treatment with ACTs within 24 hours of fever onset	*4.1%(2007 MIS)*	***100%***	*MIS*	*Weekly, Monthly*	*DHMT, NMCP, IDSR*
	2. Proportion of population reached by BCC community outreach activities		***100%***	*Reports on surveys*	*Annually*	*NMCP, DHMT, UB, IHS*
	3. Proportion of health facilities with malaria IEC material		***100%***	*Health facility surveys reports*	*Annually*	*NMCP, DHMT,*
	4. Proportion of health facilities holding monthly coordination meeting with community structures		*100%*	*Meeting reports*	*Quarterly*	*DHMT, NMCP*

7 Chapter Six: Table 9: BUDGET

Budget by Objective and Service Delivery Area								
			Total budget allocation per SDA					
Objective	Service delivery area	Percentage of total budget	Year 1	Year 2	Year 3	Year 4	Year 5	Total
To develop the requisite capacity in the programme at all levels by 2012 in order to achieve malaria elimination and maintain it thereafter	1.1.1 Strengthen programme management and coordination	62.00%	69,659,262	67,990,824	67,199,824	64,266,384	62,724,384	331,840,678
To develop a robust information system for tracking of progress and decision making by 2012	1.2.1 Strengthen epidemiological surveillance	4.23%	11,741,550	1,351,950	2,198,692	6,007,950	1,351,950	22,652,092
To develop a robust information system for tracking of progress and decision making by 2012	1.2.2 Strengthen entomological surveillance	0.29%	1,104,181	133,959	99,817	99,817	99,817	1,537,589
To develop a robust information system for tracking of progress and decision making by 2012	1.2.3 Strengthen monitoring and evaluation	2.84%	5,292,320	2,160,140	2,790,040	2,160,140	2,790,040	15,192,680
To develop a robust information system for tracking of progress and decision making by 2012	1.2.4 Strengthen Epidemic Preparedness and Response (EPR)	1.04%	1,441,680	901,680	1,441,680	901,680	901,680	5,588,400
To develop a robust information system for tracking of progress and decision making by 2012	1.2.5 Strengthen Operational Research	0.00%	1,080	1,080	1,080	1,080	1,080	5,400
To achieve universal coverage of all appropriate interventions by 2012 in all districts	1.3.1 Strengthen Vector control	8.59%	25,106,000	12,171,000	3,451,000	3,083,000	2,168,000	45,979,000
To achieve universal coverage of all appropriate interventions by 2012 in all districts	1.3.2 Strengthen malaria diagnosis	3.37%	3,603,600	3,603,600	3,603,600	3,603,600	3,603,600	18,018,000
To achieve universal coverage of all appropriate interventions by 2012 in all districts	1.3.3 Strengthen malaria treatment	8.87%	10,559,777	13,092,843	10,910,930	8,394,460	4,521,696	47,479,707
To achieve universal coverage of all appropriate interventions by 2012 in all districts	1.3.4 Strengthen use of chemoprophylaxis	0.27%	456,213	456,213	243,088	185,368	113,758	1,454,642
To achieve at least 80% of appropriate knowledge, attitudes, behaviours and practices on malaria in all populations by 2013	1.4.1 Strengthen malaria advocacy	5.96%	6,533,704	5,766,816	6,526,816	6,526,816	6,526,816	31,880,968
To achieve at least 80% of appropriate knowledge, attitudes, behaviours and practices on malaria in all populations by 2013	1.4.2 Strengthen behaviour change communication / information, education and communication	2.54%	3,526,110	3,256,110	3,526,110	3,106,110	163,710	13,578,150
Total:		100.00%	139,025,477	110,886,215	101,992,677	98,336,405	84,966,531	535,207,305

8 Annex 1: Malaria elimination continuum

1.1 Malaria Elimination Continuum

Malaria elimination builds on the foundation laid by intensive malaria control, with universal coverage of intensified, efficacious vector control and case management interventions. According to WHO, malaria elimination can be envisaged when a malaria control programme has been successful in reducing the burden of mortality and morbidity to a marginal level, complemented by evidenced based data on the achievement of successful malaria control and sufficient evidence that transmission can be interrupted by scaling up planned activities.

1.2 Control and consolidation

Vector control remains a major component of malaria control strategy. The main interventions under this strategy include universal coverage with indoor residual house spraying (IRS) and insecticide treated mosquito nets (ITNs) for prevention and prompt and effective case management with ACTs and use of primaquine as a single dose for gametocidal clearance. Accurate determination of parasite species and densities including gametocyte detection will be required. Health facility data will be used and has to be representative of the whole country indicating slide positivity rate and population based surveys in the peak transmission season will be conducted.

1.3 Pre-elimination

The pre-elimination programme should be considered in areas where the malaria case load has been reduced to a level that would allow individual follow up for each and every malaria patient (SPR <5% of all fever cases). It will rarely be possible to introduce the stringent requirements of an elimination approach in districts where more than 5% of all people with fever at any given time are diagnosed with malaria, and/or where more than 500 cases occur annually in a district of 100 000 people. The general guide is given to change when malaria incidence has been brought down to incidence of 5 cases per 1000 population. This phase involves strengthening the health information system; improving the effective coverage of health interventions in all transmission areas. This implies that the whole population, either nationals or foreigners, is easily accessing and using private and/or public health-care facilities. In addition, public and private health service staff is reoriented to the new goals of malaria elimination; public officials need to mobilize funding and advocacy. A staged approach to the implementation of the pre-elimination phase is also considered ultimately feasible for Botswana considering the country malaria profile.

1.4 Elimination

The full transition to an elimination programme is usually only possible once malaria cases are less than 1 case per 1000 people at risk per year, or roughly 100 cases per district of roughly 100 000 people annually.

Target areas (foci) within Botswana will move into elimination mode by identifying and treating all remaining malaria cases with efficacious antimalarials; and by reducing human–vector contact through comprehensive vector control, personal protection and environmental management methods and strengthened surveillance systems.

1.5 Prevention of re-introduction

During the advanced stages of the programme, when the complete interruption of malaria transmission has been achieved, activities will be directed at preventing any re-establishment of malaria in the area covered by the programme. The essential activities include the continuous reduction of vulnerability by the universal access of the whole population, including visitors, to diagnostic and treatment facilities, vector control will be targeted at vulnerable, receptive areas. Under exceptional circumstances, especially when importation of malaria is intensive, the activities may include the screening of immigrants for malaria and the use of radical treatment.

Prevention of the reintroduction of malaria will be the responsibility of the general health services as part of their normal function in communicable disease control, in collaboration with other relevant sectors (agriculture, environment, industry, tourism, etc.).

1.6 Certification

When the country has zero locally acquired malaria cases for at least three consecutive years, it can request WHO to certify its malaria-free status.

Certification of malaria elimination requires proving beyond reasonable doubt that the chain of local human malaria transmission has been fully interrupted in the entire country. The burden of proof of elimination falls on the Botswana requesting certification.

9 Annex 2

2.1 Key Indicators by stage of malaria elimination

Indicators	Malaria endemic and Hot spots (Zone A and B)	Malaria free areas (Zone C)
Outcome	• Proportion of population at risk targeted for IRS • Proportion of target population protected by IRS • Proportion of population at risk targeted for ITN/LLIN • Proportion of ITN/LLIN delivered against total needs (target population) / year • Proportion of surveyed households with at least one ITN/LLIN • Proportion of at risk population, who slept under an ITN/LLIN the previous night • Proportion of nationally recommended 1st-line antimalarial treatment courses distributed / total malaria cases reported / year • % malaria cases confirmed by laboratory test • % uncomplicated malaria cases receiving prompt and effective treatment • Improved staff performance • % breeding sites covered by larviciding • % change in knowledge attitude and behavior • % of epidemics detected within 2 weeks • Proportion of malaria drugs and commodities tested for quality • Proportion of population seeking treatment within 24 hours	• % of notified cases investigated / year • % of cases notified / year • 0 malaria mortality • Improved staff performance • % change in knowledge attitude and behavior • % of epidemics detected within 2 weeks • Proportion of malaria drugs and commodities tested for quality
Impact	• Reported malaria cases / 1000 population / year • Severe malaria cases / 100,000 population / year • Malaria attributable deaths / 100,000 population / year • Malaria parasite prevalence rate • % reduction in transmission	• Absolute number of cases by species and classification / year • Absolute number of foci by classification, and recent transitions / year • Reported malaria cases / 1000 population at risk / year
Programme milestones Achievement of milestones must be confirmed by population-based surveys	Reported malaria cases / 1000 population at risk / year less	• Reported malaria cases / 1000 population at risk / year less than 1

10 *Annexes 3:* Final editing team

Name	Organisation
Dr James D. Othwolo, Public Health Specialist	MoH
Tuelo S Mphele, Chief Health Officer	MOH-HPED
K. Gausi, Monitoring and Evaluation Technical Officer	WHO-IST, Harare
Dr Josephine Namboze, Case management focal officer	WHO-IST, Harare
Dr Nathan Bakyaita, Monitoring and Evaluation Technical Officer	WHO/AFRO, Brazzaville
Dr John Govere, Vector control focal officer	WHO-IST, Harare
Dr S Hamda, Public Health Specialist,	MOH – Disease Control
T-Mosweunyane, Programme Manager	MoH – Malaria Programme
Dr S Chihanga, PHS, Malaria	MoH-Malaria Programme
Nesredin Jami Oumer, PHS, IDSR	MoH-IDSR
Kentse Moakofhi, NPO/MAL	WHO – WHO Country Office
Dr I.M.Mtoni, Consultant Microbiologist	National Health Laboratory
S.S.S. Kanyenvu, Principal Health Officer	MLG-DPHCS
Boitshoko Seretse, Principal Health Promotion Officer	MLG-DPHCS
Davies Ntebela, Entomologist	MoH-Entomology
M Motlaleng, Surveillance and Data Manager	MoH-Malaria Programme
Allison Tatarsky	Clinton Foundation
D.L Shashane, Chief Technical Officer	MoH - Malaria Programme
M Letshoo, Intern	MoH-Malaria Programme
Lorato K Regoeng, Senior Health Promotion and Education Officer	MoH - HPED

11 ***Annex 4**: List* of participants involved in drafting the strategic plan

NAME	DESIGNATION	PLACE OF WORK/DEPT
Dr H. T. Masendu	Entomologist	Entomology
Mr M. Mosarwe	Chief Technical Assistant	Entomology
Mr S.S.S Kanyenvu	Principal Health Officer	MLG/ DPHCS
Dr James Othwolo	Public Health Specialist	MoH
Mr Stanley G. Malefho	Environmental Health Officer	Bobirwa Sub District
Ms Sara Ranko	Senior Health Education Officer	City of Francistown
Ms Gasebotho Kedikilwe	PHC, Manager	North East District Council
Mr Douglas L. Shashane	Chief Technical Assistant	MoH / NMCP
Dr Yared A. Robele	Public Health Specialist	North West District Council
Dr Ibrahim Abdellatif	Physician	Nyangabgwe Referral Hospital
Mr Tshepo Andina	Principal Environmental Health Technician	Okavango Sub District
Mr Olesego Gaboinewe	Environmental Health Technician	Chobe District
Mr Khoti Gausi	M & E Technical Expert	WHO- IST
Dr Josephine Namboze	Malaria Case Management Expert	WHO IST/ESA
Ms Kentse Moakofhi	National Professional Officer Malaria	WHO Country Office - Botswana
Mr Davies Ntebela	Entomologist	MoH
Mrs I Kuhepa	Medical Lab. Scientific Officer	Letsholathebe II Memorial Hospital
Dr Godwin Mwaipopo	Chief Medical Officer	Sefhare Primary Hospital
Mr Sefania Salepito	Principal Registered Nurse	Boteti Sub District
Ms Lorato C. Nfila	Principal Registered Nurse	S/Phikwe Govt. Hosp
Mr Muringami T. C.	Asst. Medical Lab. Scientific Officer	Kasane Primary Hospital
Dr S. Chihanga	Public Health Specialist	MoH-NMCP
Dr S. Hamda	Public Health Specialist	MoH- DPH-DC
Mr Ivan Makati	Primary Health Care Officer	MLG-DPHCS
Ms Motlaleng, M.	Assistant Health Officer	MoH/ NMCP
Ms T. Mosweunyane	Principal Health Officer I	MoH/ NMCP
Mr B. Khupe	Chief Med. Lab. Technician	Nyangabgwe Referral Hospital
Mr P. Kapesa	Senior Registered Nurse	Sekgoma M. Hospital
Dr Bob M. Wafuana	Principal Medical Officer	Lobatse Town Council
Dr Isaac M. Mtoni	Snr. Consultant Microbiologist	National Health Lab
Dr Nandan Gokhale	Consultant Microbiologist	Nyangabgwe Ref. Hospital Lab
Mr Godira Segoea	Assistant Health Officer	Entomology/ NMCP
Ms Allison Tatarsky	Program Analyst	Clinton Foundation