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Malaria elimination in the Eastern Mediterranean Region: vision, requirements and strategic outline

Malaria elimination can be expected to bring substantial benefits, among them contribution to improvement of the overall socioeconomic situation and living standards of the population, and to strengthening of the health system. In the Eastern Mediterranean Region, it is technically possible to eliminate malaria and end the fight against this disease considering the level of transmission, the availability of new tools for diagnosis, treatment and prevention, and the availability of financial resources from the Global Fund to Fight AIDS, Tuberculosis and Malaria and other sources. The Regional Committee is invited to review the current situation of malaria in the Region and the feasibility of, and prerequisites for, malaria elimination, and to consider the proposal outline for a malaria elimination strategy.

Contents

Executive summary

Malaria is endemic in nine countries of the WHO Eastern Mediterranean Region, with low intensity of transmission in most areas. High and stable transmission is limited to the southern zone of Somalia and southern Sudan, which represent only 5% of the population at risk for malaria in the Region. Falciparum malaria is the dominant species in Saudi Arabia, Yemen and the sub-Saharan countries of the Region (Djibouti, Somalia and Sudan), while in Afghanistan, Islamic Republic of Iran and Pakistan, both *P. falciparum* and *P. vivax* are transmitted, with *P. vivax* as the predominant species.

Since the launch of the Roll Back Malaria Initiative in the Region in 1999, and particularly in the past few years, malaria control has intensified in endemic countries and resulted in a reduction of the malaria burden. With the availability of new tools for case management and prevention, improvements in communication technology, availability of financial resources from the Global Fund and other sources, and the global interest in elimination, it is considered feasible to accelerate efforts to eliminate malaria in low transmission areas by 2020. In high transmission areas in the southern zone of Somalia and southern Sudan, substantial reduction of transmission could be achieved with full-scale deployment of the available tools. Commitment and support to the remaining endemic areas should be maintained in order to consolidate the achievements and proceed towards elimination in the remaining areas and foci.

An elimination programme can be started in the whole country or in a specific area (province, state or district). The national malaria programme can be reoriented from control to a pre-elimination phase and elimination, and finally to prevention of reintroduction based on certain milestones. In countries of the Region with both species (Afghanistan, Islamic Republic of Iran and Pakistan), elimination could be planned sequentially, with priority given to falciparum malaria first as the more severe problem.

Sustained political commitment with adequate funding, strong leadership and skilful management are crucial requirements until the elimination goal is achieved. Malaria elimination needs, and will contribute to, strengthening of the heath system including local competence and infrastructure. It requires full involvement of the private sector, nongovernmental organizations and community-based programmes to ensure universal access to effective tools for diagnosis, treatment and prevention, including expatriates and refugees, free of charge. A strong information and surveillance system is of high priority to monitor and evaluate the progress. The malaria situation in neighbouring countries will have to be taken into consideration and functional intercountry cooperation mechanisms should be in place.

Combating malaria is included in the Millennium Development Goals. Malaria elimination is expected to bring substantial benefits in terms of socioeconomic development, improvement of the living standards of the population and increase in local and international tourism. Investment in malaria elimination will help other public health programmes to achieve their goals, including prevention and control of neglected tropical diseases. Once elimination is achieved, malaria control will rely mainly on vigilance and surveillance as part of the general public health services, thus saving the huge expenses related to treatment and prevention methods for other public health priorities.

1. Introduction

1.1 Historical outline of malaria eradication and control

In 1955, the 8th World Health Assembly decided on a policy of malaria eradication for all malarious countries with the exception of sub-Saharan Africa and Madagascar. The global campaigns produced excellent results in Europe, north America, some parts of Asia and south-central America, north Africa, former USSR and Australia. The campaigns were hampered by technical problems, including spreading resistance to insecticide and less success in some areas. In 1979, WHO developed a strategy for malaria control that took into account the need for tactical variants in different epidemiological settings. A ministerial conference on malaria in Amsterdam, 1992, approved a revised WHO global strategy for malaria control. Nevertheless, the malaria situation deteriorated during the 1990s owing to lack of global support, weakness of the national control programmes, political instability, uncontrolled urbanization, and changing dynamics in environment, climate and migration. Global support for malaria control was strengthened in 1998 through the launch of the Global Roll Back Malaria initiative by WHO, UNICEF, UNDP and the World Bank, aiming at a sector-wide approach to control the disease. Subsequently, Heads of African States committed themselves to specific coverage targets for malaria control in the Abuja Declaration of 2000 [1].

1.2 Malaria elimination: current global and regional interest

In recent years, the idea of malaria elimination has gained broader acceptance. WHO headquarters organized a meeting in Tunis in 2006 [2] that put the initiatives of individual regions, mainly the Eastern Mediterranean Region and the European Region, under a global umbrella. In 2007, the World Health Assembly requested Member States (WHA60.18) to aim at reducing or interrupting malaria transmission wherever feasible. Most recently, malaria elimination was further emphasized in a global forum of the Bill and Melinda Gates Foundation [3]. In the past decade, the Eastern Mediterranean Region of WHO has demonstrated a strong interest in malaria elimination and has supported malaria elimination in areas where it was feasible, supported by a Regional Committee resolution in 1998 (EM/RC45/R.3). In 2005 the European Region of WHO endorsed malaria elimination from Europe by 2015. Many countries across several regions are currently implementing malaria elimination programmes, including Argentina, Armenia, El Salvador, Iraq, Paraguay, Turkmenistan, Republic of Korea, and Saudi Arabia.

1.3 Why elimination now?

Combating malaria is included in the Millennium Development Goals, specifically Goal 6 aiming to halt or reverse the spread of HIV/AIDS, malaria and other diseases. Malaria elimination can be expected to bring substantial benefits. Malaria elimination and national socioeconomic development are interdependent and mutually supportive. Malaria elimination is a key factor for improvement of the overall socioeconomic situation and living standards of the population. Achieving malaria-free status will increase economic investment and local and international tourism. Investment in malaria elimination will help other public health programmes to achieve their goals, including prevention and control of neglected tropical diseases such as leishmaniasis, Rift Valley fever, and dengue fever. Strengthening the malaria programme with a view to elimination will contribute to the strengthening of the health system in terms of increasing coverage with laboratories and treatment facilities, and strengthening surveillance, monitoring and evaluation. The immediate benefits will be to the poor and other marginalized groups, promoting equity. Once elimination is achieved, malaria control will rely mainly on vigilance and surveillance as part of the general public health services, thus saving the huge expenses related to case treatment, insecticides and other prevention methods for other public health priorities.

In the Eastern Mediterranean Region, it is technically possible to eliminate malaria and end the fight against this disease considering the level of transmission, the availability of new tools for diagnosis, treatment and prevention, and the availability of financial resources from the Global Fund to Fight AIDS, Tuberculosis and Malaria and other sources.

The aim of this paper is to raise the awareness of the Regional Committee with regard to the current situation of malaria in the Region and the feasibility of, and prerequisites for, malaria elimination, and to propose an outline for a malaria elimination strategy.

1.4 Definitions

Malaria eradication as launched by WHO in 1955, was defined as "An operation aimed at cessation of transmission of malaria and elimination of reservoir of infected cases in a campaign limited in time and carried out to such a degree of perfection that, when it comes to an end, there is no resumption of transmission". The most recent definition of eradication [5, 6] is the "permanent reduction to zero of the worldwide incidence of infection caused by a specific agent". Routine intervention measures for prevention and treatment are no longer needed once interruption of transmission is certified worldwide.

Malaria elimination is the "interruption of local mosquito-borne malaria transmission in a defined geographical area". This means zero incidence of locally contracted cases. Imported cases will continue to occur; therefore, continued intervention measures are required to prevent re-emergence and re-establishment of transmission.

Malaria control is the "reduction of disease burden to a level where it is no longer a public health problem". This means the incidence, prevalence, or mortality are reduced to a locally acceptable level [7].

2. Epidemiological situation

2.1 Global burden

An estimated 350–500 million clinical malaria episodes occur annually. More than 1 million deaths occur each year. Approximately 60% of malaria cases and more than 80% of malaria deaths occur in sub-Saharan Africa.

2.2 Regional situation

In total, 54% of the population of the Region reside in areas at various risk of malaria transmission [country reports, 2006, unpublished]. The intensity of transmission is generally low in most areas. Comprehensive review of the community surveys conducted in malaria-endemic countries during 1985–2007 showed that in 87% of the surveys falciparum prevalence was below 10%, meaning that malaria is hypo-endemic [8]. Reported malaria cases have been gradually decreasing from 6.1 million in 2000 and 4.1 million in 2003 to 3.6 million in 2006 (Table 1). However, the reported figures represent only a fraction of the true incidence owing to the weakness of malaria information systems in most high-burden countries. It is estimated that approximately 10.5 million malaria episodes and 59 000 malaria-related deaths occur every year in the Region (Table 2).

Table 1. Trend in reported malaria cases, Eastern Mediterranean Region, 2000–2006

Country	2000	2001	2002	2003	2004	2005	2006
Total cases in the Region	6 060 467	4 494 941	4 059 404	4 123 345	2 687 610	2 652 569	3 637 103
Afghanistan	203 911	364 243	590 176	591 441	261 456	281 888	329 754
Djibouti	4667	4312	5021	5036	2142	2590	7708
Pakistan*	82 526	104 003	101 761	125 152	126 719	127 825	124 000
Somalia	10 364	10 364	96 922	23 349	36 732	28 529	49 256
Sudan	4 332 827	3 985 702	3 056 400	3 084 320	2 083 711	1 988 132	2 888 943
Yemen	1 394 495	–	187 159	265 023	158 561	200 560	217 270
Others	31 677	26 317	21 965	29 024	18 289	23 045	20 172

Table 2. Reported, confirmed and estimated cases in group 3 countries in 2006

	Reported	Confirmed	Confirmed (%)	Estimated
Afghanistan	329 754	82 692	25	1 500 000
Djibouti	7708	1796	23	60 000
Pakistan	NA	124 000	NA	1 600 000
Somalia	49 256	16 430	33	1 300 000
Sudan	2 888 943	589 138	20	5 000 000
Yemen	217 270	55 000	25	900 000

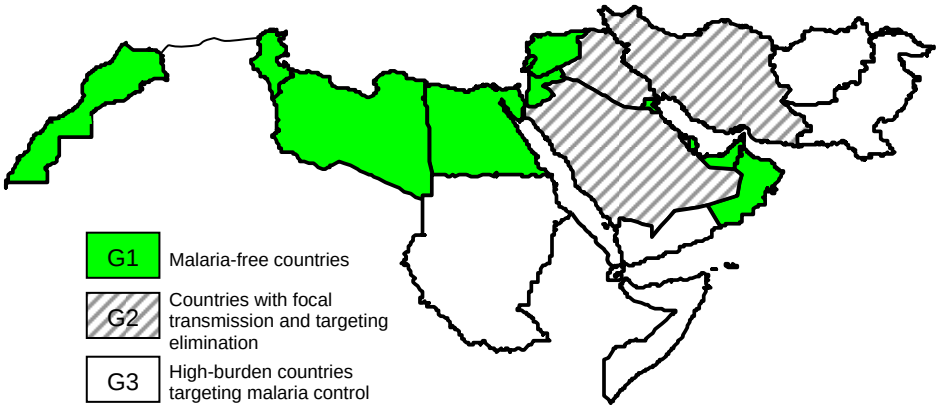

Figure 1. Malaria situation in countries of the Eastern Mediterranean Region

Geographical diversity in the Region determines malaria variability in terms of endemicity, intensity of transmission and type of malaria. In Saudi Arabia, Yemen and the sub-Saharan countries of the Region (Djibouti, Somalia and Sudan), falciparum malaria is the dominant species, while in Afghanistan, Islamic Republic of Iran and Pakistan, both *P. falciparum* and *P. vivax* are transmitted, with *P. vivax* as the predominant species. According to the malaria situation and type of programme, countries of the Region are categorized into three groups. Thirteen countries (Group 1) have eliminated local malaria transmission and are implementing programmes to prevent reintroduction. Three countries retain malaria endemicity in a few localized areas and are implementing a malaria elimination strategy (Group 2). More than 95% of the malaria cases in the Region occur in six countries (Group 3). Sudan alone accounts for almost 50% of the total regional burden of malaria (see Figure 1).

2.3 Progress and achievements

Achievements have been made in many countries of the Region since 2000. The United Arab Emirates was certified as malaria-free in 2007 [9], the last locally contracted cases in Morocco and Syrian Arab Republic were recorded in 2004. There has been a significant reduction in the malaria burden in Iraq and Saudi Arabia (Table 3), while the proportion of falciparum cases in the Islamic Republic of Iran decreased from 13% in 2000 to 7.5% in 2006.

A malaria elimination project was initiated in Socotra Island, Yemen, in September 2000. The impact of the project has been a real success story, with no local cases reported since 2005. The Khartoum and Gezira malaria-free initiative was launched in 2002 aiming at elimination of malaria as a public health problem. The initiative has resulted in significant reduction of the malaria burden in Khartoum State

Table 3. Trend of malaria cases (all confirmed in the three countries targting elimination

Year	Islamic Republic of Iran		Iraq		Saudi Arabia	
	Total	Locally acquired	Total	Locally acquired	Total	Locally acquired
2000	19 716	19 716	1860	1860	6608	4736
2001	19 274	19 274	1265	1265	3074	1614
2002	15 558	9122	952	952	2612	1226
2003	23 562	17 060	347	347	1724	700
2004	13 821	7602	155	153	1232	308
2005	18 966	14 396	47	44	1059	204
2006	15 909	13 127	24	23	1278	269

and has set an example to be followed by other States. The parasite rate in Khartoum State decreased to 0.03% in 2006, compared to 1.5% in 2001. Reduction of malaria prevalence was also noted in Gezira, from 3.17% in 2002 to 1.27% in 2007.

Implementation of the strategy of using insecticide-treated nets in high-burden countries is being scaled up. In 2007, a total of 3.4 million long-lasting insecticidal nets (LLINs) were distributed. This number was sufficient to protect a population of approximately 9 million people from vector-borne diseases, and from malaria in particular. A higher number of nets is expected to be distributed in the coming years thanks to resources available from the Global Fund and from the countries.

All falciparum endemic countries in the Region have updated their malaria treatment policy and have included effective artemisinin combination therapies (ACTs) as first line treatment. Access to treatment is gradually increasing, through national, Global Fund and other resources. Most countries have established a functional system for early detection and rapid response to malaria epidemics. There are also indications of reduction in malaria morbidity and mortality in high-burden countries (see Table 1).

3. Current response and strategies

3.1 Regional strategic plans

In 1999, the Roll Back Malaria initiative was launched in the Eastern Mediterranean Region. All countries of the Region committed themselves to the objectives of the initiative and developed national strategies accordingly. The first regional strategic plan for Roll Back Malaria was developed in 2002 and updated in 2006 [10]. The objectives are by 2010: 1) to halve the malaria burden in the countries with a high malaria burden; 2) to eliminate malaria in countries with a low malaria burden; 3) to prevent re-establishment of malaria transmission in malaria-free countries. The key technical approaches to achieve the objectives are: promotion of access to reliable diagnosis and effective treatment, scaling up use of effective vector control preventive measures; and supporting prevention and control of malaria in epidemic and complex emergency situations. Supportive approaches, including strengthening capacity of national programmes at all levels, partnership with all relevant sectors and agencies, strong malaria surveillance, monitoring and evaluation systems and operational research, are emphasized in order to deliver those technical interventions.

3.2 Current approach and experiences of malaria elimination

The regional strategy 2006–2010 supports expansion of malaria-free areas through malaria elimination initiatives at subregional level (currently north Africa, Arabian Peninsula) and malaria-free projects at subnational level (malaria-free initiatives in Khartoum and Gezira in Sudan and Socotra Island in Yemen, as well as elimination programmes at national level in Islamic Republic of Iran and Iraq).

To free the Arabian peninsula from malaria, all the member countries of the Gulf Cooperation Council (GCC) have established a cooperation mechanism to support interruption of transmission from

endemic areas in Saudi Arabia and Yemen and to prevent re-establishment of malaria transmission in areas freed from it. Eliminating malaria from the endemic areas in the peninsula will set an outstanding example of how intercountry cooperation can interrupt malaria transmission by an efficient vector species, in this case *An. Arabiensis*.

4. Challenges facing the malaria control and elimination programmes

The control programmes in malaria-endemic countries are facing several challenges as follows:

- limited coverage and low quality of laboratory services for diagnosis in high-burden countries, where only one quarter of clinical malaria cases are confirmed (see Table 2);
- weak health information and malaria surveillance systems which are unable to provide reliable data on the malaria burden, reported figures representing only a fraction of estimated cases (Table 2);
- limited access to effective treatment and prevention measures;
- the need to strengthen leadership and management skills at national and lower levels;
- lack of compliance of the private sector with national policies and guidelines;
- weak community involvement and lack of community structures to deliver the interventions to remote and inaccessible populations.

Elimination programmes are confronted with several obstacles, including:

- limited expertise in malaria elimination and weak national capacity for implementing elimination interventions;
- lack of accurate and updated stratification map of malaria transmission;
- lack of effective strategies for coordination of cross-border activities among some countries;
- weak intersectoral coordination.

The programmes face an additional constraint concerning spreading resistance to the available medicines and insecticides, which requires monitoring and containment of resistance. The unstable political situation in some areas, due to war or civil unrest, globalization and the rapidly changing dynamics in environment, climate and migration also pose formidable challenges. The support currently provided by many global partners, including Global Funds for health systems, will assist countries in addressing several gaps related to infrastructure and human resources.

5. Proposal for a regional strategy for malaria elimination

5.1 Feasibility

With the continuing reduction of malaria burden in countries of the Region, availability of new tools (including ACTs, rapid diagnostic tests and LLINs), improvements in communication technology, availability of financial resources, mainly from the Global Fund but also from other sources, as well as the global interest in elimination, it has become realistic to aspire to more ambitious and accelerated efforts to eliminate malaria from the Region. With the current tools, it is feasible to achieve interruption of transmission and malaria elimination in areas with low unstable transmission, which represent most areas of the Region. In high and stable transmission areas in the southern zone of Somalia and southern Sudan, which represent only 5% of the population at risk for malaria in the Region, complete interruption of transmission may require additional new control tools, nevertheless more than 90% reduction could be achieved by full-scale deployment of the available tools.

5.2 Regional objectives for elimination of malaria in countries by 2020 and afterwards

- Eliminate falciparum malaria from the Asian countries in the Eastern Mediterranean Region;
- Limit vivax malaria transmission to a few foci in “hot” pockets in Afghanistan and Pakistan with marked reduction of incidence (annual parasite incidence <1 per 10 000 population at risk);
- Eliminate malaria in Djibouti, north and central zones of Somalia and northern Sudan except from a few foci in the hard-to-reach and border areas (annual parasite incidence <1 per 10 000 population at risk);

- Eliminate malaria as a public health problem in southern Sudan and southern zone of Somalia (malaria prevalence among fever cases < 5% and no mortality from malaria);
- Sustain the efforts after 2020 to consolidate the achievements, and prevent re-emergence of malaria.

5.3 Prerequisites for malaria elimination

Malaria elimination needs a holistic and integrated approach based on the existing network of basic health services. It requires, and will contribute to, strengthening the heath system, with full involvement of the private sector, nongovernmental organizations and community-based programmes to ensure universal access to effective tools for diagnosis, treatment and prevention for all at-risk populations, including expatriates and refugees, free of charge. Establishing a strong information and surveillance system is of high priority to monitor and evaluate the progress. Crucial requirements for malaria elimination are: political commitment with adequate sustainable funding, strong leadership and skilful management, sound planning based on understanding of the local epidemiology and on scientific evidence from operational research; trained and motivated health workers; collaboration and integration with all relevant sectors and programmes; and functional intercountry cooperation.

5.4 Programme phases and milestones on the path from control to malaria elimination

A phased approach will be applied, guided by milestones to reorient the national malaria programme from control through pre-elimination and elimination, to prevention of reintroduction (see Table 4). The programme to reach the elimination goal can be started in the whole country or in a specific area (province, state or a district of not less than 100 000 population), based on the findings of a feasibility assessment. This will require detailed and updated stratification of malaria transmission and risk mapping.

The decision to move from one programme phase to the next will be based on certain milestones. When the incidence rate is decreased to 5 new cases per 1000 population at risk per year, meaning the slide positivity rate (SPR) among suspected fever cases is less than 5%, the programme can be reoriented from control towards elimination with a transition phase called ‘pre-elimination ’ in which preparation for elimination should be made. When malaria distribution becomes increasingly patchy, the incidence rate declines to below 1 per 1000 population at risk, and necessary changes in the strategy and all required adaptations have been made, the country can move to elimination.

5.5 Sequential elimination of parasite species

Experience shows that elimination of *P. falciparum* is easier than *P. vivax*. Current malaria control tools make *P. falciparum* elimination programmes more feasible because: rapid diagnostic tests have a higher sensitivity for *P. falciparum* compared with those currently available for *P. vivax*; the duration of ACTs for *P. falciparum* (3 days) is considerably shorter than the 14 days required for radical treatment of *P. vivax* with primaquine; and detection and treatment of hyponozoite carriers in vivax malaria is cumbersome with the current tools.

In countries of the Region with both species (Afghanistan, Islamic Republic of Iran and Pakistan) elimination could be planned sequentially, with priority given to falciparum malaria first as the more severe problem. Anti-falciparum activities would affect the vivax malaria as well. Such an approach has been documented in many countries (e.g. Morocco, Tunisia).

Table 4. Main intervention packages used by each phase of the programme

	Control programme (SPR <5%)	Pre-elimination programme (API<1/1000)	Elimination programme (Zero local cases)	Prevention of reintroduction programme
Goal	Reduce malaria morbidity and mortality	Halt local transmission	Halt local transmission	Prevent re-establishment of local transmission
Milestone for transition to next programme	SPR <5% in suspected malaria cases	API <1 case per 1000 population at risk per year	Zero locally acquired cases	
Case management	Update medicine policy, use of ACT for *P. falciparum* Laboratory diagnosis (microscopy/RDT) Clinical diagnosis sometimes acceptable Home management of malaria in certain situations Monitoring medicine efficacy	Medicine policy change: radical treatment for *P. vivax,* ACT and anti gametocyte treatment for *P. falciparum* 100% case confirmation by microscopy Microscopy quality assurance/quality control	Implementation of new medicine policy Routine expert microscopy Introduce active case detection	Case management of imported malaria Chemoprophylaxis prevention of malaria in travellers, Malaria case detection mechanism
Vector control	Scale up population coverage of ITN/LLIN or IRS Entomological surveillance	Geographical reconnaissance Total insecticide residual spraying coverage in active foci ITN/LLIN or larviciding as complementary measures in specific situations Entomological surveillance	Geographical reconnaissance Vector control in residual active and new active foci Entomological surveillance	Entomological surveillance
Malaria information system	Improve surveillance Malaria indicator surveys (MIS, MICS, DHS), parasite prevalence surveys	Establish GIS-based elimination database on cases, vectors and foci Special malaria surveys	Case investigation and classification Foci investigation and classification Routine genotyping – special malaria surveys Immediate notification of cases	Vigilance Case investigation *P. falciparum* outbreak notification in accordance with IHR (2005) Annual reporting to WHO on maintenance of malaria-free status
Health systems issues	Health system strengthening to increase access to diagnostics and treatment Scaling up home-based management and other community-based approaches	Engaging private sector Control of over-the- counter sale of antimalarial medicines Ensure availability of qualified trained staff	Full cooperation of private sector No over-the-counter sale of antimalarial medicines Free-of-charge diagnosis and treatment for all malaria cases	Integration of malaria programme staff into basic health services or with vector-borne diseases control programmes, malaria surveillance as part of the general surveillance system
Programmatic issues	Integration with other health programmes for increasing delivery of diagnostic and curative interventions Procurement and supply management Public–private partnership for improving compliance with national guidelines	Develop elimination programme Develop elimination strategy and plan of action Mobilize resources Establish malaria elimination committee Legislation Develop cross border/subregional initiative	Implementation of elimination programme Manage malaria elimination database, periodic review, oversight Implement cross border/subregional initiative	WHO certification process after 3 years from last local case
Classification of countries	Afghanistan, Djibouti Pakistan, Somalia, Sudan, Yemen	Islamic Republic of Iran	Saudi Arabia, Iraq	Bahrain, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Palestine, Qatar, Tunisia, United Arab Emirates*, Oman, Egypt, Morocco and Syrian Arab Republic

* United Arab Emirates was certified by WHO as malaria free in 2007

6. Conclusions

Malaria can be eliminated with the current tools from most areas of the Eastern Mediterranean Region as transmission is low and unstable. In the few high and stable transmission areas in southern Sudan and the southern zone of Somalia transmission can be markedly reduced and will result in eliminating malaria as a public health problem. The decision to proceed to elimination in those areas needs political stability and strong health and surveillance systems. In all countries, government interest in elimination is required and must be sustained even when the malaria burden is greatly reduced in order to achieve the desired elimination goal. The malaria situation in neighbouring countries will have to be taken into consideration in the decision to proceed to elimination. Regional initiatives and donor support to multicountry elimination projects must be encouraged to stimulate establishing functional intercountry cooperation.

WHO will provide the necessary technical support to countries to develop, implement and evaluate their plans for malaria elimination. WHO will assist countries in their efforts to mobilize resources for malaria programmes and health system strengthening, as well as in building the national capacity for malaria elimination and in coordination of cross-border activities. More investment in research will be required to develop novel tools and innovative strategies to address the challenges facing the programme in all phases and different settings, including complex emergency situations.

7. Recommendations to Member States

1. Where malaria is endemic, plan to eliminate malaria by 2020, with falciparum elimination preceding vivax elimination where both species co-exist.
2. Scale up efforts to intensify malaria control in high and stable transmission areas in Sudan and Somalia in order to eliminate malaria as a public health problem, and continue support to these areas in order to consolidate the achievements and proceed towards elimination.
3. Establish a high-level committee for elimination, allocate appropriate financial and human resources and include malaria elimination in the national development plan.
4. Ensure provision of diagnostic, treatment and preventive tools free of charge to all populations at risk and exempt such tools from all taxes and tariffs.
5. Establish stronger collaboration with research agencies/institutions in order to address programme needs for achievement of elimination, take immediate action to develop or update the malaria stratification and risk mapping using GIS methods to plan for elimination, and give priority to establishing/strengthening surveillance networks for monitoring parasite and vector resistance.
6. Make use of all available resources from national and other donors, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria and the GAVI Alliance for strengthening the health system, including stronger collaboration with the private sector, civil societies and community, with priority to areas targeted for malaria elimination.
7. Establish a functional mechanism for cross-border coordination and cooperation making use of available mechanisms for multicountry projects such as the Global Fund to Fight AIDS, Tuberculosis and Malaria.

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