

Bhutan National Malaria Control Strategy

2008-2013

**Vector-borne Disease Control Programme (VDCP)
BHUTAN**

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The draft version was reviewed during the annual malaria review meeting 2007 and 2008 by the district health personnel and subsequently all the suggestions and amendments were incorporated. As per the recommendations of the meeting, this was further reviewed by following core group and approved by the ministry on

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The programme would like to thank all the members of the working committee and others who had contributed immensely to this publication. Their contributions will go a long way in eliminating malaria from Bhutan and making malaria no longer a threat to the public.

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Fore word

Malaria remains one of the most serious problems in the World inflicting heavy morbidity and mortality. It is estimated that at least 300-500 million people suffer from acute malaria annually, and that more than a million die. In South East Region alone, the incidence is estimated at 20 million cases per year resulting in nearly 100,000 deaths.

In Bhutan, although malaria morbidity and mortality has declined significantly over the period, there are still challenges which mandate the further strengthening of the control and prevention strategies. With the high influx of carrier population into the interior parts of Bhutan, there has been frequent out breaks leading to flaring up of malaria related morbidity and mortality. Bhutan has one of the toughest terrains in the world with 69.1% of its population living in rural areas, in very remote villages. Out of 20 districts, 10 of them have seasonal transmission (population 234,630) and malaria outbreaks are an annual feature causing high morbidity and mortality in the affected population. Five districts are endemic (population 234,633) adjoining the international borders with the state of West Bengal and Assam on the Indian side. During recent years it has been noticed that there is an increase in focal out breaks in the seasonal transmission districts. Therefore, although the present malaria situation in Bhutan is at its lowest ebb, with the constant influx of the carrier population to the interior parts of the country and climatic conditions being conducive for mosquitogenesis coupled with the tough geographical terrain make malaria to be a constant threat. If the control and prevention measures are not strengthened then malaria has the potential to rebound back with a vengeance and this could lead to an even higher incidence of morbidity and mortality.

Considering these challenges, the malaria control strategy paper for Bhutan is timely and extremely essential. I would like to congratulate the programme for the initiative and would like to wish the programme, all the best in implementing these strategies.

*Dr. Gado Tshering
SECRETARY
Ministry of Health*

From the Programme Manager

Helen Keller was once asked, “*what is worse than having no eyesight?*” Keller replied, “*having eyesight with no vision.*” Any successful programme should be guided by a clear vision for the programme and with strategies to fulfil its mandates and targets. From a vertical programme during its inception, the malaria control activities have been gradually decentralized to the districts. Since it’s established in 1965, morbidity and mortality has declined due to systemic malaria prevention and control. With such a low number of cases, the task becomes even greater and surveillance system needs to be strengthened to detect the few cases along with intensification of IEC activities so that patients with fever come to the health facility for malaria screening. Despite substantial progress, the malaria control programmes is faced with numerous constraints and challenges as mentioned below. As a result of which malaria returns annually causing deep concern to the people living in Bhutan.

Some of the challenges for malaria control and prevention:

1. Malaria is not just a public health problem but a disease related to development, social, ecological and environmental changes which needs involvement from all sectors
2. Malaria is a disease without borders and with constant influx of carrier population from across the porous border poses challenges in preventing malaria
3. Global warming and meteorological changes leading to an environment conducive to vector introduction and proliferation in non malarial areas
4. With improved transportation facilities, there are increased population movement of people with little immunity which could cause high mortality if prevention mechanism are not strengthened
5. Developmental activities without proper health impact assessment could lead to emergence and out break of vector borne diseases
6. Resistance to insecticide and anti-malaria drugs
7. Lack of human resources has always been a major issue for the programme causing impediment to the implementation of the long term sustainable strategy of the programme.

Therefore, acknowledging the above mentioned challenges, this book is being published to guide programme and district health in the prevention and control of malaria. It is by no means an exhaustive guidelines and it will require timely amendments to address the future challenges. We hope that this book will be of great use to the health workers and the collaborating partners.

Tashi Tobgay

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Executive Summary

Globally, malaria eradication programme was initiated in 1955 with remarkable success. However the disease resurged to reach a peak in the mid seventies. The resurgence of malaria lead to the realization that malaria eradication was not feasible and thereafter the eradication programme was replaced by malaria control programme. While the reported deaths due to malaria have declined and there is a slow declining trend in reported cases of malaria, the proportion of cases of *P falciparum* has increased steadily along with the problem of multi drug resistance, which has expanded geographically. Malaria threatens to maintain the poor development in the affected areas and this may serve as an impediment to economic development. In Asia, which has the highest proportion of people below the poverty line, malaria strikes in a deadly manner and maintains the people in a vicious cycle of poverty from which they are unable to come out. Effective malaria control will be possible only through a clearer understanding of malaria dynamics, an estimation of the disease burden and a realistic definition of the target population including the mapping of migrant population. These will provide the evidence, needed for effective and sustainable control.

In Bhutan, the Malaria Control Programme was established in 1965. Since then the programme has started a systematic preventive and control measures. As a result malaria cases have declined drastically over the past decade. To further achieve the MDG goals, there is a need to strengthen the preventive and control measures.

With this strengthened prevention and control measure, the programme aims to achieve the objectives.

1. Malaria at Global Context

Malaria is a significant cause of illness and death across the globe and threatens 40% of the world's population most of whom live in very poor countries. It is estimated that at least 300-500 million people suffer from acute malaria annually, and of that more than a million die. The disease is endemic in all the South East Asia Region of the WHO (SEARO) except Maldives. The incidence is estimated at 20 million cases per year resulting in nearly 100,000 deaths. However other estimates suggest that officially reported cases and deaths are 10 times less, indicating the critical need for improved methods of assessing the true burden caused by malaria in the Region.

Malaria may be perennial, or it may be seasonal or sporadic, depending on the presence of vector mosquitoes. Epidemics are often associated with the movement of non-immune people into transmission areas, and such outbreaks may be associated with a high mortality. Malaria patterns differ from region to region. In addition to the toll on human life, malaria is considered by health economists to be one of the four most common causes of poverty. People exposed to the infection may spend as much as 25% of their household income on malaria-related expenses; travel for treatment, medicines, bed nets, laboratory examinations and funerals for family members dying of the disease.

Malaria is curable everywhere and it is not an inevitable consequence of poverty. In recent years, new drugs and combinations along with new approaches to vector control have been developed.

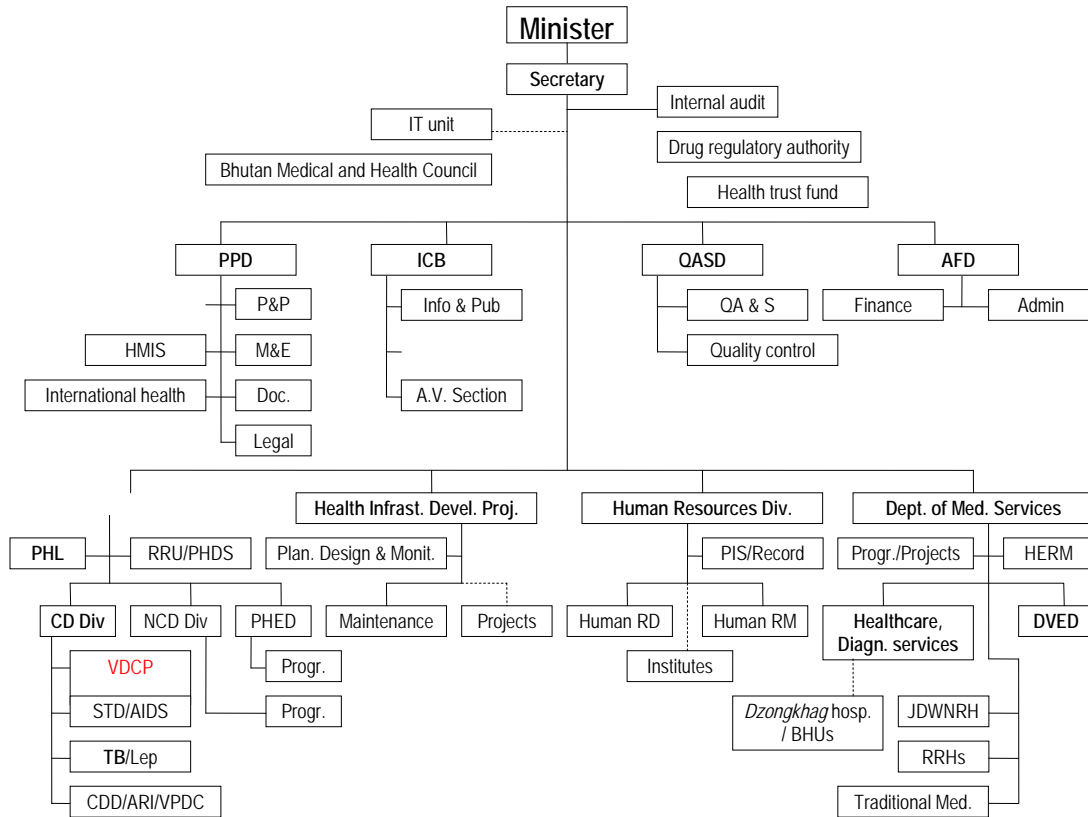
2. Bhutan Malaria Control Programme

2.1 Background

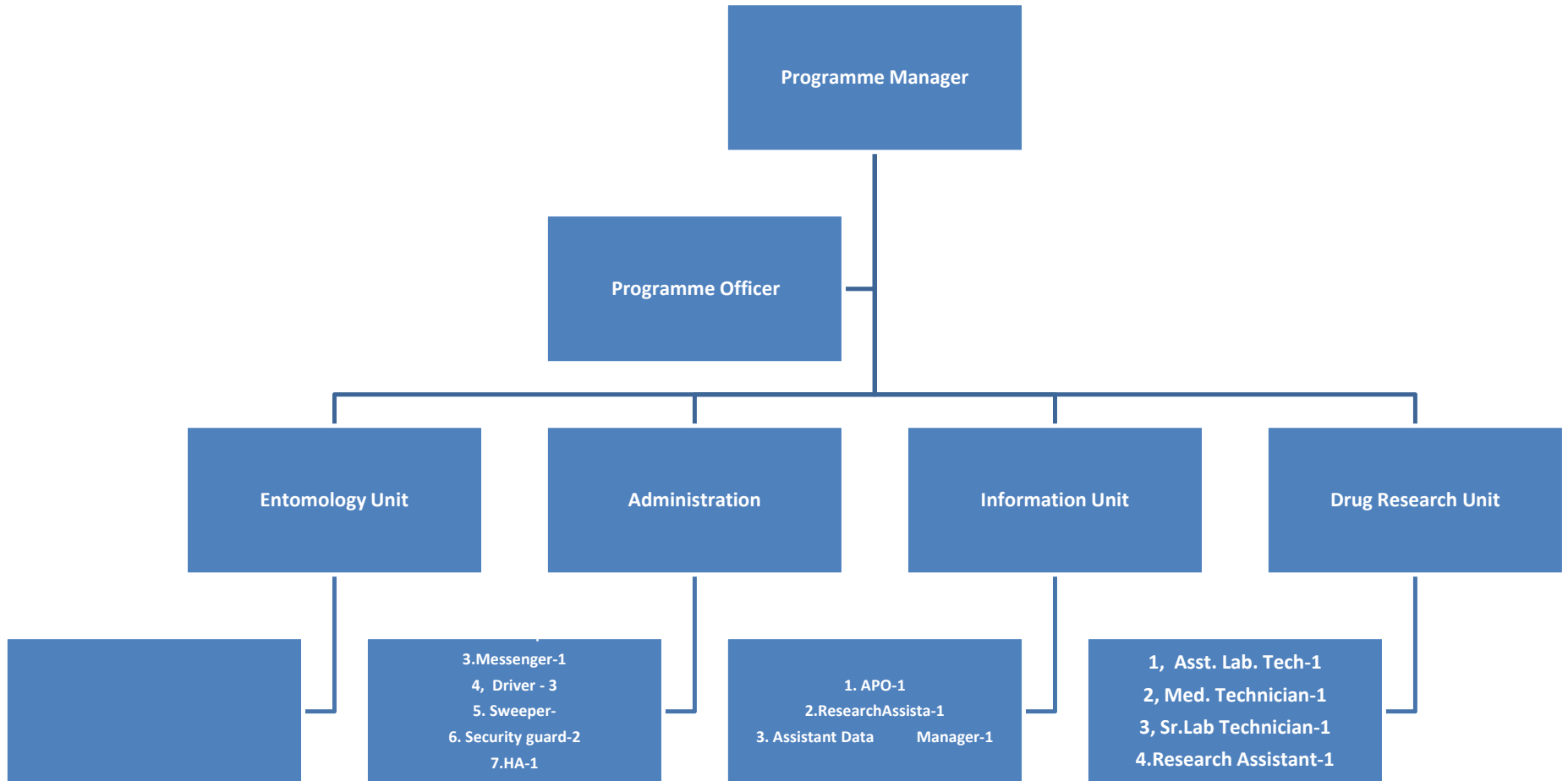
The first malaria survey was carried out in Bhutan with the technical and financial support from the government of India in 1962. This survey prompted an urgent need to control malaria in Bhutan and Malaria Eradication Programme was launched in 1964, with support from the government of India. Since, then the programme initiated a systematic control and prevention of malaria activities. However, globally it was acknowledged that malaria eradication was not possible and therefore, the programme was renamed as Malaria Control Programme in 1985. During the 9th Five year plan, noting the need to control other vector borne diseases as well, the programme was renamed as Vector-borne Disease Control Programme (VDCP) in 2003. Following, the programme within its capabilities has been actively involved in the prevention, control and management of all vector borne diseases with especial focus but not limiting to malaria, dengue, kala-azar and Japanese encephalitis. In addition the programme will also extend its activities to other vector borne diseases.

2.2. Programme Structure

The Vector-borne Disease Control Programme(VDCP) is under the Communicable Disease Division (CDD), Department of Public Health(DoPH), Ministry of Health (MoH) as shown in the following organogramme.

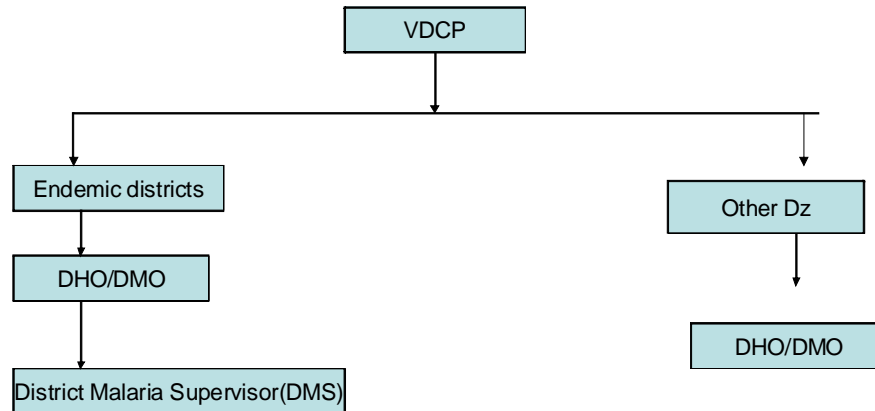


Organogram of VDCP



The programme has four units as shown in following organogram namely Administration, Information, Entomological and drug research. Currently, there are 34 staff within programme. Malaria programme is decentralised with district malaria technicians as the core person as shown in the following:

Decentralized vector Control activities

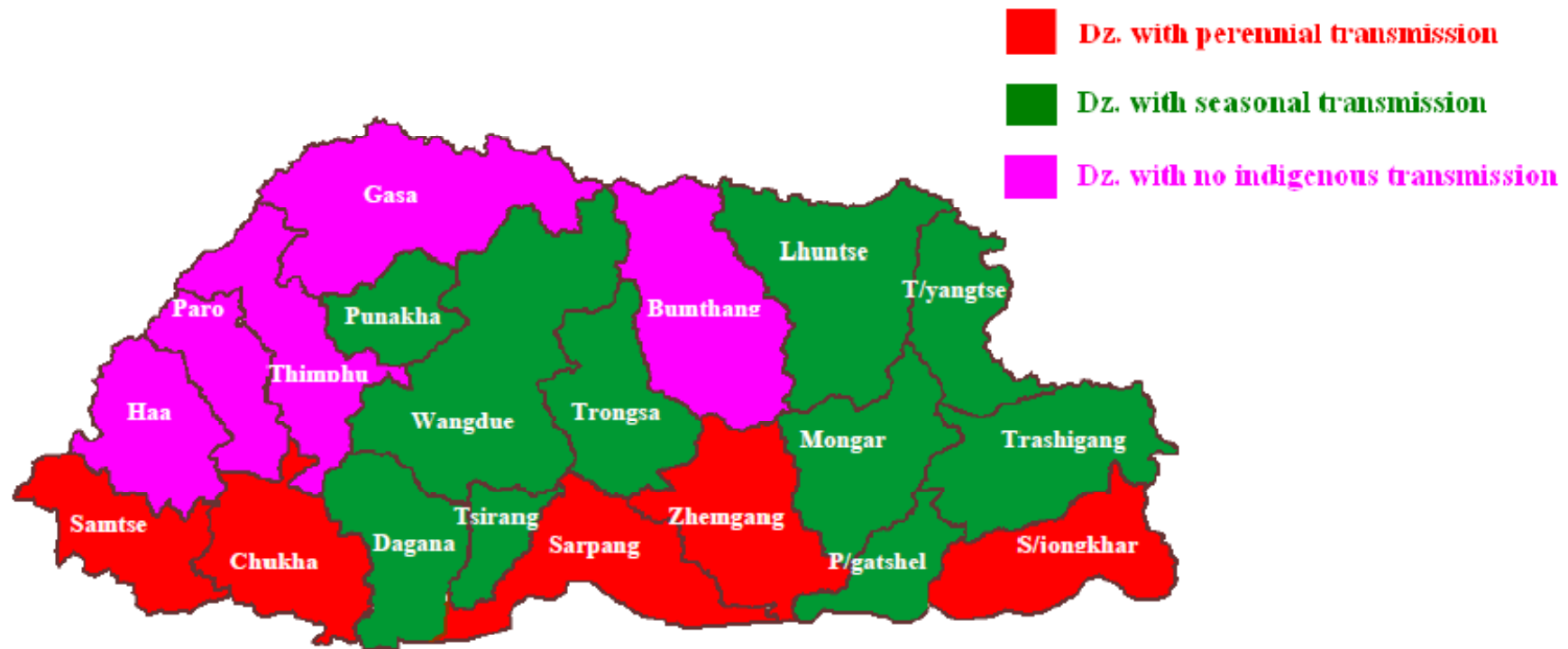


2.3. Programme Coverage

The VDCP is a central programme covering the whole country in all twenty Dzongkhags. However the focus is in the districts where the vector borne diseases are more prevalent. In terms of malaria, there are five endemic districts (Chukha, Samchi, Samdrupjongkhar, Sarpang and Zhemgang with an overall population of 234,633) and seasonal transmission district (Dagana, Lhuentse, Monggar, Pemagatshel, Punakha, Tsirang, Trongsa, Trashigang, Trashiyangtse and Wangdiphodrang, with an overall population of 234,360).

The programme has moved into an integrated community health approach with all activities well integrated with other diseases and Health assistant at the Basic health unit and the District health and the district hospital at the district level.

DISTRICT WISE STRATIFICATION OF MALARIA



Note: -

Nanglam under Pemagatshel Dzongkhag and Lhamoyzingkha under Dagana Dzongkhag falls under perennial transmission area. Inclusion of these two dzongkhags into perennial transmission will be sought during 2008 Annual Health Conference.

3. Vision, mission, objectives and targets:

Vision: Malaria no longer a cause of illness , death and a barrier to socio-economic development growth in Bhutan.

Mission: To ensure sustained delivery and use of the most effective prevention and treatment options for those affected by malaria.

Goal: To reduce malaria disease burden and help enhance socio-economic development process in Bhutan.

Objective: To prevent malaria related morbidity and mortality in the country

Targets:

- To achieve the MDG target i.e “to halt and reverse the incidence of malaria by 2015”
- Number of malaria cases reduced by 50% by 2013 from the 2005 baseline level(1825 cases)
- Reduce number of Malaria attributed death reported by the health facility to zero
- Annual parasite incidence reduced to less than 2/1000 population from the 2005 baseline (4/1000 population)
- Sustain % of household owning at least one net to more than 90%
- Sustain % of patients receiving appropriate treatment for malaria as per the treatment guideline to more than 90%

4. The control strategies

The Global Malaria Control Strategy was adopted in 1992 by the Ministerial Conference on malaria held in Amsterdam. Subsequently it was endorsed by the World Health Assembly and the UN General Assembly in 1993. In line with this and according to the WHO-SEARO scale up strategy, Bhutan malaria control strategy will be focused in following core areas:

- *Programme planning and management*
- *Prevention and control*
- *Early diagnosis and prompt treatment*
- *Epidemic/out break prediction and control*
- *Human resources development*

4.1 Programme planning and management

4.1.1. Policy

Recognising that malaria affects more than 50% of Bhutanese population and Acknowledging the need to strengthen its control and preventive measures, the Royal government of Bhutan shall

- Provide and sustain government's commitments to malaria control both in terms of budget and human resources
- Strengthen human resources both at programme and district level to meet the future mandates
- Promote and strengthen decentralization of prevention and control at the Dzongkha and further to the *Ggewogs* and *Chiwogs*
- Strengthen the surveillance system to prevent out breaks and epidemics

4.1.2. Strategies

4.1.2.1 Adopt malaria annual operational cycle as a planning guide

Malaria control programme should be more responsive to the changing dynamics of malaria, by utilising evidence based interventions. Although malaria control in Bhutan has been integrated and decentralised, the decentralisation policy needs to be further reinforced. The control programme needs to be revitalized within the context of the existing health system and mold itself to the changing needs of malaria control dynamics. All these mandates requires a strong pool of human resources both at the programme capacity and in the decentralisation process.

To promote effective prevention and control activities and foster management, the malaria prevention and control is divided into three phase; namely Preparation phase, operational phase and analysis phase. This will facilitate in making:

- Evidence-based decisions
- Early prediction & preparation
- Effective operation
- Easy monitoring and evaluation

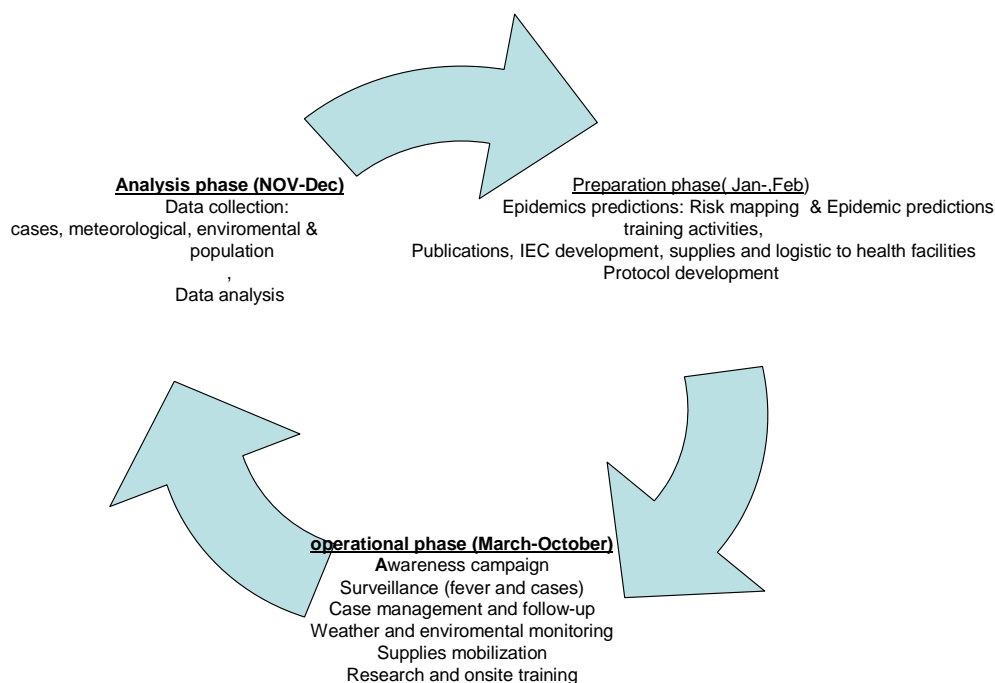


Fig 1: Figure showing the Annual Malaria Operational Cycle.

4.1.2.2 Collaborate with neighbouring states for effective malaria control in the border areas

About 8-10% of the reported cases come from across the border to avail health services within Bhutan. Due to porous border, there is a increasing need to collaborate at the local level. Therefore each district should strengthen to harmonise and collaborate with the neighbouring local governments on the prevention and control of malaria.

4.1.2.3 Strengthen collaborations with other agencies and sectors.

Malaria is not only a disease concerning health sector but cuts across the agencies and Ministeries. With the increased developmental activities, there is an ever increasing demand for increased collaborations. Hence collaboration with India, in particular, the states of Assam and West Bengal will be enhanced. The local level collaboration needs will be initiated at the district level for effective collaborations. Border collaboration could focus on information sharing, notification of cases and if possible synchronization of preventive activities at the border.

4.1.2.3 Strengthen the decentralisation of malaria prevention and control activities

In keeping with its focus on balanced regional development, based on people's participation in decision –making process, the Royal Government of Bhutan has systematically pursued the

policy of administrative and fiscal decentralisation. Taking full advantage of the decentralisation system, the malaria programme from being a vertical programme until the 1990s, has gradually decentralised to the districts. The reduction in the cases of malaria and resulting deaths in Bhutan is attributable mainly to the decentralization and integration of malaria control and prevention into the districts. By extending and taking facilities for early diagnosis and prompt treatment nearer to the communities and by deploying malaria workers in all health centres of endemic districts has also contributed to this success. During the next five years, the decentralization process will further be strengthened.

PICTURE OF ANNUAL MALARIA REVIEW

4.1.2.4 All the deaths due to malaria will be reviewed to identify possible solutions

Although mortality and morbidity are low, the case fatality rate seems to be high reflecting lower immunity among population or inability of clinicians to properly manage the case. Or it could be due to constant high % (45-50%) of pf cases indicating unstable malaria situation in Bhutan. Hence to improve the case management, all deaths due to malaria will be reviewed and health facilities should fill up the death report form and submit to the programme.

4.1.2.5 Due to low number of cases, the programme will focus on malaria transmission areas and apply area specific interventions.

Since the number of malaria cases is low, it will result in lowering population immunity as well as increasing potential outbreaks. Hence, surveillance system will be strengthened and sustained even in low transmission areas.

4.1.2.6 Strengthen monitoring and evaluation at all levels and supervisions will be conducted frequently with check list.

The information flow should be integrated well into the main health information system for easy analysis and harmonisation. However, effective malaria control demands certain specific information for the programme which is not being collected within the overall HMIS system. The ability to direct prompt focal measures depends on the program being continuously informed about the situation of malaria in space and time, therefore all reports submitted to the DHO who will send it to the programme. For further information refer to malaria monitoring and evaluation frame-work 2007.

4.1.2.7 Where ever possible to save resources and time, the malaria indicator would be pursued by integrating with other surveys.

The programme needs to be evaluated frequently in order to monitor the progress to the set target. However, to save resources and time, wherever possible some indicators could be piggy backed with other surveys conducted within ministry.

4.1.2.10 Strengthen and promote research in the field of malaria

Evidences generated from research, within Bhutan will be a important in guiding the development of the strategies and policies. Therefore, the programme will prioritise the need to conduct research but not limited to following areas:

- Investigation into drug compliance and other ethnomedical practices in the community
- Study of treatment seeking behaviour of communities

- Study of therapeutic response of currently used antimalarial (ACT) in falciparum malaria
- Study of chloroquine drug response in vivax malaria
- Study of in-vitro drug response of *Plasmodium falciparum*
- Enquiry into the impact of sub-clinical vivax malaria
- Study of prevalence of asymptomatic falciparum carriers in the community through cross-sectional surveys
- Studies on prevalence of haemoglobinopathies in different communities and their role in clinical manifestation of the disease

4.2. Prevention & Control

4.2.1. Policy

The Royal Government of Bhutan in recognizing the fact that there is no single malaria preventive measure which can solve the malaria burden at different ecological and social settings, hereby adopts the Integrated Vector Management (IVM) by integrating all the preventive measures to combat malaria.

- Introduction or change of chemicals for vector control will be guided by the WHO Pesticide Evaluation Scheme's (WHOPES) recommendations in collaboration with National Environmental Commission and Ministry of Agriculture.
- To increase advocacy on malaria, 25th April of every year will be commemorated as world malaria day
- The government shall ensure the supply of LLINs which are most effective malaria prevention through sustainable measures

4.2.2 Strategies

The control strategies for the prevention and control of malaria will be segregated into three areas due to intensity of population at risk and consequently requiring to adopt different strategies

Perennial transmission areas

4.2.2.1 With high LLIN coverage and ITBN shall be slowly phased out after proper analyses.

The programme in coordination with districts will perform complete need assessment in 2008 and based on the results LLINs will be procured with an objective to have universal coverage by LLINs to population living at risk of getting malaria. Dzongkhag health officials will project the net requirements for the communities under the respective peripheral health center based on population at risk.

The distribution will be planned by individual districts in coordination with the community leaders. The net distribution records should be clearly maintained with the signatures of the distributor from the concerned health center and the community leader involved during distribution. IEC activities will be strengthened to improve net use and care by the community.

PICTURE ON NET USE

4.2.2.2 Develop strategies for sustainable supply of LLIN

ITNs are one of the most effective methods for prevention of malaria transmission and therefore, there is a need to improve the coverage and further sustain it. The success of impregnation of community own nets will require active participation from the community. Considering the importance of ITNs as the single most preventive strategy, there is a need to develop a mechanism to further supply LLIN in

a more sustainable manner. The programme will review the current need and develop strategies to sustain the supply of LLINs in future.

4.2.2.3 Develop guideline for Focal IRS

Excessive use of insecticide for residual spray is restricted not only because of its cost implication but also in considering the impact on non target organisms and the environment.

The program will conduct timely analysis of the country's epidemiological data to judge Pf foci and mapping. The respective health centers will map out high Pf blocks/villages/areas within their boundaries that require IRS. The IRS should be used as a proactive method and not a reactive measure before the transmission season in order to achieve maximum benefit.

The effectiveness of IRS depends on the time of spray, use of correct spray pumps, on uniform application on appropriate spray surface and coverage of indoor surface area.

The programme will develop guideline for IRS including, training of sprayers, personnel protections, method of spraying and proper disposal of chemical waste.

PICTURE V: IRS USE

Criteria for the selection of areas for focal IRS should have at least one of the following:

- *Plasmodium falciparum* cases above 30% for the past three years.
- Slide Positivity Rate (SPR) above 10%.
- Annual Parasite Incidence (API) above 10 per 1000 population.
- Deaths due to malaria

IRS in selected areas should be done twice a year. The time of spray should be determined based on the epidemiological data so as to target IRS during the peak transmission month, house plastering period and agriculture timings.

The timing of IRS will remain dynamic and dates shall be fixed by the districts after seeking advice from the programme on an annual basis.

4.2.2.4 Strengthen systems for greater involvement of communities in malaria prevention and control.

The success of the programme and more importantly its sustainability will depend upon the degree of community involvement. The communities can be involved in all sectors of prevention and control such as LLIN need assessment, distribution and monitoring, Indoor residual spray, bio-environmental measures, promoting early diagnosis and treatment. The communities will be educated and informed through DYT/GYT, public gatherings on malaria prevention and control. Within the next five years, they will be equipped with appropriate IEC tools for behavioural change impact after proper need assessment, strengthen community system with formation of community action groups after proper piloting and further strengthen the village health worker as the focal health person.

“Although bridges, latrines, and laundry sites can indeed be built, with-out (behavioural) studies there are no assurance that these facilities will be used (and much experience to show that they may not be). Any effort to change human behaviour must rest on such studies. Without them there is little point in proceeding with expensive manipulation of the environment. (Dunn, 1979:503)

..... for successful malaria control, whether today or tomorrow, people's participation is absolutely essential, and in future, much will depend on the community-will". Sharma & Mehrotra, 1986: 844, as cited in the behavioural and social aspects of malaria and its control, H. Kristian Heggenhougen, veronica Hackethal et al. TDR/STR/SEB/VOL/03.1)

4.2.2.5 In the light of disadvantages of larviciding as vector control; the programme will perform the need assessment for larviciding.

Immature stages (eggs, Larvae and pupae) of mosquitoes are aquatic. The eggs and pupae are non-feeding stages whereas larvae are voracious feeders and hence the larval stage is more susceptible to chemicals, natural enemies and environmental changes.

Various methods are targeted against the larval stages. Widely used measures include larviciding with less toxic chemicals, introduction of larvivorous fishes and by environmental management. Larviciding with organophosphate has also been used and was introduced a long time ago in urban and semi-urban areas.

In Bhutan, Larviciding with temephos (Abate) was carried out in urban areas usually in drains and other water collections since 1990. Due to better tools in the prevention and control of malaria such as use of LLIN, a concern was raised both by the local experts and the international consultants about the real benefit of the larviciding especially since it involves high cost and resources and also use of chemicals. Therefore, the programme will review the larviciding need as the vector control measures considering the cost benefit analysis.

4.2.2.6 Environmental management, emphasizing mosquito source elimination and prevention of man-made mosquito genic environment in both urban and rural settings

Environmental approaches for disease prevention are considered holistic as there is no adverse effect on the environment. In addition, there are also multiple benefits, for instance the overall cleanliness of towns not only prevent vector-borne diseases but also many other air-borne and water-borne diseases. Generally, disease prevention through environmental management is divided into two sub-headings namely; environmental modification and environmental manipulation.

The environmental modification entails high expenses initially but once implemented maintenance cost is low and therefore in the long run is sustainable. For example; construction of mosquito free drainage or storm rain water drainage system in urban areas, reclamation of marshy areas or canalizing and mosquito proof housing pattern. These generally require strong commitment by the communities and authorities.

Environmental manipulations involves less initial costs but require recurring activities. For example, removing vegetation from irrigation channels to increase water velocity, filling depressions with sand, cleaning blocked drains, disposing empty containers properly. These activities can be initiated regularly at the community, family and individual level without much cost.

PICTURE ON DRAINAGE

Mechanisms for Environmental Measures

I. Urban areas

Urbanisation without proper drainage system, influx of people from rural to urban areas, lack of adequate water supply, all create a mosquito genic surrounding leading to urban malaria and spread of other vector borne diseases such as dengue. Preventive measures such as drain construction, requires astronomical sums of financial resources which is often

unavailable in developing countries. Therefore, considering the budgetary provisions, environmental measures will be undertaken as a complimentary preventive measure.

Collaborative efforts will be sorted jointly by the programme and respective district authorities. Following agencies will be the stakeholders in urban areas: Municipal/City Corporation, corporations, business communities, health agencies, VDCP, institutions, associations, Uniformed Personnel etc.

ii. Rural areas

The Dzongkhag health agency jointly with the peripheral health centers should motivate community leaders to form village community Action Groups (CAG) under the leadership of local leaders who will then organize mosquito source removal. The campaigns will include solid waste disposal, draining of stagnant water, collected within and around villages, weeding irrigation channels that pass through the village and filling of depressions with gravels and sand etc. Respective BHU will also carry out possible breeding site mappings during rainy seasons and notify the committee leaders in advance for appropriate action.

4.2.2.7 Commemorate 25th April as World malaria day to increase awareness and advocacy

The 16th World Health Assembly resolved that “world malaria day shall be commemorated annually on 25th April, or on such other day or days as individual members states may decide in order to provide education and understanding of malaria as a global scourge that is preventable and a disease that is curable”.

Consequent to this, the ministry has approved 25th April to be observed as the World Malaria day in Bhutan. This was commemorated for the first time in Gelephu on 25th April 2008, with Global Theme “Malaria-A disease without borders”. All the relevant district health people participants on that day with Dasho Dzongdhag of Sarpang dzongkhag as chief guest. For the subsequent years such days will be commemorated at the district level with budgetary support from the programme. Some of the suggested activities are: exhibition, rallies, seminars, distribution of IEC, talk shows, press releases, awareness at community.

PICTURE ON WORLD MALARIA DAY 2008

Seasonal transmission areas

4.2.2.8 LLIN coverage in epidemic prone areas

The use of ITNs is promoted and especially provided to areas prone for epidemics or likely to become epidemic areas because of seasonal transmission.

Some of the fringe areas with frequent movement and where malaria cases are imported are also to be provided with mosquito nets with at least one net per household. This is done to enable them to carry their nets during their travel to transmission zones. Other innovative measures for effective prevention can be designed locally.

4.2.2.9 IRS during outbreak or as per set criteria as in endemic districts

Spraying may prevent the occasional severe malaria epidemics but these regular spraying may represent unnecessary wastage of often scarce resources. Using the malaria incidence of the health facility during the previous transmission season, as a rough guide, decisions can be made regarding IRS but it can be misleading sometimes. However, Indoor residual spray

is carried out wherever there is a focal out breaks. pf cases are followed on an individual basis and interventions performed immediately.

4.2.2.10 Environmental management where ever necessary

Bio-environmental management will be employed as complimentary preventive measures even in the seasonal transmission areas. However, such a measure will be implemented only after careful analysis of cost benefit and future sustainability.

4.2.2.11 Strengthen awareness and advocacy

Awareness creation about primary prevention and control of malaria is one of the important strategies in malaria control. At present IEC is carried out using conventional methods such as leaflets, billboards and awareness creation on radio and television. IEC activities need to be strengthened with focus on changing people's behaviour especially in using nets and adopting other preventive measures. During the next five years, the programme will intensity IEC activities and appropriate tools will be developed after proper need assessment.

Other vulnerable population

Other groups of population include:

- Mobile population of non- immune groups entering into malaria transmission areas
- Mass gathering in the malaria endemic area
- High immune expatriate labourers (who intend to reside in the country overnight)

Strategies for these groups include:

4.2.2.12 Awareness campaigns

During religious festivals and other important occasions, people from various communities gather together. At these gatherings there are people from non malarious areas who are at higher risk for the reasons stated above. Therefore following prevention activities will be conducted for the public:

It is very important that the public is aware of the malaria risk. Therefore wherever there are mass public gathering, especially involving people from non malarious areas, leaflet distribution, briefing on malaria and other awareness campaign will be conducted. People will be encouraged to use insecticide treated mosquito nets and if people buy untreated nets they will be treated with the insecticide.

PICTURE WITH IEC

4.2.2.13 Provision of LLIN to communities living in malaria fringe areas

Considering the overall objective of universal coverage with ITNs and considering that majority of the population would stay in the hotels and guest houses during travel, all of them need to be protected with long-lasting insecticide treated bed nets. The modalities of how these can be supplied will be studied and implemented accordingly.

For the rural community dwelling in fringe areas and who needs to frequent to the lowland malarious areas for agriculture purposes or for commercial purposes, LLINs will be provided. However, modalities of distribution, quantity to be distributed and net use monitoring will be worked out by the districts in co-ordination with the programme.

4.2.2.14 Larviciding in the mosquito flight range if needed after entomological assessment during mass gathering

Entomological surveillance by the programme will also be intensified and appropriate actions taken to prevent focal outbreaks. One of the activities to be initiated is lowering the mosquito density by controlling the breeding sites. Hence it is required larviciding in the mosquito flight range will be initiated.

4.2.2.15 Screening of cases for expatriate labourers

With the developmental activities progressing rapidly in the country, there are an ever increasing number of expatriate labourers entering into the country, especially for the construction industry. These labourers are mostly from the bordering areas with high immunity and massive carrier population. Since these groups of population travel to the interior parts of the country, there is a greater chance of introducing the parasite into the interior valleys where presence of vectors exists. This could lead to outbreaks within the locality. Hence, it is necessary to prevent influx carrier population. The programme will strengthen the screening procedures after proper discussion with border hospitals and the department of medical services.

4.2.2.16 Chemoprophylaxis will not be promoted

The National Drug Committee did not recommend the use of chemo prophylaxis in Bhutan considering the frequent movement of Bhutanese population into malarious risk areas, risk of developing drug resistance, troubles in taking prophylactic medication, The people should instead be advised to use preventive measures.

4.3.1. Early diagnosis & Treatment

Malaria case definition:

A case of Malaria is one that is microscopically confirmed for the presence of plasmodium falciparum (pf) or plasmodium vivax (pv) in peripheral blood film or by positive rapid diagnostic test.

4.3.2 Policy

- The Royal government of Bhutan shall provide anti-malarial drugs free of cost to all citizens of Bhutan. The anti-malaria drug selection will be done by the National Drug committee (NDC) based of efficacy, safety, suitability and cost effectiveness. All health workers shall prescribe the anti-malaria drugs as guided by the standard treatment guideline of the Royal Government of Bhutan.
- The Royal Government shall ensure the quality of anti- malarial drugs.
- To improve the appropriate use of anti- malaria drugs and to prevent development of drugs resistance, the treatment shall be guided by laboratory findings either through microscopy or Rapid Diagnostic Test (RDT)
- The Government shall ensure that these basic diagnostic facilities are available throughout the country and that services are available around the clock

4.3.2. Strategies

Diagnosis

4.3.2.1 Strengthen advocacy to promote early diagnosis and prompt treatment within 24 hours of onset of fever and within one hour upon arrival to health facility.

Malaria is a disease of poverty... Because ignorance, apathy, lack of means or access to medication often prevent them seeking help early enough, the most serious manifestations of tropical diseases are invariably seen among the underprivileged. Reuben,1993:473 as cited in the behavioural and social aspects of malaria and its control, H. Kristian Heggenhougen, veronica Hackethal et al. TDR/STR/SEB/VOL/03.1)

All malaria affected Dzongkhags will make micro plans involving the peripheral health centres in-order to determine their catchment areas and understand the need of the people for providing early diagnosis and prompt therapy. In Bhutan, malaria prevalent areas have one of the most difficult terrains, which are usually cut off from the health facilities during the summer season when the malaria transmission is at its highest. While making such micro-plans, special focus should be provided to those areas which are hard to reach during the peak malaria transmission and develop strategies on mitigating these problems so that people get timely treatment. The 'hard to reach areas' will be properly mapped and appropriate strategy developed to improve services.

Involving Community for early diagnosis

Community system should be strengthened to promote EDPT. IEC activities will be intensified among the communities using community leaders, village health workers (VHW), Non Formal Education Instructors (NFEI) and local healers emphasizing the importance of early diagnosis and treatment. This is especially important for fevers and people must be encouraged to seek treatment within 24 hours of onset of fever. In this way fever cases will refer themselves or get referred to health facilities for EDPT. The districts should also utilise innovative measures for promoting early diagnosis.

In perennial transmission areas and those with recent history of travel to malarious areas it is mandatory for all health workers to take blood smears for malaria microscopy or do RDT for all fever cases to diagnose malaria. The report should be available and treatment provided to the patient within 1 hour.

One of the village health workers in a malarious area said "in my village, one child was brought to me due to fever; I gave some paracetamol and asked the mother to take child to the health centre; on the following day, during my regular visit to the village, I still found the child sick in the village and parents were busy performing 'rimdoo' ". Tashi Tobgay, 2007-Research on barriers to EDPT.

As one mother reiterated when referring to convulsions in children: 'we know what we can treat ourself and what you can treat for us'. Mwenesi 1994: as cited in the behavioural and social aspects of malaria and its control, H. Kristian Heggenhougen, veronica Hackethal et al. TDR/STR/SEB/VOL/03.1)

PICTURE WITH MICROSCOPE

4.3.2.2 A proficiency test (e.g send blinded positive and negative test to malaria technicians to read and report back to VDCP) will be conducted on an ad-hoc basis in malarious districts

Currently 10% of negative slides and 25% of the positive slides are sent for checking at VDCP in Gelephu. However, in view of the low malaria incidence, the external review of the programme

conducted in 2007 noted that the existing cross checking is not the best way to monitor the efficiency of malaria technicians. Consequently it was recommended that proficiency test to be conducted on an adhoc basis. There fore the programme will perform the proficiency test to assess the technicians and trainings imparted to those in need.

4.3.2.2.1 Quality control system for both RDT and microscopy to be established

To improve the quality of the diagnostic facilities, the programme shall develop the malaria diagnostic quality assurance system and training will be imparted to all laboratory technicians. The quality control system for the RDT will also be developed and strengthened.

Treatment

4.3.2.4. To reduce the case fatality, all pf cases need to be admitted in the health facility and treatment shall be provided as directly observed therapy (DOT)

All malaria cases (Pf and Pv) that are diagnosed will be treated immediately after the confirmation by blood microscopy or RDT. If the RDT shows positive for pf, the laboratory technician should confirm with microscopy slide examination and to rule out the mixed infection. To reduce drug resistance and to prevent complications, the following steps should be taken:

- Admit all Pf cases for the initial first 3 days to ensure compliance to the present drug regimen and to reduce case mortality.
- The pf cases should have blood examination done on completion of treatment to ensure parasite clearance to prevent further transmission.

PICTURE OF PATIENT EXAMINATION

4.3.2.5. Strengthen strategies for drug compliance especially for vivax therapy

Pv cases constitute about 50% of the malaria cases in Bhutan. Although it hardly causes severe malaria, it cause equally debilitating condition. Hence equal importance will be provided to the prevention and control of pv cases. Unlike pf treatment, pv cases need to be treated with 14 days therapy with primaquine where compliance could be a major proble. Hence the programme within the next five years will strengthen strategies on improving the patient compliance.

4.3.2.6. Collaborate and support DRA and DVED to ensure quality anti-malaria drugs

All anti-malaria drugs used in the country are of good quality since it is procured from companies which conform to the WHO-cGMP standards. Currently there is not many drug retailers to have major problems. However, to prevent the future problems, there is a need to establish a quality assurance system for ensuring the quality of drugs. For this programme will collaborate with DVED and DRA. A Minilab will be procured and provided to the DRA and relevant staff will be trained on drug quality assurance, store management, good dispensing practice, and rational use and pharmaco-vigillance of anti-malaria drugs.

Drug research

4.3.2.7. Strengthen therapeutic efficacy study

The programme will monitor the therapeutic efficacy of the anti-malarial drugs regularly by using standard guideline (*Annexure-II*) and the data will be collected from the sentinel sites. At present there are five sentinel sites namely: Sarpang Hospital, Sipsoo Hospital, Lhamoizingkha BHU I, Jomutsangkha BHU and samdrupjongkhar Hospital. These health facilities are selected based on case load although the health facility may be altered to get required sample size. The selected site should have at least one person trained on drug

therapeutic efficacy study and the other basic facilities required for the study (Microscopic, computer and required stationery). The programme will facilitate in budgetary and supply of equipment to these facilities.

The therapeutic efficacy findings from these sentinel sites will be submitted to the NDC, who will decide on the need of any treatment change based on the WHO criteria. WHO has four periods leading to drug Policy change:

- "Grace period" when clinical failure rates are between 0%-4%;
- "Alert" when they are between 5-14% ;
- "Action" between 15-24% and finally
- "change" when they are above 25%.

However, changes in the treatment schedule may be considered even before the high levels of treatment failure are reached.

4.3.2.8. Strengthen patient follow-up for both pf and pv cases

In view of the low number of cases, both pf and pv cases will be followed. However due to lack of resources the follow up will be as per following:

Considering the human resource and the cost benefit, the pf follow-up shall be done only during the following situations:

- First pf case in the locality. Subsequent cases are considered new if a case occurs after 14 days. This is as per the sporogony period of the mosquito.
- Upsurge of cases within the locality as compared to the previous years
- In outbreak situation

To reduce further spread of disease within the locality, the health person should visit the focal areas of pf using the form "PF patient follow-up report" as soon as the patient is diagnosed as pf. The pf follow-up should be done by health facility using a pf follow-up form as indicated in the malaria indicator frame work.

Although plasmodium vivax is not a major cause of case fatality, it is none the less causes high morbidity and debilitating condition among individual and the community.

Hence community surveillance of pv should be done if there is recurrence of pv in the locality. The objectives are to:

- Improve drug compliance
- Monitoring breeding sites
- Monitor transmission surveillance in the locality

4.3.2.9. Strengthen therapeutic efficacy study by adding PCR/ molecular marker

In order to strengthen the current therapeutic drug efficacy monitoring the programme will add in-vitro test and PCR/molecular marker.

4.4. Epidemic predictions & control

An epidemic is an acute exacerbation of disease that is out of proportion to the normal to which the community is subject to in a given place and time OR the malaria caseload exceeding the capacity of the existing health care facilities to handle it.

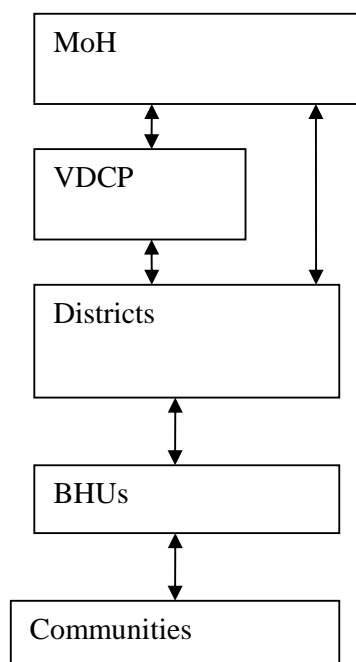
4.4.1. Policy

Recognizing the importance of preventing epidemic, the Royal government shall provide top priority in the prevention of epidemics and provide full support to contain the epidemics in terms of resources

4.4.2. Strategies

4.4.2.1. Strengthen epidemic prediction system to prevent future out breaks and epidemic.

There is no doubt that active epidemiological surveillance system and collection of good information is important in malaria risk mapping and epidemic prediction. The programme will initiate the development of an epidemic prediction system based on the risk factors such as meteorological variables, morbidity and mortality, entomological variables and socioeconomic variables. The programme will also strengthen out break system. The following communication flow will be used as a guide. The rumour of out break in the community will be investigated by the BHU and submit report to the dzongkhag authority. The dzongkhag health office will verify and inform the programme and ministry accordingly and necessary actions will be implemented urgently. The communication systems will also be strengthened through provision of computers and fax machines. The information system strengthening will be co-ordinated under the health information system development i.e fax machines provided by HIV/AIDS programme will be used for all disease surveillance system.



4.4.2.2. Enhance capacity in data analysis and to address focal out breaks at all levels with special focus at districts and BHUs.

Currently the BHU staff donot have the capacity to perform data analysis and investigate out breaks. In order to fully utilise the data collected and enable the health facilities to be more responsive and improve control interventions, the programme will strengthen capacity in data analysis at all levels especially at districts and basic health units.

4.4.2.3. Stratify malarious areas at micro level.

Currently malaria cases are reported according to the health facility where treatment is sought without much information on where the disease was acquired and hence there is no system for case classification. For the nation, the country is divided into perennial and seasonal transmission and this does not reflect the true malaria transmission areas. Therefore in order to identify the exact location of malaria transmission for better targeting of control activities, especial vector control, the malaria case will be investigated with regard to the possible place of transmission (i.e places where the patients stayed 2-3 weeks before the onset of symptoms). Case classification will be performed in all confirmed cases. Modern technology such as GIS and health mapper will be utilised for stratification and identification and understanding the foci.

4.4.2.4. Contain epidemics and focal out breaks

The VDCP under the guidance of ministry will develop guidelines for the containment of epidemics and focal out breaks.

4.5. Human resources

“Human resources for malaria and Vector-borne disease control are key issues. In view of the future upgradation of the vector borne disease control programmethere is an urgent need to develop human resources..”. Bhutan malaria control programme review, SEA-MAL-248.

4.5.1. Policy

To ensure effective malaria prevention and control, the Royal Government will provide priority in developing adequate, competent and skilled human resources at all levels.

4.5.2. Strategies

4.5.2.1 A comprehensive training need assessment will be performed to cover both pre-service and In-service.

The technical capacity of the VDCP and the districts are limited. The malaria technicians have provided immense input in the prevention and control of malaria in Bhutan. It has to be appreciated that it is their sole input which has lead to the current success in the malaria prevention and control. Hence a comprehensive analysis of the human resources both at the central and the district has to be assessed keeping in mind, the requirement to upgrade the current malaria technicians. The assessment will include both at the pre-service and in-service level keeping in mind the requirements of the future mandates. The core areas that will be provided priority within the next five years are entomology, epidemiology, social science, tropical medicine and drug researcher.

4.5.2.2. Explore and strengthen private sector for supporting and sustaining malaria prevention and control activities.

Although, currently the role of private sector is limited, there is an immense potential where private agencies can play an important role in the prevention and control of malaria. Hence the programme will identify potential areas where private sector can play a part. The potential areas may include LLIN distribution and social marketing, Indoor residual spray, IEC activities etc.