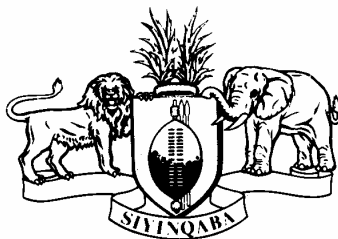


**Malaria Elimination Strategic Plan
2008-2015**

**Revised Version
May 2013**



**Kingdom of Swaziland
Ministry of Health
National Malaria Control Programme**

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ACRONYMS

ACT	artemisinin combination therapy
BCC	behaviour change communication
CMS	Central Medical Stores
EPR	epidemic preparedness and response
GPS	Geographic Positioning System
GIS	Geographic Information System
IEC	information, education, communication
IRS	indoor residual spraying
KAP	knowledge, attitudes, practices (survey)
LLIN	long-lasting insecticide-treated nets
HMIS	Health Management Information Systems
MIS	Malaria Indicator Survey
M&E	Monitoring and Evaluation
MRC	Medical Research Council
NERCHA	National Emergency Response Council on HIV/AIDS (Principal Recipient)
NLS	National Laboratory Services
NMCP	National Malaria Control Programme
PDA	Personal Digital Assistant
PR	Principal Recipient
RDT	rapid diagnostic test
SADC	Southern African Development Community
UNICEF	United Nations Children's Emergency Fund
WHO	World Health Organisation

KEY TERMS

Case, imported: a case, the origin of which can be traced to a known malarious area outside the country in which the case was diagnosed.

Case, indigenous: a case, the origin of which from local transmission cannot be disproved. It includes delayed first attacks of *P. vivax* due to locally acquired parasites with a long incubation period.

Case, induced: a case, the origin of which can be traced to a blood transfusion or other form of parenteral inoculation, but not to normal transmission by a mosquito.

Case, introduced: a case in which it can be proved that the infection is a first step (first generation) of local transmission subsequent to a proved imported case, i.e. in which the mosquito was infected from an imported case.

Case investigation: gathering enough information to allow classification of a malaria case by origin of infection. It includes, but is not limited to, administration of a standardized questionnaire to a person diagnosed with a malaria infection.

Case, malaria (as defined in elimination programmes): a person in whom, regardless of the presence or absence of clinical symptoms, malaria parasites have been confirmed by quality-controlled laboratory diagnosis.

Case management: diagnosis, treatment, clinical care and follow-up of malaria cases.

Case notification (compulsory): reporting of detected cases of malaria by all medical units and medical practitioners, to either the health department or the malaria elimination service (as laid down by law or regulation).

Endemic: applied to malaria when there is a constant measurable incidence of cases and mosquito-borne transmission in an area over a succession of years.

Epidemic: occurrence of cases in excess of the number expected in a given place and time period.

Evaluation: a process that attempts to determine as systematically and objectively as possible the relevance, effectiveness and impact of activities in relation to their objectives.

Focus: a defined and circumscribed locality situated in a currently or former malarious area and containing the continuous or intermittent epidemiological factors necessary for malaria transmission. Foci can be classified as residual active, residual non-active, cleared up, new potential, new active, endemic or pseudo-foci.

Gametocytes, person carrying: person who has malaria gametocytes in the peripheral blood, making him/her a potential source of infection.

Geographical reconnaissance: the operation that provides the basis for the choice of field centres and depots, for detailed schedules and itineraries of spraying and surveillance personnel, for the final deployment of transport, and for the numerical control of the completeness of the work accomplished or reported. It includes collection of information on the number, type, location and means of access to all houses and field shelters, as well as on communications, health units, vehicle repair facilities, population movements and other relevant factors.

Incubation period: the time between infection (by inoculation or otherwise) and the first appearance of clinical signs, of which fever is the most common.

Intensity of transmission: rate at which people in a given area are inoculated with malaria parasites by mosquitoes (usually expressed by the annual entomological inoculation rate).

Local mosquito-borne malaria transmission: occurrence of human malaria cases that are acquired in a given area through the bite of infected *Anopheles* mosquitoes.

Malaria elimination: a reduction to zero of the incidence of infection caused by human malaria parasites in a defined geographical area as a result of deliberate efforts. Continued measures to prevent re-establishment of transmission are required.

Malaria-free: an area where there is no continuing local mosquito-borne malaria transmission, and the risk of acquiring malaria is limited to introduced cases only.

Malaria incidence: the number of newly diagnosed malaria cases during a specified time period in a specified population.

Malaria prevalence: the number of malaria cases existing at any given time in a specified population, measured by positive laboratory test results.

Monitoring (of programmes):

- Episodic measurement of the effect of an intervention on the health status of a population or the environment;
- The process of collecting and analysing information about the implementation of a programme for the purpose of identifying problems, such as non-compliance, and taking corrective action;

National foci register: centralized computerized database of all malaria foci in a country.

National malaria case register: centralized computerized database of all malaria cases

registered in a country, irrespective of where and how they were diagnosed and treated. It allows detailed analysis and synthesis of epidemiological information and trends, to guide the malaria elimination programme.

Parasite strain: subtype of parasites with similar properties. Properties that are strain-specific include immune response in the human host, infectiousness for a given species of vectors and antimalarial drug resistance.

Passive case detection: detection of malaria cases among patients who on their own initiative went to a health post to get treatment, usually for a febrile disease.

Population at risk: population living in a geographical area where locally acquired malaria cases occurred in the current and/or previous year. The measurement unit for elimination milestones among populations at risk is a political unit corresponding to approximately 75 000–150 000 people (e.g. a district).

Population-based blood survey: survey in which a blood slide is prepared for every individual in a given population (i.e. irrespective of history of fever) once or more, for the thorough assessment of the prevailing conditions in the area, to provide additional proof of the interruption of transmission. The goal is to detect asymptomatic infections usually associated with low parasite densities.

Rapid diagnostic test (RDT) positivity rate: the proportion of RDTs found positive among RDTs performed.

Receptivity: the abundant presence of anopheline vectors and the existence of other ecological and climatic factors favouring malaria transmission.

Re-establishment of transmission: renewed presence of a constant measurable incidence of cases and mosquito-borne transmission in an area over a succession of years. An indication of the possible re-establishment of transmission would be the occurrence of three or more introduced and/or indigenous malaria infections in the same geographical focus, for two consecutive years for *P. falciparum* and for three consecutive years for *P. vivax*.

Relapse: renewed manifestation (of clinical symptoms and/or parasitaemia) of malaria infection separated from previous manifestations of the same infection by an interval greater than that related to the normal periodicity of the paroxysms. The term is used mainly for renewed manifestation due to the survival of hypnozoites (exo-erythrocytic forms) of *P. vivax* or *P. ovale*.

Sensitivity (of a test): the proportion of true positives among all the positives it detects.

Slide positivity rate: the proportion of slides found positive among the slides examined.

Surveillance: that part of the programme aimed at the discovery, investigation and elimination of continuing transmission, the prevention and cure of infections, and the final substantiation of claimed elimination.

Transmission season: period of the year during which mosquito-borne transmission of malaria infection can normally take place.

Vector control: measures of any kind directed against a vector of disease and intended to limit its ability to transmit the disease.

Vigilance: a function of the public health service during the programme for prevention of re-introduction of transmission, consisting of watchfulness for any occurrence of malaria in an area in which it had not existed or from which it had been eliminated, and the application of necessary measures against it.

Vulnerability: either proximity to malarious areas or resulting from the frequent influx of infected individuals or groups and/or infective anophelines.

FOREWORD

The Ministry of Health in the Kingdom of Swaziland is proud to present the Revised Malaria Elimination Strategic Plan for the country. Following the African Union and SADC's support for Swaziland to pursue elimination, the country developed and launched its initial elimination strategic plan in 2008. Since that time, the country has made great progress to develop the robust systems required to achieve elimination and has developed a greater understanding of its malaria burden. Based on lessons learned since 2008, the country has revised its strategic plan to refine the objectives, interventions and activities that are aligned with our goal of elimination by 2015.

This updated elimination strategic plan is based on recommendations from the country's Malaria Programme Review (MPR), which identified best practices and action points for improvement. Through the development and launch of this revised strategic plan, we demonstrate our commitment to achieving the goal of malaria elimination in Swaziland by 2015. Whilst we fully acknowledge that this is a colossal task, we believe that malaria elimination can be achieved, through the support of our government and partners. We will make every effort to implement each of the interventions detailed in this document and to continue working on cross border malaria initiatives with our neighbours: South Africa and Mozambique, as this will be pivotal to eliminating malaria and preventing its re-introduction, in our country.

We are committed to delivering on the key strategies outlined in this strategic plan and are confident that through the support of our partners we will achieve the goal of malaria elimination.

The Honourable Minister Benedict Xaba
Minister of Health
Swaziland

ACKNOWLEDGEMENTS

The development of this elimination strategic plan has been made possible through the financial and technical support of the World Health Organization. The development of this strategic plan was led by multiple departments within the Ministry of Health, including but not limited to, the National Malaria Control Programme (NMCP), Epidemic Preparedness and Response Unit (EPR), the Strategic Information Department (SID) including Health Management Information Systems (HMIS) and Monitoring and Evaluation, and Health Promotion. Support and input was also provided by numerous domestic and international partners, including the Swaziland Ministry of Works, particularly Meteorological Services; Swaziland Ministry of Agriculture, the Swaziland National Emergency Response Council for HIV/AIDS (NERCHA); the World Health Organisation (WHO); the Clinton Health Access Initiative (CHAI), and the Global Health Group at the University of California, San Francisco. A full list of participants who were involved in the Strategic Plan Review workshop is available in Annex B. The Ministry of Health hereby expresses its sincere appreciation for their contributions to the completion of this national malaria elimination strategic plan.

EXECUTIVE SUMMARY

As a low malaria transmission country, Swaziland was identified by the African Union Health Ministers and the Southern African Development Community (SADC) as a country ready to pursue malaria elimination. Swaziland's initial malaria elimination strategic plan was drafted in 2008 to guide the transition from control-based interventions to the establishment of systems necessary to achieve elimination by 2015. Following a WHO-supported Malaria Programme Review in 2011, this document presents a revision of the 2008-2015 Malaria Elimination Strategic Plan based on lessons learned and identified gaps from the first three years of the elimination campaign. This updated edition of the strategic plan takes into account the more advanced and detailed thinking on the interventions and systems expected to be implemented under Swaziland's elimination campaign.

This strategic plan was developed with the vision of a malaria-free Swaziland. The goal of this strategic plan is to eliminate malaria from Swaziland by 2015. To achieve this goal, the country must reduce the number of indigenous malaria cases to zero by 2015. The country must also reduce and maintain the number of malaria deaths seen at health facilities to zero for total population.

To achieve the vision and goal of malaria elimination in Swaziland, seven objectives have been identified across the four technical areas of the malaria program (Case Management, Vector Control, Surveillance and Epidemic Preparedness and Response, and Information, Education, and Communication):

- Objective 1** All suspected malaria cases are diagnosed by RDT and/or microscopy by 2014
- Objective 2** All confirmed malaria cases are treated according to national guidelines by 2014
- Objective 3** All malaria cases diagnosed by health care workers are reported within 24 hours by 2014
- Objective 4** 100% of the population at risk of malaria is covered by effective and appropriate vector control measures by 2014
- Objective 5** All active foci are eliminated through in-depth investigation and response by 2015
- Objective 6** All confirmed malaria cases are investigated within 48 hours of notification
- Objective 7** 100% of the total population exhibits appropriate health seeking behaviour for malaria by 2015

The Monitoring and Evaluation (M&E) component of the malaria elimination programme will be the joint responsibility of the NMCP and implementing partners. The indicators, defined collectively by the implementing partners, will be collected using routine data collection systems including the Immediate Disease Notification System (IDNS), the Health Management Information Systems (HMIS), the active case-based and entomological surveillance systems

managed under the Malaria Surveillance Database System (MSDS), the annual KAP survey, and regular reports describing activities carried out. Reporting will occur on a daily, monthly, quarterly, and annual basis. Targets are set on an annual basis and are not cumulative.

The implementation of the Malaria Elimination Strategic Plan requires strong Programme Management. This includes fostering the development of required human resource capacity, facilitating partnership coordination to maximize available resources, organizing the development of sound implementation plans for each activity, and ensuring the availability of resources for procurement of necessary commodities and implementation of planned activities.

The projected costs for the implementation of this Strategic Plan are SZL 35,965,770 over three years. Activities in the plan are well-funded in 2012-13 and 2013-14; however a budget gap has been identified for 2014-15 due to the closure of the Global Fund Round 8 grant. The country plans to pursue additional funding from Global Fund to address these funding gaps.

1. INTRODUCTION

As a low malaria transmission country, Swaziland is among the four Southern African countries¹ identified by the African Union Health Ministers and the Southern African Development Community (SADC) to be able to achieve malaria elimination. Malaria elimination is a top priority in the national development agenda and the national health policy. In April 2011, the National Malaria Elimination Policy, a document outlining the guiding principles necessary to achieve elimination, was approved by the Prime Minister's Cabinet. Funding support for elimination in Swaziland is provided by government and the Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria.

To achieve elimination, countries require strong strategic plans, which help to organize decisions and actions to achieve particular goals and objectives. This document details the background and rationale for malaria elimination in Swaziland, as well as the goal, objectives, key strategies, and activities of the country's elimination strategic plan. This strategic plan utilized the foundation set by WHO's malaria elimination manual and SADC malaria elimination strategic framework to guide the malaria elimination efforts in Swaziland.^{2,3}

Swaziland's initial malaria elimination strategic plan was drafted in 2008 to guide the malaria elimination efforts in Swaziland, describing the key interventions required for achieving the goal of malaria elimination by 2015. Following a WHO-supported Malaria Programme Review in 2011, this document has been revised to its current form based on lessons learned and identified gaps from the first three years of the elimination campaign. This updated edition of the strategic plan takes into account the more advanced and detailed thinking on the interventions and systems expected to be implemented under Swaziland's elimination campaign.

1 Other countries targeted for elimination include Botswana, Namibia, and South Africa.

2 World Health Organisation (WHO), *Malaria Elimination: A Field Manual for Low and Moderate Endemic Countries*, 2007.

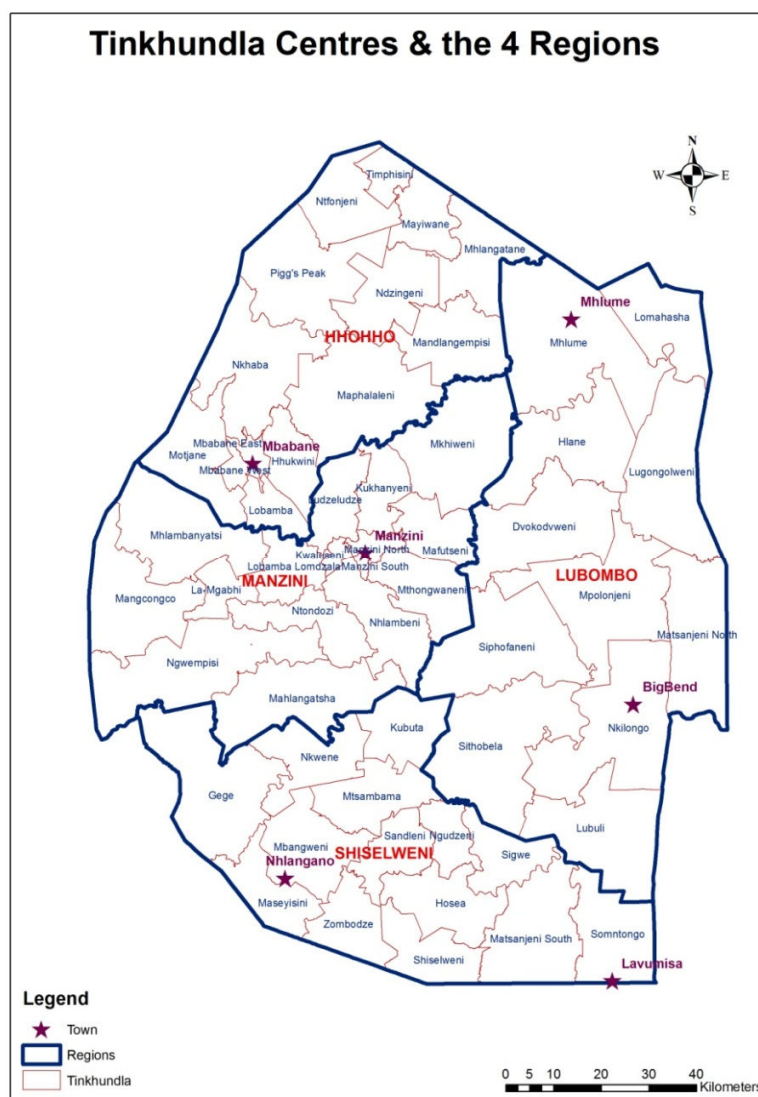
3 Southern African Development Community (SADC), *Malaria Elimination Framework*, 2007.

2. COUNTRY PROFILE

2.1 Socio-political System

The country is led by King Mswati III, who serves as Head of State, and is governed through a parliamentary system. Swaziland's current constitution was ratified by King Mswati III in July 2005 and went into effect in February 2006. Administratively, the country is made up of four regions: Hhohho, Manzini, Shiselweni, and Lubombo, which are further sub-divided into 55 constituencies (Tinkhundla centres). Figure 2.1 presents a map of the four administrative regions of Swaziland and the 55 Tinkhundla centres.

Figure 2.1 Regions and Tinkhundla Centres in Swaziland



2.2 Demographics

The total population of Swaziland is approximately, of which 53% is female. The majority of the population is ethnic Swazi, mixed with a small number of Zulus and non-Africans. Seventy percent of the population resides rural areas. The crude death rate has increased from 7.6 in 1997 to 18.03 in 2007. Life expectancy at birth is 43 and 42 for males and females, respectively. On average, women give birth to 4 children.

2.3 Environment and Climate

The Kingdom of Swaziland is a landlocked country in Southern Africa bordered by South Africa in the north, west and south and by Mozambique in the east. It lies between latitude 25° S and 28° S and longitude 31° E and 32° E, spanning approximately 17,364 km². The country is divided into four ecological zones: the Highveld ranges from 900m to 1400m with annual average temperatures of 17° C, the Middleveld ranges from 400m to 800m with annual average temperatures of 20° C, the Lowveld ranges from 200m to 400m with annual average temperatures of 22° C, and the Lubombo Plateau ranges from 250m to 600m with annual average temperatures of 21° C. The ecological zones have diverse climate conditions ranging from sub-humid and temperate in the Highveld to semi-arid and warm in the Lowveld.

2.4 Socio-economic Situation

The World Bank classifies the country as a lower middle income country with a GDP per capita income of US\$3502 for 2010. Despite being perceived as having a reasonable resource base compared to many developing countries, the majority of people (69%) in the country are classified as poor (Swaziland Household Income and Expenditure Survey (SHIES), 2001) and nearly 40% are estimated to be unemployed.

The economy of the country is based on agriculture, mining, food processing and manufacture of clothing and light consumer goods. The country is heavily dependent on South Africa from which it receives more than 90% of its imports and to which it sends 60% of its exports. The level of economic growth has been largely dependent on fluctuations in the performance of the agriculture sector caused by erratic climatic conditions and changes in prices of agriculture products in the world market. While the country appears to have made significant economic development progress in the past, there is no doubt that these achievements are being significantly curtailed by the effects of the AIDS epidemic and difficulties in attracting meaningful direct foreign investment.

2.5 Health System Analysis

2.5.1 Health Service Availability

Swaziland's health care system consists of 223 health facilities nationwide, including eight hospitals and five health centres (hospitals with minimal inpatient capacity). There are also eight public health units throughout the country, which provide a significant proportion of the country's preventive services. Ownership of health facilities in the country is distributed among government, non-governmental organizations, industry, and privately owned facilities. The government owns 44.8% of all health facilities, while private facilities owned by doctors or nurses comprise 22.4% of all facilities in the country. Other health facilities are owned by missions (14.8%), industries (12.6%), and NGOs (5.4%).² The country's health care system suffers from many challenges, including personnel shortages, particularly in remote rural areas, limited financial resources, frequent stock outs and weak information systems.

2.5.2 Health System Strengths, Weaknesses, Opportunities, Threats

The National Health Sector Strategic Plan, 2008-2013 (NHSSP) was recently reviewed to assess the achievements and constraints since implementation on the plan in 2008. The review included an evaluation of the strengths, weaknesses, opportunities, and threats (SWOT) of the health system to better position the Ministry of Health and partners to direct priorities and activities for the remaining period to ensure the goals and objectives of the NHSSP are met.

Table 2.1 Health System SWOT Analysis (Source: NHSSP, 2008-2012 Midterm Review)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Government commitment to national development and health on national agenda • Appropriate vision and goals for the health sector • Appropriate strategies for HSS • Availability of information through various studies and surveys • Growing capacity within health sector 	<ul style="list-style-type: none"> • Health sector budget not protected from external financial shocks • Prioritization of health interventions not clear • Resource allocation formula at programme level not elaborated • Efficiency/effectiveness of resource use not tracked • Inadequate number and skills of health workers • Operations and systems research not given adequate attention
Opportunities	Threats
<ul style="list-style-type: none"> • Positive progression in health sector partnerships (national and regional) with partners willing to support the health sector 	<ul style="list-style-type: none"> • Financial crisis limiting required investments • Increasing number of services needing to be provided

3. MALARIA SITUATIONAL ANALYSIS

3.1 Epidemiology

3.1.1 Parasite and Vector

The *Plasmodium falciparum* parasite is predominately responsible for over 99% of malaria cases in Swaziland. Since 2009, only one malaria case was identified as something other than the *P. falciparum*; the case, captured through the 2010 MIS using DNA PCR, was *Plasmodium Malariae*.

Anopheles arabiensis remains the predominant vector responsible for malaria transmission. Although previously prevalence in Swaziland, *Anopheles gambiae s.s.* and *Anopheles funestus s.s.* have not been noted in recent years. Routine field larval and adult collections by NMCP staff reveal that there is presence of *An funestus gr*, *An coustani*, *An pretoriensis*, *An rufipes*, *An squamosus*, *An gambiaes.l.* species in the country.

3.1.2 Dynamics of Malaria Transmission

In Swaziland, malaria transmission is most prevalent along the eastern border, particularly in the Lubombo Region and the north eastern part of the Hhohho Region. It is estimated that 30% of the population, or approximately 285,972 people live in malaria at-risk areas. Transmission occurs primarily in the rainy season between November and May, with a peak in February and March, and occurs mainly in the *lowveld* region of the country. The 2010 Malaria Indicator Survey estimated national malaria prevalence at 0.2%. Malaria transmission is unstable and closely related to the level of rainfall, which varies considerably each year. The unstable and highly seasonal nature of malaria transmission in Swaziland indicates that acquired immunity by populations at risk to malaria is negligible and all age groups are therefore at risk of developing clinical malaria disease.

3.1.3 Morbidity and Mortality

New strategies related to Swaziland's malaria elimination campaign have changed the understanding of malaria morbidity and mortality in the country. Previous estimations of malaria incidence in Swaziland were based on suspected cases reported in aggregate by health facilities on a monthly basis. In February 2010, rapid diagnostic tests (RDTs) were introduced at health facilities throughout the country, allowing for definitive diagnosis of malaria through parasitological confirmation. Additionally in August 2010, the country implemented a national immediate disease notification system for 15 notifiable diseases or conditions, of which confirmed malaria is included.

In 2011-2012 (July to June), a total of 643 cases were reported, of which 369 were confirmed, or 1.3 cases per 1000 population at-risk. A total of 4 confirmed deaths were recorded over the same time period. Before RDTs were rolled out, in 2008-2009, the country recorded 7507 clinical episodes of malaria, of which only 73 cases were confirmed.

Of the 369 in 2011-2012, 221 (60%) were investigated and travel history was collected on each. Among investigated cases, 149 (67.5%) were imported, 71(32%) were local, and 1 case could not be determined.

3.1.4 Malaria Stratification and Mapping

Swaziland’s malaria risk stratification is based on the country’s ecological zones, which contribute to receptivity, and focal areas that are not active but are susceptible to resumed transmission. The current estimation for population at-risk is based on the number of people residing in areas that ecologically receptive (lowveld) or are determined to be highly vulnerable (Lubombo Plateau). The classification and risk stratification figures are presented in the table below. A total of 285,972 people are classified as at-risk for malaria. These figures are updated periodically based on the changing dynamics of transmission.

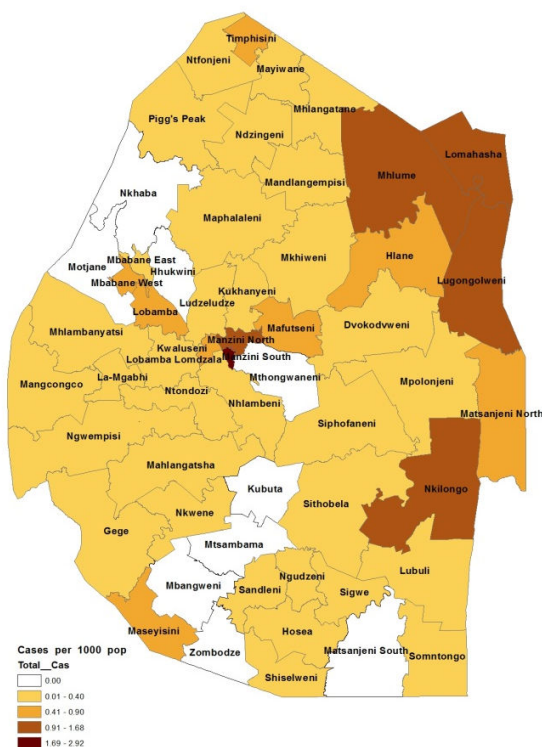
Table 3.1 Ecological Zone and Population Risk Stratification

Classification	Ecological Zone	Total Population
High Risk Area (Ecologically receptive)	Lowveld	230 952
Low Risk (High Vulnerability)	Lubombo Plateau	55 020
Low Risk (Low Vulnerability)	Middleveld	423 641
Malaria Free	Highveld	308 286

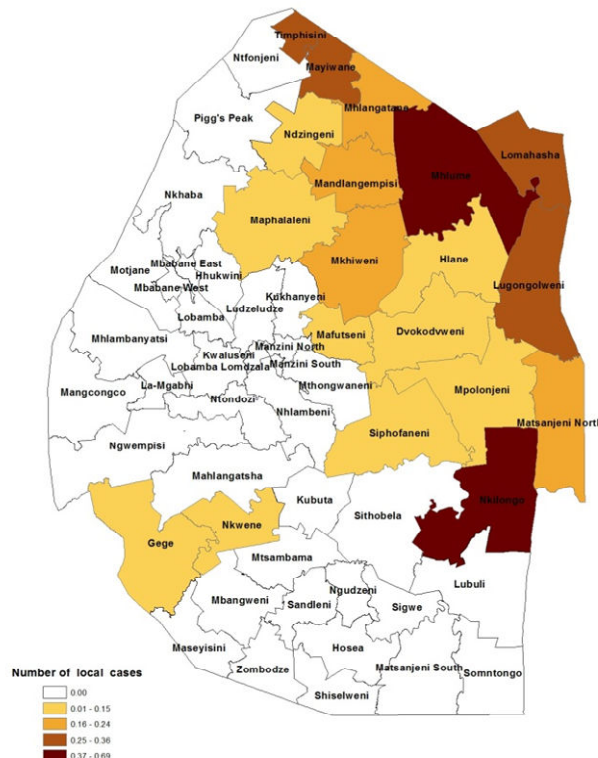
The maps in Figure 3.1 show the local case incidence and total incidence per 1000 population by Tinkhundla for July 2011-June 2012. The tinkhundla reporting the highest local incidence were Lomahasha (8 local cases), Mhlume (9), Nkilongo (11).

Figure 3.1 Incidence per 1000 by Inkhundla for Confirmed and Local Cases, 2011-2012

**Confirmed Malaria Cases per 1000 population by Inkhundla
July 2011-June 2012 (n=369)**



**Local Malaria Cases per 1000 population by Inkhundla
July 2011-June 2012 (n=71)**



3.2 Malaria Programme Performance

3.2.1 History of Malaria in Swaziland

Though malaria has recently been reduced to low levels in Swaziland, it has historically comprised a significant disease burden. Prior to the establishment of the country's national malaria program in 1945, country-wide epidemics were recorded in 1932, 1937, and 1942.¹ Indoor residual spraying with DDT began in 1949 and was scaled up to most of the accessible transmission areas in 1951.² By 1955, all malarious areas in the country had been sprayed³ and the campaign effectively reduced vector densities and parasite prevalence decreased from 24% to 0.4% between 1952 and 1957.⁶

Incidence remained at a manageable level throughout the 1960s due to focal spaying and active surveillance.³ Malaria incidence reached its lowest level in 1969 with only 46 total cases reported, of which 36 were determined to have been imported.⁵ By 1970, malaria was no longer perceived as a major public health problem and the World Health Organization began to reduce funding support for control measures. In 1977 when an epidemic of 1,473 confirmed cases were reported and 87 deaths were attributed to malaria.³

Following the epidemic in 1977, Swaziland faced several challenges that made management and containment of malaria difficult: funding shortages, antimalarial resistance, instability in Mozambique.³ In 1984, Cyclone Demoina struck Swaziland, causing large scale flooding throughout the country, especially the Lowveld and Middleveld eco-zones confirmed cases dramatically increased to 2,750 in 1984.⁹ With support from the South African Trade Commission and United States Agency for International Aid (USAID), the country scaled-up active case detection programmes, improved the availability, management, and regulation of antimalarial drugs, and designed a health education programme to improve health seeking behaviours among communities. These programmatic efforts decreased the country's malaria incidence by 55% over the next two years, to 2,400 cases in 1990.³

In 1991, South Africa greatly reduced its financial support for Swaziland's control efforts¹⁰, and the government of Swaziland was unable to maintain its control interventions. By the mid-1990s, malaria had re-emerged as serious public health threat in Swaziland, with incidence returning to its highest level since 1947 due to a combination of above-average rainfall, parasitic resistance to drug options like chloroquine and fansidar, and the instability in the health system exacerbated by the emerging HIV epidemic.¹¹ In 1995-96, there were 9,700 confirmed cases and over 38,000 clinical cases were recorded in outpatient departments across the country.^{9, 12}

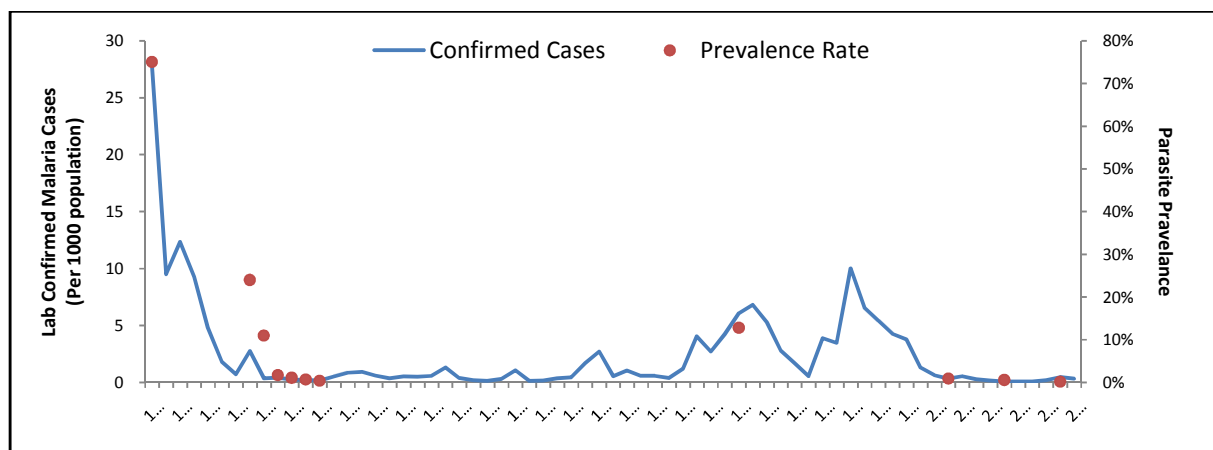
In 1999, Swaziland entered into a regional collaboration with South Africa and Mozambique, known as the Lubombo Spatial Development Initiative (LSDI). The partnership aimed to decrease malaria incidence in the border regions of South Africa, southern Mozambique and Swaziland by increasing indoor residual spraying.¹³ The LSDI proved very successful for all countries involved. In Swaziland, confirmed malaria cases decreased from 4,420 in 1998 to 342 in 2002.⁹

In 2003, Swaziland was awarded a Global Fund Round 2 grant that provided financial support to improve vector control activities in Swaziland, including increasing coverage of indoor residual house spraying among all populations at-risk and the distribution of insecticide-treated nets (ITNs) to pregnant women and children under 5 in the Lubombo region. Due to improved vector control activities within and outside of Swaziland, the country witnessed a reduction in total (clinically and parasitologically diagnosed) malaria cases from 49.5 per 1000 population at risk in 2002 to 9.5 per 1000 population at risk* in 2009.^{12,14} Figure 3.2 below shows Swaziland's varying malaria incidence and parasite prevalence by year from 1945-2011.

* Based on 366,900 people at-risk, calculated before 2007 estimates for population at-risk for malaria.

With this progress, Swaziland has already exceeded the Millennium Development Goal on malaria and Roll Back Malaria's Abuja targets. In recognition of the country's advancement on reducing its malaria burden, the Southern African Development Community (SADC) and the African Union (AU) identified Swaziland as a candidate for malaria elimination, and the country has since moved forward with implementing elimination strategies to achieve this goal by 2015.

Figure 3.2 Malaria Incidence and Prevalence, 1945-2011



3.2.2 Current Malaria Situation in Swaziland

Malaria elimination is a top priority in the national development agenda and the national health policy. The government financial commitment has sustained large scale program implementation over the years. In 2008, the country adopted a strategic plan to move towards elimination of malaria by 2015. The program was successful in mobilization of additional resources from the Global Fund in order to strengthen the required system for program re-orientation. Elimination program development is on-going, with dedicated malaria staff in every thematic area and additional expertise in IT and GIS.

Artemisinin-based combination therapy (ACT) and RDTs have been made available to health facilities nationwide, providing access at <8km throughout the country. The case management policy is that diagnostic testing by RDT and microscopic examination of suspected malaria cases and treatment for confirmed cases are to be provided free of charge to patients in government health facilities.

The current vector control policy is to provide universal coverage of IRS and LLIN in at risk areas, in combination with selective larviciding. The country has an effective vector control program in place, supported by effective management systems. In 2011-12, the coverage of IRS was 93% of targeted structures, and LLINs were distributed to 78% of the households in the same area. In

the 2012 KAP survey following the distribution campaign, reported use of LLINs was 28% and 33% among children and adults, respectively. Seven sentinel sites for vector monitoring are established and there is insecticide resistance monitoring carried out in collaboration with the Medical Research Council in South Africa. As progress towards elimination continues, the identification of receptive areas and monitoring of the vector mosquito population becomes more important. There is no documented data on vector density to define the receptivity potential of the different zones of Swaziland. Vector monitoring linked to malaria case investigation to determine transmission foci is needed. Environmental conditions that promote mosquito breeding and malaria transmission should be monitored to respond with adequate vector control measures to reduce receptivity in the affected areas.

With regard to health promotion a Malaria Elimination Communication and Advocacy Plan was developed to guide program activities. At national level, malaria-related health promotion activities are spearheaded by NMCP health promotion coordinators. There is a need to strengthen the existing Health Promotion Unit within the MOH and to mainstream malaria activities within the work plan of the unit. At community level, a network of Rural Health Motivators (RHM) is engaged in community mobilization and conducting health education by means of community meetings and house visits.

As the country transitioned from a control to an elimination approach, the NMCP has adopted an innovative surveillance strategy and system. A surveillance manual is in place to guide the implementation of activities. The NMCP retrieves its disease reports from two sources, Health Management Information System (HMIS) and the Immediate Disease Notification System (IDNS). The web-based Malaria Surveillance Database System (MSDS), linked to GIS mapping, supports field operations. Malaria surveys have been regularly conducted in the past to measure the malaria infection rate in the population

Epidemic Preparedness and Response Guidelines were developed in September 2009, and are due to be reviewed and revised. Integrated epidemic response teams are available at national and regional level. These teams meet annually for re-training before the start of the malaria transmission season. The IDNS also assists in alerting the program of an increase or presence of cases in an area or health facility. There is a Malaria Early Warning System under development to assist the NMCP in detecting epidemics early. The NMCP has a strong collaboration with the Meteorological Services that offers the possibility for eventual use of weather data for planning purposes

In elimination, the importance of identifying every last malaria case and reducing the risk of onward transmission takes on prominence. The precise identification of transmission areas becomes more important. There is a need for in-depth systematic analysis of time and space

clustering of reported malaria cases to determine potential transmission foci. A good understanding of malaria epidemiology in the various transmission foci and of their physical characteristics will be critical for targeting the elimination program activities in Swaziland and bordering areas of Mozambique, and for advancing towards zero transmission in a safe, cost-effective and efficient manner.

The team that supported the Malaria Programme Review in August and September 2011 made the following strategic recommendations to achieve the objective of elimination in an effective and efficient way:

- a) Mobilize the local private sector and external financial resources while increasing the national budget for the elimination program to ensure that the gains are not lost.
- b) Strengthen cross-border collaboration with Mozambique and South Africa in the area of health.
- c) Strengthen the epidemiology and entomology skills at central level to optimize activities for malaria elimination.
- d) Strengthen the surveillance and foci investigation system.
- e) Revise the program strategy of universal coverage of interventions towards targeted interventions based on malaria surveillance and mapping.
- f) Strengthen the engagement of community based structures in the malaria elimination activities.

3.3 Rationale for Malaria Elimination in Swaziland

Swaziland is well-positioned for pursuing malaria elimination. In recent years, the country has had significant success in reducing the malaria burden. Between 2002 and 2009, malaria incidence in Swaziland decreased by 64%, from 49.5 to 18.6 cases per 1000 population at risk.⁴ The implementation of the Malaria Elimination Strategy (2008-2015) has further reduced incidence of malaria to 1.3 cases per 1000 population at risk.⁵

Swaziland has a relatively small and homogenous population, with only a moderate proportion (30%) of the population living in at-risk or receptive areas. The country shares a limited national border with malaria endemic areas; provinces in Mozambique and South Africa bordering Swaziland are considered low endemic. The highly seasonal nature of malaria transmission in Swaziland limits the potential for long-term endemic transmission.

⁴ Figure based on previous estimate of 366,900 at risk from 2008-2015 Elimination Strategic Plan.

⁵ Based on estimated population at risk of 285,972

The government of Swaziland is deeply committed to malaria elimination, as evidenced by the cabinet's approval of the National Malaria Elimination Policy and the government's continued financial support for malaria interventions. Leadership and management within the National Malaria Control Programme are strong and dedicated. With support from Global Fund, Swaziland has expanded the country's malaria control programme staff to include technical officers in case management, surveillance, and health promotion dedicated to the goal of malaria elimination.

In 2009, Swaziland began to implement the original elimination strategy, which introduced new interventions necessary to achieve elimination. Since implementation began, the country has witnessed an 88% reduction in reported malaria incidence. Through optimisation of current elimination interventions, eliminating malaria in Swaziland is possible.

The threat however of reintroduction of malaria into the country will always pose a significant challenge, due to regular movement of persons to and from malaria endemic areas across the borders in neighbouring countries and other malaria endemic countries. For this reason, cross-border collaboration with South Africa and Mozambique needs to be sustained and scaled up. In addition, active surveillance of vectors and cases and information, education, and communication will play a pivotal role in prevention of re-introduction of malaria into malaria-free zones in the country. These strategies will therefore need to be further developed and strengthened.

4. SWAZILAND ELIMINATION STRATEGIC FRAMEWORK

This chapter discusses the revised strategic direction of the remaining three years (2012-13, 2013-14, 2014-15) of the National Malaria Elimination Strategic Plan. The revisions have been informed by a thorough review of the implementation of the previous plan carried out by the NMCP and other partners and stakeholders during the Malaria Programme Review.

4.1 Vision

A malaria-free Swaziland

4.2 Goal

The goal of this strategic plan is to eliminate malaria from Swaziland by 2015.

To achieve this goal, the country must reduce the number of indigenous malaria cases to zero by 2015. The country must also reduce and maintain the number of malaria deaths seen at health facilities to zero for total population. The timeline and targets for achieving these goals is outlined in the elimination framework below.

Figure 4.1 Elimination Framework

Elimination				Prevention of Reintroduction
2011-12	2012-13	2013-14	2014-15	2016 and beyond
219 local cases	88 local cases	35 local cases	0 local cases	0 local cases
5 deaths	0 deaths	0 deaths	0 deaths	0 deaths

*A local case is any case that is determined through investigation to be indigenous (and excludes introduced cases) OR a case that does not have sufficient evidence to prove beyond reasonable doubt that it is not indigenous.

4.3 Objectives

To achieve the above goal and realize the vision of a malaria-free Swaziland, seven objectives have been identified across the four technical areas of the malaria program (Case Management, Vector Control, Surveillance and Epidemic Preparedness and Response, and Information, Education, and Communication). Reaching these targets will ensure the success of accomplishing the overall elimination goal.

- Objective 1** All malaria cases are diagnosed by RDT and/or microscopy by 2014
- Objective 2** All confirmed malaria cases are treated according to national guidelines by 2014
- Objective 3** All malaria cases diagnosed by health care workers are reported within 24 hours by 2014
- Objective 4** 100% of the population at risk of malaria is covered by effective and appropriate vector control measures by 2014
- Objective 5** All active foci are eliminated through in-depth investigation and response by 2015
- Objective 6** All confirmed malaria cases are investigated within 48 hours of notification
- Objective 7** 100% of the total population exhibits appropriate health seeking behaviour for malaria by 2015

5. INTERVENTIONS AND IMPLEMENTATION STRATEGIES

To achieve the seven objectives and the overall elimination goal, specific interventions and activities must be carried out in a thorough and effective manner. The primary strategies and activities for each objective are listed below.

Objective 1: All suspected malaria cases are diagnosed by RDT and/or microscopy by 2014

In an elimination setting, all suspected malaria cases must be diagnosed and confirmed with a parasitological diagnostic test, either RDT or microscopy. Thorough screening and testing of all patients presenting with the signs and symptoms of malaria at a health facility is necessary to identify and promptly treat all infections within the population and halt transmission.

Strategy 1.1: Ensure that high-quality RDTs are available at all public and private health facilities

To ensure the availability of high quality RDTs at all health facilities in the country, the National Malaria Control Program will collaborate with National Laboratory Services (NLS) to conduct an accurate quantification of RDT-need based on previous and forecasted consumption. The NMCP and NLS will also improve the tracking of consumption of diagnostic commodities at health facility level. The NMCP will provide mentoring visits to health facilities on the importance of ordering RDTs in a timely manner. The Ministry of Health will also foster a partnership with private sector healthcare providers to assure that affordable diagnostic services for malaria are available to the entire population.

Strategy 1.2: Improve availability and accuracy of microscopy in health facilities with laboratory capacity and at central level

The NMCP will continue to train laboratory technicians and technologists on malaria microscopy. The NMCP will regularly evaluate microscopy performance and provide feedback to healthcare workers. Where possible, the NMCP will work with National Laboratory Services to expand the availability of microscopy at health facilities. The NMCP will also continue to develop the capacity of expert microscopists within the NMCP laboratory and the National Reference Laboratory to ensure that the highest quality of diagnostic services are available for the population.

Strategy 1.3: Ensure that all health care workers adhere to national diagnosis guidelines

The NMCP will continue to conduct pre-service, in-service and refresher trainings with all health care workers on the national diagnosis guidelines. The NMCP will also ensure that national

guidelines, job aids, and IEC materials reinforcing parasitological diagnosis of malaria are available at all health facilities and can be accessed by health care workers.

Strategy 1.4: Conduct quality assurance to ensure quality and effectiveness of diagnostic tools

NLS and the NMCP will continue to strengthen the diagnosis quality assurance program, which was launched in February 2010. This will include developing protocols for confirming all RDT-positive malaria cases by microscopy and recording the results in a national register. NLS will also pursue WHO-accreditation of its lab to ensure that the country has the capacity to provide high quality microscopy diagnosis. The country will also build local capacity at the National Reference Laboratory to conduct molecular testing for malaria, which will serve as the gold-standard for cross-checking the quality of RDT and microscopy performance.

Objective 2: All confirmed malaria cases are treated according to national diagnosis and treatment guidelines by 2014

All confirmed malaria cases require effective therapy to rapidly cure the patient and reduce parasite carriage, thus reducing the potential for transmission. Under the current diagnosis and treatment guidelines, the ACT artemether-lumefantrine (AL) is the first line treatment for all uncomplicated cases of malaria, excluding pregnant women in their first trimester. ACTs are the WHO recommended treatment for uncomplicated *Plasmodium falciparum* malaria as they produce a very rapid therapeutic response. The second line treatment for uncomplicated malaria and the first-line treatment for pregnant women in their first trimester is oral quinine. Severe malaria is managed with IV/IM artesunate until the patient can tolerate oral treatment with AL. National treatment guidelines are reviewed as necessary and may change over the course of this strategic plan.

The treatment target for malaria elimination is to ensure that 100% of all confirmed cases are treated according to the national diagnosis and treatment guidelines by 2014 and subsequent years.

Strategy 2.1: Ensure the availability of recommended anti-malarials at all public and private health facilities

To ensure the availability of recommended anti-malarials at all health facilities in the country, the NMCP will collaborate with Central Medical Stores to conduct an accurate quantification of anti-malarial need based on previous and forecasted consumption. CMS and the NMCP will also improve the tracking of consumption of all pharmaceutical commodities at health facility level. The NMCP will also provide mentoring visits to health facilities on the importance of ordering

anti-malarials in a timely manner. The Ministry of Health will also foster a partnership with private sector healthcare providers to assure that affordable anti-malarials are available to the entire population.

Strategy 2.2: Ensure that all health care workers comply to the national diagnosis and treatment guidelines

The NMCP will continue to conduct pre-service, in-service and refresher trainings to all health care workers on the national diagnosis and treatment guidelines. The NMCP will also continue to ensure that national guidelines, job aids, and IEC materials reinforcing prompt and efficacious treatment for all confirmed malaria cases are available at all health facilities and can be accessed by health care workers.

Strategy 2.3: Monitor the efficacy of anti-malarials and continually assess the need and feasibility of introducing new anti-malarial drugs

The NMCP will continue to conduct drug efficacy monitoring and pharmacovigilance to ensure optimal treatment outcomes for all malaria patients. The NMCP, with support from partners, will also assess the feasibility of introducing radical cure with ACT plus Primaquine.

Objective 3: All malaria cases diagnosed by health care workers are reported within 24 hours by 2014

The immediate notification of all confirmed malaria cases is necessary to trigger rapid follow-up activities such as reactive case detection, which can limit or halt transmission. Notification, if not immediate, should occur within 24 hours of diagnosis. Healthcare workers collect contact information of the case and report through the IDNS toll-free hotline, 977. When the case is entered into the database, a short-message-service is sent to the NMCP surveillance team for follow-up within 48 hours. All cases reported to the IDNS should accurately reflect aggregate figures reported to the country's monthly HMIS system.

Strategy 3.1: Ensure availability and utilisation of the immediate notification tool in all health facilities

The Ministry of Health and its programmes will continue to train all health care workers on the utilization of the IDNS and refine the system as necessary to achieve optimization. The NMCP and Epidemic Preparedness and Response (EPR) Unit will provide supportive supervision and mentoring to all facilities, as well as IEC materials reinforcing the use of the IDNS. The NMCP will establish a feedback mechanism to all health facilities to keep them informed of the on-going malaria situation in their areas.

Strategy 3.2: Ensure accurate monthly reporting of malaria cases to the Health Management Information System by all health facilities

The NMCP will analyse and validate data from the monthly HMIS system against the IDNS on a quarterly basis and will provide supportive supervision and mentoring to facilities reporting discrepancies between the two systems. The Ministry of Health will also partner with the private sector to encourage real-time case reporting for malaria. Additionally, the Ministry of Health will lobby for the establishment of regulation within the Public Health Bill to require accurate disease reporting from all facilities, including private sector.

Objective 4: 100% of the population at risk for malaria is covered by effective and appropriate vector control measures by 2014

The principal objective of vector control is to suppress vector activity to a point where malaria transmission can be fully interrupted resulting in a decrease in malaria morbidity and mortality. Vector control in Swaziland is aligned to the WHO-recommended Integrated Vector Management (IVM) approach to vector control, based on evidence and knowledge of the local situation. The key intervention strategies for IVM in Swaziland include IRS, LLIN, and larviciding. The implementation of the IVM strategies is guided by Geographic Information System (GIS) technology, which facilitates the geographical mapping of vector control interventions. This ensures appropriate identification of transmission foci and effective implementation of IVM interventions. Monitoring of insecticide effectiveness should be carried out on a continual basis to ensure maximum impact of vector control interventions.

Strategy 4.1: Distribute Long-Lasting Insecticide Treated Nets to population at-risk

The NMCP will engage net distributors to work concurrently with spray operators to distribute LLINs in areas not already covered by LLINs or to replace LLINs in communities where they may no longer be effective due to age. Data on LLIN distribution, including GPS coordinates of for all households receiving LLINs, will be recorded and entered into the MSDS. Routine monitoring will be used to evaluate LLIN coverage and utilization.

Strategy 4.2: Conduct IRS in all at-risk areas

The NMCP identifies and defines at-risk areas annually based on the previous year's case surveillance. The NMCP will engage and train spray operators prior to the initiation of spray activities. The NMCP will also secure all necessary insecticides equipment, vehicles and protective clothing for spray operators. The NMCP will ensure the safe disposal of all insecticides waste and related potentially hazardous materials. Data from IRS activities will

recorded on spray cards and entered into the MSDS for on-going monitoring. Routine monitoring will be used to evaluate IRS coverage.

Strategy 4.3: Conduct insecticide resistance monitoring

To monitor the effectiveness of vector control strategies and interventions, the NMCP will monitor insecticide resistance on a continuous basis. The NMCP will establish an insectory for vector monitoring and secure the necessary bio assays and susceptibility tests for resistance monitoring. Based on the results of monitoring activities, the NMCP will adjust IRS and LLIN strategies to ensure effectiveness of interventions deployed.

Conduct 4.4: Conduct winter larviciding in receptive areas

To reduce overall mosquito populations and interrupt the mosquito breeding cycle, the NMCP will deploy winter larviciding at community level. The NMCP will conduct an evaluation to ascertain the acceptability of larviciding in targeted communities, conduct training exercises to capacitate community members where larviciding is accepted, and ensure effective implementation of this strategy through entomological surveillance.

Objective 5: All active foci are eliminated through in-depth investigation and response by 2015

A focus is a defined, circumscribed locality situated in a currently or formerly malarious area with the continuous or intermittent epidemiological factors necessary for transmission. When a locally acquired malaria case is detected in Swaziland, a focus investigation is carried out to describe the areas where malaria occurred, delineate the population at-risk, and inform the most appropriate combination of interventions for eliminating malaria in the specific locality. Foci investigation involves the identification of the features of a location, including entomological surveillance and geographical reconnaissance, to determine how the vector interacts with the population and environment spatially. The response and management of active foci leads to the reduction of focal areas of transmission and eventual elimination.

Strategy 5.1: Conduct entomological surveillance and research

To improve the targeting of vector control interventions, entomological surveillance will be carried out. The NMCP will establish an insectory for vector monitoring where entomological testing can be carried out. Based on the results obtained, informed decisions will be made to reduce vector populations within active foci.

Strategy 5.2: Identify, investigate, and classify all suspected transmission foci

Swaziland is currently developing guidelines and tools to standardize data collection for foci investigation. Data will be collected from the HMIS, the MSDS, Meteorological Services, and other sources to create a thorough profile of each focus. All potential foci will be investigated and classified based on the potential for transmission. Interventions will be recommended to relevant programs for management action within the focus.

Strategy 5.3: Eliminate all active foci

Based on foci investigations, a response will be coordinated in collaboration with the NMCP vector control, health promotion, and surveillance teams. The continual intervention within a focus will support the elimination of that focus as an active transmission area.

Objective 6: All confirmed malaria cases are investigated within 48 hours of notification

All malaria cases are followed-up via home visit during active case investigation by NMCP surveillance staff to gather information about patient demographics, source of infection, and other epidemiology-related information. After active case investigation has been conducted, reactive case detection is carried out in receptive areas. Screening is done using RDTs and all positive malaria cases are transported to the nearest health facility for treatment. The investigation and detection of malaria cases is essential to the detection of asymptomatic infections and the prevention of potential outbreaks, thereby helping to interrupt local transmission.

Strategy 6.1: Conduct active case investigation for all malaria cases at the case's place of residence

The NMCP continues to follow-up all confirmed malaria cases. Investigations are carried out to determine the source of infection and capture details including GPS coordinates of the case household, utilization of personal protection measures, and other behaviours that may be associated with an increased risk of infection. Annual training of surveillance officers is carried out on malaria case investigation protocols. NMCP surveillance supervisors ensure that all supplies required for investigation are readily available to NMCP surveillance agents. The NMCP surveillance team holds weekly and monthly meetings to review previous case investigations and improve strategies to ensure all cases are investigated within 48 hours of notification.

Strategy 6.2: Conduct reactive case detection around investigated cases in all receptive areas

The NMCP screens all people residing within 1 km of an index case in all receptive areas of the country to ensure that all malaria infections are detected and treated so as to interrupt local transmission. The NMCP surveillance manual will be reviewed and revised based on need and lessons learned. Follow-up fever screening is carried out in areas where there is a high suspicion of on-going transmission.. In cases where potential epidemics are identified, active case detection will be quickly and efficiently deployed.

Strategy 6.3: Conduct proactive case detection among high risk groups and areas where there is suspicion of on-going transmission

To ensure thorough screening of all populations at-risk, the NMCP will identify and screen groups or networks with an increased risk of infection as well as populations living in areas where there is a high suspicion of on-going transmission. The NMCP will conduct screening and education at port of entry health posts during months of high importation risk. Based on foci investigation, NMCP will carry out screening in active and residual foci to ensure that transmission has been interrupted.

Objective 7: 100% of the total population exhibits appropriate health seeking behaviour for malaria by 2015

As malaria cases start to decrease in Swaziland, sectors of the population and stakeholders, including certain government departments, may lose interest in malaria preventative measures or the elimination goal. The health promotion intervention strategy will involve increasing advocacy for malaria elimination through the use of IEC. To improve health seeking behaviour and the utilization of malaria prevention measures, the NMCP seeks to mobilise communities to become engaged in malaria elimination. To achieve this objective, mass media and community outreach activities using tailored messages will be deployed. This will ensure that communities in at-risk areas and travellers from malaria endemic areas exhibit appropriate health seeking behaviour and take the necessary precautions to prevent infection.

Strategy 7.1: Advocate for support of malaria elimination agenda

To advocate for the elimination agenda, the NMCP will conduct sensitisation meetings for policy makers, members of parliament, and community leaders on malaria elimination and related activities. The NMCP will also engage private sector partners and business leaders to support malaria elimination activities. The NMCP will also carry out other advocacy events such as commemorating World Malaria Day and SADC Malaria Day.

Strategy 7.2: Mobilise communities to actively participate in malaria elimination interventions

The NMCP will actively engage targeted communities to participate in malaria elimination interventions. The NMCP will further provide malaria IEC at national and community events. The NMCP will also engage targeted communities in malaria elimination activities focused on specific objectives such as personal protection when traveling or utilizing bed nets during high transmission season.

Strategy 7.3: Communicate malaria elimination messages to promote behaviour change

To promote behaviour change related to health seeking and personal protection, the NMCP will develop and distribute malaria IEC materials to members of the public to reinforce key malaria elimination messages. The NMCP will also utilize a multi-media strategy to deploy messages via radio, television, newspaper, the World Wide Web, cellphone networks, and billboards. The NMCP will also develop interpersonal communication training materials for different target groups, especially healthcare workers and rural health motivators (RHMs) who consistently interact with communities at-risk. The NMCP will also conduct regular quantitative and qualitative surveys to measure the impact of these interventions on behaviour change within the population.

6. MONITORING AND EVALUATION

To ensure continual progress toward the malaria elimination goals and objectives, the implementation of all intervention areas must be regularly monitored and critically evaluated. The objective of an M&E system is to enable the effective management of a programme. By allowing managers and implementers to understand the impact, outcomes, and outputs of the implemented interventions, the M&E system promotes evidence-based decision-making. Through proper interpretation of the collected data, corrective action can be taken to improve ineffective practices, and best practices can be implemented across multiple programmes.

6.1 Tracking Progress

The M&E component of the malaria elimination programme will be the joint responsibility of the NMCP and implementing partners. The indicators, defined collectively by the implementing partners, will be collected using routine data collection systems including the Immediate Disease Notification System, the Health Management Information Systems, the case-based and entomological surveillance systems managed under the Malaria Surveillance Database System (MSDS), the KAP survey, and regular reports describing activities carried out. Based on the indicator, data collection and reporting will occur on a daily, monthly, quarterly, and annual basis. Targets for the Strategic Plan are set on an annual basis and are not cumulative.

6.2 Measuring Outcome and Impact

The revised Strategic Plan's Performance Framework is designed with targets that must be achieved to reach the goal of elimination. The ability to achieve the seven primary objectives is dependent on accomplishing the related outcome and output indicators. The Monitoring and Evaluation Plan has been revised to align with this new Performance Framework. Data is collected through routine sources and managed in

6.3 Performance Framework

Indicator	2011-12 Baseline	2012-13	2013-14	2014-15	Source of Data	Party Responsible
Objective 1: All suspected malaria cases are diagnosed by RDT and/or microscopy by 2014						
% of cases confirmed by RDT and / or microscopy	57%	85%	100%	100%	IDNS/HMIS	EPR/HMIS
No of people tested in health facilities with RDT and/or microscopy	11082 (2010-11)	12,500	15,000	16,500	HF stock cards	NMCP LDC
Proportion of facilities that have no RDT stock outs	N/A	90%	100%	100%	HF stock cards	NMCP LDC
Proportion of health care workers trained on the guidelines	20%	31%	35%	35%	MSDS	NMCP LDC and CMC
Proportion of RDT positive cases that are confirmed by microscopy	N/A				MSDS	NMCP LDC
Objective 2: All confirmed malaria cases are treated according to national guidelines by 2014						
Percentage of confirmed malaria cases treated according to the national guidelines		100%	100%	100%	IDNS	EPR/HMIS NMCP CMC
Proportion of health facilities that have no stock outs of nationally recommended anti-malarials	N/A	90%	95%	100%	HF stock cards	NMCP CMC
Objective 3: All malaria cases diagnosed by health care workers are reported within 24 hours by 2014						
Percentage of malaria cases notified by healthcare workers within 24 hours of diagnosis by 2012	77%	85%	90%	100%	IDNS	EPR/HMIS
Percentage of health facilities reporting monthly to HMIS	85%	90%	95%	100%	HMIS	HMIS

Indicator	2011-12 Baseline	2012-13	2013-14	2014-15	Source of Data	Party Responsible
Objective 4: 100% of the population at risk of malaria with is covered by effective and appropriate vector control measures by 2014						
% of population reporting LLIN ownership or IRS coverage		70%	90%	100%	KAP Survey	NMCP HP
Number of LLINS Distributed (cumulative)	154218	199854	245492	245492	MSDS	NMCP VC
% of targeted households reporting LLIN ownership	78%	80%	90%	100%	KAP Survey	NMCP HP
% of structures sprayed in areas attempted	93%	95%	100%	100%	MSDS	NMCP VC
Number of targeted households reporting receiving IRS	66%	80%	90%	100%	KAP Survey	NMCP HP
Objective 5: All active foci are eliminated through in-depth investigation and response by 2015						
% of active foci in Swaziland		80%	25%	0%	MSDS	NMCP Foci Investigator
% of investigated and classified transmission foci	0%	50%	80%	100%	MSDS	NMCP Foci Investigator
% of active foci responded to with vector control	0%	50%	80%	100%	MSDS	NMCP Foci Investigator
Objective 6: All confirmed malaria cases are investigated within 48 hours of notification						
% investigation of all malaria cases within 48 hours	14%	50%	75%	95%	MSDS	NMCP CSO
% of investigated cases with REACD as per protocol		80%	100%	100%	MSDS	NMCP CSO
% of eligible population tested during case detection	N/A	60%	100%	100%	MSDS	NMCP CSO
% of people positive in reactive/proactive case detection	0.7%	0.5%	0.2%	0%	MSDS	NMCP CSO
No. of people tested in reactive/proactive case detection	1545	2500	4000	5000	MSDS	NMCP CSO

Indicator	2011-12 Baseline	2012-13	2013-14	2014-15	Source of Data	Party Responsible
Objective 7: 100% of the total population exhibits appropriate health seeking behaviour for malaria by 2015						
% of the targeted population sleeping inside a LLIN	33%	50%	65%	80%	KAP Survey	NMCP HP
% of the population that can identify at least 4 malaria signs and symptoms	60%	75%	95%	100%	KAP Survey	NMCP HP
No. of community dialogues conducted	4	4	4	4	NMCP Report	NMCP HP
No. of mass media messages conducted	3	3	3	3	NMCP Report	NMCP HP

7. PLANNING AND IMPLEMENTATION

To achieve the goal of elimination by 2015, an enabling environment is required to support the malaria programme to effectively implement the Elimination Strategic Plan. Therefore, there is a need to support all implementing partners by fostering the continued development and maintenance of required human resource capacity, facilitating partnership coordination to maximize available resources, organizing the development of sound implementation plans for each activity, and ensuring the availability of resources for procurement of necessary commodities and implementation of planned activities.

7.1 Human Resources

The NMCP operates under the Directorate of Public Health's Communicable Diseases Division within the Ministry of Health, which is coordinate Deputy Director of Public Health Services. Within the NMCP, the Programme Manager is supported by coordinators of various departments covering management and administration, case management and diagnosis, vector control, surveillance (including IT and GIS), and IEC, as shown in Table 7.1. Of the 17 technical positions at central level, 12 are supported through Global Fund resources. These NMCP plans to advocate for the absorption of these positions into the national establishment register.

Table 7.1 NMCP Staff by Department

Programme Management and Administration	Case Management	Vector Control	Surveillance and Epidemic Preparedness and Response	Information, Education, and Communication
<ul style="list-style-type: none"> • Programme Manager (1) • Global Fund Grant Manager (1) • Accounts Officer (1), • Procurement Officer (1) • Driver (1) 	<ul style="list-style-type: none"> • Case Management Coordinator (1) • Laboratory Diagnosis Coordinator (2) • Laboratory Assistants (3) 	<ul style="list-style-type: none"> • Senior Environmental Health Officer (1) • Environmental Health Officer (1) • Senior Environmental Health Technicians (2) • Environmental Health Technicians (6) • Spray operators (72) 	<ul style="list-style-type: none"> • Chief Surveillance Officer (1) • Surveillance Supervisors (2) • Surveillance Agents (6) • Foci investigator/ Entomology Coordinator (1) • IT Officers (2) • GIS Analyst (1) 	<ul style="list-style-type: none"> • Health Promotion Officers (2)

An emphasis is placed on capacity building among NMCP employees. Funding in the Global Fund grant allows for training courses for NMCP employees in their specific technical area. Additionally, capacity building opportunities with WHO and other partners are sought to improve the skills and knowledge that may be applicable to the elimination strategy.

7.2 Planning and Operations

The NMCP holds an annual review meeting after the malaria season has ended in July. Participants at this meeting reflect on achievements and challenges from the previous year and develop implementation plans for the upcoming season. Quarterly implementers' meetings are held for all partners receiving Global Fund resources to monitor and evaluate implementation of planned activities and progress toward targets set in the Performance Framework. The NMCP also holds internal monthly meetings to review recent progress on project areas and plan for the upcoming month of activities.

7.3 Partnership Coordination

At the national level, the NMCP collaborates with other departments in the Ministry of Health, including the National Laboratory Services, Central Medical Stores, Epidemic Preparedness and Response (EPR) Unit, Strategic Information Department, which includes the Health Management Information System (HMIS) and Monitoring and Evaluation (M&E Unit), and components of the Health Promotion Unit. The NMCP also works closely with NERCHA, which acts as the Principal Recipient for all Global Fund grants.

Few external partners support the NMCP, likely due to the low burden of disease. The Southern African Malaria Elimination Support Team (SAMEST), a collaboration between the Clinton Health Access Initiative and the Global Health Group at the University of California, San Francisco, provides in-country support for planning and logistics, case management and diagnosis, surveillance, and operational research. The Medical Research Council of Durban, South Africa, supports the country on case management and diagnosis quality assurance, vector control and entomological surveillance, IT and GIS, and operational research. Additionally, the NMCP receives regional support from WHO around strategic planning, program management, and health promotion. The Southern African Roll Back Malaria Network (SARN) also contributes to Swaziland's elimination campaign by coordinating partner support on operational issues and facilitating information-sharing between countries.

In-country malaria partners and stakeholders also serve within the Swaziland Malaria Elimination Advisory Group (SMEAG), an independent council of advisors who meet on a regular basis to evaluate the effectiveness of the malaria elimination strategy, monitor the implementation of policies, and revise them as appropriate. The SMEAG is composed of a general committee as well as subcommittees on surveillance, case management, vector control, and health promotion.

7.4 Procurement and Supply Management System

Procurement of all supplies and resources with government funding is led by the NMCP Accounts Officer, in coordination with the Ministry of Health Procurement Unit. Pharmaceutical and diagnostic commodities procured with government funding for distribution by Central Medical Stores or National Laboratory Services are procured by accounts officers in those respective units in consultation with the NMCP Case Management Coordinator and Laboratory Diagnosis Coordinator, along with the MOH Procurement Unit.

Procurement of supplies with Global Fund resources is directed by the NERCHA Procurement Unit, in coordination with NERCHA's Grant Management Unit, the NMCP Grant Manager, and relevant NMCP staff and partners. Once Global Fund supplies enter into the country, they are managed under the Ministry of Health's supply chain systems.

Supply chain logistics for non-pharmaceutical and non-diagnostic products is directly under the management of the NMCP. Antimalarial medications, RDTs for clinics without laboratory capacity, and diagnosis quality assurance bundles for Lubombo region facilities are managed under the CMS's supply chain systems. RDTs and other diagnostic supplies for facilities with laboratory capacity are managed under the NLS's supply chain.

7.5 Financial Resource Management

All finances are overseen by the NMCP Manager. Government resources allocated to the NMCP are managed by the NMCP Accounts Officer. Global Fund resources are managed directly by NERCHA with consultation and review by the NMCP Grant Manager. Finances for Global Fund are reviewed quarterly at the Implementers' Meeting. Financial allocation and performance is also reviewed at the Annual Malaria Review after the end of the malaria season.

8. BUDGET AND FINANCIAL PLAN

Understanding the costs associated with each activity in the Malaria Elimination Strategic Plan is imperative to ensure that necessary funds are allocated for effective implementation. Primary costs under this strategic plan include human resources, capital costs, consumable commodities, fuel and vehicle maintenance, and meetings and trainings.

8.1 Forecasted Budget

The annual cost to implement this Strategic Plan ranges from SZL 13,957,204 in 2012-13 to 10,077,957 in 2014-15, as shown in Table 8.1 below. Costs are highest in 2012-13 due to the expected procurement of LLINs for Objective 4. Due to overlapping activities for Objectives 1, 2, and 3, such as healthcare worker training, costs associated with these activities have been designated to specific objectives to reduce overestimating. Costs for Objectives 5 and 6 are primarily associated with human resources due to the required field work to implement strategic activities.

Table 8.1 Costs of Implementation of Activities by Objective, 2012-2015

Objective	2012-2013	2013-2014	2014-15
Objective 1: All suspected malaria cases are diagnosed by RDTs and/or microscopy by 2014	SZL 1,902,596.36	SZL 2,440,134.76	SZL 2,556,331.65
Objective 2: All confirmed malaria cases are treated according to national treatment guidelines by 2013	SZL 381,198.84	SZL 468,635.48	SZL 555,623.19
Objective 3: All malaria cases diagnosed by health care workers are reported within 24 hours by 2013	SZL 72,465.41	SZL 76,088.68	SZL 79,711.95
Objective 4: 100% of the population at risk for malaria is covered by effective and appropriate vector control measures by 2013	SZL 7,791,665.14	SZL 4,938,805.71	SZL 2,731,820.75
Objective 5: All active foci are eliminated through in-depth investigation and response by 2014	SZL 420,085.53	SZL 541,467.27	SZL 502,264.83
Objective 6: All confirmed malaria cases are investigated within 48 hours of notification	SZL 1,362,503.76	SZL 1,337,452.87	SZL 1,401,141.10
Objective 7: 100% of the total population exhibits appropriate health seeking behaviour for malaria by 2014	SZL 1,307,994.80	SZL 1,373,394.54	SZL 1,460,499.43
Programme Management and Support	SZL 718,694.74	SZL 754,629.48	SZL 790,564.22
TOTAL	SZL 13,957,204.58	SZL 11,930,608.79	SZL 10,077,957.10

8.2 Financial Plan

Financial resources are available to implement all activities forecasted in 2012-13 and 2013-14. Due to the Global Fund Round 8 grant's expected closure in June 2014, financial gaps exist in 2014-15. Where possible, the government of Swaziland will absorb Global Fund employment positions into the establishment register. Where supplemental funding is still required to implement the Strategic Plan, the Ministry of Health plans to seek funding from the Global Fund, as potentially other sources. The NMCP will also develop a sustainable financing plan to ensure that financial gaps are not a threat to the implementation of the Malaria Elimination Strategic Plan.

REFERENCES

ANNEX A: LOG FRAME OF OBJECTIVES, STRATEGIES, AND ACTIVITIES

Target	Strategy/Intervention	Activity
Objective 1: All suspected malaria cases are diagnosed by RDT and/or microscopy by 2014	Strategy 1.1: Ensure that high quality RDTs are available at all public and private health facilities	<ul style="list-style-type: none"> • Forecast/procure of all malaria diagnostics with NLS • Send RDTs for lot testing before distribution to field • Establish commodity tracking system to track the consumption of diagnostics at health facilities • Reinforce the importance of timely ordering of malaria diagnostics from CMS or NLS during HCW trainings/mentoring • Develop partnership between the MOH and the private sector to ensure access of affordable diagnostic commodities
	Strategy 1.2: Improve availability and accuracy of microscopy in health facilities with laboratory capacity and at central level	<ul style="list-style-type: none"> • Train laboratory technicians and technologists on malaria microscopy • Regularly evaluate microscopy performance and provide feedback to healthcare workers • Expand availability of microscopy at health facilities • Develop capacity of expert microscopists at NMCP and NRL
	Strategy 1.3: Ensure that all health care workers adhere to national diagnosis guidelines	<ul style="list-style-type: none"> • Conduct pre-service, in-service and refresher trainings to all health care workers • Ensure access to national diagnosis guidelines, training job aids and IEC materials for all healthcare workers • Conduct mentoring and supportive supervision to health workers
	Strategy 1.4: Conduct quality assurance to ensure quality and effectiveness of diagnostic tools	<ul style="list-style-type: none"> • Build capacity for molecular testing at the NLS for RDT and microscopy cross-checking • Strengthen adherence to diagnosis QA protocols • Develop national registry to record microscopy results of all RDT positive malaria cases • Facilitate accreditation the national malaria reference laboratory for quality assurance of malaria microscopy
Objective 2: All confirmed malaria cases are treated according to national treatment guidelines by 2014	Strategy 2.1: Ensure the availability of recommended anti-malarials at all public and private health facilities	<ul style="list-style-type: none"> • Forecast and procure all anti-malarials in collaboration with Central Medical Stores • Develop tracking system to collect data on consumption of anti-malarials at health facilities • Reinforce the importance of timely ordering of all antimalarials from CMS during HCW trainings/mentoring • Develop partnership between the MOH and the private sector to ensure access of affordable antimalarials at all private sector facilities
	Strategy 2.2: Ensure that all health care workers comply to national treatment guidelines	<ul style="list-style-type: none"> • Revise and distribute treatment guidelines • Ensure access to national treatment guidelines, training job aids and IEC materials for all healthcare workers • Conduct mentoring and supportive supervision to health workers
	Strategy 2.3: Monitor the efficacy of anti-malarials and continually assess the need and feasibility of introducing new anti-malarial drugs	<ul style="list-style-type: none"> • Conduct drug efficacy and pharmacovigilance to ensure optimal treatment comes for malaria patients • Assess the feasibility of introducing radical cure with ACT + Primaquine • Revise QA diagnosis manual SOPs to ensure microscopists are documenting the presence of gametocytes in malaria positive slides • Conduct operational research on G6PD deficiency prevalence in Swazi population

Objective	Strategy/Intervention	Activity
Objective 3: All malaria cases diagnosed by health care workers are reported within 24 hours by 2014	Strategy: 3.1 Ensure availability and utilisation of the immediate notification tool in all health facilities	<ul style="list-style-type: none"> • Ensure the IDNS tool is available at all health facilities • Train all health care workers on the immediate notification system • Maintain and upgrade the IDNS as necessary • Establish a quarterly feedback mechanism for health facilities on malaria case reporting • Provide supportive supervision and mentoring to all health facilities on a quarterly basis • Provide IEC materials on IDNS to reinforce its use • Based on cases reported, respond rapidly to all potential malaria epidemics
	Strategy 3.2: Ensure accurate monthly reporting of malaria cases to the Health Management Information System by all health facilities	<ul style="list-style-type: none"> • Upgrade HMIS data repository to accommodate confirmed malaria cases • Provide supportive supervision and mentoring to all health facilities on a quarterly basis • Assess private sector disease reporting practices • Establish regulation through Public Health Bill to require private sector disease reporting • Supportive supervision and mentoring provided to all health facilities on a quarterly basis.
Objective 4: 100% of the population at risk for malaria is covered by effective and appropriate vector control measures by 2014	Strategy 4.1: Distribute of Long-Lasting Insecticide Treated Nets (LLINs) to population at-risk	<ul style="list-style-type: none"> • Engage and train LLIN distributors • Quantify need and procure LLINs • Distribute LLINs to targeted populations • Replace used or expired LLINs; dispose of old LLINs safely • Monitor and evaluate LLIN distribution • Conduct KAP survey on LLIN coverage and utilization
	Strategy 4.2: Conduct IRS in all targeted areas	<ul style="list-style-type: none"> • Engage and train spray operators • Secure insecticides, vehicles and equipment, and protective clothing for spray operations • Identify and define risk areas for spraying • Conduct IRS activities • Ensure safe disposal of all potentially hazardous materials
	Strategy 4.3: Conduct insecticide resistance monitoring	<ul style="list-style-type: none"> • Establish insectory for insecticide resistance monitoring • Procure bio assay and susceptibility tests • Conduct resistance testing • Adjust vector control operations based on insecticide resistance findings
	Strategy 4.4: Conduct larviciding winter in receptive areas	<ul style="list-style-type: none"> • Procure larvacide • Conduct field trials on the implementation and acceptance of larviciding at community level • Engage in community larviciding during winter months

Target	Strategy/Intervention	Activity
Objective 5: All active foci are eliminated through in-depth investigation and response by 2015	Strategy 5.1: Conduct entomological surveillance and research	<ul style="list-style-type: none"> • Establish insectory for entomological surveillance tests • Establish and maintain surveillance sites • Purchase and install window traps seasonally • Continually collect mosquito samples for analysis • Conduct LC's, NBC's, PT's, KC's, PSC's • Build in country capacity on PCR for entomology
	Strategy 5.2: Identify, investigate, classify, and monitor all suspected transmission foci	<ul style="list-style-type: none"> • Complete foci investigation guidelines • Collect and compound all data that describes suspected foci (GIS, MET, Vector, Active Surveillance) • Investigate and classify suspected foci based on transmission potential • Refer classified foci to relevant programs for management action • Maintain register foci profiles • Monitor foci and the effects of on-going interventions
	Strategy 5.3: Eliminate active foci	<ul style="list-style-type: none"> • Cover active foci with vector control interventions prior to the start of transmission season • Respond with rapid vector control in active foci where local transmission is occurring • Manage response with other technical officers to support elimination of foci (health promotion, active surveillance)
Objective 6: All confirmed malaria cases are investigated within 48 hours of notification	Strategy 6.1: Conduct case investigation for all malaria cases at the case's place of residence	<ul style="list-style-type: none"> • Train NMCP surveillance officers annually on case investigation protocols • Ensure all supplies and equipment are available for investigation • Review case investigation activities weekly and monthly and plan active case investigation strategy moving forward
	Strategy 6.2: Conduct reactive case detection around investigated cases in all receptive areas	<ul style="list-style-type: none"> • Review and revise protocol for case detection as necessary • Ensure all supplies and equipment are available and adequate for case detection • Conduct reactive case detection around index cases • Conduct follow-up fever screening in all areas with high suspicion of on-going malaria transmission • Utilize case detection to rapidly respond to potential malaria epidemics
	Strategy 6.3: Conduct proactive case detection among high risk groups and areas of where there is suspicion of on-going transmission	<ul style="list-style-type: none"> • Identify high risk groups and networks for screening • Provide screening and education at port of entry health posts during high travel volume periods • NMCP-led border screening in high travel months • Regularly screen active foci

Target	Strategy/Intervention	Activity
Objective 7: 100% of the total population exhibits appropriate health seeking behaviour for malaria by 2015	Strategy 7.1: Advocate for support of malaria elimination agenda	<ul style="list-style-type: none"> • Conduct sensitisation meetings for policy makers, members of parliament, and community leaders • Engage private sector to support malaria elimination activities • Commemorate malaria days e.g SADC and World Malaria Days
	Strategy 7.2: Mobilise communities to actively participate in malaria elimination interventions	<ul style="list-style-type: none"> • Conduct community dialogue with targeted community members • Exhibit during national and community events such as marual festival, reed dance, Incwala, imimemo • Conduct malaria elimination promotion activities in targeted communities e.g competitions, awards • Conduct malaria campaigns such as "Malaria Week-Travel Wise" "Operation- NetUprising"
	Strategy 7.3: Communicate malaria elimination messages to promote behaviour change	<ul style="list-style-type: none"> • Develop and distribute malaria IEC materials for members of the public • Disseminate malaria messages through multi-media ie mass media, website, cellphones, indoor and outdoor advertising • Develop IPC training tools for the different target groups • Train health workers on malaria IPC skills - nurses, surveillance agents, spray operators, RHMs • Update and provide feedback to RHMTs on malaria elimination activities • Conduct annual quantitative and qualitative studies on KAP)

ANNEX B: STRATEGIC PLAN REVISION - PARTICIPANTS

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