

APMEN Asia Pacific Malaria Elimination Network

Celebrating six years of collaboration in the effort
for a malaria-free Asia Pacific

2009 - 2015





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FOREWORD

It is a pleasure to introduce this report of the results achieved by the Asia Pacific Malaria Elimination Network (APMEN), and to take a look toward the exciting future direction of the Network. APMEN has had a great impact on malaria elimination in the Asia Pacific region during its first 6 years, but its future prospects are even more promising.

Before APMEN was first convened, the Asia Pacific was making tremendous progress towards malaria elimination, although elimination was not a commonly accepted goal for national malaria programs, nor by the regional and global malaria community. There was also little regional cooperation and coordination for malaria work. APMEN created an awareness of the hard work that countries were undertaking, the proximity to reaching elimination for some, and the gaps that remained for many programs. Since the establishment of APMEN in 2009, with major funding from the Australian Government, the Bill and Melinda Gates Foundation and support from many other partners, the Network grew from an initial 10 founding country partners to 18 countries who were committed to malaria elimination.

Since 2009, APMEN has continuously strived to promote discussion, collaboration and regional exchange of ideas and experiences on malaria elimination in the Asia Pacific region. APMEN has supported the progress of countries, such as Sri Lanka and Bhutan, toward the completion of their elimination goals, while also providing information and access to key partners to support other countries to continue striving forward. APMEN also brought together a unique blend of governmental and non-governmental organisations, scientific collaborators and private corporations, to foster community engagement – through annual meetings, working groups and fellowship programs, and has developed a reputation for being a network that allowed the free exchange of ideas.

In my home country of Malaysia, we have worked to decrease the incidence of malaria by 45% in the last 10 years, and have benefited from the support of APMEN and the community it created in the region.

Despite these successes, there are still threats to the achievement of elimination in the Asia Pacific. Antimalarial drug resistance is a serious issue, and seems to disproportionately affect those areas where malaria elimination is most challenging due to terrain and population movement. Maintaining elimination financing and efforts in areas with low incidence is a challenge faced by many malaria programs, even though maintaining motivation and efficient use of malaria control tools become even more important when the disease is at low levels.

It is my hope that this report will show the benefits of investing in regional cooperation, as demonstrated through the efforts of APMEN. This report highlights the work that APMEN has done so far, and what will be done in the future. APMEN has recently entered in to a strategic partnership with the Asia Pacific Leaders' Malaria Alliance (APLMA), to strengthen and streamline the Asia Pacific's regional response to malaria. The alliance between these two groups signals an affirmation of the goal of a malaria-free Asia Pacific by 2030.

With APMEN's continued support and engagement of elimination partners, ongoing efforts by those on the ground, and strong country ties, malaria will be eliminated from the Asia Pacific.



Dr Chee Kheong Chong
Chair, APMEN Advisory Board



WHAT IS APMEN?

The Asia Pacific Malaria Elimination Network (APMEN) is a network of countries and stakeholders in the Asia Pacific region, that are committed to working towards malaria elimination.

APMEN brings together country program managers with a range of other stakeholders in elimination, including representatives from development agencies, scientific and academic institutions, the private sector and global leaders in malaria elimination.

APMEN supports countries to collaboratively pursue regional malaria elimination efforts through knowledge exchange, capacity building, building the evidence base and leadership and advocacy for elimination.

Beginning with ten countries in 2009, APMEN now consists of 18 countries: Bangladesh, Bhutan, Cambodia, China, the Democratic People's Republic of Korea (DPRK), India, Indonesia, Lao People's Democratic Republic, Malaysia, Nepal, Papua New Guinea, the Philippines, the Republic of Korea (ROK), the Solomon Islands, Sri Lanka, Thailand, Vanuatu and Vietnam.

Some of APMEN's key activities include:

- Advocacy and leadership to support elimination efforts in the Asia Pacific region.
- Bringing together a wide range of stakeholders in elimination including: partners from government, development agencies, scientific institutions, funders and the private sector.
- Developing a collegial space for knowledge sharing and partnerships through well-run annual meetings, workshops, study tours and other events.
- Building the evidence on key regional priorities through Technical Working Groups.
- A range of capacity building activities, including the highly successful APMEN Fellowship Program.

WHY ELIMINATE MALARIA IN THE ASIA PACIFIC?

Malaria elimination is gaining ground globally and the Asia Pacific is no exception. Over the past 15 years, rates of malaria have dramatically decreased thanks to a period of intensified global commitment to elimination, which enabled countries to scale up interventions such as Indoor Residual Spraying (IRS) and the distribution of Insecticide Treated Nets (ITNs) during the early 2000s.

The formation of the Roll Back Malaria Partnership in 1998 and the Global Fund to Fight AIDS, Tuberculosis and Malaria in 2002 greatly accelerated global leadership for malaria. In 2007 Bill and Melinda Gates called for the global eradication of malaria, drawing attention to the great reductions that were being achieved around the world and describing the eradication of malaria as a feasible objective and an unquestionable public good.¹ In 2006, the Australian government declared malaria a key health priority facing the region and a barrier to regional economic development and made the first of several major commitments to malaria elimination in the Asia Pacific.²

Many countries in the Asia Pacific were also making impressive achievements during this period, though these accomplishments were overlooked within many global forums.³ As APMEN was forming in 2009, Sri Lanka and Bhutan were nearing elimination,⁴ and impressive reductions in malaria were being achieved in countries including China, Thailand, Malaysia, and the Republic of Korea. Other countries were achieving successes at the sub-national level, including Indonesia, the Philippines, the Solomon Islands and Vanuatu.⁵

It is not only the successes but also the challenges facing the region that are often underestimated. For example in 2008, more than 2.2 billion people in the Asia Pacific were at risk of malaria, which was approximately 67% of the total number of people at risk worldwide.⁶ Eliminating malaria in the Asia Pacific required renewed focus on a number of regional issues that have traditionally received marginal attention within the global malaria landscape.⁷ These challenges included the elimination of *Plasmodium vivax*, a less well understood form of malaria that is more resilient to elimination.⁸ The region also needed innovative approaches to vector control, since the region has high levels of vector diversity, including outdoor biting mosquitoes which are more difficult to target.⁹ APMEN Partners shared concerns around drug safety and efficacy, and growing insecticide resistance. In addition, many countries found themselves working





(APLMA) in 2013 has strengthened political leadership for elimination in the region, while the WHO and Roll Back Malaria Partnership continue to provide global leadership for elimination. In November 2014 Bill Gates renewed the call for the global eradication of malaria within his lifetime,¹¹ and in the same year leaders at the 9th East Asia Summit declared a commitment to increasing regional coordination in elimination efforts to achieve a malaria free Asia Pacific by 2030.¹² In 2015, the eradication goal was described in the Aspiration to Action document, written by Bill Gates and Ray Chambers, UN Secretary-General's Special Envoy for Financing the Health Millennium Development Goals and Malaria.¹³

Malaria elimination efforts in the Asia Pacific have been very successful since 2001, and APMEN is proud to have played an important role in bringing about this success. However, the region continues to face major challenges, including the emergence of artemisinin-resistant malaria. It is vital that political commitment and funding for malaria elimination continues even as rates of malaria decline. Sustained political commitment will prevent possible resurgences of malaria, ensure that the gains that have been made by Asia Pacific countries are sustained and support the region to achieve its goal of malaria elimination by 2030.

KEY ACHIEVEMENTS OF APMEN

In its first six years, APMEN has made remarkable achievements in its four core program areas to support malaria elimination: advocacy and leadership for elimination, building the evidence base, building capacity, and knowledge exchange.

During this time APMEN has developed a reputation as a collegial and effective Network that has brought together important stakeholders to accelerate elimination efforts in the Asia Pacific region.

This report showcases the key achievements that APMEN has made in its six years of operation. During this time APMEN has carried out a large number of activities; this report is not a comprehensive documentation of all these activities. Rather its intent is to show the highlights of APMEN's work, to discuss the ways in which the Network has become valued by its Partners, and to bring attention to some of the shifts that have occurred within the Network as it adapts to a changing elimination landscape.

The report is informed by monitoring and evaluation activities that were carried out from 2012 to 2016. The full evaluation report is available on the APMEN website¹⁴, together with reports on the Vivax Working Group¹⁵ and the APMEN Fellowship Program.¹⁶ More detail on APMEN activities can be found in these reports, on the APMEN website, and in *The Asia Pacific Malaria Elimination Network (APMEN): Supporting the common goal of a malaria-free Asia Pacific*, published as part of the Roll Back Malaria Partnership Progress and Impact Series.¹⁷

Box 1: Highlights of APMEN's work

In the last six years, APMEN has:

- Played a lead role in establishing elimination as a shared, regional goal and brought global attention to the achievements and challenges faced by Asia Pacific countries
- Established a country-led platform for elimination with robust governance processes
- Brought together a unique range of stakeholders in elimination, including country program managers, scientists, development agencies, the private sector, WHO and other global malaria leaders
- Developed a reputation as a collegial platform to share experiences, expand regional awareness and foster partnerships for elimination
- Advocated for and built evidence around the safe and radical cure of *Plasmodium vivax*, especially through the Vivax Working Group
- Established additional Technical Working Groups on Vector Control and Surveillance and response to build evidence and regional capacity for elimination
- Built the capacity of future leaders in elimination through the APMEN Fellowships Program and other capacity building activities
- Facilitated strategic partnerships for elimination
- Continuing to expand and adapt to an ever-changing malaria and public health landscape

ADVOCATING FOR MALARIA ELIMINATION IN THE ASIA PACIFIC

One of APMEN's central goals has been to provide advocacy and leadership for malaria elimination in the Asia Pacific. APMEN has played a major role in facilitating the shift from control to elimination within the region. As one Country Partner noted:

“When we started APMEN everybody started to focus on elimination. I mean everyone was just doing control - all of us were just doing control. APMEN was set up, [now] every time we sit down now for development we talk about elimination. We're moving forward for elimination.”

In addition to pursuing their national elimination targets¹⁸, all APMEN countries have declared formal commitments to collectively pursuing regional malaria elimination.¹⁹ APMEN's success in helping to establish elimination as a regional agenda will deliver great benefits to the region for many years to come.

In addition, APMEN has played a major role in bringing global attention to the successes and challenges facing the region. APMEN drew attention to regional priorities through annual meetings, technical working groups, study tours, communications work, case studies and other publications and activities. APMEN recognised the existing expertise within regional institutions, and facilitated partnerships between regional and global leaders in elimination. Over its life, APMEN has increased the visibility of Asia Pacific countries within the global malaria community, for example through a presence at high-level meetings, such as the Malaria 2012 meeting convened by the Australian government and more recently at various meetings convened by APLMA and other regional conferences.

APMEN has also played a major role in advocating for issues that are of major concern to the region, but that have been previously neglected by global funding channels. In particular, APMEN has played a major role in facilitating funding and expertise toward *P. vivax* (discussed further below) and has, in recent years, sparked discussion and debate about the potential challenge of *P. knowlesi* for malaria elimination in several APMEN countries. At the 2015 Vector Working Group Meeting the issue of insect resistance was also raised as an important challenge facing the region. APMEN has

helped to advance awareness around regional priorities such as vector control, population mobility, surveillance and response, amongst other issues.

APMEN has supported Advocacy Workshops in Manila and Bangkok to build capacity for advocacy at the country level. APMEN and the Asia Pacific Leader's Malaria Alliance



Participants in the Sixth Annual Meeting of APMEN, held in Manila, Philippines in 2014

(APLMA) previously signed a Letter of Understanding to work collaboratively in building advocacy and leadership for elimination in the region²⁰ and are now beginning to work in close collaboration, to streamline malaria elimination efforts in the Asia Pacific. Advocacy and leadership remain an important APMEN priority, as it has been demonstrated that sustained

political commitment and leadership for elimination is vital in order to ensure consistency in elimination efforts and avoid potential resurgences of malaria²¹, and this partnership with APLMA will provide advocacy efforts at the highest levels of government, which will complement APMEN's on-the-ground work.

Box 2: Key achievements in advocacy and leadership for elimination

APMEN has:

- Played major role in shifting agenda from control to elimination
- Promoted elimination as a shared, regional goal
- Facilitated collaborative approaches to address shared challenges
- Brought global attention to the successes being achieved by Asia Pacific countries
- Increased visibility of the Asia Pacific at the global level
- Advocated for the need to build evidence around regional issues, including *P. vivax*

A COUNTRY-LED NETWORK WITH ROBUST GOVERNANCE

APMEN is based on the principle that development should be led by countries working together to address shared goals. The collaborative approach of APMEN is well-suited to malaria elimination, which by its very nature goes beyond national borders and requires regional and cross-sectoral action.

One of APMEN's key successes and ongoing challenges has been to bring together a wide range of stakeholders to approach elimination collaboratively, while also ensuring that countries lead decision making and take ownership of the elimination agenda.

APMEN has developed clear and effective governance processes to place countries at the centre of the Network. The APMEN governance document was originally developed by the Secretariat in a consultative process with the network, and was approved by Country Partners at APMEN II.²² The governance document provides the basic framework to support country-led

Box 3: Measures to ensure APMEN is country-led

- Evolving governance processes are developed through consultation and voting at meetings
- Voting processes ensure that countries identify priority areas for action
- The Advisory Board is Chaired by Country Partners
- Meetings and events are hosted by Country Partners and rotated between countries
- Meetings are facilitated to give visibility to Country Partners and showcase the priorities of Country Partners
- Country Partners participate in all Technical Working Groups
- Research grant and Fellowship recipients require endorsement from national programs

decision making. For example, the Chair and Co-chair of the APMEN Advisory Board are Country Partners, and Country Partners identify the priority areas of action for the APMEN work plan. Meetings are hosted by countries, and facilitated to showcase country experience and support country ownership of the Network.

Governance has evolved over time as Country Partners identify new mechanisms to strengthen country ownership of the Network. Continual monitoring and evaluation of the Network helps to assess the extent to which APMEN activities support the work of Country Partners as well as the sense of ownership that is experienced by Country Partners.²³ In evaluation interviews most Country Partners reported a strong and growing sense of ownership of the Network. As one Country Partner expressed:

"I think now our role with APMEN is more towards partnership. Before I believed we were looking for more technical support and assistance, costing and interacting on top of building our capacity. APMEN has been very helpful in helping us build our capacity. Now we are moving towards a new relationship, towards a partnership in research and elimination activities."

Although governance processes work to support country decision making, in practice maintaining country ownership of the network has been an ongoing challenge. APMEN's Network structure means that it is composed of a wide range of Partners. While the Network shares many common goals, Partners also maintain their individual priorities and expectations. For example, some APMEN countries are more active than others, leading some countries to perceive that others have a greater



impact on the overall Network. Similarly, at times the reputation and specialised expertise of some Partner Institutions have overshadowed the priorities of Country Partners and the aims and objectives of APMEN as a whole. Managing the conflicting expectations of diverse partners is a key challenge of a Network. This has taught APMEN the importance of maintaining not only clear governance processes but also effective communications to ensure that APMEN has a distinct voice that is additional to the multiple perspectives of its Partners.

BRINGING TOGETHER A CRITICAL RANGE OF EXPERTISE FOR ELIMINATION

One unique feature of APMEN is its diverse composition of country program managers, development agencies, funders, scientific and research institutions, the private sector and global agencies, including the WHO. Although this diversity brings challenges, APMEN's unique composition brings a wide range of benefits to APMEN Partners and to the region.

Firstly, APMEN enables representatives from eliminating countries throughout the region to engage in informal discussions and to learn from the experiences of their neighbours. Many countries share common challenges and greatly value the opportunity to learn how their neighbours have successfully addressed them. Countries in the region that have already achieved elimination sometimes attend APMEN meetings as invited observers, as do countries that are considering making formal commitments to elimination in the future. Issues such as drug resistance, population mobility and imported malaria reach across borders and cross-country dialogue on such issues is invaluable. Similarly, countries become more aware of the collective challenges facing the region through discussions with countries facing distinct challenges. As one Country Partner described:



emerging challenges. Country Partners greatly value the opportunity APMEN gives them to discuss these issues with leading malaria scientists. Likewise, many APMEN Partner Institutions joined APMEN in an effort to achieve greater policy impact with their research.

APMEN brings together a unique range of expertise, including country program managers, the scientific community, the development sector, the private sector and global health leaders.

As one Partner Institution representative explained:

“There’s lots of research that goes on at different levels, but the most important thing about APMEN is that it’s translational. It’s in trying to link researchers with country partners, country partners with researchers, so that knowledge gaps can be identified and translational research implemented. That’s the key element of APMEN, and that’s why I’m interested in it.”

Finally, APMEN incorporates perspectives and expertise from funders, development agencies, the private sector, and regional and global health agencies, including the WHO. Some of these organisations are APMEN Partner Institutions and are highly involved. In addition, APMEN has developed productive working relationships with other malaria initiatives such as APLMA and the RBM Partnership. Private sector representatives, such as the Pilipinas Shell Foundation, also have a close working relationship with APMEN. The WHO Global Malaria Programme and WHO Western Pacific Regional Office and South-East Asia Regional Office have been closely affiliated with APMEN since its inception. A representative from both SEARO and WPRO sit on the APMEN Advisory Board and WHO representatives are invited to all annual meetings, working group meetings and to other APMEN events.

Although APMEN’s diverse composition is highly valued by almost all APMEN Partners and observers, it can be challenging for APMEN to incorporate the perspectives and needs of such diverse organisations. APMEN’s broad scope has in the past obscured the role of the Network to outside observers.²⁴ Despite presenting a challenge this diversity is without doubt a great benefit of APMEN. Elimination requires that national elimination programs be resourced by highly skilled implementers and equipped with a range of evidence based strategies. While it is often stated that cross-sectoral work and interdisciplinary dialogue is important for achieving elimination, it is rare to find initiatives that make concrete efforts to facilitate such collaboration. As such APMEN’s diverse composition is a unique and important feature of the Network that is highly beneficial to its members.



“The other thing is the Asia Pacific – we are working in a local area, expanding our area – working with [Pacific nations] also broadens our thinking and the way of doing things.”

Secondly, APMEN has become an important forum for facilitating knowledge exchange between country program managers and scientists. Elimination requires that countries adapt new strategies and stay informed and responsive to



Box 4. APMEN Partner Institutions

Partner Institutions

- ACTMalaria
- Armed Forces Research Institution for Medical Science (AFRIMS)
- Australian Department of Foreign Affairs and Trade
- Australian Army Medical Institute (AAMI)
- Australian Initiative for the Control and Elimination of Malaria (AICEM)
- Bill & Melinda Gates Foundation
- Burnet Institute
- U.S. Centers for Disease Control
- FIND – Foundation for Innovative New Diagnostics
- Eijkman-Oxford Clinical Research Unit, Indonesia
- Institut Pasteur, Cambodia
- Institute of Medical Research, Papua New Guinea
- International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)
- James Cook University
- Karolinska Institutet
- London School of Hygiene and Tropical Medicine
- Mahidol Vivax Research Center
- Malaria Atlas Project (MAP)
- Malaria Consortium
- Medicines for Malaria Venture (MMV)
- Malaria Research Centre, Universiti Malaysia Sarawak
- Menzies School of Health Research

Malaria Elimination Group (MEG)

Population Services International (PSI)

QIMR Berghofer Medical Research Institute (QIMR Berghofer)

Research Institute for Tropical Medicine (RITM), Philippines

Research School of Population Health Australian National University (ANU)

Roll Back Malaria Partnership

UNICEF Indonesia

USAID Regional Development Mission for Asia

University of California San Francisco, Global Health Group

University of Melbourne - Nossal Institute for Global Health

Walter and Eliza Hall Institute of Medical Research

WorldWide Antimalarial Resistance Network (WWARN)

WHO Partners

Global Malaria Programme (GMP)

South-East Asia Regional Office (SEARO)

Western Pacific Regional Office (WPRO)

APMEN Secretariat

University of California San Francisco, Global Health Group

University of Queensland

A COLLEGIAL SPACE FOR SHARING EXPERIENCE AND IDENTIFYING COMMON GROUND

APMEN has developed a reputation as a collegial platform through which country program managers, scientists, funders and others can share ideas and experiences, expand their awareness of the region and gain a stronger understanding of elements of malaria elimination and public health that shape the impact of their work. APMEN has become well-known for its enjoyable and well-organised annual meetings, workshops and other events, at which APMEN Partners can informally share experiences and identify common ground.

This collegiality stems in part from the common interest that APMEN partners share in progressing regional malaria elimination, and in part from the informal and collaborative environment generated at APMEN meetings. As one Country Partner explained:

“I think it’s just the way it’s actually set up, you know? Someone told me that it is only here that you can really discuss things. In other forums it looks like there is a line between the experts and the non-experts. But here I think there is a gel of discussion, whether or not you’re an expert in the field or a program manager that is not a medical officer.”

Annual meetings are hosted by the Ministries of Health of APMEN countries, and organised by the host country and the APMEN Secretariat. Hosting APMEN events and meetings gives countries the opportunity to showcase the key achievements of their country programs, and to facilitate discussions around their own priority topics.

Each year, APMEN hosts a study tour in conjunction with the annual meetings. Study tours present an opportunity for program managers and scientists to go into the field, observe a country program in action, and adapt the strategies they observe to their own country programs. For example, a program officer with UNICEF Indonesia successfully adapted surveillance and response techniques in Aceh, Indonesia that were observed during a study tour in Sri Lanka in 2010.²⁵

APMEN Partners greatly value the practical and action-oriented knowledge sharing that APMEN generates and the collegial atmosphere in which this exchange takes place. By valuing the experiences of countries, APMEN supports countries to learn from others while also showcasing regional success stories as exemplars of elimination.



Box 5. APMEN Annual Meetings

Inaugural meeting
8-11 February 2009, Brisbane, Australia.
Hosted by APMEN Secretariat and the Australian Government

APMEN II
16-19 February 2010, Kandy, Sri Lanka
Hosted by: Sri Lanka Ministry of Health

APMEN III
9-12 May 2011, Kota Kinabalu, Malaysia
Hosted by: Malaysian Ministry of Health

APMEN IV
7-10 May 2012, Seoul, Republic of Korea
Hosted by Ministry of Health Republic of Korea

APMEN V
4-7 March 2013, Bali, Indonesia
Hosted by Indonesian Ministry of Health

APMEN VI
11-13 March 2014, Manila, Philippines
Hosted by Philippines Department of Health

APMEN VII
24-27 March 2015, Hoi An, Vietnam
Hosted by Vietnam Ministry of Health

TECHNICAL WORKING GROUPS TO BUILD EVIDENCE FOR ELIMINATION

APMEN has carried out a number of activities to build the evidence around issues of special significance to the Asia Pacific region, especially *P. vivax* and vector control, and more recently, surveillance and response. Much of this has been carried out or coordinated by APMEN’s three Technical Working Groups.

VIVAX WORKING GROUP

As APMEN was forming in 2009, the Asia Pacific contained 91% of the global burden of *Plasmodium vivax*,²⁶ a malaria species that can remain dormant in the liver, until it relapses. This property of the parasite and its ability to survive in diverse environmental locations make its elimination challenging.²⁷ The biology of *P. vivax* is still poorly understood, and yet vivax malaria receives less than 5% of global expenditures of malaria research.²⁸ This neglect was likely due to the perception that *P. vivax* is benign, however it is associated with significant morbidity and mortality.²⁹⁻³⁰ The Vivax Working Group was formed in the recognition that vivax malaria is a major challenge facing the region and that *P. vivax* is associated with a number of concerns surrounding drug safety and efficacy. Since the radical cure of *P. vivax* remains challenging, it was seen that regional malaria elimination will only be possible if more evidence is built around *P. vivax*.

The Vivax Working Group has been highly active and has become one of APMEN’s most successful and high profile activities. The Vivax Working Group is composed of APMEN Country Partners and Partner Institutions and brings together leading experts in *P. vivax* throughout the region and globally. The Working Group is facilitated by the Vivax Working Group coordinating team at Menzies School of Health Research in Darwin, Australia.

The central aim of the Vivax Working Group is to develop and coordinate operational research to build evidence around surveillance, diagnostics and treatment of *P. vivax* in the Asia Pacific. The Vivax Working Group builds capacity of the region for achieving elimination. This is achieved by funding and supervising operational research led by scientists based at regional research institutions, and by providing an avenue through which country program managers can have input in operational research priorities.

The Vivax Working Group holds annual meetings. These dynamic meetings generate dialogue aimed at building consensus around priority issues for operational research and its implementation. The meetings provide an opportunity to share the results of research, discuss country experience and continue the process of generating consensus surrounding operational research priorities.



Research grant recipients at APMEN V, Bali 2013.

The Vivax Working Group has carried out a number of activities to identify key knowledge gaps of *P. vivax* and to build consensus amongst Country Partners and Partner Institutions around operational priorities. These activities include:

- Four systematic literature reviews to identify knowledge gaps surrounding *P. vivax*.³¹
- A meeting on *P. vivax* research priorities, in Sri Lanka in 2010
- Two workshops on *P. vivax* genotyping, in Malaysia in 2011 and Republic of Korea in 2012
- A workshop on planning a multi-centre primaquine trial, held in China in 2011
- A G6PD detection workshop in Republic of Korea in 2012
- A workshop on the threat of antimalarial resistance to elimination, held in Indonesia in 2013
- Site visits to discuss issues facing countries and build capacity amongst country staff

To build the evidence around these priority themes, the Vivax Working Group has coordinated 21 research grants administered through the Country Partner Technical Development Program. The recipients of these grants were scientists from research institutions based throughout the Asia Pacific. Three grants were issued to Bhutan; one to Cambodia; four to scientists from China; five to scientists from Indonesia; one to the Republic of Korea; two to Sri Lanka; two to Malaysia; one to the Philippines; and one to researchers from Vanuatu and the Solomon Islands. Research was carried out collaboratively and the Vivax Working Group coordinating team facilitated funding and expertise to support these research projects. These research projects include 16 projects related to surveillance, 4 related to diagnostics, and 3 clinical trials.

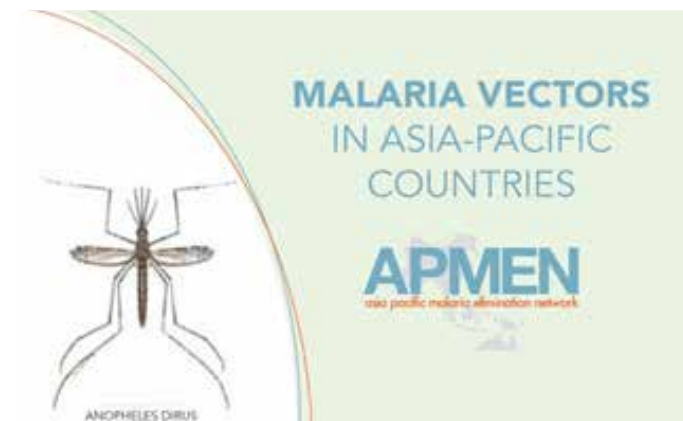
Research grant recipients presented the findings of their research to the Network at APMEN V in 2013 and APMEN VII in 2015³² and most grant recipients have attempted to inform policy by presenting the results of their findings to their respective national elimination programs. Some have continued on to publish the findings of their research. In addition, this research informs the consensus-building discussions of the Vivax Working Group, and in this way attempts to help inform elimination policy.

For a detailed report on the challenges of Vivax Malaria, the Vivax Working Group and the outcomes of Vivax Working Group workshops, and the research grants, please see the report Targeting Vivax Malaria in the Asia Pacific: APMEN Vivax Working Group Report, available on the APMEN website.³³

VECTOR CONTROL WORKING GROUP

Vector control is another major technical challenge facing the region. Although most countries in the region scaled up the distribution of vector control during the 2000s, countries continued to rely on bednets and indoor residual spraying (IRS) as the primary vector control strategies. Although these strategies are highly effective in a high transmission context, many were concerned that these strategies may not be sufficient in an elimination setting when malaria becomes more concentrated in localised areas.

In addition, the Asia Pacific region shares a number of vector-related challenges. The region has 19 dominant vector species, compared to 7 in sub-Saharan Africa and 9 in the Americas.³⁴ Many of these species display outdoor-biting or breeding behavior, which is more difficult to target through conventional vector control strategies.³⁵ Despite this vector complexity, many countries in the region lack entomological capacity. This means they do not have sufficient knowledge of the breeding sites and behaviours of the vectors that they are trying to control. In some countries, insecticide resistance is a growing concern.



The Vector Control Working Group is composed of APMEN Country Partners and Partner Institutions with special expertise in entomology or vector control. In addition, the Working Group carries out an annual study tour in which Working Group members and observers visit field sites of special interest to the host country and share knowledge and experience surrounding vector issues.

Other activities carried out by the Vector Control Working Group included a survey on vectors and vector control strategies to identify entomological capacity and the resourcing of vector control in the region, and a literature review on the use of larvicides and repellents for elimination.³⁶

In addition, APMEN supported the development of the pocketbook, *Malaria vectors in Asia Pacific countries*.³⁷ This pocketbook is the first of its kind, containing data on the distribution, ecology and medical importance of 26 Asia Pacific malaria vectors. It is designed for entomologists in the field. The pocketbook was produced by the Armed Forces Research Institute (AFRIMS) and the Walter Reed Biosystematic Unit with funding and support from APMEN. APMEN is currently working towards updating the pocketbook and developing a mobile application version of the vector pocketbook.

In addition, five APMEN Fellows have carried out Fellowships related to vector control, including a special Thematic Fellowship supported by VecNet. APMEN has also funded 23 people to attend the Integrated vector management (IVM) course at the Institution of Medical Research, Malaysia. APMEN also held a one-day workshop on Insecticide Resistance which was held in conjunction with the annual working group meeting in Malaysia in 2015. Three APMEN Thematic Fellows on Insecticide Resistance are currently undertaking their fellowships

Awareness of regional challenges and capacity surrounding vector control is growing, however vector control remains an important challenge facing the region, and ongoing efforts will be necessary to continue to build evidence and capacity in vector control in the region.

SURVEILLANCE AND RESPONSE WORKING GROUP

As rates of malaria decline, malaria becomes more densely concentrated in particular demographic groups and certain localities. In addition, as incidence declines, there may be an increase in asymptomatic malaria infections that go undetected. Elimination programs must develop surveillance as a program intervention to clear the remaining reservoirs of infection.

In an elimination setting, it becomes increasingly important for programs to be able to accurately identify where and within which population groups transmission is occurring, and to have the strategies, tools and capacity to efficiently target

these areas and groups with surveillance and ensure prompt diagnosis, treatment and reporting of cases. Lastly, surveillance information must be analysed to inform robust response strategies, from further active surveillance to vector control.

The Surveillance and Response Working Group was formed in 2012 to build capacity and share knowledge and experience across country programs and partners. The Working Group is Co-Chaired by the Jiangsu Institute of Parasitic Diseases (JIPD) and the Global Health Group (GHG) of the University of California, San Francisco. The Working Group first convened in Wuxi, China in September 2013. At this meeting, the Working Group identified priority programmatic and capacity gaps that needed to be addressed. Identified challenges included: reaching out to migrant and mobile populations at higher risk of malaria; integrating multiple reporting systems; IT, internet and telecommunication reporting timeliness; maintaining malaria microscopy; and the need for increased capacity in data analysis at the country level.

In 2013 APMEN introduced a special Surveillance and Response Thematic Fellowship and an additional Fellow was selected in 2015.

In 2014, the Working Group conducted a training in place of the annual meeting, held in Wuxi, China, sponsored by the China Ministry of Commerce and as a collaboration between APMEN and the Jiangsu Institute of Parasitic Diseases (JIPD) in Wuxi, China. There were two groups of trainees, 36 participants from APMEN countries (13 of the 16 APMEN countries) and 31 from other countries that were sponsored by China, including Ethiopia, Malawi, Pakistan, and South Sudan. The training was focused on surveillance and response. Three days of the training focused on the three topics of data analysis, spatial decision support systems, and stratification.

After the training, the following training needs were identified by working group members: GIS, vector control responses, stratification, Entomological surveillance, data analysis, Web based surveillance systems, IT system for rapid reporting, and clinical trial research.

In May 2015, the Working Group convened in Thailand to produce a minimum set of indicators for elimination and prevention of reintroduction (POR). Through a facilitated working group format, the SRWG developed consensus on the priority activities and indicators for elimination and POR. On May 13, 2015, these outputs were summarized and presented to an elimination stakeholders' meeting funded by the Global Fund to Fight AIDS, Tuberculosis, and Malaria and were since disseminated to WHO through one of its Technical Expert Groups and is part of the development of the elimination operational manual to be published in 2016.

Box 6. Building the evidence for elimination

- Advocated for and mobilised funding and expertise into Vivax Malaria through the Vivax Working Group
- Built evidence around the safe and radical cure of *Plasmodium vivax*
- Supported 21 research grants through the Country Partner Technical Program
- Increased awareness of vector related challenges and expanded entomological capacity through the Vector Control Working Group
- Established the Surveillance and Response Working Group to build capacity around surveillance in elimination settings
- Developed and disseminated priority indicators for malaria elimination and prevention of reintroduction programs and their implementing and research partners and donors.
- Facilitated dialogue between Technical Working Groups and the network through publications, meetings and workshops.
- Supported evidence-based policy by facilitating dialogue between program managers and the scientific community.

BUILDING REGIONAL CAPACITY TO ACHIEVE ELIMINATION

Elimination requires that Country Programs throughout the region have highly skilled and motivated staff with a wide range of technical and professional skills, develop linkages with a range of potential collaborators, and a broad understanding of the changing context of elimination. APMEN has supported a number of innovative capacity building activities to strengthen the capacity of the region to achieve elimination.

FELLOWSHIPS

One of the most well-known and successful of these activities is the APMEN Fellowship Program. APMEN Fellowships are awarded to successful and active professionals who have been identified as future leaders within their fields, and whose area of expertise is in line with the priorities of their country national malaria programs. Between 2010 and 2016, APMEN awarded 27 Fellowships to Fellows from nine countries. Of the 6 fellowships in 2015, a special Joint-Fellowship awarded to two Fellows from DPR Korea.

There are a number of features that have contributed to the success of the APMEN Fellowship Program. Firstly, Fellowships build the capacity of future leaders in areas that have been identified as priorities by the Fellow's country program and by the APMEN network. This helps to ensure that Fellowships contribute to building the skills that countries need, while also building capacity on an individual level.

Secondly, Fellowships foster collaborations for elimination. Fellowships are hosted by APMEN Partner Institutions who have special expertise in their fields. Most Fellowships are hosted by Partners based within the region. This allows Fellows to visit field sites, labs and speak with scientists and program managers from their neighbouring countries, and helps Fellows to develop a broader regional perspective of elimination and the priorities of their neighbours. Since many regional countries share similar challenges, this regional focus often leads to fruitful knowledge exchange. As one Fellow explained:

"After this Fellowship I could go about my own mapping. It really helped putting it into perspective. They showed me how to do here in [my country] what I learned from [the host country]."

Many Fellows developed a mentoring relationship with their Host. These mentoring relationships led to highly effective training, and facilitated knowledge exchange across countries and across generations of malaria experts. In some cases, Fellows undertook training at leading global institutions, which gave them the opportunity to access internationally recognised educators.

Finally, the collaborative nature of Fellowships benefits not only the Fellow but also the Host Institution and APMEN as a whole. Many Fellows bring data-sets and valuable country experience to their Host Institutions. Many Host Institutions enjoyed the opportunity to build relationships with Fellows and establish partnerships with country programs from across the region. The collaborative, mentor-based approach of Fellowships was highly valued by the broader APMEN Network, and worked to motivate the whole Network by observing collaboration in action.

For more details on the Fellowship Program and the Fellowship Alumni please see the report: *The APMEN Fellowship Program: Supporting future leaders in malaria elimination.*³⁸

Box 7. The APMEN Fellowship Program:

- Aimed at future leaders in the region
- Builds a range of technical and professional skills
- Emphasises practical training and mentoring
- Fosters collaborations across the region and between regional and global institutions
- Brings benefits to Home and Host institutions and APMEN as a whole, in addition to the Fellow
- Increases regional awareness and boosts confidence and motivation of Fellows
- Has proven to be a highly successful and value for money activity with a wide range of benefits.

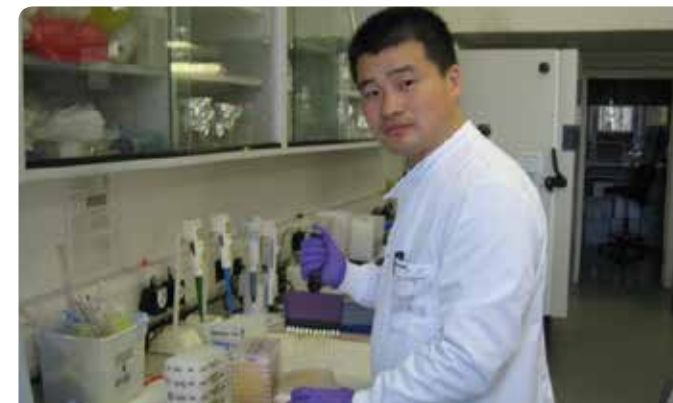
OTHER ACTIVITIES

In addition to the Fellowship Program, APMEN has facilitated a number of other workshops and capacity building activities on the themes of Global Information Systems (GIS), advocacy, community engagement and other topics.

At APMEN III in 2011, Country Partners identified GIS as an important area requiring capacity building and this need was confirmed by a number of surveys. APMEN then supported a short course in GIS to build skills around mapping, temporal-spatial modelling and the use of GIS data to inform decision making for elimination. The GIS short course was held in Shanghai, China in November 2011 and was attended by 35 participants. The course was hosted by the National Institute of Parasitic Disease (NIPD) in collaboration with the Chinese Centre for Disease Control (China CDC) the Malaria Atlas Project (MAP) with Oxford University.



Following APMEN Fellowship training, hosted by Mahidol University, Mr Pema Samdrup trained his colleagues in Bhutan in GIS



Dr Jun Cao (Jiangsu Institute of Parasitic Disease, China) during his Fellowship at the London School of Hygiene and Tropical Medicine.



APMEN Community Engagement Meeting, November 2011, Chiang Mai Thailand

The course was highly successful and several participants went on to apply for Fellowships in GIS-related topics. Many participants integrated their new skills in GIS into their country programs. For example, Mr Pema Samdrup (Bhutan) and Dr Ooi Choo Huck (Malaysia) both went on to train their colleagues in GIS, and greatly scaled up GIS activities within their country programs.³⁹ The success of GIS activities and the ongoing interest in strengthening skills around GIS led Country Partners to vote for the formation of the Surveillance and Response Working Group. GIS and surveillance and response remain important priorities of APMEN capacity building activities. Other APMEN capacity building activities include a meeting on community engagement held in Chiang Mai, Thailand in November 2011 and advocacy workshops on held in Manila, Philippines in March 2014, and Bangkok, Thailand in November 2014.

In addition, APMEN has funded a number of our Partners to attend capacity building events organised by other organisations. For example, since 2012 APMEN has funded 27 participants to attend a course in Integrated Vector Management organised by the Malaysian Ministry of Health. Since 2013 APMEN supported six Partners to attend the Science of Eradication course in Barcelona, Spain.⁴⁰ APMEN's capacity building activities will continue to be a key element of the Network, as countries continue to develop skilled and motivated staff at all levels of their country elimination programs.

PARTNERSHIPS FOR ELIMINATION

EAPMEN brings together a broad range of actors that each make important contributions to elimination. While APMEN works closely with national malaria control programs, it is able to reach beyond the Ministry of Health to engage other government ministries, the research community, the private sector and the broader public health and development sector. Almost all APMEN activities including meetings, working groups, fellowships and research grants generate partnerships within the Network.

APMEN has further ties to the global elimination landscape through its participation in annual meetings of the Malaria Elimination Group, a group of international malaria experts who gather to discuss malaria elimination challenges and current progress. Many Country Partners see that regional elimination will only be achieved through effective partnerships that recognise elimination as a shared concern:

“We challenged [our Ministry of Health] to fight malaria. We are fighting it among our country, but we can’t fight alone. We need to among the region, because the problem is not just in [our home countries] it is the whole region.”

APMEN also works to facilitate partnerships beyond the Network by developing productive working relationships with other organisations active within malaria elimination in the Asia Pacific. APMEN has developed a strong partnership with APLMA, which was formalised in the signing of a Letter of Understanding in November 2014.⁴¹ And has resulted in close collaboration and commitment to implementing the APLMA Malaria Elimination Roadmap.

APMEN has also developed collegial links with the Roll Back Malaria Partnership and the Asian Development Bank, who both play central roles in progressing malaria elimination in the region. APMEN has endeavoured to maintain a working relationship with the WHO, and the WHO Global Malaria Programme and the SEARO and WPRO offices have been closely involved with APMEN since its inception and sit on the APMEN Advisory Board.

APMEN continues to grow and bring in a broader scope of countries, Partner Institutions, potential funders and public health expertise to the Network. As the network grows, APMEN is committed to continuing to develop strong partnerships across the public health architecture, and to identifying and strengthening synergies between APMEN and other regional leaders in elimination.



Box 8. APMEN can facilitate a range of strategic partnerships for elimination

- Country-to-country partnerships
- Regional-global partnerships
- Linkages between public health agencies
- Multiple forms of malaria and public health expertise
- Cross-sectoral partnerships at the country level
- Public-private partnerships

THE FUTURE OF APMEN: EXPANDING AND ADAPTING TO AN EVER-CHANGING LANDSCAPE

Since its creation, APMEN has witnessed and responded to many changes in the Network and in the regional and global malaria elimination landscape.

Global and regional efforts for elimination have greatly intensified since APMEN began in 2009. During this time APMEN has grown to add an additional eight countries, many new Partner Institutions, and developed partnerships with a broad range of stakeholders active within the rapidly changing elimination landscape.

Likewise, the thematic focus of APMEN has evolved as countries have met challenges and identified new priorities, such as surveillance and response. New challenges have emerged that require collective action, including the threats of artemisinin resistance and insecticide resistance. Other ongoing challenges, such as vector control and diagnostics, require continued effort. APMEN will continue to support a range of activities to build the evidence and facilitate knowledge exchange around regional priorities, and to build the capacity of regional countries to achieve elimination.

The global elimination agenda is now well established and accelerating. In November 2014, leaders of Asia Pacific nations at the 9th East Asian Summit confirmed their commitment to achieving regional malaria elimination by 2030.⁴² In the same month, Bill Gates once again called for the global eradication of malaria within his lifetime, encouraging the development of

new tools through enhanced multidisciplinary and cross-sectoral collaboration. At the 10th East Asia Summit in 2015, the leaders again reaffirmed their support of malaria elimination by endorsing the APLMA Malaria Elimination Roadmap, a plan that will guide malaria elimination efforts in the Asia Pacific in the years to come. In 2016, the Second Global Malaria Action Plan will be released, detailing the global strategy for malaria elimination from 2016 to 2030.

APMEN is now well established as a leader in malaria elimination in the Asia Pacific, and will continue to support countries to work towards the goal of regional malaria elimination. APMEN’s innovative network structure and unique collaborative approach have allowed the Network to adapt to the rapidly changing environment. As the network continues to expand, APMEN aims to maintain a range of activities to facilitate knowledge exchange, and to build the necessary evidence and capacity of countries to achieve elimination.

In 2016, APMEN will integrate its efforts with APLMA, building momentum toward the 2030 regional malaria elimination goal through harnessing APMEN’s technical expertise, partnerships and engagement with national malaria control programs, and linking this with the political advocacy and multisectoral access of APLMA. Alongside APLMA, and with the support of regional partners, APMEN will continue to provide a valuable and effective platform to promote discussion, collaboration and regional exchange of ideas and experiences on malaria elimination, and to work collaboratively towards the ultimate goal of a malaria-free Asia Pacific.



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