Human Resource Capacity to Effectively Implement Malaria Elimination in Ethiopia

**Included:**
- Description of a health system problem
- Viable options for addressing this problem
- Strategies for implementing these options

**Not included: recommendations**
This policy brief does not make recommendations regarding which policy option to choose

**Who is this policy brief for?**
Policymakers, their support staff, and other stakeholders with an interest in the problem addressed by this policy brief

**Why was this policy brief prepared?**
To inform deliberations about health policies and programmes by summarizing the best available evidence about the problem and viable solutions

**What is an evidence-based policy brief?**
Evidence-based policy briefs bring together global research evidence (from systematic reviews*) and local evidence to inform deliberations about health policies and programmes

*Systematic Review: A summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise the relevant research, and to collect and analyse data from this
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Suggested citation

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The Ethiopian Health and Nutrition Research Institute is a technical arm of the Ministry of Health of Ethiopia with the mission of protecting and promoting health of the Ethiopian people by addressing priority public health and nutrition problems through problem-solving research, public health emergency management, establishing and maintaining quality laboratory system. www.ehnri.gov.et

The Evidence-Informed Policy Network (EVIPNet) promotes the use of health research in policymaking. Focusing on low and middle-income countries, EVIPNet promotes partnerships at the country level between policymakers, researchers and civil society in order to facilitate policy development and implementation through the use of the best scientific evidence available. www.evipnet.org
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Preface

*The purpose of this report*

The purpose of this report is to inform deliberations among policymakers and stakeholders. It summarises the best available evidence regarding human resource capacity building as well as staff motivation as policy options for developing the capacity to effectively implement the proposed malaria elimination strategy in Ethiopia.

The report was prepared as a background document to be discussed at meetings of those engaged in developing policies for malaria elimination and people with an interest in those policies (stakeholders). In addition, it is intended to inform other stakeholders and to engage them in deliberations about those policies. It is not intended to prescribe or proscribe specific options or implementation strategies. Rather, its purpose is to allow stakeholders to systematically and transparently consider the available evidence about the likely impacts of different options for building the human resource capacity for malaria elimination.

*How this report is structured*

The executive summary of this report provides key messages and summarises each section of the full report. Although this entails some replication of information, the summary addresses the concern that not everyone for whom the report is intended will have time to read the full report.

*How this report was prepared*

This policy brief brings together global research evidence (from systematic reviews) and local evidence to inform deliberations about building the human resource capacity for malaria elimination. We searched for relevant evidence describing the problem, the impacts of options for addressing the problem, barriers to implementing those options, and implementation strategies to address those barriers. We searched particularly for relevant systematic reviews of the effects of policy options and implementation strategies. We supplemented information extracted from the included systematic reviews with information from other relevant studies and documents. (The methods used to prepare this report are described in more detail in Appendix 1.)

*Limitations of this report*

This policy brief is based largely on existing systematic reviews. For options where we did not find an up-to-date systematic review, we have attempted to fill in these gaps through other documents, through focused searches and personal contact with experts, and through external review of the report.

Summarising evidence requires judgements about what evidence to include, the quality of the evidence, how to interpret it and how to report it. While we have attempted to be transparent about these judgements, this report inevitably includes judgements made by review authors and judgements made by ourselves.
**Why we have focused on systematic reviews**

Systematic reviews of research evidence constitute a more appropriate source of research evidence for decision-making than the latest or most heavily publicized research study (Mulrow, 1984; Bero 1997). By systematic reviews, we mean reviews of the research literature with an explicit question, an explicit description of the search strategy, an explicit statement about what types of research studies were included and excluded, a critical examination of the quality of the studies included in the review, and a critical and transparent process for interpreting the findings of the studies included in the review.

Systematic reviews have several advantages (Lavis et al 2004). Firstly, they reduce the risk of bias in selecting and interpreting the results of studies. Secondly, they reduce the risk of being misled by the play of chance in identifying studies for inclusion or the risk of focusing on a limited subset of relevant evidence. Thirdly, systematic reviews provide a critical appraisal of the available research and place individual studies or subgroups of studies in the context of all of the relevant evidence. Finally, they allow others to appraise critically the judgements made in selecting studies and the collection, analysis and interpretation of the results.

While practical experience and anecdotal evidence can also help to inform decisions, it is important to bear in mind the limitations of descriptions of success (or failures) in single instances. They can be useful for helping to understand a problem, but they do not provide reliable evidence of the most probable impacts of policy options.

**Uncertainty does not imply indecisiveness or inaction**

Many of the systematic reviews included in this report conclude that there is “insufficient evidence”. Nonetheless, policymakers must make decisions. Uncertainty about the potential impacts of policy decisions does not mean that decisions and actions can or should not be taken. However, it does suggest the need for carefully planned monitoring and evaluation when policies are implemented (Oxman et al., 2010).

“Both politically, in terms of being accountable to those who fund the system, and also ethically, in terms of making sure that you make the best use possible of available resources, evaluation is absolutely critical.” (Julio Frenk 2005, former Minister of Health, Mexico in Moynihan et al., 2008)
Key messages

The Problem:
The lack of adequately trained human resources and personnel attrition are major challenges to effectively implement the planned multi-faceted malaria elimination by 2020 strategy in Ethiopia. Although a reduction in malaria incidence has been observed in the last 3-4 years, maintaining this success and achieving the malaria elimination goal with the present human resource profile will be impossible. A clear strategy for developing the capacity of the health workers in general, and malaria experts in particular, and retaining and motivating staff are crucial for malaria control and elimination.

Policy Options:

Implementing 1. In-service training, 2. Recruiting and training of malaria specialists, 3. Implementing attractive motivation and retention packages

1. Large scale training of health personnel and specialized malaria experts and their deployment may improve the critical shortage of malaria personnel.
2. Providing both financial and non-financial incentives could potentially improve the motivation and retention of malaria experts.

The costs and cost-effectiveness of all options are not certain.

Implementation strategies:

A combination of strategies is needed to effectively implement all three options.

- Better use of existing resources through coordination of governmental and non-governmental initiatives, and resource mobilization (i.e. through a national consensus and clear commitment to eliminating malaria, applying for additional funds from donors and reallocating public funds) are needed to build capacity at various levels to tackle malaria elimination.
A national policy is needed for the use of incentives. A mechanism to ensure that incentives that are used do not adversely affect other programmes or create undesirable inequities across different cadre of health workers should be put in place.
The problem

Background

Malaria is one of the major public health problems in Ethiopia. Predominantly, the disease occurs in the form of epidemics with high case fatality (Ghebreyesus et al., 2006; Negash et al., 2005).

At present, however, as a result of huge scale-up in malaria prevention and control since 2005 there is a sustained reduction in both cases and malaria related deaths even during the peak of transmissions seasons (Otten et al., 2009). Encouraged by the results of the previous strategy and by the global interest in malaria elimination (WHO, 2008b), Ethiopia is now planning to sustain and consolidate the gains so far to move towards malaria elimination by 2015 in areas of unstable malaria transmission and in the whole country by 2020. There is a strong political commitment by the government of Ethiopia to eliminate malaria.

However, there is an enormous shortage of expert capacity and adequate human resources at all levels. Ethiopia is one of the 57 countries in the world with a very critical shortage of health workers. There are only 2.0 physicians per 100,000 people (IGHWA, 2008) and about 0.2 health worker per thousand population (Girma et al., 2007). Besides the shortage of different types of health workers, there is also inequitable distribution of professionals among regions, urban and rural settings, and governmental and non-governmental organizations (Girma, et al., 2007).

Within the health sector malaria control has suffered the worst in terms of loss of skilled manpower over the years. Malaria control used to be a vertical program responsible for the whole country, but in 1993 the already few technical personnel were distributed among the nine regions; this left the regional health bureaus with meager technical and managerial staff to effectively control malaria in their respective regions. Since then the shortage of malaria experts has remained a critical problem. Other factors include attrition due to very low salaries in the civil service and lack of a succession plan to replace seasoned experts in malaria. For instance, a case study in Oromia regional state regarding malaria professionals has shown that all malaria technicians trained in the 50s and 60s have not been replaced and the National Malaria Training Centre has stopped training since the 1970s (Deressa et al., 2003) due to the decentralization scheme in 1993. Given the prevailing situation of acute shortage of malaria expertise it would be difficult to achieve the goal of eliminating malaria by 2020.

With this background, extensive discussions with the Technical Working Group involving the Ministry of Health identified the need for a policy brief on the acute shortage of human resource the Ministry is facing in light of the malaria elimination strategy that the country is planning to launch. The critical problem of a shortage of human resources for malaria control was highlighted more than a decade ago (Kitaw et al. 1998).
Hence, this policy brief was prepared to advise the ministry of health on policy options to address the need for skilled health workers to achieve the malaria elimination goal.

Size of the problem

Sixty-eight per cent of the total Ethiopian population is at risk of malaria infection (MOH, 2000). It has been reported that malaria is the major cause of death in rural Ethiopia (Dressa et al. 2007). This is where more than 85% of the total population resides. In 2007–2008, malaria was the top cause of outpatient visits and admissions, with 12% of all visits and 10% of admissions (MOH, 2008). Moreover, in light of the envisaged malaria elimination strategy, the need for additional human resources is eminent. However, specialized and mid-level malaria expertise has been dwindling over the last few decades, particularly people with entomological expertise, because of retirement or being transferred to other health services without trained persons to replace them (Kitaw et al., 1998).

Factors underlying the problem

Reasons for the shortage and maldistribution of health workers with the necessary expertise to control or eliminate malaria include a failure to replace the vertical control program with a viable alternative, inadequate motivation and retention of health workers, lack of a malaria control training centre, and lack of a succession plan for people with malaria expertise.

The vertical malaria control program was not replaced with a viable alternative after decentralization in 1993.

There was no national program to control malaria in Ethiopia until 1959. Since 1959 the malaria program in Ethiopia has undergone various reforms, including the Malaria Eradication Service (1959-1970), Malaria Control Program (1971-1978), Division for Malaria Control (1979-1985), and Malaria and Other Vector-Borne Diseases Organization (1986-1993). After the dissolution of the Malaria Eradication Service malaria control in Ethiopia lost its structural strength and manpower in the subsequent reforms and finally in 1993 decentralization and integration led to malaria control workers being distributed among the federal states without an organizational structure capable of staff development, deployment and guidance. Subsequently, the ministry of health lost experienced malaria workers due to retirement, attrition or promotion to other fields of work leaving malaria control activity understaffed in the country (Kitaw et al., 1998).

Lack of adequate motivation and retention mechanisms

A key constraint in African health systems is the lack of properly trained and motivated health workers and retention mechanisms (Willis-Shattuck, 2008). The disparity between salaries of civil servants and people working for non-governmental organizations in Ethiopia is large. This has drained people out the ministry of health in general and the malaria control program in particular. Malaria experts were excluded from the 1997 and 2001 changes in career structure that were intended to benefit health professionals, and the incentives were
not enough to retain and motivate other health professionals. Nonetheless, this affected negatively the morale of malaria experts and encouraged malaria experts to shift to administrative roles rather than malaria control in an effort to benefit from the changes in career structure (Deressa, et al., 2003).

**Lack of a dedicated malaria control training center**

The Malaria Eradication Service training centre stopped training in the 1970s (Kitaw, et al., 1998). Since then very few training activities for malaria experts have been carried out in Ethiopia (Deressa, et al., 2003).

**Lack of skill transfer or succession plans**

Experienced malaria technicians who were trained in the 60s were not replaced as their number dwindled over decades due to retirement and death (Deressa, 2003).
Policy options

The Ethiopian national malaria control strategic plan for malaria prevention, control and elimination (2010-2015) has indicated the importance of trained professionals as well as improved training for the existing work force (MOH, 2009). We propose three options for addressing the acute shortage of personnel necessary to implement the activities necessary to achieve malaria elimination. The first option is for in-service training to build up the knowledge and skills of general health workers involved in malaria control. The second option is to recruit and retain malaria specialists. The third option is packages to motivate and retain malaria experts so that there will be a sustainable pool to achieve and sustain malaria elimination. These options are complementary and should be considered in combination.

**Policy option 1:**

**In-service training**

There are different approaches to improve health professional practice. These interventions include guideline dissemination, educational meetings, audit and feedback, outreach visits, supervision, and tailored interventions (Grimshaw et al., 2004). These interventions may be complementary and can be applied in combination. For instance, malaria diagnosis requires improving the performance of microscopists in identifying positive and negative blood films, malaria parasite species identification, reliable counts of parasites, and correct reporting. Guidelines are needed in the work place. In addition, audit and feedback could help to improve the accuracy with which negative and positive blood films are identified.

Different strategies or combinations of strategies are likely to be effective for different types of activities. We summarise here evidence from systematic reviews of different strategies and provide an indication of the types of strategies that may be relevant for key activities that are needed to eliminate malaria. A more detailed assessment of specific barriers to change for specific activities and designing in-service training to address these is likely to be more effective than providing in-service training that does not identify and address barriers to change.

**Guideline dissemination**

Printed educational materials are widely used to improve knowledge, awareness, attitudes, skills, professional practice and patient outcomes. Traditionally they are presented in paper formats such as clinical guidelines and appear to be the most frequently adopted method for disseminating information. A systematic review (Farmer et al., 2008) found that disseminating printed materials alone may have a beneficial effect on professional practice, but the size of the effect is uncertain. The effect is most often small (with a median absolute improvement in adherence to guidelines of 4%). There is insufficient information about how
to optimise educational materials, and the effectiveness of educational materials compared to other interventions is also uncertain,

- **Guideline dissemination alone may improve health professional practice, but is unlikely to be sufficient.**

### Continuing education meetings and workshops

Continuing education meetings include: conferences, lectures, workshops, seminars, symposia and courses. A systematic review (Forsetlund et al., 2008) found that educational meetings alone or combined with other interventions probably improve professional practice (median absolute improvement 6%) and patient outcomes (median absolute improvement 3%). The effect appears to be larger with higher attendance at the educational meetings and with mixed interactive and didactic educational meetings. Educational meetings did not appear to be effective for complex behaviours.

- **Continuing education meetings probably improve health professional practice and patient outcomes.**
- **They are more likely to be effective if strategies are used to ensure attendance and if they combine interactive and didactic strategies.**

Resources needed for educational meetings may be less available in rural areas. Thus, additional resources may be needed to ensure equitable access to effective educational meetings for health workers in rural areas. The cost of educational meetings is likely to be highly variable and must be estimated based on specific local conditions outside research settings.

There is evidence that educational meetings are effective in resource poor settings. However, there is little evidence regarding the cost-effectiveness of educational meetings. Thus, there is a need to monitor professional practice and resource use.

### Audit and feedback

Audit and feedback is defined as any summary of clinical performance of health care over a specified period of time that is given to health workers in a written, verbal or electronic format. It is commonly used as a strategy to improve professional practice based on the assumption that healthcare professionals will be prompted to modify their practice if given feedback that their clinical practice is inconsistent with that of their peers or accepted guidelines. There is evidence from a systematic review (Jamtvedt et al., 2006) that audit and feedback can improve the performance of health care professionals, but the effects are variable. Most often the effects are small to moderate. The effect is likely to be greater when baseline adherence to recommended practice is low and when feedback is delivered more intensively.
Audit and feedback may improve health professional practice, but the effects are variable.

It is more likely to be effective if there is low baseline adherence to guidelines and when feedback is delivered more intensively.

Before deciding to use audit and feedback as intervention pragmatic factors and local circumstances should be considered (Flottorp, 2008). There is a scarcity of studies from low and middle income countries. Reliable medical records and resources needed for audit and feedback may be less available in disadvantaged settings.

Few trials reported the cost of the interventions. The cost of audit and feedback is likely to be highly variable and must be estimated based on specific local conditions, including the availability of reliable routinely collected data and personnel costs. Providing adequate support to programmes for audit and feedback is likely to be vital to ensure effectiveness when scaling up.

There is little evidence of the effects or cost effectiveness of audit and feedback in resource poor settings. Scarcity of health professionals, potential problems with staff morale and lack of motivation to perform activities other than direct patient care may limit the feasibility and potential for audit and feedback to improve professional practice. The impact of audit and feedback, with or without additional interventions, should routinely be monitored by auditing practice after providing feedback. The effects of audit and feedback should be evaluated before it is taken to scale in resource poor settings.

Educational outreach visits

Educational outreach visits are personal visits to health care professionals in their own settings. This type of face-to-face visit has been referred to as university-based educational detailing, academic detailing, and educational visiting. A systematic review found that educational outreach visits alone or when combined with other interventions consistently improve prescribing (median absolute improvement 5%) (O'Brien et al., 2007). Their effects on other types of professional performance vary from small to moderate improvements (interquartile range in absolute improvement 4% to 16%), and there is not a clear explanation for this variation.

Educational outreach visits improve appropriate prescribing and probably improve other types of professional practice.

It is not known to what extent performance is likely to deteriorate or improve over time, or whether multiple visits are worth the additional cost. Long-term performance (beyond one year) should be monitored. The costs and cost effectiveness of this approach depend on the targeted behaviours and the context in which the interventions are provided.
Supervision

Supervision is widely used between district or more centralised supervisors and more peripheral primary health care workers. It is intended to improve performance and to motivate staff. It is a complex intervention and implemented in different ways. It may include problem solving, reviewing records, and observing clinical practice. It is usually undertaken by visiting the place where those being supervised work, but may also include meetings in the centre. A broad scoping review found 12 quasi-experimental trials of primary health care supervision in developing countries (Bosch-Capblanch and Garner, 2008). Supervision interventions generally showed small positive effects in some of the outcomes assessed in these trials. However, some of the trials had important limitations and outcomes varied greatly between them.

*Supervision may improve the performance of primary care health workers.*

Supervision appears expensive from studies that have reported costs (Bosch-Capblanch and Garner, 2008).

Tailored interventions

Tailored interventions to change professional practice are interventions planned following an investigation barriers to change. Such barriers vary for different types of practice, different health workers and different healthcare settings. It is logical that efforts to improve performance are more likely to be successful if barriers to change are identified and taken into account. A systematic review (Baker et al., 2010) found moderate quality evidence that tailored interventions are more likely to improve practice than no intervention or dissemination of guidelines. However, the methods used to identify barriers and tailor interventions to address them vary. It is uncertain how best to do this or to what extent tailored interventions are more effective than other interventions.

*Tailored interventions improve professional practice, but is uncertain how to identify barriers to change and tailor interventions to address them.*

In summary, different packages of in-service training are needed for different activities. Some key activities are summarised in Table 1. Guidelines are needed for all of these activities, with the possible exception of activities undertaken by leaders and managers. Educational meetings or outreach visits are likely to be needed in addition. Audit and feedback may also help to improve performance, provided reliable routinely collected data are available. Tailored interventions that address identified problems and barriers to change for each type of activity are likely to be most effective.
### Table 1. Key activities by general health personnel

<table>
<thead>
<tr>
<th>Cadre</th>
<th>Activities</th>
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<tbody>
<tr>
<td>Leaders and managers</td>
<td>Leadership and management, planning and implementation, monitoring and evaluation, stewardship, effective communication</td>
</tr>
<tr>
<td>Clinicians</td>
<td>Management of severe malaria</td>
</tr>
<tr>
<td>Nurses</td>
<td>Diagnosis and treatment of uncomplicated malaria using clinical signs and symptoms, correct drug prescription, referral of severe malaria</td>
</tr>
<tr>
<td>Microscopists and lab technologists</td>
<td>Reliable laboratory results and quality reports</td>
</tr>
<tr>
<td>Health extension workers</td>
<td>Correct use of malaria rapid diagnostic tests and prescribing of anti-malarial drugs, identification of clinical malaria, referral of severe malaria, supervision of effective use of ITNs and IRS, control of re-plastering, health education</td>
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**Policy option 2:**

**Recruit and train malaria specialists**

This option is needed to overcome the dramatic drop in the number of malaria specialists that goes back to the beginning of the 1990s. In this period of time the vertical and semi-autonomous malaria control program became decentralized and integrated with the basic health services following the change in the country’s political system to a federal system. A small number of malaria specialists was handling the malaria control activities of the country. Thus, some of the key activities such as malaria microscopy and the quality control system, monitoring and surveillance of outbreaks, effective planning and implementation of spray operations, and reporting systems were jeopardized. Similar challenges have been reported elsewhere in Africa. Thus, a comprehensive local capacity building strategy was suggested to overcome the prevailing shortage of malaria specialists mainly in vector control activities (AAA, 2009).

Recruitment and training of new malaria specialists to strengthen the malaria prevention and control activities is necessary to successfully eliminate malaria. This includes malaria entomologists, malaria epidemiologists, vector control operation technicians, medical parasitologists, malaria microscopists, and geographic information system (GIS) and database experts. Table 2 below summarises some of the key activities these experts would undertake and highlights the problem affecting these cadres and possible interventions to address these.

There is scarcity of evidence regarding how best to recruit and train these specialists. Academic support, career guidance, and social support might increase student enrollment and reduce drop-out rates (Pariyo et al., 2009). However, there is a lack of evidence from low and middle income countries.
Table 2: Summary of new specialists and activities as well as interventions to combat the existing gap.

<table>
<thead>
<tr>
<th>Cadre</th>
<th>Activities</th>
<th>Problem</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical entomologists</td>
<td>Operational research on malaria vectors (e.g. insecticide resistance)</td>
<td>Although a small number is needed (e.g. 12 centrally*), there currently are very few</td>
<td>Recruitment and training (outside of the country)</td>
</tr>
<tr>
<td>Malaria epidemiologists</td>
<td>Operational research, surveillance and monitoring epidemics, evaluation of interventions</td>
<td>Most epidemiologists in Ethiopia are currently working for NGOs</td>
<td>Recruitment and a package of non-financial and financial incentives</td>
</tr>
<tr>
<td>Vector control operation technicians</td>
<td>Planning, training, &amp; organizing vector control operations</td>
<td>Most have retired and there is a maldistribution where approximately 500 technicians are needed</td>
<td>Reopen training centre</td>
</tr>
<tr>
<td>Medical parasitologists</td>
<td>Operational research on malaria parasites (e.g. drug resistance)</td>
<td>Although a small number is needed (e.g. 12 centrally*), there currently are very few</td>
<td>Recruitment and training (outside of the country)</td>
</tr>
<tr>
<td>Malaria microscopists</td>
<td>Malaria diagnosis, &amp; parasite count</td>
<td>There is a need of at least one in each of the nine regions</td>
<td>Two months specialist training of lab technologists</td>
</tr>
<tr>
<td>GIS and database experts</td>
<td>Mapping of malaria distribution, interventions, and data management</td>
<td>There is a shortage</td>
<td>Recruitment and specialist training of students or graduates from existing programmes in the country</td>
</tr>
</tbody>
</table>

* at least one medical parasitologist/entomologist in each region

**Policy Option 3:**

**Motivation and retention packages for malaria specialists**

Motivation and retention packages involve both financial and non-financial incentives. According to WHO (2010) non-financial incentives include education, regulatory interventions, personal and professional support. Financial incentives encompass all additional payments aimed at boosting the morale of the health worker. Motivating and retaining health professionals is likely to require packages of both non-financial and financial incentives (Dayrit, et al., 2010). Countries need to design incentive packages that suit their own local circumstances (Dambisya, 2007).

**Current situation in Ethiopia**

In Ethiopia non-governmental organizations pay much more than the government and as a result the rate of attrition in the public sector is very high. This massive attrition is affecting malaria control activities in particular, as experts in malaria are already few and far between. Motivation and retention efforts by the ministry of health are sporadic and not
comprehensive, though there are some financial incentive mechanisms for other health workers such as medical doctors and researchers. For example, medical doctors are allowed to use the facilities of government owned hospitals after working hours for their private practice. However, working conditions in the rural areas are mostly difficult. Lack of electricity, proper roads, and facilities is common in rural Ethiopia. Although the government has introduced obligatory service for people going for a higher education, the impact it has on addressing the shortage of human resources for health is not clear. The ministry of health is well aware of the shortage of health workers and motivational packages are under consideration. Though the ministry of health is aware of the shortage of malaria professionals in its fight against malaria, it has not yet put forward a plan to build the human resource capacity that is needed to eliminate malaria (MOH, 2010).

**Financial incentives**

Well-designed studies of the effects financial incentives (rural and housing allowances, raised salaries, per diems, etc.) on motivating and retaining health workers are lacking. However, the available evidence suggests that financial incentives alone are not enough. To be effective financial incentives should be integrated with other incentives (Willis-Shattuck et al., 2008; Wilson et al., 2009).

Financial incentives potentially have a number of undesirable effects. They may demotivate other staff who are not receiving the incentive (Pantoja, 2008). Other undesirable effects, especially when incentives are conditional on taking a measurable action or achieving a predetermined performance target (pay for performance) include motivating unintended behaviors, distortions (ignoring important tasks that are not rewarded with incentives), gaming (improving or cheating on reporting rather than improving performance), widening the resource gap between rich and poor, and dependency on financial incentives (Oxman, 2009).

Financial incentives, particularly pay for performance, incur administrative costs as well as the cost of the incentives. The cost effectiveness of this strategy is uncertain, since the effects on malaria control and elimination are uncertain. There is a need for monitoring and evaluation of financial incentives to ensure that desired impacts on motivating and retaining health workers are obtained, that undesirable impacts are avoided, and that resources are used as intended.

To the extent that financial incentives work, motivated health workers in rural Ethiopia fighting malaria are likely to have a positive impact on equity. Equity would be a byproduct with regard to malaria burden if malaria elimination succeeds. However, incentives only to people working on malaria could de-motivate other health workers.
Non-financial incentives

Education
Education or training opportunities may be effective in motivating staff as they are strongly connected to personal goals of professional advancement (Willis-Shattuck, et al., 2008). As a large proportion of the population of low-income countries like Ethiopia lives in rural areas, retaining health professionals in these areas is an important challenge. It is particularly important for malaria activities, which are primarily in the rural areas where the disease prevails. Education interventions targeted at students, such as rural service and selection of students from rural areas, may attract students to work in rural and remote areas (Dolea, et al., 2010).

Personal and professional support
Health workers are motivated when there is a chance of career development (Willis-Shattuck, et al., 2008).

Availability of good living conditions like accommodation, roads, electricity, running water, internet access, and schools are likely to be important (Kotzee and Couper, 2006; Chaudhury and Hammer, 2003) for motivating and retaining health workers in rural setting. However, there is a lack of well-designed studies of the effects of providing non-financial incentives such as these (Gobler et al., 2009).

Similarly, a supportive working environment, with a good infrastructure, available resources, and supportive supervision is likely to motivate health workers (Willis-Shattuck, et al., 2008), although there is a lack of well-designed studies to support this (Gobler et al., 2009).

Recognition or appreciation from the community, managers or colleagues is also likely to be an important motivating factor for health workers (Willis-Shattuck, et al., 2008). Simple public recognition measures such as awards and medals may boost the morale of health workers and result in their retention in remote areas (WHO, 2010).

Regulatory interventions
There is a lack of evidence of the effects of regulatory measures such as compulsory service on recruiting and retaining health workers (Gobler et al., 2009). Requirements or regulatory interventions likely must be accompanied with appropriate support and incentives if health workers are to be motivated and remain where they are needed (WHO, 2010).

Because currently there are minimal incentive packages for malaria workers in Ethiopia, introducing them into the system has a large potential to reduce inequities in access to malaria prevention and control, and ultimately by helping to eliminate malaria.

Monitoring and evaluation of whatever incentive packages are used is necessary so that they can be modified, if needed.
Implementation considerations

Strategies for implementing all three options should take advantage of factors that enable their implementation as well as addressing barriers. In particular, as already reflected in the recent malaria prevention, control and elimination of the five year strategic plan (2010-2015) there is a strong political commitment from the government of Ethiopia to eliminate malaria areas of unstable malaria within the coming few years. Other enablers include:

- Reactivation of malaria elimination as a top priority globally
- Major funding opportunities and public-private sector collaboration globally
- Effective intervention options both for treatment and vector control
- Advanced research and training opportunities

Barriers to implementing the three options and possible strategies for addressing them are summarised in Table 3. There is limited evidence of the extent of these barriers or of the effects of strategies for addressing them.

Table 3. Showing barriers and implementation strategies

<table>
<thead>
<tr>
<th>All three options</th>
<th>Barriers</th>
<th>Description</th>
<th>Strategies for implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial constraints</td>
<td>Implementation of each of the options requires a substantial investment of resources</td>
<td>Piloting and costing of in-service training (option 1), better use of existing resources through coordination of governmental and non-governmental initiatives, and resource mobilization (i.e. through a national consensus and clear commitment to eliminating malaria, applying for additional funds from donors and reallocating public funds)</td>
<td></td>
</tr>
<tr>
<td>Resistance of leaders</td>
<td>Some managers and leaders may view a centrally coordinated programme of inservice training for malaria as undesirable if it is perceived to be reintroducing a vertical programme, taking resources from other priorities, or threatening to their autonomy</td>
<td>Achievement of a national consensus prioritising scaling-up of malaria control with the aim of eliminating malaria and a well organised communication strategy that addresses concerns of managers and other key stakeholders</td>
<td></td>
</tr>
<tr>
<td>Regional autonomy and</td>
<td>Because regions are autonomous, it may be difficult to coordinate and ensure implementation.</td>
<td>Establishment of National Malaria Elimination Council with representation of regions and key stakeholders. Ensure that the Council has the authority to make decisions and ensure that they are implemented, and ensure that decision-making by the Council is transparent</td>
<td></td>
</tr>
<tr>
<td>lack of coordination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate Health</td>
<td>Problems with the current HMIS include that it is paper-based, some types of information are not available when they are needed or not available at all, and it may be unacceptably costly to use the HMIS for audit and feedback or monitoring the implementation of options 1 and 3. The HMIS may also not provide information that is needed by malaria specialists (option 2)</td>
<td>Improve the HMIS in the country to the state of the art technology (IT based)</td>
<td>Review the current HMIS to identify gaps, additional data needs for malaria elimination and support necessary to meet the short term need for quality malaria data.</td>
</tr>
<tr>
<td>Management Information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System (HMIS)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Policy Options 1 and 3

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Description</th>
<th>Strategies for implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Procurement and distribution of equipment and drugs</strong></td>
<td>Drugs and equipment are often not available. This limits the ability of health workers to provide effective care, even if they are well trained and motivated. It also impacts negatively on motivation.</td>
<td>Establish systems to ensure adequate procurement and distribution of essential drugs and equipment.</td>
</tr>
<tr>
<td><strong>Scaling up</strong></td>
<td>There is not capacity to immediately implement these options throughout the country.</td>
<td>Cascading of training and pilot testing and staged implementation of both options (which would, in addition, help to address the need for evaluation and for costing these options).</td>
</tr>
</tbody>
</table>

### Policy option 2

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Description</th>
<th>Strategies for implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inadequate facilities and equipment for specialized training</strong></td>
<td>Following the transition from a vertical programme to integrating malaria into the general health services the national malaria training centre has not been maintained and there are currently no sufficient training facilities for malaria specialists in Ethiopia.</td>
<td>Refurbish and equip the national malaria training centre and provide support to research institutes and universities for training of specialists that can and should be done in Ethiopia. For specialists that are only needed centrally initial training needs can best be met by sending people for training outside of Ethiopia.</td>
</tr>
</tbody>
</table>

### Policy option 3

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Description</th>
<th>Strategies for implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Absence of policy for incentives</strong></td>
<td>There is no policy for incentives in the country. This could lead to conflicts and might adversely affect other programmes if incentives were used to motivate malaria specialists and not other health workers.</td>
<td>Develop a national policy for the use of incentives or ensure that incentives that are used do not adversely affect other programmes or create undesirable inequities across different cadre of health workers.</td>
</tr>
<tr>
<td><strong>Corruption</strong></td>
<td>There is not a system in place for managing incentives and there is a risk of misuse of incentives and rewarding people without merit.</td>
<td>Transparent systems for managing and awarding incentives and ensuring accountability.</td>
</tr>
</tbody>
</table>
Next steps

The aim of this policy brief is to foster dialogue and judgements that are informed by the best available evidence. The intention is *not* to advocate specific options or close off discussion. Further actions will flow from the deliberations that the policy brief is intended to inform. These might include:

- Assessments of barriers to improving the performance of key malaria control activities by general health workers and selection of appropriate packages of in-service training that take account of those barriers
- Development of a detailed plan for recruiting and training malaria specialists that are needed to eliminate malaria
- Development of appropriate packages of financial and non-financial packages to motivate and retain key cadre of malaria specialists
- Development of detailed plans for monitoring and evaluating each of the policy options
Appendices

Appendix 1. How this policy brief was prepared

The methods used to prepare this policy brief are described in detail elsewhere (SURE 2010a, SURE 2010b, SURE 2010c).

The problem that the policy brief addresses was clarified iteratively through discussion among the authors, review of relevant documents and research, discussion with the Technical Working Group that includes the Ministry of Health, CNHDE, MACEPA/PATH, ICAP, PMI and EHNRI and external review of a preliminary description of the problem. Research describing the size and causes of the problem was identified by reviewing government documents, routinely collected data, searching PubMed and Google Scholar, through contact with key informants, and by reviewing the reference lists of relevant documents that were retrieved.

Strategies used to identify potential options to address the problem included considering interventions described in systematic reviews and other relevant documents, considering ways in which other jurisdictions have addressed the problem, consulting key informants and brainstorming.

We searched electronic databases of systematic reviews, including: the Cochrane Library (CENTRAL, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects) and supplemented these searches by checking the reference lists of relevant policy documents and with focused searches using PubMed, Google Scholar, and personal contacts to identify systematic reviews for specific topics. The final selection of reviews for inclusion was based on a consensus of the authors.

One of the authors extracted the key findings of each review, assessed the quality of the evidence, and summarised important information regarding the interventions, participants, settings and outcomes; and considerations of applicability, equity, economic consequences, and the need for monitoring and evaluation. The quality of the evidence was assessed based on the GRADE approach and the key findings were expressed consistently so as to reflect the quality of evidence, using the approach developed for Cochrane plain language summaries.

Potential barriers to implementing the policy options were identified by brainstorming using a detailed checklist of potential barriers to implementing health policies. Implementation strategies that address identified barriers were identified by brainstorming and reviewing relevant documents. Systematic reviews of relevant implementation strategies were identified using the databases listed above for finding reviews of the policy options.

Drafts of each section of the report were discussed with the Technical Working Group and the SURE Project team based at the Norwegian Knowledge Centre for the Health Services.
External review of a draft version was managed by the Norwegian Knowledge Centre for the Health Services. Comments provided by the external reviewers and the authors’ responses are available from the authors. A list of the people who provided comments or contributed to this policy brief in other ways is provided in the acknowledgements.
Appendix 2. Strategies and approaches specific to malaria elimination, including capacity building (compiled from Ref. WHO, 2008b)

In general, the principles of malaria elimination are mostly based on those formulated for the malaria eradication campaign in 1950s and 1960s. As guidance, WHO has produced a comprehensive field manual on malaria elimination (WHO, 2007). The approaches in malaria elimination applicable by countries based on their local situation include geographical reconnaissance, case detection, curative measures, and surveillance. Details of each approach and related ones are presented as follows:

**Geographical reconnaissance**
- Planning of indoor residual spraying (IRS).
- Computerized database (classified as malarious, potentially malarious & malaria free areas)
- Geographic Information System (GIS) supporting the mapping and monitoring
- Additional layers for malaria (risk factors and vector control coverage)

**Case detection**
- Passive method supplemented by active detection
- Rapid case detection followed by prompt treatment
- Case definition and confirmatory tests
- Determine parasite density for the purpose of quality control of malaria diagnosis
- Apply spot checks of malaria rapid diagnostic test (RDT)
- Record gametocytes and give anti-gametocyte treatment

**Curative treatment**
- Chloroquine 3 days and Primaquine 14 days are given for *vivax* cases
- An artemisinin-based combination therapy (ACT) for *falciparum* cases

**Epidemiological surveillance**
- Identify malaria-prone areas (all areas below the cut-off altitude)
- Application of an epidemiological investigation & classification
- Classification of foci based on the epidemiological investigation and classification
- Minimum unit of application of measures in malaria elimination is a focus, not a case or a cluster of cases, or a household.
- Produce database of all settlements with a risk of malaria transmission
- Maintain information in real time using an electronic database (GIS).
- Entomological surveillance (information pertaining to planning of IRS, anti-larval measures, if applied, and to epidemiological analysis and forecasting.
- Meteorological monitoring (average daily Temp. & daily Rainfall).
The major intervention options are:

- Indoor residual spraying
  - Control transmission. Its objective is to reduce the longevity of mosquitoes
  - Interrupting the man to mosquito transmission. If the coverage is below 85%, it is considered as no spraying at all (protection is zero).
- Insecticide-treated nets/Long lasting insecticide treated nets
  - A measure to interrupt transmission
- Anti-larval measures
  - Source reduction & chemical application
- Mass drug administration (MDA) in the form of suppressive treatment
- Community involvement through information, education and communication
- Village committees are instrumental for ensuring smooth implementation of activities
- Training of all health workers involved in malaria elimination
  - Short term training
  - Long term (specialization) for selected groups
- Training of laboratory technicians and laboratory supervisors
  - Slide processing (identification and correction of errors of processing, and maintenance of microscopes and small repair)
- Training to entomologists, vector control supervisors, and spray men
- Training of health workers related to early detection, diagnosis, treatment, prevention.
- Lay volunteers and schoolmasters are to be trained on case detection, presumptive treatment and referral. Additionally, matters pertaining to malaria need to be included in school curricula.
- Applied field research on malaria (parasites, vectors, human behaviour, surveillance mechanism)
Glossary, acronyms and abbreviations

ACTs - artemisinin-based combination therapies
EOV- Educational Outreach visits
GHWA-Global Health Workers Alliance
GIS – Geographical information systems
GRADE (Grading of Recommendations Assessment, Development and Evaluation) – a system for rating the quality of evidence and the strength of recommendations (www.gradeworkinggroup.org).
MOH – Ministry of Health
RDT – Rapid Diagnostic test
SURE – Supporting the Use of Research Evidence (SURE) in African Health Systems (www.evipnet.org/sure)
WHO - World Health Organization
References


http://www.support-collaboration.org/summaries.htm


SURE 2010b. Supporting the Use of Research Evidence (SURE) in African Health Systems. SURE guides for preparing and using policy briefs: 5. Deciding on and describing options to address the problem.


