

REGIONAL ACTION FRAMEWORK for

Malaria Control and Elimination in the Western Pacific (2016–2020)



Regional Action Framework for Malaria Control and Elimination in the Western Pacific (2016–2020)



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Western Pacific Region

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ABBREVIATIONS

ABER	annual blood examination rate
ACD	active case detection
ACT	artemisinin-based combination therapy
API	annual parasite incidence
APLMA	Asia Pacific Leaders Malaria Alliance
G6PD	glucose-6-phosphate dehydrogenase
GMS	Greater Mekong Subregion
GTS	WHO Global Technical Strategy for Malaria 2016–2030
IEC	information, education, communication
IRS	indoor residual spraying
ITN	insecticide-treated bed net
LLIN	long-lasting insecticidal net
LSM	larval source management
M&E	monitoring and evaluation
MMPs	mobile/migrant populations
MDA	mass drug administration
MVP	Malaria, other Vector-Borne and Parasitic Diseases (WHO unit)
NGO	nongovernmental organization
NMCP	National Malaria Control Programme
PCD	passive case detection
PSM	procurement and supply management
PQ	primaquine
QA	quality assurance
RDT	rapid diagnostic test
TES	therapeutic efficacy study (of antimalarial medicine)
TPR	test positivity rate
UHC	universal health coverage
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme

FOREWORD

In the Western Pacific Region, malaria control efforts have been an evolving success story. From 2009 to 2015, reported malaria deaths in the Region decreased by 85%, and overall cases reduced by 48%. Nine out of 10 of the malaria-endemic countries in the Region achieved the malaria targets of the Millennium Development Goals.

Building on these successes in alignment with the Sustainable Development Goals, the regional action framework lays a foundation for accelerating progress towards malaria elimination in the Region by 2030 – an ambitious goal endorsed by leaders across the Region.

Despite our progress, however, malaria burden remains unacceptably high among marginalized population groups in many of the endemic countries of the Region. More than 70% of malaria deaths in the Region are attributable to *P. falciparum*. This is particularly worrisome because of the presence of multidrug resistance in *P. falciparum*, especially in remote and hard-to-reach areas of Cambodia, the Lao People's Democratic Republic and Viet Nam. The presence of multidrug-resistant strains of this type of malaria in areas of the Greater Mekong Subregion reinforces the need to accelerate progress towards elimination. Unfortunately, *P. falciparum* malaria is not the only challenge we face. *P. vivax* and *P. knowlesi* strains also pose unique challenges that must be addressed by all countries in the Region.

We can overcome these challenges and improve on the progress towards elimination. This framework can help make that happen by helping countries build on successes and lay the groundwork for accelerated elimination. The framework provides countries with guidelines they need to strengthen surveillance systems and ensure access to proper and appropriate drug treatment options. This step will further reduce mortality and morbidity from malaria.

With the *Regional Action Framework for Malaria Control and Elimination in the Western Pacific (2016–2020)*, we hope to fulfil the hopes of all those affected by malaria across the Region for a healthier, happier and more prosperous future, free from the threat of this deadly disease.



Shin Young-soo, MD, Ph.D.
Regional Director

REGIONAL ACTION FRAMEWORK AT A GLANCE

OVERALL VISION: A Western Pacific Region free of malaria

- GOALS:**
- Reduce mortality due to malaria in the Region by 50%, and morbidity by at least 30%, by 2020, relative to 2015 baselines.
 - Achieve malaria elimination in three countries by 2020.
 - Establish and maintain elimination-capable surveillance systems in the Greater Mekong Subregion by 2017, and in all countries of the Region by 2020.

Strategic framework: pillars and objectives for 2016–2020

PILLAR 1	Universal access to malaria prevention, diagnosis and treatment
Objective 1.1	Achieve universal coverage with long-lasting insecticidal nets (LLINs) or indoor residual spraying (IRS) for all at-risk populations no later than 2020, especially in areas of high malaria transmission.
Objective 1.2	Achieve universal access to quality-assured malaria diagnosis and treatment no later than 2020, irrespective of household income, place of residence or gender.
PILLAR 2	Accelerate efforts towards elimination and attainment of malaria-free status
Objective 2.1	Interrupt transmission of <i>P. falciparum</i> in areas of multidrug resistance, including resistance to artemisinin-based combination therapy (ACT), by no later than 2020.
Objective 2.2	Accelerate progress towards malaria elimination in countries aiming for elimination by 2020.
Objective 2.3	Reduce malaria incidence in identified high-transmission areas to less than 1 case per 1000 population-at-risk by 2020.
Objective 2.4	Define first-level subnational administrative units where malaria transmission has been interrupted, and prevent the re-establishment of malaria in those areas.
PILLAR 3	Surveillance as a key intervention
Objective 3.1	To establish elimination-capable surveillance systems (including entomological surveillance) by 2017 in countries of the Greater Mekong Subregion (GMS) and in countries aiming for elimination by 2020, and by 2020 in all other malaria-affected countries of the Western Pacific Region.

SUPPORTING ELEMENTS

SUPPORTING ELEMENT 1

Strengthening the underlying health system and the enabling environment

- Strong political commitment and adequate domestic and external financial support for malaria elimination, including ensuring the availability of sufficient, adequately trained human resources at all levels.
- Capacity development appropriate to each country's implementation strategy.
- Active strengthening of underlying health systems to facilitate elimination, including increased efficiency of service delivery at the primary care level and of overall health financing.
- Inclusion of malaria services within broader policies for delivery of health services to meet the specific needs of mobile, migrant and hard-to-reach populations, while also addressing gender disparities in access to services.
- Intersectoral collaboration, private sector and community involvement.
- Advocacy to support subnational political commitment for elimination efforts and collective action.

SUPPORTING ELEMENT 2

Expanding research in support of improved service delivery and innovation

- Vector control and entomological surveillance, to better understand: the contribution of early and outdoor biting malaria vectors to malaria transmission; ecosystem receptivity and vulnerability to malaria; how to improve the cost-effectiveness of long-lasting insecticidal nets deployment; and the role of novel interventions.
- Case management, including approaches to: point-of-care testing for glucose-6-phosphate dehydrogenase deficiency; therapeutic efficacy monitoring; and the potential role of mass drug administration.
- Social and behavioural research, including operational research, to: better define the malaria burden among mobile/migrant and marginalized populations; help understand the factors, including gender disparities, that contribute to transmission risk among those groups; develop strategies to better manage transmission risk among those groups; and optimize behaviour change communication.
- Health systems research and analytic work: to facilitate rapid uptake of new tools, interventions and strategies as they are validated and strengthen, cost-effective delivery of interventions in elimination settings.

PRIORITY ACTIONS

AT REGIONAL LEVEL

- Establish an elimination-capable surveillance system for malaria in all malaria-affected countries of the Region, ensure appropriate use of data for effective targeting of interventions, and ensure regular monitoring of their malaria situation.
- Respond aggressively to and eliminate malaria in areas with multidrug resistance – including artemisinin-based combination therapy (ACT) resistance – in Cambodia, the Lao People’s Democratic Republic and Viet Nam.
- Respond aggressively to and reduce transmission throughout Papua New Guinea, and in high-transmission areas of the Lao People’s Democratic Republic, the Philippines and Solomon Islands.
- Strengthen technical support for countries that have made significant progress towards malaria elimination, thereby facilitating acceleration of elimination efforts by 2020.

AT COUNTRY LEVEL

- Ensure national and subnational political commitment and sustainable domestic funding and partnerships.
- Strengthen health system components (including surveillance, procurement and supply management, and logistics management information systems) to maximize efficiency through an integrated approach to facilitate universal, uninterrupted access to quality-assured primary and preventive care for malaria.
- Use surveillance data for regular micro-stratification to better target interventions.
- Eliminate malaria in areas of multidrug resistance, including resistance to ACT.
- Address the challenges posed by *P. vivax* and *P. knowlesi*.
- Determine malaria burden among mobile/migrant and marginalized population groups and ensure equity in access to services (including developing services tailored to the needs of those populations).
- Achieve rapid reduction of transmission in highly endemic areas through targeted delivery of both proven and innovative interventions.
- Ensure adequate uptake and effectiveness of interventions through sound monitoring and evaluation.

EXECUTIVE SUMMARY

Since 2000, the malaria burden in countries of the WHO Western Pacific Region has fallen steadily in real terms, although cases reported have risen recently in some countries, often as a result of increased case detection due to more extensive roll-out of rapid diagnostic tests for malaria. Reported malaria deaths in the Region decreased by 87% between 2000 and 2015.

The Region faces challenges on the road to malaria elimination. In particular, the epidemiology of malaria exhibits enormous diversity, with the disease often concentrated in remote areas and/or among highly mobile or hard-to-reach populations.

More than 70% of cases and almost all malaria deaths in the Region are due to *P. falciparum*. Resistance of *P. falciparum* to several antimalarial medicines, including artemisinin-based combination therapy (ACT), has reached alarming levels in Cambodia and there are early indications of ACT resistance in the Lao People's Democratic Republic and Viet Nam. Multidrug resistance is therefore both an impediment to elimination and a reason for pursuing it.

This *Regional Action Framework for Malaria Control and Elimination in the Western Pacific (2016–2020)* is guided by the *WHO Global Technical Strategy for Malaria 2016–2030* (GTS) and strongly aligned with the *Strategy for Malaria Elimination in the Greater Mekong Subregion (2015–2030)*. It has been developed through a series of consultations between national malaria programmes and their partners, and WHO and individual technical experts. Targets adopted in national malaria strategic plans and the East Asia Summit leaders' agreement to the goal of an Asia Pacific free of malaria by 2030 have also been taken into consideration.

The goals of the framework are: to reduce malaria mortality in the Western Pacific Region by 50% and morbidity by at least 30%, by 2020, relative to 2015 baselines; achieve malaria elimination in three countries in the Region by 2020; and establish and maintain elimination-capable surveillance systems in all malaria-affected countries of the Western Pacific Region by 2020.

The framework is modelled on the three pillars of the GTS:

1. Universal access to malaria prevention and case management services
2. Acceleration of efforts towards elimination and attainment of malaria-free status
3. Transformation of malaria surveillance into a key intervention

The framework follows the parallel approach of an aggressive pursuit of burden reduction in high transmission areas and the implementation of elimination strategies, with rigorous norms for surveillance and management in low transmission settings and in active transmission foci.

The framework has seven objectives under the pillars (see at-a-glance summary, above).

An immediate priority is the determined reduction in malaria incidence in identified high-transmission areas to less than 1 case per 1000 as soon as possible (in most cases, by 2020). Consistent with the *Strategy for Malaria Elimination in the Greater Mekong Subregion (2015–2030)*, priority is also given to the rapid interruption of transmission in areas affected by multidrug resistance, including resistance to ACTs. It is imperative that efforts to address drug resistance are based on evidence, and are well coordinated and closely monitored.

In areas and countries where transmission has been interrupted, the establishment of elimination-ready surveillance systems will help to maintain malaria-free status and prevent reintroduction, with a particular emphasis on strengthening preparedness and response capacities to tackle imported malaria.

The framework highlights the need for a supportive policy environment, at both the national and regional levels. All countries need to: ensure support from the highest level of government to achieve effective multisectoral commitment and engagement; ensure effective national leadership and governance, including stakeholder coordination and expand health services to provide full access for people living or working in remote areas including strengthening community-level services in areas with limited access to health services in accordance with national commitments to universal health coverage (UHC).

Malaria programmes must also be supported by an adequate enabling environment that includes stronger health systems and expanded research capability. The strengthening of health system functions must be planned and managed effectively, including the use of malaria related services as an entry point.

Countries must address the human resources requirements for malaria, centrally and at all levels of the health system. They must acquire adequate financing for malaria, but with an emphasis on the efficient use of all available health resources, especially at the subnational level. Integrated information systems also need further investment to ensure they are capable of delivering elimination.

Guided by the framework, all malaria endemic countries of the Western Pacific Region will aim for:

- a stronger health system that is able to deliver basic health services, including interventions to support malaria transmission reduction and elimination;
- universal coverage of malaria case management;
- universal coverage of appropriate vector control in transmission areas;
- full access to health and malaria services for mobile and migrant populations; and
- established and functional systems for malaria surveillance, including entomological surveillance.

Operations will be based on a careful assessment of technical and health system factors. In countries and subnational administrative units already reaching elimination or are already free of malaria transmission:

- systems for adequate case-based malaria surveillance and entomological surveillance will be established and fully functional, with mandatory notification of each case of malaria;
- operations will be based on epidemiological investigation and classification of each malaria case and focus;
- there will be total and effective coverage of all active foci with proven vector-control measures based on epidemiological investigations; and
- a national malaria elimination database will be established and operational.

At the Region level, resources will be leveraged to support: training and technical collaboration; the efficient and appropriate use of health and malaria finances; collaboration in border areas; ensuring the quality of antimalarial medicines; management and operationalization of high-priority research; monitoring and evaluation; and governance, coordination and political commitment.

A regional mechanism to review progress under the framework will be developed to identify lessons and experiences of mutual benefit within the Region, and to make adjustments to regional and national strategic approaches as appropriate.



1. Background

1.1 Malaria in the Western Pacific Region

The World Health Organization (WHO) Western Pacific Region includes 37 countries and areas and is home to 1.8 billion people – more than a quarter of the world’s population. Ten of those 37 countries continue to experience malaria transmission: Cambodia, China, the Lao People’s Democratic Republic, Malaysia, Papua New Guinea, the Philippines, the Republic of Korea, Solomon Islands, Vanuatu and Viet Nam. Overall, approximately 735 million people are at risk of malaria, including 31 million who are at high risk.

Malaria epidemiology exhibits enormous geographical and risk group related heterogeneity throughout the Region – even within countries. Countries generally conform to one of three epidemiological subgroups, based on their malaria transmission risk and underlying social and demographic factors. Transmission is generally most intense in the Melanesian area, mainly Papua New Guinea, some provinces of the Solomon Islands and, to a lesser extent, Vanuatu. In the Philippines and GMS countries, transmission is often more focal and affects ethnic minorities, migrant workers and other mobile populations disproportionately. Three countries are approaching elimination: China, Malaysia and the Republic of Korea.

Both *P. falciparum* and *P. vivax* are prevalent, but cases are due entirely to *P. vivax* in the Republic of Korea where there is some residual local transmission. In recent years, *P. knowlesi* has been recognized as the infective agent for an increasing number of cases, especially in Malaysia.

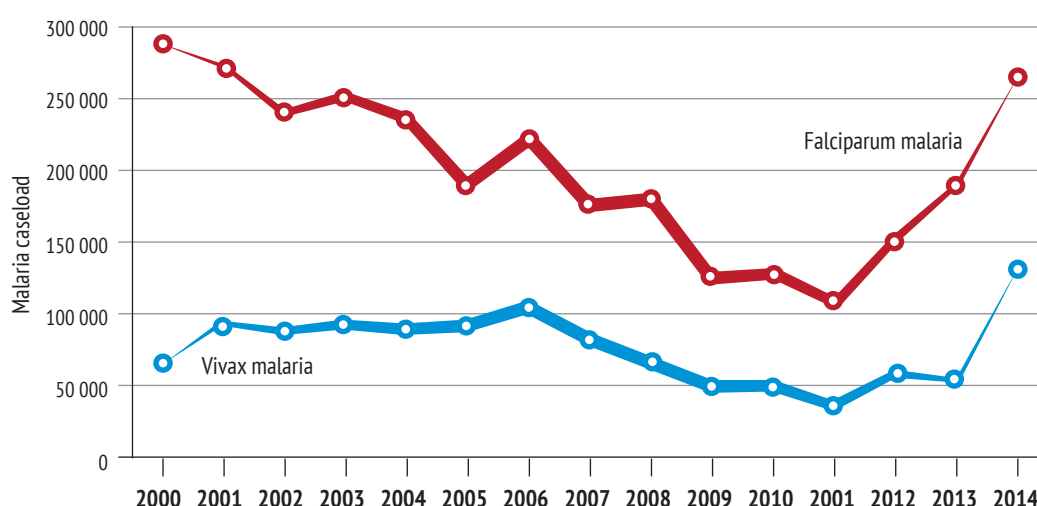
In 2015, three countries accounted for 91% of the just over 355 000 confirmed cases reported: Papua New Guinea (79%), Cambodia (7%) and Solomon Islands (5%). All countries except Papua New Guinea achieved a greater than 75% decrease in the incidence of microscopically confirmed cases between 2000 and 2013. The Lao People’s Democratic Republic reported a twofold increase in cases in 2012 and 2013, but case incidence remains less than 25% of 2000 levels.^{1 (1,2)}

1. Unless otherwise referenced, data cited in this section were either extracted from the *World Malaria Report 2015* database maintained at the WHO Regional Office for the Western Pacific, or were reported by national malaria programmes during the review of the *Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015)*.

Papua New Guinea had almost a fourfold increase in confirmed cases in 2015 compared with 2007, but this most likely reflects an increase in availability of diagnostics using rapid diagnostic tests (RDTs). Nationally representative household surveys indicated a drop in parasite prevalence from 12.4% to 1.8% between 2009 and 2014, while the incidence of malaria at four sentinel surveillance sites fell from 205 per 1000 to 48 per 1000 over the same period.⁽³⁾ These data are consistent with a reduction in malaria case incidence of more than 75%.

Figure 1 summarizes overall trends in reported malaria incidence for the Region as a whole. Further detail is provided in the Annex.

FIGURE 1 Malaria caseload in the Western Pacific Region, 2000–2014



Reported malaria deaths in the Region decreased by 87%, from 2360 in 2000 to 297 in 2014. Three countries accounted for 84% of all reported deaths in 2014: Papua New Guinea (68%), and China and Solomon Islands (each 8%). Vanuatu has reported zero deaths from malaria since 2012.

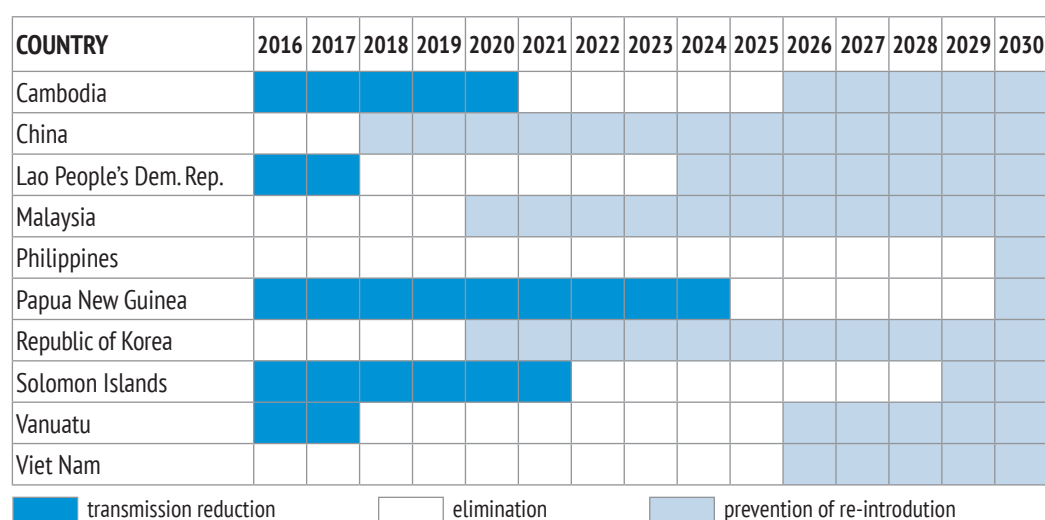
Malaysia is progressing towards elimination, reporting 5456 cases of non-zoonotic malaria in 2007 and 1337 in 2014; less than half of cases reported in 2014 were locally acquired – predominantly in the districts of Sabah and Sarawak.

In the Republic of Korea, which is in the elimination phase, the number of indigenous cases was 557 in 2014. China reported just 39 indigenous cases, including 6 cases of *P. falciparum* malaria and 50 cases of *P. vivax* in 2015, and is aiming to eliminate malaria nationally by 2020; 97% of cases reported in 2013 and 98% in 2014 were classified as imported.

The Philippines is proceeding with a subnational elimination approach and by 2015, had declared 30 of a total of 80 provinces malaria-free; the most malaria-affected provinces – Maguindanao, Palawan and Tawi-Tawi – are subject to political instability and/or have a substantial mobile population living in remote areas.

Figure 2 projects likely progress towards malaria elimination in countries of the Western Pacific Region over the next 15 years, based on current trends and national strategies.

FIGURE 2 Roadmap for malaria elimination for countries of the Western Pacific Region, 2016–2030



1.2 Challenges to malaria control and elimination in the Region

The major challenges to malaria control and elimination in the Region are due to the malaria parasite and host response, population and population movement, and the weaknesses of underlying health systems.

Challenges related to the malaria parasite and host response

Multidrug resistance of *P. falciparum* (including resistance to artemisinin-based combination therapy; ACT) is perhaps the single greatest threat, particularly in countries of the GMS. *P. vivax* parasites pose a unique set of challenges due to low density infections and relapses.

Other technical challenges related to the host response include: individuals who remain asymptomatic or have levels of parasitaemia that are too low to be detected using

currently available point-of-care diagnostic tools (noting also that the epidemiological implications for transmission are not completely understood); and the lack of a diagnostic tool for the detection of relapse causing dormant hypnozoite parasite forms of *P. vivax* in the liver.

High levels of glucose-6-phosphate dehydrogenase (G6PD) deficiency in affected population groups can result in possible severe adverse reaction to 8-aminoquinolines, the only class of drug available for the radical cure of *P. vivax* malaria.

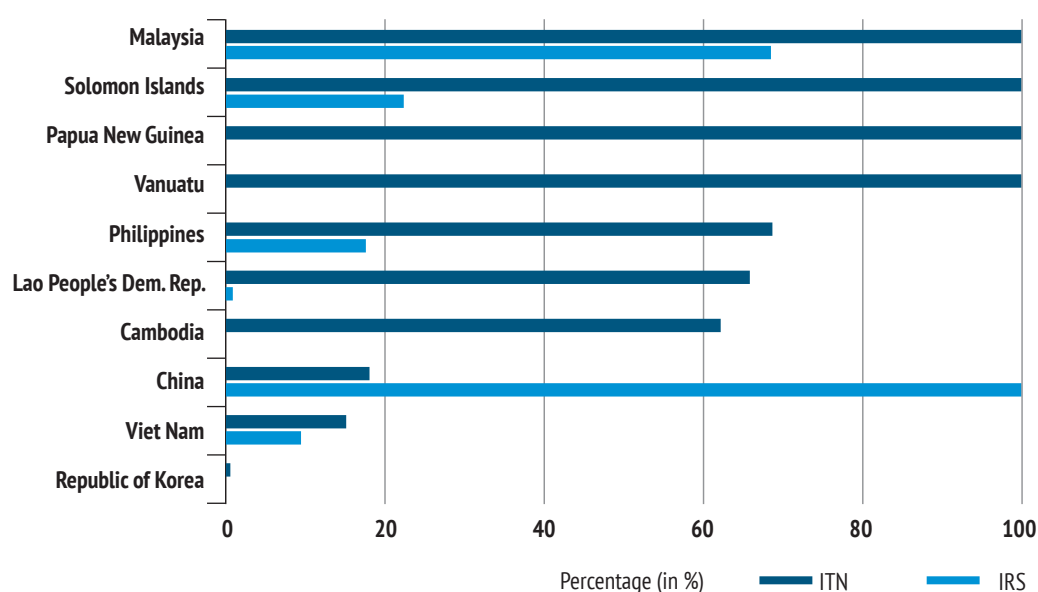
Additionally human infection with simian malaria such as *P. knowlesi* presents new challenges to malaria diagnosis, control and elimination that are unique to this Region.

Challenges related to populations

At the population level, malaria burden is often greater among mobile populations, migrants (both within countries and between countries) and minority groups and other hard-to-reach populations in remote areas or areas inaccessible due to conflict.

Ensuring universal access to malaria prevention interventions among high-risk populations will be a key activity for accelerating malaria elimination in the Region. Figure 3 presents World Malaria Report estimates of the proportion of high risk populations adequately protected by vector control interventions, such as insecticide-treated bed nets (ITNs) and indoor residual spraying (IRS).

FIGURE 3 Percentage of high-risk population in the Region protected by ITNs or IRS in 2014



Source: World Malaria Report 2015.

Increasing numbers of workers are also travelling from countries in the Region to malaria-endemic countries outside the Region, and add to the ongoing risk of malaria importation.(4,5)

Health system challenges

Key health system issues hampering progress in some countries include weak surveillance systems and capacity, limited human resources, insufficient funding and weak technical capacity.

Human resources capacity needs to be strengthened and maintained until transmission is interrupted, and possibly for some time thereafter. As malaria incidence falls to very low levels and interventions become more focal, a more complete integration of malaria services with broader primary and preventive care is recommended and will considerably reduce the need for dedicated malaria staff. However, it will still be necessary to retain quality technical leadership and management at national level.

Limitations in financing and technical capacity have seen a slowing of elimination efforts and a delay in elimination time-frames in Solomon Islands and Vanuatu. In Papua New Guinea, national revenues have been severely affected by a downturn in global oil and natural gas prices and this will inevitably place pressure on government investment in social sectors such as health and education.(6)

From 2008 to 2014, external donors provided about 90% of malaria financing in Melanesia (Papua New Guinea, Solomon Islands and Vanuatu) and about 80% in GMS countries (Cambodia, the Lao People's Democratic Republic and Viet Nam), and the proportion of donor financing was either steady or increasing over that period. Constrained donor budgets following successive global economic downturns are now likely to see a reduction in donor engagement in the Region, forcing countries to identify additional sources of domestic funds and to increase efficiencies within their health care systems. In the Philippines, the government provides an increasing proportion of malaria funding, currently about 50%. In China, Malaysia and the Republic of Korea, 100% of malaria funding is from government revenues.

Other health system challenges include:

- weak commodity procurement systems and supply chain management;
- weak systems for monitoring and evaluation;
- an unregulated private health sector, which may not participate effectively in surveillance systems and may allow the use of ineffective antimalarial medicines or marketing of unregulated vector control products; and
- periodic humanitarian and environmental crises and political instability, all of which compromise population access to health services.

1.3 Development of the Regional Action Framework

WHO Global Technical Strategy for Malaria 2016–2030

Endorsed by the World Health Assembly in May 2015, the Global Technical Strategy for Malaria 2016–2030 (GTS) was the result of an extensive consultation process that spanned two years. The GTS is discussed in more detail in Section 2.2, below.

The rationale for undertaking malaria elimination in the Region

Various factors have converged to create an urgent need for action to enhance, control and, where possible, accelerate elimination of malaria from the Region. These include: the magnitude of the threat of drug resistance; the commitment of governments; the contribution that malaria control and elimination can make to broaden health and development outcomes; the substantial impact and cost-effectiveness of the scaled-up interventions currently being applied; the keen interest of partners; and the additional momentum provided by recent scientific advances.

Also, in May 2015, the *Strategy for Malaria Elimination in the Greater Mekong Subregion (2015–2030)* – aligned with the GTS – was jointly launched by the ministers of health of GMS countries.

Malaria elimination represents a complementary approach to strengthening health systems and promoting health security in the Region, with the potential to leverage donor financing as disease-specific funding declines. Any delay in addressing the problem of multidrug resistance in the GMS could lead to the emergence of untreatable *falciparum* malaria or the further geographical spread of artemisinin resistance, which would adversely impact regional and global health security.

The *Strategy for Malaria Elimination in the Greater Mekong Subregion (2015–2030)* responds to the worsening multidrug resistance situation, including resistance to ACT. The strategy builds on the WHO recommendation that GMS countries affected by artemisinin resistance adopt the goal of accelerated elimination of *P. falciparum*, to counter the threat of multidrug resistance.

The need for a Regional Action Framework

The GTS presents a broadly inclusive approach for addressing current challenges to malaria control and elimination at the global level, while the *Strategy for Malaria Elimination in the Greater Mekong Subregion (2015–2030)* addresses the needs of a sub-set of countries with a specific threat from drug resistance.

Each WHO region needs to adapt the approaches of the GTS along the continuum of transmission reduction to malaria elimination to meet the specific needs of Member States.

Process of developing the Regional Action Framework

The planning process for developing the *Regional Action Framework for Malaria Control and Elimination in the Western Pacific (2016–2020)* included consultations with national malaria programmes in all malaria endemic countries in the Region, WHO country office malaria focal points and partners.

A regional malaria expert group convened in December 2015 to review the previous *Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015)* and to identify lessons that could inform the new framework. This was followed by a meeting of malaria programme managers in May 2016 to review and discuss a draft version of the framework.

This framework will serve as a guide to national planning and provide countries with a model to guide mobilization of domestic and external funding, based on WHO-endorsed strategies adapted specifically to the needs of the Region.



2. The Regional Action Framework

2.1 Vision and goals

OVERALL VISION:

A Western Pacific Region free of malaria.

ULTIMATE GOALS (by 2030):

- Eliminate malaria in all countries in the Western Pacific Region by 2030.
- Maintain malaria-free status and prevent reintroduction in countries and areas where malaria transmission has been interrupted.

GOALS FOR THE REGIONAL ACTION: FRAMEWORK 2016–2020

- Reduce mortality due to malaria in the Region by 50%, and morbidity by at least 30%, by 2020, relative to 2015 baselines.
- Achieve malaria elimination in three countries by 2020.
- Establish elimination-capable surveillance systems in GMS countries by 2017, and in all countries in the Region by 2020.

2.2 Alignment with the Global Technical Strategy

The *Global Technical Strategy for Malaria 2016–2030* is based on three interlinked strategic pillars and two supporting elements to guide global efforts towards malaria elimination and is summarized in the box.

The *Regional Action Framework for Malaria Control and Elimination in the Western Pacific (2016–2020)* follows the strategies proposed in the GTS. It adapts the three pillars and two supporting elements of the GTS to the malaria and health system priorities of countries in the Western Pacific Region for the first 5-year period of the GTS, 2016–2020. It also builds on lessons learnt from the review of the previous *Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015)*.

VISION: A WORLD FREE OF MALARIA			
GOALS	Milestones		Targets
	2020	2025	2030
Reduce malaria mortality rates globally compared with 2015	At least 40%	At least 75%	At least 90%
Reduce malaria case incidence globally compared with 2015	At least 40%	At least 75%	At least 90%
Eliminate malaria from countries in which malaria was transmitted in 2015	At least 10 countries	At least 20 countries	At least 35 countries
Prevent re-establishment of malaria in all countries that are malaria-free	Re-establishment prevented	Re-establishment prevented	Re-establishment prevented

STRATEGIC FRAMEWORK

Comprising three major pillars, with two supporting elements

MAXIMIZE IMPACT OF TODAY'S LIFE-SAVING TOOLS

Pillar 1. Ensure universal access to malaria prevention, diagnosis and treatment

Pillar 2. Accelerate efforts towards elimination and attainment of malaria-free status

Pillar 3. Transform malaria surveillance into a core intervention

SUPPORTING ELEMENTS

1. Harnessing innovation and expanding research

- Basic research to foster innovation and the development of new and improved tools
- Implementation research to optimize impact and cost-effectiveness of existing tools and strategies
- Action to facilitate rapid uptake of new tools, interventions and strategies

2. Strengthening the enabling environment

- Strong political and financial commitments
- Multisectoral approaches, and cross-border and regional collaborations
- Stewardship of entire health system, including the private sector, with strong regulatory support
- Capacity development for both effective programme management and research

Source: The WHO Global technical strategy for malaria 2016–2030

Principles underpinning the Regional Action Framework

The Regional Action Framework is guided by the following principles (five of which are modelled on the GTS, with three additional principles that are specific to the Western Pacific Region).

- All countries can accelerate efforts towards elimination through combinations of interventions tailored to local contexts.
- Country ownership and leadership, with participation of communities, are essential to accelerate progress through a multisectoral approach.
- Partners can maximize the use of national health systems for planning, procurement, service delivery and reporting, and wherever possible, partner support will aim to strengthen those national systems, rather than develop parallel mechanisms.

- A multisectoral approach includes the involvement of the private sector.
- Improved malaria case surveillance, periodic re-stratification based on the dynamics of malaria disease burden, M&E and entomological surveillance are required to optimize implementation of malaria interventions.
- Equity in access to quality assured preventive, diagnostic and curative services is essential, especially for the most vulnerable and hard-to-reach populations.
- Malaria prevention, case management and control services will be included in all packages of essential health services as UHC is rolled out in countries of the Region.
- Innovation in implementation approaches at the local level and the adoption of new tools will enable countries to maximize their progress towards malaria elimination.

Adapting the three pillars of the GTS to different transmission settings

The strategic pillars of the framework are aimed at guiding regional- and country-level actions to accelerate transmission reduction and ultimately eliminate malaria in the regional and country contexts.

The three pillars of the GTS represent a path towards elimination – a continuum – based on a steady transition through stronger surveillance systems and health system integration. Countries can use the strategies embedded in the GTS pillars to accelerate their progress towards malaria elimination from any point on the continuum, whatever their current malaria incidence or transmission intensity. As it is a continuum, there are also natural points of strategic overlap between Pillars 1 and 2, and between Pillars 2 and 3.

PILLAR 1

Ensure universal access to malaria prevention, diagnosis and treatment

This is the starting point for countries with higher malaria incidence rates and transmission intensity. Cornerstones are universal coverage of the population at risk with appropriate vector control and other preventive interventions and effective information on how to reduce the risk of malaria, backed up by ready access to quality-assured diagnosis, treatment and clinical follow-up.

Pillar 1 is worded in the language of UHC.² (7,8) In the context of UHC, “universal” does not necessarily mean 100% population coverage with every malaria control intervention (although it may, in settings of high transmission risk). Populations need access to defined interventions – “the services they need” – which will, in turn, be defined in

2. Universal health coverage means that all people can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship (World Health Report, 2010; Bangkok Statement: Priority Setting for UHC, 2016). A commitment to UHC is currently being adopted by most countries of the Region.

national malaria strategic and operational plans. This is likely to vary from population to population according to their transmission risk, especially where the malaria epidemiology in different parts of a country are at different stages along the continuum towards elimination, or where there are variations in the prevalence of specific risks (e.g. drug-resistant *P. falciparum*). Innovative approaches and non-traditional partnerships may be needed to reach mobile, migrant and other hard-to-reach populations (including ethnic minorities living in remote and/or border areas).

PILLAR 2

Accelerate efforts towards elimination and attainment of malaria-free status

This includes all of the strategic interventions that are needed as a national or subnational malaria programme successfully reduces transmission intensity. Specific challenges addressed during the period include: strengthening malaria surveillance and possible transition to case-based surveillance (depending on case numbers); implementation of universal, quality-assured parasitological diagnosis of every case; ensuring and protecting the efficacy of specified treatment protocols; developing specific strategies for addressing the challenge of *P. vivax*; and re-designing communicable disease control programmes and related elements of the health system along more integrated (rather than disease-specific) lines. Effective engagement with the private sector is essential.

The strategic interventions continue beyond achieving elimination and include early detection of possible imported cases and the prevention of reintroduction in areas where local transmission has been interrupted.

PILLAR 3

Transform malaria surveillance into a key intervention

This reflects the fundamental importance of effective surveillance to better understand transmission dynamics in control settings and elimination settings. In control settings, strengthened surveillance will provide for better targeting of interventions and in elimination settings will provide for responding appropriately to any cases identified. This will contribute to better allocation of resources in an efficient and effective manner, and will contribute to achieving accelerated reduction of malaria transmission.

Key activities under Pillar 3 can commence even while transmission intensity is relatively high. The process defined by Pillar 3 is: a programme reorientation which includes a

transition from population-based to case-based surveillance and response (at the correct time, which is when case numbers reach a low enough level for this to be both feasible and efficient); management of identified or potential foci of transmission; and ensuring rapid and timely response to identified cases.

2.3 Supporting elements

The framework has two supporting elements, aligned with the GTS but re-prioritized to reflect and address the needs of the Western Pacific Region. Each covers a number of key requirements for the successful acceleration of malaria transmission-reduction and elimination in the Region.

SUPPORTING ELEMENT 1

Strengthening the underlying health system and the enabling environment

- Strong political commitment and adequate domestic and external financial support for malaria control and elimination, including ensuring the availability of sufficient, adequately trained human resources at all levels.
- Capacity development appropriate to each country's implementing strategy.
- Active strengthening of underlying health systems to facilitate elimination, including increased efficiency of service delivery at the primary care level and of health financing overall.
- Inclusion of malaria services within broader policies for delivery of health services to meet the specific needs of mobile, migrant and hard-to-reach populations, while also addressing gender disparities in access to services.
- Intersectoral collaboration, private sector and community involvement.
- Advocacy to support subnational political commitment to accelerate control and elimination efforts and collective action.

SUPPORTING ELEMENT 2

Expanding four themes of research in support of improved service delivery and innovation

- Vector control and entomological surveillance, to better understand: the contribution of early and outdoor biting malaria vectors to malaria transmission; ecosystem receptivity and vulnerability to malaria; how to improve the cost-effectiveness of long-lasting insecticidal net (LLIN) deployment; and the place of novel interventions.
- Case management, including approaches to: point of care testing for glucose-6-phosphate dehydrogenase deficiency; therapeutic efficacy monitoring in elimination settings; and the potential role of mass drug administration.

- Social and behavioural research, including operational research, to: better define the malaria burden among mobile/migrant and marginalized populations; help understand the factors, including gender disparities, that contribute to transmission risk among those groups; develop strategies to better manage transmission risk among those groups; and optimize behaviour change communication.
- Health systems research and analytic work, to facilitate rapid uptake of new tools, interventions and strategies as they are validated, and strengthen cost effective delivery of interventions in elimination settings.

2.4 Priority actions

This *Regional Action Framework for Malaria Control and Elimination (2016–2020)* aims for an accelerated scale-up of appropriate interventions in all endemic areas, tailored to local epidemiology and health systems.

Nevertheless, to make the best and most efficient use of available resources, there is a need to prioritize at both regional and country levels.

Factors to be considered include the past and current intensity of transmission in an area, the degree of resistance to different antimalarial drugs and insecticides, and the size and mobility of affected populations. If a high-burden area is located near a low-burden area, then early reduction of transmission in the high-burden area will likely make it easier to achieve elimination in both.

PRIORITY ACTIONS AT REGIONAL LEVEL

- Establish an elimination-capable surveillance system for malaria in all malaria-affected countries of the Region,³ ensure appropriate use of data for effective targeting of interventions, and ensure regular monitoring of their malaria situation.
- Respond aggressively to malaria and eliminate in areas with multidrug resistance (including ACT resistance) in Cambodia, the Lao People's Democratic Republic and Viet Nam.
- Respond aggressively to malaria and reduce transmission throughout Papua New Guinea, and in high-transmission areas of the Lao People's Democratic Republic, the Philippines and Solomon Islands.
- Strengthen technical support to all countries, helping them to address the challenges posed by *P. vivax*, including countries that have made significant progress towards malaria elimination, and facilitate the acceleration of efforts to achieve elimination by 2020.

3. This analysis should include past malaria incidence data and risk determinants related to the human host, parasites, vectors and the environment.

PRIORITY ACTIONS AT COUNTRY LEVEL

- Ensure national and subnational political commitment and sustainable domestic funding and partnerships.
- Strengthen health system components (including surveillance, procurement and supply management, and logistics management information systems) to maximize efficiency through an integrated approach to facilitate universal, uninterrupted access to quality-assured primary and preventive care for malaria.
- Use surveillance data for regular micro-stratification to better target interventions.
- Eliminate malaria in areas of multidrug resistance, including resistance to ACT.
- Address the challenges posed by *P. vivax* and *P. knowlesi*.
- Determine malaria burden among mobile/migrant and marginalized population groups and ensure equity in access to services (including developing services tailored to the needs of those populations).
- Achieve rapid reduction of transmission in highly endemic areas through targeted delivery of both proven and innovative interventions.
- Ensure adequate uptake and effectiveness of interventions through sound monitoring and evaluation.

Local analysis may identify additional priorities

This prioritization does not mean that efforts to eliminate malaria in low-transmission areas should be put on hold, only that such efforts must not take precedence over addressing burden reduction and major threats such as drug resistance. In most countries, certain areas should be eligible for accelerated elimination as soon as the necessary systems have been developed. Ideally, those systems should be integrated into primary and preventive care services, with ongoing technical oversight to ensure quality of care.



3. Strategic approaches to achieving objectives for each pillar

PILLAR 1

Ensure universal access to malaria prevention, diagnosis and treatment

Objective 1.1: Achieve universal coverage with long-lasting insecticidal nets (LLINs) or indoor residual spraying (IRS) for all at-risk populations no later than 2020, especially in areas of high malaria transmission.

Objective 1.2: Achieve universal access to quality-assured malaria diagnosis and treatment no later than 2020, irrespective of household income, place of residence or gender.

The WHO recommended core interventions – quality-assured vector control, chemoprevention (where relevant), diagnostic testing and treatment – can dramatically reduce morbidity and mortality and accelerate the progress of national malaria programmes towards elimination. In areas of moderate-to-high transmission, ensuring universal access of populations at risk to interventions will be a principal objective for the Region and for national malaria programmes.

This framework recommends simultaneous implementation of two complementary sets of key interventions:

1. Prevention strategies based on vector control and, in certain settings and in some populations and occupational groups, administration of chemoprevention and the use of other personal preventive measures; and
2. Universal diagnosis and prompt, effective treatment of malaria in public and private health facilities and at the community level in high transmission settings.

Structuring national strategies and subnational programmes based on stratification of malaria by disease burden and an analysis of access to services will enable the tailoring of interventions to the local context and ensure efficient use of resources.⁴

4. This analysis should include past malaria incidence data and risk determinants related to the human host, parasites, vectors and the environment.

Vector control interventions

The selection of appropriate vector control interventions will be guided by eco-epidemiological stratification informed by malaria case and entomological surveillance data, including information on bionomics and insecticide susceptibility of the vectors. Where appropriate, implementation is encouraged within the conceptual framework of integrated vector management and products used should conform to the WHO Pesticide Evaluation Scheme (WHOPES) recommendations.

The use of insecticidal interventions will be guided by good insecticide resistance management practice.⁽⁹⁾

Long-lasting insecticidal nets (LLINs) are a core malaria prevention measure, widely used to reduce transmission and provide personal protection. Achieving and maintaining universal coverage of populations in transmission areas requires distribution of LLINs based on actual needs. Analysis of the age and gender of malaria cases at village or community level and the treatment-seeking behaviour of the different population groups should allow the most strategic and cost-effective targeting of LLIN distribution.

For most target populations, distribution of LLINs should be through periodic mass campaigns, incorporating locally appropriate and gender sensitive information, education and communication (IEC) to ensure high and correct usage. To maintain high levels of coverage and usage between mass campaigns, there should also be a continuous bed net supply and distribution system to provide replacement nets for established community members, as well as new or returning community members and immigrants.

Indoor residual spraying (IRS) operations across the Region are conducted as a primary prevention measure to accelerate transmission reduction, or as a reactive strategy to manage outbreaks or individual foci of transmission. IRS programmes need quality assurance (QA) systems to ensure appropriate targeting and high levels of coverage. Procurement cycles sometimes encounter serious delays, particularly in countries with small-scale operations, and there is a need to address these issues through improved planning.

Larval source management (LSM) refers to measures used to reduce mosquito breeding, either for primary prevention (through vector habitat modification), or for prevention of re-introduction of malaria following elimination. Methods include: environmental modification (such as drainage); habitat manipulation (controlling water levels, clearing aquatic vegetation); targeting aquatic habitats with larvicides; and biological control (for example, with larvivorous fish). Decisions on the use of LSM will be guided by the larval ecology, abundance of breeding sites and their accessibility and disease burden.

Chemoprophylaxis

Chemoprophylaxis should be considered for travellers going to high-risk areas in and outside the Region in combination with advice about measures to protect themselves from malaria vector bites. This is particularly important in countries aiming for elimination. The drugs currently recommended for chemoprophylaxis are described in relevant WHO technical guidelines.⁽¹⁰⁾

Case management

Universal coverage with early diagnosis and effective treatment reduces morbidity, mortality and transmission. Case detection can be through passive case detection (PCD), active case detection (ACD), or screening for malaria in high-risk groups.

The diagnosis of malaria infection is primarily based on blood examination by quality-assured RDT or microscopy. Provided diagnostic QA is in place, both methods are suitable for both surveillance and case management, however, microscopy has advantages for follow-up of patients, detection of gametocytes and determination of parasite density.

Treatment for falciparum and non-falciparum malaria should be in conformity with national treatment policies and based on WHO guidelines. It is essential to ensure adherence to the full course of prescribed malaria medication – not only to ensure adequate clinical and parasitological response, but also to reduce the further risk of drug resistance developing in malaria parasites.

Currently, all medicines recommended for the treatment of uncomplicated falciparum malaria are ACTs. Treatment should also include primaquine (PQ) to eliminate gametocytes, responsible for uptake into vector mosquitoes and continued transmission of malaria. PQ may cause haemolysis in G6PD deficient individuals but, for treatment of falciparum malaria where only its gametocytocidal effects are necessary, a safe single and low dose of PQ has been identified and recommended by WHO which can be used without determining G6PD status of patients.⁽¹¹⁾

In patients infected with *P. vivax*, the standard treatment is with chloroquine or ACT, plus a 14-day course of PQ for prevention of relapse. The G6PD status of patients with vivax malaria should be used to guide administration of PQ (see also Specific strategies for *P. vivax* under Pillar 2).

Monitoring drug efficacy is also important, through therapeutic efficacy studies using standard WHO protocols and enhancing pharmacovigilance to detect unexpected adverse events.

Avenues for service delivery

Achieving universal coverage with quality-assured diagnostics and antimalarials requires three channels of service delivery to be considered: public, private and community-based (the latter in remote high transmission settings). The optimal mix of these channels and the best strategy for delivering them will vary between and within countries. Where malaria incidence remains high, maximizing coverage through all three channels is likely to be the best approach, provided efforts are made to improve and maintain quality and minimize out-of-pocket expenditures for malaria services. In elimination settings, the roles for each channel should be reviewed and defined, depending on the country situation and local conditions, to ensure optimal case management, surveillance and reporting in all areas.

In areas well served by the public health sector, all facilities serve as free diagnosis and treatment centres for malaria. Restricting certain services to public health facilities can help to ensure that they are delivered according to standard guidelines. However, the public health sector in some countries remains under-resourced and challenged by human resources and supply chain issues, while the reach of the health service network may be inadequate, especially in sparsely populated or remote areas.

Several national programmes have engaged with the private health sector for delivery of malaria curative services. The private health sector may include:

- licensed private medical practitioners,
- licensed pharmacies,
- authorized services belonging to private companies catering to their employees,
- not-for-profit services such as nongovernmental (NGO) and faith-based organizations.

All of these service providers can be involved in case management where the number of cases remain high and access to public sector facilities are limited. The public sector will continue to play a central role in communication, training, monitoring and data management, QA and, in many cases, provision of diagnostics and medicines.

The diagnosis and treatment of malaria by private service providers should not incur any financial hardship for the patient or their family.

Some countries have well-established, free, community-based services for malaria. Technically, community service providers are a part of public services but the providers themselves are usually volunteers who depend on the support of their community, an NGO or the National Malaria Programme. Community-based services are often the best solution for remote areas, when disease burden remains significant and access to any other type of health service is limited. As the disease burden decreases, countries should consider reducing the numbers of volunteers and focus on improving the quality of services they provide.

Severe malaria still remains a major threat in most countries, even in countries nearing elimination. Facilities for urgent provision of medical attention, including diagnostics and WHO recommended first- and second-line treatments in accordance with national treatment guidelines, should continue to be readily available in health facilities. In elimination settings, ensuring awareness among clinicians is also important.

Addressing potential barriers to universal coverage

Providing necessary services of appropriate quality for high-risk populations, which may include mobile, migrant and other hard-to-reach populations, is essential. Malaria burden remains high in such populations due to limited access to health services, which include malaria information, prevention, diagnosis and treatment. Weak health systems in remote areas, irregular supplies and staffing and even sociocultural practices in population groups could be limiting access to services. Elimination will not be achieved unless these diverse population groups have access to malaria prevention interventions, early diagnosis and treatment, and appropriate follow up.

All countries must assess the burden of malaria among these marginalized communities and mobile/migrant populations and understand factors contributing to this higher burden. Such an analysis will provide for proper and timely targeting of interventions to maximize effectiveness. Key actions for detecting, protecting and providing access to diagnosis and treatment for high-risk marginalized populations, including mobile/migrant populations (MMPs) are:

- defining clearly the burden of malaria in these groups;
- understanding factors contributing to higher burdens among them;
- strengthening the availability of diagnosis and treatment in health facilities;
- ensuring the inclusion of malaria prevention, diagnosis and treatment in comprehensive packages of health care interventions, in accordance with the principles of UHC;
- empowering marginalized populations by ensuring they understand the disease through culturally appropriate and gender-sensitive communication;
- developing partnerships through NGOs, faith-based organizations, non-health sector service providers (for instance, education) and employer groups that may have more regular contact with remote populations;
- maintain robust supervision and monitoring systems to ensure the quality of patient care; and
- phase out the use of standby treatments early, as morbidity decreases and service coverage (including increased access to RDTs) and utilization improve.

Province-level malaria units should include mobile and outreach teams for managing malaria in marginalized populations. Efforts to ensure and improve patient adherence to the full treatment regimen are necessary, especially for 14-day radical treatment of vivax malaria.

For case management, it is critical that medicines are effective and of good quality, and that supplies are adequate. Procurement and supply management systems and logistics management systems should be strengthened to prevent stock outs of antimalarials. Efforts to eliminate counterfeit and substandard medicines must be continued.

Drug regulatory agency functions will be strengthened to:

- eliminate artemisinin monotherapy products and register only quality-assured medicines and diagnostics;
- strengthen QA during and after registration to prevent the manufacture and sale of substandard products;
- intensify surveillance to detect and eliminate the sale of spurious, falsified, falsely labelled and counterfeit products;
- improve national capacity for quality-control testing and cross-border enforcement activities to reduce the flow of counterfeit and substandard products; and
- fast-track registration of new antimalarials based on country needs and resistance status.

PILLAR 2

Accelerate efforts towards elimination and attainment of malaria-free status

Objective 2.1: Interrupt transmission of *P. falciparum* in areas of multidrug resistance, including resistance to artemisinin-based combination therapy (ACT), by no later than 2020.⁵

Objective 2.2: Accelerate progress towards malaria elimination in countries aiming for elimination by 2020.

Objective 2.3: Reduce malaria incidence in identified high-transmission areas to less than 1 case per 1000 population-at-risk by 2020.

Objective 2.4: Define first-level subnational administrative units where malaria transmission has been interrupted, and prevent the re-establishment of malaria in those areas.

5. In areas of multidrug resistance, including ACT resistance, that have already been identified, elimination will be achieved as rapidly as possible, and by no later than 2020. Transmission of *P. falciparum* in any additional areas of multidrug resistance, including ACT resistance, detected in future will be interrupted as soon as possible depending on the epidemiological setting, by no later than 2015.

Accelerating progress towards malaria elimination builds on the efforts under **Pillar 1**, where universal coverage with effective interventions for vector control and case management is achieved.

Pillar 2 describes a transitional stage as the intensity of malaria transmission reduces and/or transmission risk becomes more localized in well-defined geographical areas and administrative units. Pillar 2 envisages a progressive narrowing of intervention delivery from the wider population to distinct geographic areas, then to transmission foci and eventually to individual cases. The aim is to further rapidly reduce the malaria burden through better use of surveillance data (Pillar 3) and target intervention delivery and to start minimizing the risk of onward (secondary) transmission, based on programme capacity.

Investments in surveillance – **Pillar 3** – will need to be made early, irrespective of a country being in control or elimination phase to make optimum use of available resources. As countries near elimination, surveillance should become case-based and should ensure that every infection is detected, investigated and reported. Interventions should target both parasites and vectors to interrupt local transmission, eliminate all malaria parasites from the human population and manage the risk of re-establishment through imported malaria. This will often require a phased geographic approach.

Malaria programme reorientation

As the number of malaria cases is reduced to low levels in a given country or subnational area, countries will need to make a number of adjustments to their national malaria strategies, including: improving the quality and targeting of vector control operations; maintaining universal access to malaria diagnosis and treatment; maintaining the awareness of health workers; and ensuring the quality of the public health response to identified cases.

In many cases, this will involve adjustments to the core prevention and case management interventions described under Pillar 1, meaning that the following programme capacities and aspects need to be reviewed, refined or strengthened:

- establish a national malaria elimination oversight (monitoring) committee – see Supporting Element 1;
- strengthen the health information system, including: centralized management; engagement of all health-care providers in malaria case surveillance; immediate, mandatory notification of all malaria cases; and entomological surveillance;
- set up an elimination database, including a register of national or subnational foci;
- improve and maintain the coverage of quality preventive and curative health services in all transmission areas, especially where MMPs constitute an ongoing risk group;
- ensure universal parasitological confirmation of all malaria cases and compliance with national treatment guidelines to ensure total clearance of parasites;

- reorient governmental and nongovernmental private health service providers towards the new goals of malaria elimination;
- strengthen programme resources (personnel and logistics) in a way that ensures better long-term integration with the broader health system;
- reduce dependence on community-level volunteers as the disease burden falls; and
- establish and strengthen programmes in international and/or domestic border areas and points of entry (especially those servicing endemic areas).

Ensure integration and strengthening of the health system

Priority health system considerations for countries and areas accelerating towards elimination include:

- political advocacy to ensure commitment and continuity of predictable long-term domestic funding, with the assistance of development partners (where necessary);
- legislative aspects to control the quality and supply of antimalarial medications and to make malaria subject to immediate, mandatory notification;
- significant investment in broader health information systems, including centralized reporting for malaria case and entomological surveillance to efficiently gather information about the spatio-temporal spread of malaria in affected populations, early adoption of case-based surveillance in low endemic settings, use and dissemination of these data to efficiently target the delivery of interventions, early outbreak reporting, and preparedness and response; and
- improving supply management to reduce any shortages and prevent stock out in the public supply chain.

Simultaneously, malaria programme management should be strengthened to ensure that it is operating optimally at all levels of the health system (see Supporting Element 1).

*Aggressive interruption of *P. falciparum* transmission in areas of drug resistance*

Deterioration in the efficacy of ACTs in specific areas of the GMS could seriously threaten progress achieved in the Region to date and requires an aggressive response. These actions and safeguards are defined in the *Strategy for Malaria Elimination in the Greater Mekong Subregion (2015–2030)*, and build on the diligent targeted application of interventions already described under Pillar 1:

- ensure universal access to preventive and curative services,
- ensure compliance with national treatment guidelines, and
- ensure national treatment policies include the most efficacious treatment.

Monitoring of resistance to antimalarials should be done in each country, based on most recent WHO guidelines:

- perform routine monitoring of therapeutic efficacy of first- and second-line medicines through therapeutic efficacy studies (TES), where blood samples are also collected and analysed for molecular markers of resistance; and
- timely change of antimalarial treatment policy when required, and ensuring implementation of the new policy is supported by effective communication to treatment providers and timely availability of new antimalarial drug/s if introduced.

Once the number of patients falls to low levels, it is no longer possible to recruit sufficient subjects for TES in a timely way. Instead, the focus should be on attempting extended follow-up for all patients with parasitological testing on the days specified in the WHO TES protocol for the ACT in question.

*Specific strategies for *P. vivax**

P. falciparum usually disappears from an area before *P. vivax*, leaving vivax malaria as a particular challenge for elimination programmes.

The multiple challenges related to vivax malaria (which need specific strategies) include: a wider geographical range than falciparum malaria; the appearance of gametocytes in peripheral circulation even before the manifestation of signs, meaning that transmission may occur before symptoms appear;⁶ parasitaemia is typically low compared with *P. falciparum* (making it more difficult to detect and treat than *P. falciparum*); the dormant hypnozoites in the liver cannot be detected with existing diagnostic tests, but can nevertheless give rise to multiple relapses; and malaria due to chloroquine-resistant *P. vivax* is spreading.

The effective control of vivax malaria and the new tools required to address the challenges of the hypnozoite reservoir are described in more detail in relevant WHO guidelines.⁽¹²⁾ All patients with laboratory-confirmed vivax malaria should be treated with a regimen for a radical cure to clear hypnozoites. Hypnozoites of *P. vivax* can currently only be eliminated with a 14-day course of PQ, with the attendant risks of haemolysis in individuals with G6PD deficiency. An additional challenge in the Region is the presence of *P. vivax* belonging to the Chesson strain, which requires higher doses of PQ. The recommendation is to screen for G6PD deficiency prior to primaquine administration, particularly in areas where variants of G6PD deficiency giving rise to severe haemolysis are prevalent.

Vector control in elimination settings

The delivery of preventive measures should be appropriate to local vector biology, transmission setting and population characteristics to accelerate the impact on transmission,

6. This means that prompt and effective treatment has less influence on transmission of *P. vivax* than is the case with *P. falciparum* and other malaria species.

morbidity and mortality. Even where substantial reductions in malaria transmission have been achieved, universal coverage with vector control interventions for most populations still at risk of malaria should be maintained as per WHO guidelines.

WHO recommends a cautious approach to the potential scale-back of vector control interventions in areas with ongoing local malaria transmission, due to the high risk of resurgence.⁽¹³⁾ That risk increases with increasing receptivity and/or importation rates, especially where coverage of active disease surveillance and case management is fragile.

In areas where transmission has been interrupted, the defined population at risk should be adjusted downwards as geographic areas progress towards elimination. If case-based surveillance and response systems are established and functional, a gradual scale-back from universal LLIN coverage to a more targeted approach to specific populations or geographic foci is recommended, based on a detailed analysis of receptivity and vulnerability.

Other vector control interventions such as targeted IRS or larval source management could still be relevant as part of the response to outbreaks, or strategy to eliminate transmission foci.

Management of transmission foci

In settings where the rate of transmission is very low, it is important to maintain capacity for active detection of malaria infections, including maintaining a high degree of awareness among physicians. Prompt notification, case investigation and an adequate, prompt response are important for clearing foci of transmission (see description under Pillar 3).

PILLAR 3

Transform malaria surveillance into a key intervention

Objective 3.1: To establish elimination-capable surveillance systems (including entomological surveillance) by 2017 in countries of the Greater Mekong Subregion (GMS) and in countries aiming for elimination by 2020, and by 2020 in all other malaria-affected countries of the Western Pacific Region.

As areas and countries achieve interruption of transmission, programmatic focus needs to ensure maintenance of success and prevention of reintroduction. The probability of malaria becoming re-established in a malaria-free area varies according to the area's receptivity and vulnerability.

Malaria case surveillance

The elimination of malaria will require the application of malaria case-based surveillance. The transition of surveillance systems from transmission-reduction to elimination will require revision of guidelines, staff training and strengthening supervision.

Rationale for enhanced malaria case surveillance

In accelerating towards elimination, malaria case surveillance aims to:

- detect and notify all malaria infections, ensuring that they are given early treatment to prevent secondary cases and, wherever possible, receive appropriate clinical and parasitological follow-up; and
- investigate each malaria case to determine whether it was locally acquired or imported; case investigation and classification should be completed within one to three days, depending on available health system and malaria programme capacities and factors affecting accessibility, such as geographical terrain.

Key actions

Key actions will include:

- clearly define, at the first level of subnational administrative unit, areas free of malaria transmission;
- establish reliable malaria case-based surveillance and entomological surveillance systems, with full coverage of malaria-free, at-risk areas;
- maintain adequate epidemiological and entomological capabilities to mount an early and effective response to imported malaria;
- maintain a high degree of vigilance and ensure easy access to quality-assured laboratory diagnosis, and effective treatment for every individual; and
- establish an integrated epidemic preparedness and alert system, utilizing and enhancing existing outbreak response mechanisms.

Implementation

Elimination-ready surveillance systems need to be established and functional in all countries reaching elimination thresholds. Countries aiming for national elimination by 2020 should already have such systems in place.

Other countries in the Region are strongly encouraged to adopt such systems: at the national level by the end of 2017 for GMS countries; and at the subnational level for other countries in administrative units reaching elimination thresholds to prevent reintroduction. Once a local case of malaria has been detected and notified, a focus investigation is carried out by malaria staff to assess the risk of transmission in the locality where malaria occurred.

Design of the malaria case surveillance system

The design of a malaria surveillance system depends on the level of malaria transmission and the resources available to conduct surveillance. In high transmission settings there are still many cases of malaria, therefore it is rarely possible to examine and react to each confirmed case individually. Instead, any response is based on aggregate numbers and action taken at a population level. As transmission is progressively reduced, it becomes increasingly possible (and necessary) to track, investigate and respond to individual cases.

The government can regulate reporting by formal health providers, which makes it easier to incorporate details into national malaria surveillance systems. In contrast, the informal health sector is more difficult to include because of a lack of regulation and enforcement, while supervisory outreach capacity may be unable to reach village malaria volunteers frequently.

Human resources and infrastructure for surveillance in accelerating towards elimination

Health staff should be trained to investigate malaria cases. This usually requires adequate supervision by someone knowledgeable about national malaria policy and the principles of elimination. In hospitals, this is often done by laboratory technicians.

The investigation form is filled in and forwarded to a province or district malaria officer, who reviews it, classifies the case and communicates it to higher levels, where it is again reviewed. The investigation and management of cases requires expertise and training in epidemiology, entomology and operations management. Such capacity could be based at provincial or district level.

Timeliness of response is key, and China provides a good example with its “1–3–7 strategy” which requires malaria cases to be reported within one day, full case investigation to be conducted within three days, and response actions to be taken within seven days.⁽¹⁴⁾ Such a scheme makes it clear to health workers what is required and also allows the monitoring of performance against a benchmark.⁷ Countries may wish to adopt a similar system based on availability of resources and capacities of the health system. Malaria should by this stage, be subject to mandatory reporting. The surveillance and response

7. The Philippines is currently investigating the feasibility of implementing a 1-3-5 reporting and response protocol at selected subnational sites.

system will therefore undergo some convergence with systems for reporting other diseases of public health importance that are subject to notification within 24 hours.

Detection and prevention of malaria outbreaks and epidemics

It is essential to ensure that mechanisms are in place to predict outbreaks where possible, detect them at early onset and rapidly respond with a comprehensive package of services to halt transmission at the earliest opportunity. As the malaria case burden decreases in countries nearing elimination, it becomes important for countries to use existing standard outbreak response mechanisms rather than sustaining outbreak response capacity within national malaria programmes. Such a shift will help most programmes to respond more rapidly to outbreaks in many countries and will facilitate a more effective shift to prevention of re-introduction. ACD and focal-responsive vector control, combined with early detection and prompt treatment of malaria through existing health services, have proven to be effective in accelerating towards elimination and also preventing re-introduction.

In areas of high transmission, national contingency plans should be available with an indication of the channels to be used to transfer emergency funding and to facilitate early delivery of necessary supplies to areas affected by outbreaks. The effectiveness of preventive action is heavily dependent on the speed with which national and relevant subnational health services mobilize the necessary resources.

Prevention of re-establishment of local malaria transmission

Even after the disease has been eliminated from a country or subnational area, continued risk of importation of malaria means that the access to and quality of case detection must remain high.

Vigilance for possible renewed local transmission is a responsibility of general health services as part of their normal function in communicable disease control. Health systems should maintain their capacity for:

- early diagnosis of all cases of malaria through a system of case-based surveillance and rapid, aggressive response;
- treatment of all malaria cases promptly and adequately within the public and private health sectors, and prevention of onward transmission and risk of death from imported malaria; and
- improvement of preventive practices among travellers through effective and evidence-based pre-travel health advice on chemoprophylaxis and measures to protect against mosquito bites, aimed at reducing the importation of parasites.

Visitors and migrants from endemic areas should be informed of the risk that they may be carrying malaria and given easy access to diagnostic and treatment facilities.



4. Supporting elements

SUPPORTING ELEMENT 1

Strengthening the underlying health system and the enabling environment

Countries and areas accelerating towards elimination need to consider and address a number of priority areas within their health systems. Simultaneously, malaria programme management should be strengthened to ensure that it is operating optimally at all levels of the health system.

Strong political commitment to elimination

The level of political commitment for elimination of malaria in the Asia Pacific region is unprecedented. At the 9th East Asia Summit in 2014 in Myanmar, heads of government agreed to the goal of a malaria-free Asia Pacific by 2030. At the 10th East Asia Summit in November 2015 in Malaysia, the leaders endorsed a high-level malaria elimination road map developed by the Asia Pacific Malaria Leaders Alliance (APLMA).⁽¹⁵⁾

To ensure these commitments are successful, the *Regional Action Framework for Malaria Control and Elimination in the Western Pacific (2016–2020)* must be backed by an effective national policy and leadership environment, in which:

- a high-level multisectoral national malaria elimination committee or task force is established and functional and chaired by a senior central agency official, which will ensure policy harmonization across government and effective coordination between the public, nongovernmental and private sectors;
- national level political commitment is translated to subnational political commitment up to the smallest administrative units;
- political commitment is translated into adequate and sustained financing of malaria elimination, including an increase in domestic financing;

- the health system is strengthened, including adequate and trained human resources, and is able to deliver basic health services, including interventions for malaria elimination;
- malaria is made a notifiable disease, subject to mandatory reporting (within 24–48 hours in countries and areas in the elimination phase);
- appropriate legislation is in place to ensure the regulation and quality of antimalarial drug supplies;
- case-based malaria surveillance is established and fully functional across the country;
- planning and implementation of elimination activities is based on epidemiological investigation and classification of each malaria case and focus;
- universal access to quality assured diagnosis and treatment is supported within UHC plans;
- full coverage with proven vector-control measures of all populations in active foci of malaria; and
- a national malaria elimination database is set up and operational.

Adequate financial allocations

Successful malaria elimination requires adequate planning and budgeting, permitting programme staff to focus on implementation issues rather than fund-raising, and activities should be conducted with sufficient lead-time and the necessary mobilization of resources.

A strong participatory approach (with clear roles and responsibilities of all partners concerned) and regular exchange of information and consultations between WHO, partners and national programmes should be encouraged and promoted. This will enable the regional partnership to function more effectively and to better coordinate malaria elimination efforts and facilitate resource mobilization.

Countries must be prepared to increase national investments. It is crucial for every country in the Region to ensure that adequate financial resources are available during all phases of the strategy. Even when the burden of infection falls to very low levels and even after the attainment of malaria-free status, surveillance systems to prevent reintroduction need to be maintained, especially in countries with high receptivity and vulnerability, as well as for a rapid and effective response in case of outbreaks.

Greater flexibility in programme implementation is needed as the epidemiology changes. Investments in personnel, infrastructure and surveillance systems for malaria elimination can and must be designed so that they enable health systems to better tackle other

priority public health issues and contribute towards the goal of UHC. Such changes support more efficient use of all available funding.

This is a particular challenge for indigenous population groups and MMPs, who are a priority groups for prompt access to free quality services despite low population density, mobility, different languages and, in some circumstances, undocumented status. Sustained investments are necessary on the part of the ministry of health for general health service staff in remote areas and creative engagement with employer groups, border control officials, and agencies and NGOs providing services to affected remote, mobile populations and indigenous minorities.

Elimination of malaria in the Region is both a regional and a global public good, because addressing resistance of *P. falciparum* to antimalarial agents is both a driver and an outcome of the elimination programme with global repercussions. Thus, it merits continued support from both global and regional development partners.

Stability of funding and the flexibility to respond to changing needs is also essential for an elimination programme as delays in disbursements can lead to malaria resurgence, where gains made over several years can be lost in less than a few months.

Various options for innovative financing to support malaria elimination programmes have been proposed, (16) and a combination of some of these mechanisms might well support malaria elimination.(15) Examples include hypothecated taxes such as those levied on the sale of alcohol, tobacco and sugary foods,⁸ tourism and airline levies, lotteries, private sector networks or sponsorship,⁹ and innovative debt financing mechanisms.

APLMA and WHO are both well placed to analyse which schemes would be best adapted to country-specific situations, or collectively to the regional malaria context. However, this requires the strong involvement of all national governments concerned and relevant partners.

Enhancement of technical capacity of the national malaria programme

In recent years, technical capacity within national programmes has declined in several countries of the Region. This is due to a number of factors, including: an ageing workforce; limited opportunities for high-level training; administrative fragmentation consequent to decentralisation of the health system; and increased staff attrition due to recruitment by partner agencies. Urgent steps will need to be taken in affected countries to strengthen capacity at all levels of the health system, in line with the requirements for elimination.

8. An example is the “sin tax” levied on alcohol and tobacco in the Philippines and earmarked for the health sector including the national malaria programme.

9. For example, the Papua New Guinea Industry Malaria Initiative (PIMI) guides the country’s major resource sector companies in establishing public-private partnerships with the provincial governments in areas where they work. The goal of PIMI is to accelerate implementation of Papua New Guinea’s National Malaria Control Strategy, with the further specific goal of achieving malaria elimination.

Health systems strengthening to facilitate malaria elimination

Many countries in the Region have strong economic growth and their health systems are improving, but further accelerated strengthening is required to achieve malaria elimination targets. The following health system functions are critical to decision-making and planning for elimination and should be addressed at the highest level of the ministry of health, possibly at cabinet level.

Malaria is a vital component of regional health security and progress in malaria elimination is also linked to strengthening surveillance systems. Integrated surveillance system strengthening will benefit both malaria and the wider regional health security agenda. Strong surveillance systems and a high quality of malaria control operations will require investments in human resources. This may be achieved through efficiency gains, such as sharing responsibilities with existing surveillance cadres at provincial and district levels, utilization of existing generic outbreak response mechanisms at national and subnational levels, or by literally expanding the malaria work force. This could be achieved in a cost-neutral manner to the malaria programme and health service in some situations through private sector partnerships, engagement of village malaria volunteers or collaboration between other public health programmes. In some countries, this may require some minimum strengthening of malaria staff numbers.

Acceleration of malaria elimination activities requires some personnel to be devoted entirely to malaria. Alternatively, general public health and primary care clinical staff could devote sufficient time for malaria surveillance and response, but they will need some retraining. Such an approach will necessitate some efficiencies in the way rural primary care and preventive services are organized, resourced and managed.

Staff must be motivated and maintained until transmission is interrupted, and possibly thereafter. Human resources required may appear to be disproportionate to the disease burden but this can be addressed by careful task management within the malaria programme or primary health-care settings so that overall programme goals can still be achieved (technical efficiency) and through multi-programme tasking of more peripheral personnel so that multiple health outcomes are supported (allocative efficiency).

In relation to governance and regulation, the two main issues are pharmaceutical regulation and regulation of the private sector. Government may consider enacting a legislation (where needed) to support changes in programme prioritization, such as ban on over-the-counter sales of all malaria medicines. Intensified coordination between public, private and community-based agencies and services is needed to address this issue.

Accelerating towards elimination requires that malaria must be made a notifiable disease subject to immediate (24-hour) mandatory reporting. Enforcing the relevant legislation will be a major challenge in countries where most fever patients seek care in the informal

private sector. This Regional Action Framework envisages ensuring that malaria becomes a notifiable disease before the end of 2017 in all countries aiming for elimination by 2020, and in all (or nearly all) other endemic countries in the Region by 2020.

Strong, appropriate (and appropriately enforced) pharmaceutical legislation will also be necessary to ensure the quality of medicines available through accredited case management facilities.

Inherent in Pillar 3 is investment in health information systems. This will include: centralized reporting for malaria case and entomological surveillance to efficiently gather information about the spatio-temporal spread of malaria in affected populations; early adoption of case-based surveillance in low endemic settings; use and dissemination of these data to efficiently target the delivery of interventions; and outbreak reporting, preparedness and response.

Many countries also require improvements in procurement and supply management (PSM) to reduce any shortages and prevent stock out in the public supply chain. Where malaria programmes operate a stand-alone PSM network, significant effort may be needed to achieve formal integration with broader national pharmaceutical and procurement systems.

Inclusion of malaria services

Inclusion of malaria services within broader policies to meet specific needs while addressing disparities in access to services.

Mobile and migrant populations and indigenous populations, particularly those living and working in forest areas of the GMS, are vulnerable to malaria and are at-risk of receiving delayed and/or sub-standard treatment due to poor access to health services. Malaria services and commodities need to be made accessible, affordable, and acceptable to these population groups in the context of universal health coverage. Such vulnerable population groups and groups of MMPs have to be identified early and their malaria burden assessed well before appropriate and sustainable solutions are developed. This may require collaboration with NGOs, private sectors and development actors.

Intersectoral collaboration and community involvement

Understanding the influence of land use change on malaria occurrence is critical for shaping future surveillance strategies. Several recommended strategies could be seen as applicable to the Region for greater coordination between health and non-health sectors, as well as within the health sector.

Trade and industry sectors should be involved in developing corporate social responsibility programmes for improved health, which includes malaria prevention and treatment. Large-scale infrastructure, agriculture, mining, oil and gas exploration projects are attracting significant local and foreign investments and labour forces. There is a need for clearer guidance on the type of services or assistance companies could provide, such as awareness, vector control, case management and surveillance, which may, in turn, be related to the nature of businesses or industries. Countries may also explore how financing opportunities in non-health sectors can be leveraged for malaria.

To be effective, intersectoral action needs to be supported by political leaders as ministries of health alone are not usually powerful enough to motivate other ministries or the corporate sector for effective collaboration. Adoption of malaria elimination as a national development goal offers an opportunity for enactment of policies mandating intersectoral collaboration by the cabinet or prime minister's offices.

Recruiting agencies and employers of migrant labour, such as large-scale development, plantations, extractive industries and infrastructure projects, can provide migrants with information and commodities, as well as NGOs providing social services.

There are good examples of collaboration between malaria control/elimination programmes and plantations owners and petroleum or gas companies within the Region. Some ministries of health have specific requirements and protocols for establishing public-private partnerships, which should be encouraged.

Efforts are required to ensure that military, police and security forces have access to malaria services.

Producers and importers of malaria control commodities could be engaged in malaria elimination beyond the sale of products. Such collaboration will also help countries to prepare for malaria-free status, for example, where some populations in receptive areas are still at risk of reintroduction, but the risk is not high enough to justify continued vector-control coverage by the public health system. The availability of consumer-friendly quality products through commercial channels could be an efficient way to reduce transmission risk.

Community involvement through partnership with the health sector is another crucial element. Malaria prevention must go hand in hand with community participation and empowerment in their health development. Unless individuals in communities see the merits of preventing the illness, even the best-designed prevention strategies might not be used. It is necessary to understand existing behaviours that may either complement or hinder preventive measures.

Knowledge, attitudes and practices should be assessed to ensure that strategies and approaches are compatible with the practices, customs and beliefs of various social groups and minorities, and to develop effective IEC strategies and targeted materials. Health education and community participation can greatly facilitate work, reduce cost and help to ensure success.

Advocacy to support collective action

Advocacy can leverage political commitment, create new funding opportunities and support partnerships. Economic modelling is required to develop robust cost-benefit modelling that focuses on elimination targets. This is a core need for ongoing elimination advocacy.

There are a number of global and regional malaria partnerships that could provide a platform for elimination advocacy. Advocates for malaria elimination can work within developmental frameworks, building synergies with other health and social programmes, to maximize outcomes from investment and prevent competition for increasingly scarce resources.

Key elements of advocacy for malaria elimination in the Region are likely to include:

- the GTS and this Regional Action Framework document;
- the APLMA roadmap for elimination;
- strong advocacy for elimination at subnational level, which is mandatory to keep malaria on the agenda in subnational administrative units;
- core elimination advocacy messages;
- provision of advocacy tools for partners;
- extensive and effective community engagement; and
- strong partnerships.

SUPPORTING ELEMENT 2

Expanding four themes of research in support of improved service delivery and innovation

The fundamental principle behind the inclusion of a supporting element for research in this framework is that research must bear a close relationship to the needs of national malaria programmes. National programmes must generate issues for research based on their analysis of programme data and other operational information, while research partners must design their activities with a view to translating the findings into operational use.

The framework proposes four research themes to inform programme innovation and improved delivery of services: strengthening vector control and entomological surveillance; case management; social and behavioural research; and health systems research and analytic work.

Strengthening entomological surveillance and vector control

Entomological surveillance must include monitoring the bionomics of vector populations and the monitoring of the susceptibility of vector populations to insecticides used or planned for use.

Since 2010, pyrethroid resistance has been reported in malaria vectors of local importance in Cambodia, China, the Lao People's Democratic Republic, the Philippines and Viet Nam, with all countries but Viet Nam also reporting DDT resistance. Organophosphate resistance has been reported in China.

Entomological surveillance systems should be established to actively monitor for changes in key parameters, such as species composition and sensitivity to insecticides in relation to interventions and malaria epidemiology. Resulting entomological data needs to be used to inform programmatic decisions such as the choice of LLINs or insecticide for IRS.

Establishing and maintaining such surveillance systems requires human and infrastructural capacity, including vector technicians and facilities such as insectaries and laboratories appropriately placed to support vector sampling, identification and characterization at sites selected based on eco-epidemiological representativeness. Countries need to ensure that a core group of highly-trained entomologists is maintained to manage entomological surveillance as well as monitoring and evaluation of vector control interventions, and make evidence-based recommendations about any neces-

sary changes in interventions or delivery strategies, and to address any post elimination challenges due to receptivity.

The potential areas of research and innovation include:

- the contribution of early and outdoor biting malaria vectors to malaria transmission;
- ecosystem receptivity and vulnerability to malaria;
- how to improve the cost-effectiveness of bed net deployment through targeting appropriate for regional vector species; and
- the place of novel interventions.

Case management

The potential areas of research and innovation include:

- point of care testing for G6PD deficiency for use at community level;
- therapeutic efficacy surveillance, including areas with a case load too low to support adequate recruitment of subjects for TES; and
- operational aspects relating to mass drug administration (MDA), in accordance with current WHO technical guidance and evaluation of its role in accelerating progress towards elimination.¹⁰ (17)

Social and behavioural research, including operational research

The potential areas of research and innovation include:

- better defining the malaria burden among MMPs and other hard-to-reach populations;
- helping to understand the factors, including gender disparities, that contribute to transmission risk among MMPs; and
- optimizing behaviour change communication to improve compliance and utilization of interventions, particularly for MMPs and ethnic minorities.

10. MDA may be considered as a way of interrupting transmission of falciparum malaria in endemic island communities and in low-endemic non-island settings approaching elimination, where there is minimal risk of re-introduction of infection, good access to treatment supervision, good quality surveillance and sound implementation of vector control. See: Malaria Policy Advisory Committee, World Health Organization (2015) Mass drug administration, mass screening and treatment and focal screening and treatment for malaria (WHO/HTM/GMP/MPAC/2015.9)

Health systems research and analytic work

The potential areas of research and innovation include:

- modelling malaria programme resource needs (human and financial) at the subnational level;
- addressing funding bottlenecks;
- guiding engagement with the private sector; and
- determining the most effective ways of facilitating rapid uptake of new tools, interventions and strategies as they are validated.



5. Measuring progress and impact

5.1 Milestones and targets

The following milestones and targets are proposed to guide successful implementation of this Regional Action Framework for Malaria. They are consistent with the GTS and the *Strategy for Malaria Elimination in the Greater Mekong Subregion (2015–2030)*, but have been adapted to provide a fuller perspective of the WHO Western Pacific Region.¹¹

All country-specific targets have been confirmed by the respective ministries of health, and are consistent with current national malaria strategic plans.¹²

By end of 2017

All countries have updated (or revalidated) their malaria strategic plans and defined targets for malaria elimination and have included those targets in their broader national health policies and planning frameworks.

All countries have a costed annual implementation plan for their national malaria strategic plan.

Countries of the GMS have established case-based surveillance for elimination in all areas, including in areas with ACT and other drug resistance.⁽¹⁸⁾

By end of 2018

At least 80% coverage with LLINs and/or IRS achieved for all at-risk populations, especially in areas of high malaria transmission, as defined in each country's national malaria strategic plan.

At least 80% of targeted, at-risk populations have access to parasite-based malaria diagnosis and treatment, as defined in each country's national malaria strategic plan.

11. Provisional milestones and targets were developed, and then modified in consultation with national malaria programme managers.

12. All incidence and mortality rate reduction targets are relative to 2015 baselines.

Malaria prevention, diagnosis and treatment are included in packages of essential health care under national UHC policies.

Each country has established a national level surveillance system that is capable of accelerating toward elimination through case-based surveillance in areas with low burden, and has substantially strengthened epidemiological surveillance in areas of high burden, including case reporting by the smallest administrative unit.

Malaria incidence rate reduced by at least 40% in Vanuatu and in high-transmission areas of the Lao People's Democratic Republic and Viet Nam.

Malaria mortality reduced by at least 50% in Solomon Islands.

By end of 2019

Malaria incidence rate reduced by at least 40% in Solomon Islands.

Malaria incidence rate reduced by at least 40% in high transmission areas of Cambodia and the Philippines.

By end of 2020 (or earlier)

At least 90% coverage of targeted populations with malaria preventive interventions (LLINs and/or IRS), as defined in each country's national malaria strategic plan.

At least 90% of targeted, at-risk populations have access to parasite-based malaria diagnosis and treatment, as defined in each country's national malaria strategic plan.

Transmission of falciparum malaria interrupted in all areas of multidrug resistance, including ACT resistance.

Malaria eliminated in Yunnan Province, China, in the Republic of Korea and in Malaysia.

Falciparum malaria eliminated in Cambodia.

Malaria incidence rate reduced by at least 25%, and mortality reduced by 50%, in Papua New Guinea.

Elimination capable case-based surveillance is maintained in areas with low burden and epidemiological surveillance continues to be enhanced in areas of higher transmission.

No re-establishment of local transmission of malaria in first-level subnational administrative units where malaria transmission has been interrupted.

National level targets

Countries are encouraged to set interim targets by parasite species, with a priority to be given to elimination of *P. falciparum*, and/or by geographical area. Different parts of the country may be at different programme phases simultaneously.

5.2 Monitoring and evaluation

Principles

National malaria elimination programmes should be evaluated at regular intervals for progress towards the targets and objectives to be achieved. Parameters should be established to monitor and evaluate all programme areas, with a focus on four key issues.

- Monitoring the operational aspects of the programme, and measuring impact or process indicators to ensure that the activities are yielding desired results and moving the programme towards achieving its operational targets and objectives.
- Monitoring changes in epidemiological and entomological indicators resulting from the activities implemented.
- Appropriately interpreting results and informing revisions in policies or strategies, when needed, to help ensure progress.
- Documenting progress towards malaria elimination.

Information on coverage and quality of interventions, mapping of residual and new foci of malaria, relevant eco-epidemiological data and first-line treatment efficacy are particularly important.

Surveillance system and database enhancements

Countries implementing elimination will need to establish a malaria elimination database. This will serve as the national repository of all information related to malaria elimination, and should include the following.

- *National malaria case register*: a single database of all individual case information from identified sources in the entire country, allowing detailed analysis and synthesis of epidemiological information and trends, which can help guide the elimination programme over time.

- *Laboratory register*: a single database, linked to the patient register, which contains all pertinent information regarding malaria diagnosis of the patient. Comparison of the laboratory and malaria patient registers allows cross-checking for completeness of case data.
- *Entomological monitoring and vector-control records*: a central repository of information related to entomological surveillance, as well as monitoring and evaluation of chosen vector-control interventions.

Ideally, oversight of the malaria elimination database should be the responsibility of a national committee that is independent of the malaria programme.⁽¹⁹⁾

Progress on the path to malaria elimination in the Region will be measured using multiple data sources, including routine information systems, household and health facility surveys, and longitudinal studies. Progress will be monitored through a minimal set of five impact levels and 11 outcome indicators (see Annex) drawn from a larger set of indicators, recommended by WHO, tracked routinely by national malaria programmes.

Essential steps in strengthening monitoring and reporting

A number of essential activities will need to be implemented to develop and strengthen the surveillance, monitoring and reporting systems required for the effective implementation of the malaria elimination strategy.

At national level, strengthening of surveillance and monitoring and evaluation will need to include:

- establishment of country surveillance and M&E technical working groups;
- updating of national surveillance and M&E plans;
- capacity-building for both surveillance and M&E;
- establishment of a national malaria elimination database;
- regular external malaria programme reviews; and
- annual national malaria reporting.

At subregional level, strengthening surveillance and M&E will need to include:

- harmonization and standardization of surveillance and M&E tools;
- establishment of an intercountry surveillance technical working group;
- development of a regional surveillance and M&E framework; and
- quarterly reporting against a regional scorecard pending establishment of a web-based data sharing platform.

5.3 M&E framework

A regional M&E framework for the *Regional Action Framework for Malaria Control and Elimination in the Western Pacific (2016–2020)* will be developed by WHO, in consultation with countries and partners. Malaria surveillance is the central component in M&E for progress towards elimination.

Operationally, the main information requirement is to indicate which areas are engaged in accelerating towards elimination at a given point in time. Based on the WHO criteria for elimination, it is possible to define a shortlist of criteria that can be verified for each first-level administrative area. From the perspective of coordinated Regional elimination, it is then important to report exactly which administrative units have reached this operational status.

Indicators on surveillance coverage are central to verification of elimination and to its sustainability. Setbacks on the pathway to malaria-free status or reintroduction of malaria are often related to lack of awareness on the part of physicians and other service providers.

5.4 Role of WHO in monitoring progress under the Regional Action Framework

A coordinated multicountry elimination effort requires careful monitoring of progress and periodic evaluation. The Malaria, other Vector-Borne and Parasitic Diseases Unit at the WHO Regional Office of the Western Pacific will be responsible for regular monitoring of the implementation of the Regional Action Framework, and will ensure timely review of progress towards agreed outcome and impact indicators.

Sharing information quickly and effectively, particularly between neighbouring countries, will help to ensure a coordinated regional approach.



6. Governance and coordination

6.1 Regional leadership and technical support

Although national leadership is the strategic centrepiece of this framework, there is a clear consensus on the need for a supportive and coordinating platform at the regional level.

Regional governance and coordination mechanism

At regional level, a governance and coordination structure would help to guide countries and partners on how to address technical and managerial gaps in the implementation of the framework. This would comprise three principal functions: a political component with strong country representation; a technical component led by WHO; and a financial component responsible for fund-raising and fund management.

A regional review, with participation of national programme managers and technical experts, shall convene annually to review country-level progress and the implementation of regional elements under the framework, and to identify and endorse any strategic adaptations that may have become necessary.

The regional coordination for malaria elimination will also address the following areas.

Cross-border collaboration, coordination and cooperation mechanisms

Countries in the Region share many commonalities in relation to eco-epidemiological and socioeconomic settings. Therefore, closer cross-border and regional collaboration, coordination and cooperation should be promoted through the strengthening of national surveillance systems and regular exchange of malaria-related information of mutual interest. This should include provision of regular updates on the malaria situation in border areas and early resolution of cross-border issues.

Cross-border activities and plans with countries from other regions will also be facilitated as necessary between such countries as Papua New Guinea and Indonesia, the Demo-

cratic People's Republic of Korea and the Republic of Korea and within the countries of the Region including GMS countries.

Technical support and capacity-building

To address future needs and achieve elimination of malaria, a creative and innovative approach to capacity development should be promoted at regional, national and subnational levels.

Relevant WHO technical units can support national programmes to:

- develop and regularly update human resources development plans, coordinated with public health directorates and subnational health service delivery managers;
- maintain a core technical group of adequately trained professionals with the necessary epidemiological expertise to address emerging elimination challenges;
- advise regarding integration of malaria-related services into primary care services for accelerating and achieving elimination;
- update knowledge and enhance the skills of specialized and general health staff;
- ensure that training programmes are updated as necessary to support national elimination strategies; and
- ensure that training increases the motivation of health staff to maintain their skills and competence.

6.2 National leadership, ownership and management

Political leadership, ownership and representation

National governments are key to the success of the elimination effort and need to take the lead role in governance.

Countries need to establish strong and proactive national malaria elimination committees responsible for monitoring progress and coordination. Efforts to strengthen coordination will need to focus on strategic planning, legislation, research, data-sharing, resource mobilization, review mechanisms, review of cross-border strategies, communications and advocacy, oversight of implementation, division of labour and private sector engagement.

In addition, when adopting a malaria elimination objective, higher levels in ministries of health must be actively engaged to ensure that:

- malaria elimination is recognized at cabinet level as a national concern, led by the ministry of health and involving all relevant sectors; and
- the malaria programme is given administrative power to re-programme and react rapidly to emergencies, recruit additional short-term staff as needed and mobilize funds (this must also include some flexibility on the part of donors to address such contingencies).

Leadership, management and administrative capacity of malaria programmes

Adoption of a malaria elimination strategy increases the need for leadership, management and administrative capacity in malaria programmes themselves. Operations will need to be managed with rigor and flexibility, supported by robust monitoring and quality control. Programmes will need to be responsive to the evolving needs of the elimination effort and risks will need to be taken in the interests of innovation and to accelerate programmatic impact.

In summary, for a malaria programme with elimination as its objective, the following capabilities must be present at the central level, and to some extent, at other levels:

- technical competence and strong leadership;
- ability to advocate, communicate and convince;
- ability to manage human and financial resources and time;
- ability to work with partners and other sectors, and within the health sector;
- ability to train other professionals;
- ability to interpret and use epidemiological, entomological and operational information; and
- information management skills.

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Annex

Proposed progress indicators for the Regional Action Framework

Impact level indicators

GOAL	PROPOSED INDICATOR
To reduce mortality due to malaria in the Region by 50%, and morbidity by at least 30%, by 2020, relative to 2015 baselines.	Confirmed malaria cases (number and rate). ¹ Deaths due to malaria (number and rate). ¹
To achieve malaria elimination in three Western Pacific Region countries by 2020.	Number of countries reporting zero local malaria transmission by 2020.
To establish and maintain elimination-capable surveillance systems in all malaria-affected countries of the Western Pacific Region by 2020.	Number (and %) of cases, by classification and country. ² Number (and %) of foci, by classification and country. ²

Notes:

1. Disaggregated by country, species, age group and sex.
2. Indicator would apply to elimination-phase countries and/or sub-national units only.

PILLAR 1 – Malaria prevention and case management

OBJECTIVE	PROPOSED INDICATOR
To achieve universal coverage with LLINs and/or IRS for all at-risk populations no later than 2020, especially in areas of high malaria transmission.	Proportion of targeted population at risk (as determined by each country) covered by LLIN distribution (and/or IRS), by country.
To achieve universal access to quality assured malaria diagnosis and treatment no later than 2020.	Proportion of targeted, at-risk populations with access to parasite-based malaria diagnosis and treatment. ¹ Proportion of suspected malaria cases tested with parasite-based diagnosis and, among those, proportion correctly treated, by species. ² Number of malaria cases treated on clinical suspicion.

Notes:

1. Need to define “access” and “quality assured” in each country context.
2. Indicator would potentially miss MMPs and other hard-to-reach populations, hence inclusion of the access indicator.

PILLAR 2 – Progress towards elimination and attainment of malaria-free status

OBJECTIVE	PROPOSED INDICATOR
To interrupt transmission of <i>P. falciparum</i> in areas of multidrug resistance, including resistance to ACT, by no later than 2020.	Confirmed cases by malaria species (number and percentage) and country. ¹
To accelerate progress towards malaria elimination in countries aiming for elimination by 2020.	Number and percentage of targeted administrative units, by country, with annual parasite incidence (API) <1/1000 and reporting interruption of local transmission of malaria. ²
To reduce malaria incidence in identified high-transmission areas to less than 1 case per 1000 population-at-risk by 2020.	Number and percentage of targeted administrative units, by country, with TPR ≥ 5%, TPR < 5% and API <1/1000. ^{3,4}
To define first level subnational administrative units where malaria transmission has been interrupted, and prevent the re-establishment of malaria in those areas.	Number and percentage of malaria cases reported from administrative units, by country, where local transmission of malaria has been interrupted and, among those, the number and classification of locally diagnosed cases of malaria. ⁵

Notes:

1. Indicator would apply to countries with documented drug-resistant *P. falciparum* only.
2. Indicator would apply to elimination-phase countries only.
3. “Targeted” could be “all provinces/districts” or could be a defined sub-set.
4. TPR (disaggregated by RDT and microscopy), also monitor and report on ABER.
5. Indicator would apply to elimination-phase countries and/or subnational units only.

PILLAR 3 – Surveillance as a key intervention

OBJECTIVE	PROPOSED INDICATOR
To establish elimination-capable surveillance systems in GMS countries by 2017, and in all other malaria-affected countries of the Western Pacific Region by 2020.	Number of countries with malaria surveillance systems that meet “elimination-capable” criteria.¹ Proportion of cases investigated and classified (by species, place of acquisition, etc.), by country.² Proportion of foci investigated and, among them, proportion classified.²

Notes:

1. NMCP and surveillance system audit (or self-audit), e.g. by check-list.
2. Indicator would apply to elimination-phase countries and/or sub-national units only.

