

The APMEN Fellowship Program

Supporting future leaders in malaria elimination

2009 - 2014







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ABBREVIATIONS

ACTMalaria	Asian Collaborative Training Network for Malaria
AFRIMS	Armed Forces Research Institute of Medical Sciences
AMI	Australian Army Malaria Institute
API	Annual Parasite Index
APMEN	Asia Pacific Malaria Elimination Network
G6PD	Glucose-6-phosphate dehydrogenase
GIS	Geographical Information Systems
HRM	High Resolution melting
IRS	Indoor residual spraying
IVM	Integrated vector management
ITNs	Insecticide treated nets
JIPD	Jiangsu Institute of Parasitic Diseases
LSTM	Liverpool School of Tropical Medicine
LLINs	Long-lasting Insecticide-Treated Nets
LSHTM	London School of Hygiene and Tropical Medicine
MAP	Malaria Atlas Project
NIIHRD	National Institute of Health Research and Development
NIMPE	Vietnam National Institute of Malariaology, Parasitology and Entomology
NMCP	National malaria control programme
PCR	Polymerase chain reactions
<i>P. falciparum</i>	<i>Plasmodium falciparum</i>
<i>P. vivax</i>	<i>Plasmodium vivax</i>
RITM	Research Institute for Tropical Medicine
VecNET	Vector Ecology and Control Network
VBDCP	Vector-borne Disease Control Program

FOREWORD

It is our pleasure as the Co-Chairs of the Asia Pacific Malaria Elimination Network Advisory Board to introduce this important publication. This report documents the first five years of APMEN's Fellowship Program, which has fast become one of APMEN's most well-known and successful activities.

At APMEN's inaugural meeting in 2009, APMEN Partners discussed the need for capacity building activities to support promising early and mid-career staff across the region. It was seen that while many early and mid-career country staff were highly skilled and motivated, that many did not yet have the training and practical experience that was necessary to strengthen country capacity to achieve elimination. Since much of this expertise existed elsewhere in the region or globally, the Fellowship Program was seen as an opportunity to build country capacity while also transferring knowledge between countries and between older and younger generations of malaria experts that were dedicated to the long-term goal of regional malaria elimination.

In addition to building the capacity of future leaders in malaria elimination in the Asia Pacific, over time the Fellowship Program has proven itself capable of bringing a wide range of additional benefits to APMEN Partners and to the region. In addition to building the capacity of individual Fellows, the Fellowship Program has also helped countries to develop innovative implementation strategies for achieving elimination and to foster partnerships and knowledge sharing across the region and globally. Many Fellows have gone on to train their colleagues in country. The collaborative nature of APMEN Fellowships has boosted the motivation of country program and scientific staff and broadened the regional awareness of a wide range of stakeholders committed to bringing about a malaria-free Asia Pacific.

This report presents a special opportunity to draw attention to the achievements of the APMEN Fellowship Alumni, many of whom are indeed on track to become leaders in malaria elimination. It is also an opportunity to thank the APMEN Partner Institutions for their support in enabling the success of the Fellowship Program. Fellowship Host Institutions generously contributed time, expertise, resources and facilities and in-kind financial contributions to support individual Fellows and carried out the Fellowships in ways that strengthened APMEN's spirit of collaboration.

Finally, the Board would like to thank the APMEN Fellowship Committee for their hard work in ensuring that the Fellowship Program selects quality candidates, supports priority topics and facilitates partnerships with suitable Host Institutions, and overseeing the application process in line with APMEN governance procedures. In 2014 the APMEN Fellowship Committee consists of Dr Fe Esperanza Caridad (Effie) Espino from the Research Institute for Tropical Medicine (RITM), Dr Christina Rundi from the Ministry of Health; Dr Prakash Ghimire from the WHO Nepal office; Dr Apinya Niramitsantipong from the Ministry of Public Health Thailand; and Ms Arna Chancellor from the APMEN Secretariat. The Board would also like to thank the members of previous years of the Fellowship Committee for supporting the Program since the first round of Fellowships in 2010.

The APMEN Fellowship Program has made an important contribution to building the capacity of countries in the region to achieve elimination. As malaria elimination continues to gain momentum, the Fellowship Program will continue to support Fellowships that respond to the changing needs and priorities of the region. We hope you enjoy reading about the APMEN Fellowship Program and the ongoing efforts being made by APMEN Partners toward work together to achieving a malaria-free Asia Pacific.

Prof. Gao Qi
Chair, APMEN Advisory Board, 2014

Dr. Mario Baquilod
Deputy Chair, APMEN Advisory Board, 2014



Ho Viet Hieu, from the Institute of Malariaology, Parasitology and Entomology, Vietnam, learning innovative vector control techniques at the Armed Forces Research Institute of Medical Sciences (AFRIMS), Thailand

APMEN FELLOWSHIP PROGRAM AT A GLANCE

WHAT IS THE APMEN FELLOWSHIP PROGRAM?

The APMEN Fellowship Program equips the next generation of malaria leaders from low and middle-income, malaria-endemic countries within the Asia Pacific region with the tools and training to guide malaria elimination in the coming critical decades. APMEN Fellowships are typically two to three months in duration and enable Fellows to undertake practical training to support strategic areas of their home country's malaria elimination plans.

WHO ARE APMEN FELLOWS, HOW ARE THEY SELECTED AND WHERE DO THEY TRAIN?

The Fellowship Program builds the capacity of staff that have been identified as future leaders in malaria elimination in the region. All Fellows are from APMEN countries and work within or in collaboration with the National Malaria Control Programs (NMCPs) of their home country. The selection process ensures that Fellowships are awarded to promising early and mid-career scientists and program managers and that Fellowships support the priorities of country programs. The APMEN Secretariat offers to assist Fellows to develop their applications and identify a relevant Host Institution, most of which are institutions within the Asia Pacific region.

WHAT DO APMEN FELLOWS LEARN?

APMEN Fellowships focus on practical training and knowledge sharing in areas that have been identified as of strategic importance to malaria elimination in the home country of the Fellows and in the region. Fellowships have focused on topics such as: vector taxonomy and mapping, genotyping *Plasmodium vivax* (*P. vivax*), G6PD mapping, spatial epidemiology, Geographic Information Systems (GIS) and community engagement. In 2013, APMEN introduced thematic fellowships on the topics of GIS, vector control, surveillance and response. Fellowships allow Fellows to access data, skills, technology and mentoring that is not readily available in their home country but that can often be found within the region. Fellowships often involve close mentoring from a senior expert in the field and incorporate some combination of lab work and field work together with a range of scientific and professional skills.

HOW DOES THE APMEN FELLOWSHIP PROGRAM SUPPORT REGIONAL MALARIA ELIMINATION?

While the APMEN Fellowship Program is primarily intended as a capacity building activity, the Fellowship Program has proven to support all four of APMEN's strategic areas: capacity building; knowledge sharing; building the evidence base; and leadership and advocacy for elimination. In addition to providing future leaders with practical knowledge and skills to support their country programs, the Fellowship Program encourages an exchange of skills and knowledge across the region; builds mentoring and partnerships; and bolsters leadership and advocacy for malaria elimination in the region. The Fellowship Program has become a well-regarded network activity and its wide ranging benefits are well recognised across and beyond the APMEN network.



Rinzin Namgay (left) from the Vector Borne Disease Control Program (VCDP) in Bhutan, with Mr Sommal Phomstaporn from the Diagnostic and Reemerging Diseases Section, Department of Entomology, Armed Forces Research Institute for Medical Science (AFIRMS), Thailand

1. WHAT IS APMEN?

APMEN is a network of countries and other stakeholders that are committed to working collaboratively to achieve malaria elimination in the Asia Pacific region. APMEN brings together country program managers, development agencies, non-governmental organizations, academic institutions, the private sector and global agencies involved in malaria elimination, including the World Health Organization (WHO). Together these partners collaboratively pursue regional malaria elimination through knowledge exchange, capacity building, building the evidence base and leadership and advocacy for malaria elimination.

APMEN was formed in 2009 in recognition of the dramatic successes in malaria control that countries across the Asia Pacific were achieving. Many regional countries had greatly reduced malaria, and elimination had once again become a feasible goal. This was a time of growing political and economic support for malaria elimination globally, through initiatives such as the Roll Back Malaria Partnership (RBM) and the Global Fund to Fight AIDS, Tuberculosis and Malaria. The Australian

Government, the foundational donors of APMEN, were leaders in mobilising the regional elimination agenda in the Asia Pacific.

Despite the progress that is being made in the region, a range of technical and operational challenges continue to face countries pursuing malaria elimination. These challenges include *P. vivax*, control of the diverse range of vectors in the region, case detection, imported malaria, and the challenges of transitioning to a low transmission context. APMEN acts as a collegial forum for country-to-country knowledge exchange, capacity building and evidence building on these technical and operational issues, while also advocating for elimination as a long term regional goal.

APMEN has grown steadily since its inception in 2009 to become a crucial element of the regional malaria elimination landscape. In 2014, APMEN consists of 16 Country Partners: Bangladesh; Bhutan; Cambodia; China; the Democratic People's Republic of Korea (DPRK); Indonesia; Lao People's Democratic Republic; Malaysia; Nepal; the Philippines; the Republic of Korea (ROK); the Solomon Islands; Sri Lanka; Thailand; Vanuatu and Vietnam; together with 29 Partner Institutions. In addition to their country elimination targets, APMEN Country Partners have a shared goal that by 2025, half of all the countries in the region with malaria today will have achieved their malaria elimination¹ targets, and all have declared a commitment to collectively pursuing the long term goal of regional malaria elimination. As more countries in the Asia Pacific are shifting toward elimination, APMEN continues to grow and evolve to support countries to achieve these goals.



APMEN AT A GLANCE

APMEN is: a network of countries and institutions that are committed to working collaboratively to achieve malaria elimination in the Asia Pacific.

APMEN is composed of: the National Malaria Control Programs of eliminating countries in the Asia Pacific in addition to Partner Institutions from academic, development, government, non-government, private sector and global agencies involved in malaria control and elimination.

APMEN supports malaria elimination by: supporting country programs; acting as a collegial platform for knowledge sharing; bringing scientists and program managers together in one forum; building the evidence base for priority issues for the Asia Pacific; generating collaborative research and training activities; facilitating innovative partnerships; advocacy and leadership for long-term support for malaria elimination.

APMEN's key activities are: Annual Technical and Business Meetings; Working Group meetings; the APMEN Fellowship Program; other capacity building trainings and workshops; catalytic and operational research through the Country Partner Technical Development Program; matrix database of elimination programs in partner countries; gap analyses for core elimination topics; development of tools to support capacity development; advocacy for elimination.

APMEN's key points of connection are: Annual Technical and Business Meetings; Vivax Working Group; Vector Control Working Group; Surveillance and Response Working Group; the Advisory Board; the Secretariat.





2.WHY AN APMEN FELLOWSHIP PROGRAM?

The APMEN Fellowship Program was born from the inaugural meeting of the network in Brisbane, Australia in February 2009. At this meeting, the newly gathered partners saw APMEN as a vehicle for mobilising capacity building amongst malaria specialists in the region as they switched from control to elimination strategies.² The participants in the inaugural meeting saw that a Fellowship Program would be beneficial for a number of reasons.

Firstly, it was recognised that although many countries were nearing national elimination, regional elimination would be a long term goal that would require dedicated and skilled staff for decades to come. Senior malaria experts were enthusiastic to transfer their knowledge and experience to the younger generation of malaria experts in the region. The concept of a capacity building program that supported future leaders in malaria elimination and encouraged mentoring between junior and senior scientists across the region was highly valued by APMEN's new partners.

Secondly, it was seen that there was a need for capacity building in topics of particular importance to the region, some of which would become increasingly important as more countries near elimination. For example, many APMEN partners were concerned about risks and knowledge gaps associated with *P. vivax* infections, so the network dedicated several Fellowships to G6PD deficiency. Despite high levels of vector diversity and complexity there is a shortage of entomologists in the region, and so several Fellowships were allocated to vector taxonomy and the development of entomological capacity within the region. APMEN partners saw that skills in GIS would be integral to surveillance strategies in an elimination setting, leading to GIS fellowships. Fellowships are an efficient and cost effective way to provide training in fields that are identified priorities to countries, and in which there are limited opportunities for training within the home country. Although the thematic focus of the Fellowships is designed to evolve over time, Fellowships continue to focus on building the skills in areas that Country Partners identify as a priority to countries in the Asia Pacific.

Finally, in addition to building the capacity of individual Fellows the APMEN Fellowship Program was developed to facilitate strategic partnerships across the region. The APMEN Secretariat often assists with identifying Fellowship



Ms Majhalia Torno from the Research Institute for Tropical Medicine (RITM), Philippines

Host Institutions, most of which are partners in the network. Some Fellows carry out short courses at global research institutions with specialised expertise in the field of training; while most Fellowships are hosted by other APMEN partners who are located in the region. Since APMEN sees that elimination can only be achieved through collaborative efforts, this partnership building function has proven to be highly successful and highly valued.

The Fellowship Program was officially launched on World Malaria Day in April 2010. From 2010 to 2013 APMEN has supported a total of 18 Fellowships. Fellowships are offered annually, after applications are assessed by the APMEN Fellowship Committee which is composed of three Country Partners, one Partner Institution representative, and one representative from the APMEN Secretariat. The successful applications are then forwarded to the APMEN Advisory Board for final confirmation and approval. The selection process is designed to ensure that Fellowships are offered to outstanding candidates, whose field of specialisation is in line with the priorities of APMEN countries. Further details of the selection process can be found in Annex One. To date APMEN has supported Fellowships on a wide range of topics including program capacity development, surveillance and response, *P. vivax* case management and diagnostics, community participation and advocacy, and vector control. The thematic focus of Fellowships will continue to evolve, reflecting the changing capacity and concerns of APMEN's Country Partners.



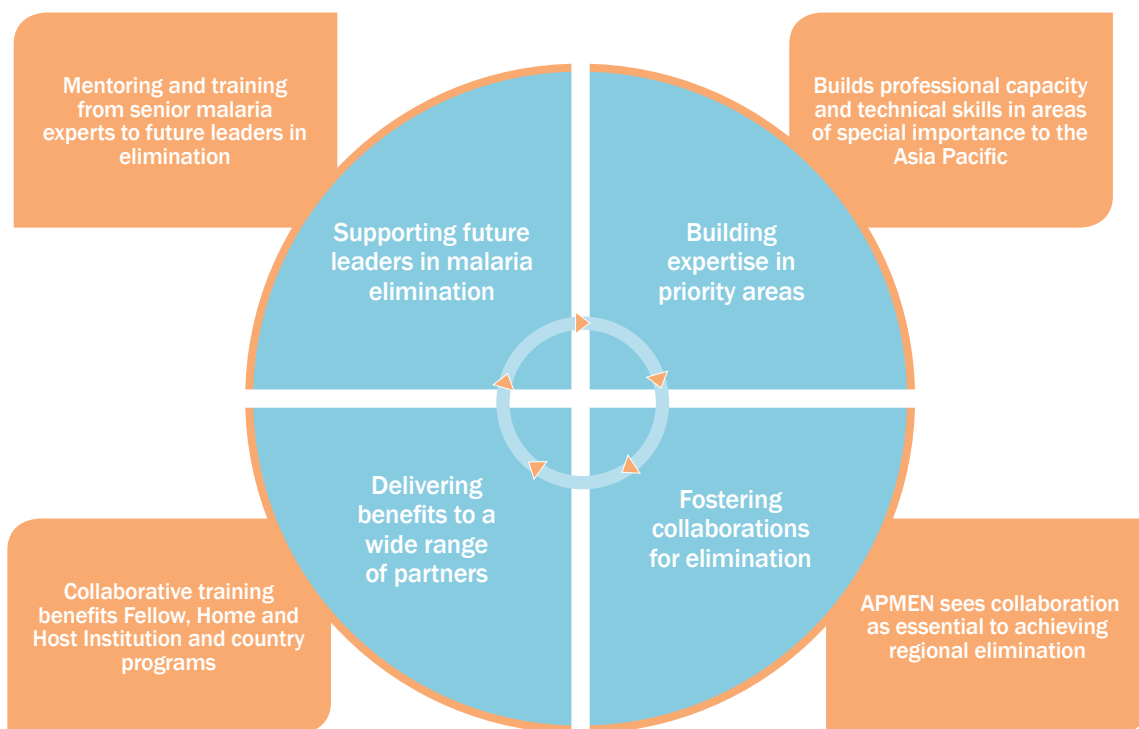
3. KEY SUCCESSES OF THE APMEN FELLOWSHIP PROGRAM

The Fellowship Program is often seen as APMEN’s flagship capacity building activity and has become widely respected across and beyond the network. In 2012 and 2013, APMEN carried out an internal evaluation to assess the success of the Fellowship Program.² In-depth interviews with APMEN Partners and observers of APMEN revealed a number of successes and perceived benefits of the Fellowship Program.

The Fellowship Program is valued because it:

- Supports future leaders in malaria elimination
- Builds expertise and skills in priority areas
- Builds partnerships and collaborations essential to achieving regional elimination
- Delivers benefits to a wide range of APMEN partners

Figure 1: The four key successes of the APMEN Fellowship Program



SUPPORTING FUTURE LEADERS IN MALARIA ELIMINATION

The Fellowship Program is helping to build a generation of highly skilled and dedicated experts to lead malaria elimination efforts in the Asia Pacific. APMEN Fellows are selected from amongst promising early and mid-career scientists and program managers who have already begun to establish their careers in their home countries. As one Country Partner explained:

We select the young staff. The young generation for malaria research and they will be in the future the key person who the leadership of malaria control (APMEN Country Partner, interview 2012).

More than a conventional training program, the Fellowship Program supports the development of well-rounded future leaders by facilitating specialised training that also supports Fellows to build professional networks and develop a broader awareness of the global malaria elimination landscape. Since APMEN encourages a collegial, mentoring approach to training, Fellows often return to their Home Institutions not only with new skills, but with the professional networks and motivation necessary to support their countries to achieve elimination.

BUILDING EXPERTISE IN PRIORITY AREAS

To achieve elimination, countries will need staff with specialised technical skills together with staff with the breadth of knowledge needed to respond to emerging challenges and implement effective elimination programs. The Fellowship Program aims to support future leaders by building both the technical and the program capacity of countries.

APMEN Fellowships prioritise training in areas that are identified priorities of the country program, but in which expertise is not readily available in the home country. Some Fellowship topics – such as *P. vivax* and outdoor biting vectors – are of particular importance to the region, while others are of global significance to malaria elimination. While all Fellows have strong educational backgrounds, some were seeking training in skills that were integral to their ongoing work but in which they were largely self-taught. Others sought to expand or update their knowledge of rapidly evolving fields.

The thematic focus of Fellowships changes in response to the changing priorities of countries. To date this has included: program capacity development; surveillance and response; *P. vivax* management and diagnostics; community participation and advocacy for elimination and vector control. In 2013 APMEN Country Partners voted to introduce

Thematic Fellowships to build capacity on priority themes, and supported a MAP Thematic Fellowship, a Surveillance and Response Fellowship and a VecNet Fellowship. The next section of this report includes a detailed discussion of each APMEN Fellow and Host Institution, and the key aims and findings of the Fellowships completed to date.

Many Fellows valued the opportunity to develop their knowledge and skills in a supportive environment that aimed at delivering practical training to support Fellow's ongoing work:

It's easier to learn when you're actually seeing another person who has been doing it for a long time do it in front of you and experience the field surveys and how an experienced worker would do it. It's faster than learning on your own. And faster if you make a mistake, they correct you immediately (Fellowship recipient, interview 2012).

This emphasis on practical training and applied knowledge sharing means that Fellows are quickly able to apply their knowledge. This in turn boosts their confidence and motivation in their work:

After attending fellowship I was able to do taxonomic studies and wasn't afraid of problematic species (Fellowship recipient and country program staff, Interview 2012).

In addition to training in technical skills, the Fellowship Program supports future leaders to develop a range of professional skills such as lab work, fieldwork, grant writing and cross-cultural communication skills:

One of the things we've applied from what I learned there is the field study. The way they organise the field study is more efficient than ours ... by sharing this and applying it to our own study, we make more efficient ways and breakthroughs (Fellowship recipient, interview 2012).

Many Fellows took the initiative to establish ongoing training activities within their Home Institutions upon finishing their Fellowships, training their peers or staff from other infectious and Vector-Borne Disease Control Programs.

I've shared it with colleagues here because this is new and some may or may not have done it before (Fellowship recipient and Partner Institution, Interview 2012).



Fellows and their mentors together at APMEN III, Kota Kinabalu Malaysia, May 2011

Many Fellows working in malaria control applied the skills learned in their Fellowship to other infectious disease control programs, including dengue fever, scrub typhus and filariasis control programs.

FOSTERING COLLABORATIONS ESSENTIAL TO ACHIEVING REGIONAL ELIMINATION

Many of the benefits of APMEN Fellowships stem from the collaborative approach to capacity building that APMEN encourages. Since APMEN sees collaboration as essential to achieving regional elimination, the network aims to incorporate collaborative approaches into each of its activities.

Fellows often found that although certain expertise is not available in their home country, that much existing knowledge was available within the region. For example, one Fellowship recipient travelled to a neighbouring country to learn screening techniques for G6PD deficiency. Another Fellow learned techniques used for vector identification and mapping in another regional country and was able to incorporate these identification techniques into her ongoing work within her home program:

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] (Fellowship recipient, Interview 2012).

This practical, collaborative approach makes the training directly relevant to the Fellow, and helps to promote collaborative approaches to elimination.

In several instances Fellows came to their Fellowship with datasets and samples from their home country. The Host Institution provides expertise and equipment to teach the Fellow how to analyse this data, and show them how to incorporate this new knowledge into their ongoing work. For example, one country had epidemiological data that they were unable to analyse and act upon. Following their Fellowship, this country was much more strongly equipped to incorporate this data into their elimination activities.

Most Fellows developed an ongoing mentoring relationship with their Host Institutions, many have gone on to publish work with their mentors, and some to develop new projects with their former Host Institutions. Some Host Institutions have agreed to become informal mentors to the former Fellow's country elimination program, offering guidance and expertise and facilitating informal partnerships to support country elimination efforts.

While many valued the opportunity to build partnerships with leading global institutions, many also valued the opportunity to facilitate partnerships within the region. Many APMEN Country Partners in particular said that they value that the Fellowship Program recognises the existing expertise and achievements already made by country programs and scientists within the region.

We can train people, they can go to [other countries in the region], rather than sending them thousands of miles away (Partner Institution, Focus Group APMEN IV).

Facilitating knowledge sharing between regional countries is a key aim of APMEN, and the Fellowship Program is an important activity to generate such regional dialogue.

DELIVERING BENEFITS TO A WIDE RANGE OF APMEN PARTNERS

The benefits to the individual Fellowship recipients are clear. Almost all Fellows reported that their Fellowships exceeded their expectations by enabling them to develop new skills, new professional networks and by expanding their overall understanding of the malaria elimination sector. However the collaborative nature of the APMEN Fellowship Program allows it to generate a number of additional impacts that go beyond the individual Fellow. The Fellowship Program benefits the Fellow's country program by training future leaders in their country's elimination programs, and by generating technical and program capacity in critical areas. Fellowships also help country programs to build strategic partnerships with neighbouring countries and with regional and global institutions. Many Fellows develop formal training modules or carry out other capacity building activities with their peers upon returning to the country programs.

In addition, APMEN Fellowships are often also beneficial to the Host Institution. For example, Fellowships allow Host Institutions to develop partnerships with National Malaria Control Programs throughout the region. In addition, Fellows often bring datasets, samples and valuable experience and insights from their own country experience to the Host Institution, which can enrich the understanding of the Host Institution. These mutually beneficial Fellowships are often reported to be the most rewarding to participants. As such, APMEN endeavours to facilitate strategic partnerships that are mutually beneficial to the Host Institution, the Home Institution and the individual fellow.

Finally, the Fellowship Program strengthens the capacity of the APMEN network itself, by facilitating regional awareness, collaboration and collegiality, by strengthening the capacity and motivation of key partners in the network, and by bringing awareness and momentum to regional malaria elimination efforts. Importantly, the Fellowships that were the most successful in terms of reported satisfaction of the Fellows, Host and Home Institutions and secondary outcomes such as publications and ongoing training activities, were those that were mutually beneficial to all partners. This highlights the many benefits of the collaborative approach to elimination that is supported by networks such as APMEN.

Thematic Focus Areas of Fellowships

P. vivax case management and diagnostics

- Genotyping for *P. vivax* isolates as a tool for monitoring parasite population and transmission *P. vivax* genotyping
- The establishment of enzyme-linked immunosorbent assay (ELISA) based high-throughput serological methods including modelling data analysis and interpretation
- G6PD deficiency diagnosis in the context of a mass screening in connection with a primaquine challenge clinical trial in Cambodia
- *P. vivax* genotyping to support therapeutic efficacy studies

Surveillance and response

- GIS mapping (to support the use of epidemiological data in Bhutan)
- GIS and Spatial Analysis Methods (for application in Sarawak, Malaysia)
- *P. vivax* genotyping for molecular characterising parasite population and for identifying imported cases from local transmission
- GIS and Spatial Analysis Methods (for understanding spatio-temporal dynamics of malaria along international borders of Thailand)
- Surveillance and Response Thematic Fellowship
- MAP Thematic Fellowship

Vector control

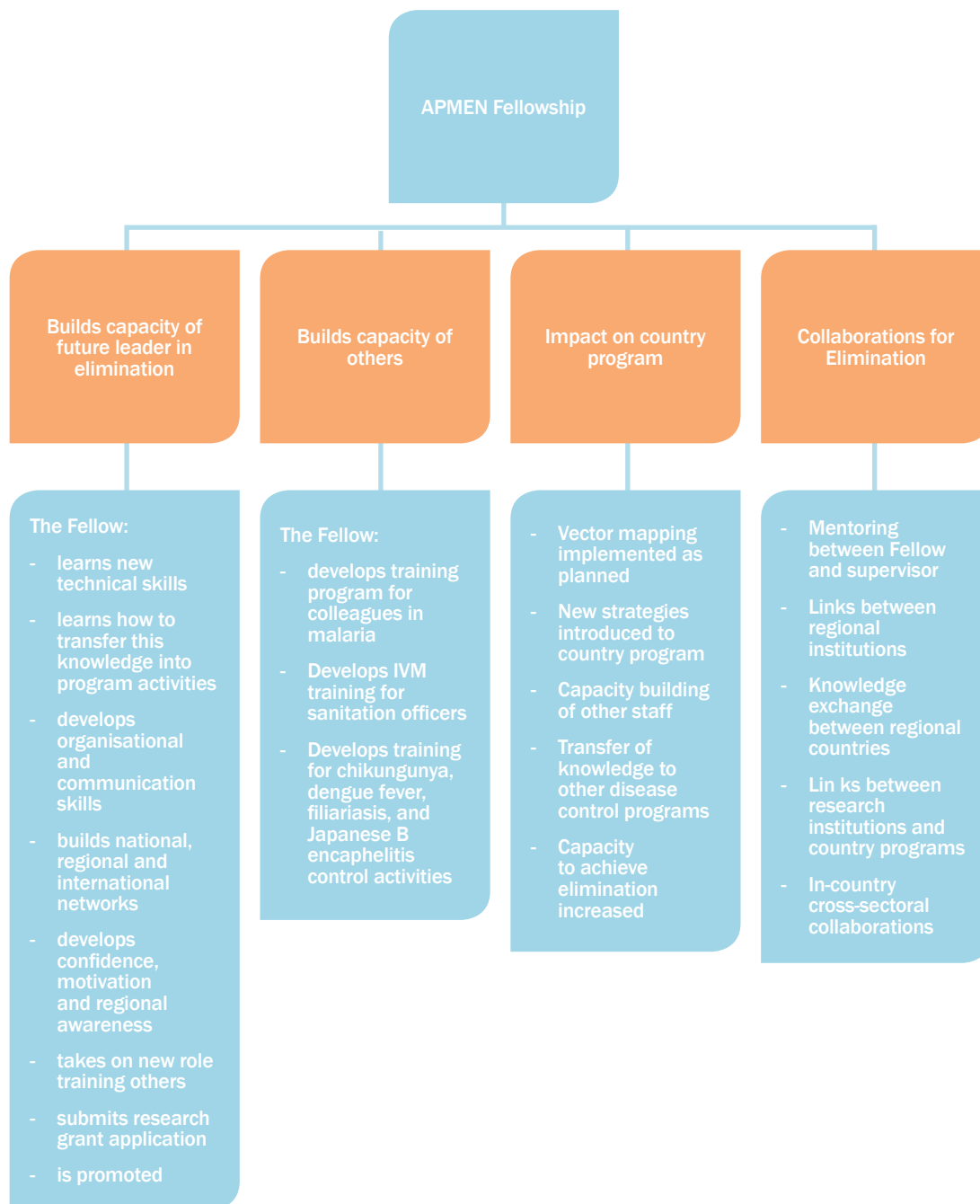
- Anopheline taxonomy and mapping of species to correlate vector distribution and disease incidence
- Training on Molecular Techniques for Malaria Diagnosis and Vector Incrimination, Bhutan
- Repellents as added control measure to Long Lasting Insecticide-treated nets to target residual transmission to Southeast Asia – a step forwards for malaria elimination
- Pyrethroid resistance mechanisms in *Anopheles sinensis*, the major malaria vector in China
- VecNet Thematic Fellowship

Community participation and Advocacy

- Community Action Groups and Behaviour Change Communication in malaria elimination

Program capacity development

- Human resource capacity building of the Vector Borne Disease Control Program, Solomon Islands





4. LIMITATIONS OF THE FELLOWSHIP PROGRAM

Although the Fellowship Program has been highly successful there have been a number of challenges that faced Fellows.

COMPETING PROGRAM DEMANDS CAN SLOW IMPLEMENTATION

Many Fellows returned from their Fellowships highly motivated and eager to implement their new skills into their ongoing work or even to make significant changes within their Home Institutions, and indeed many Fellows were successful in doing so. However some found upon return that their programs faced competing demands that their managers decided to prioritise. In some instances the planned activities of Fellows were reduced or delayed by the shifting priorities of their Home Institutions. Although all Fellows are supported by senior staff within their institutions, since most Fellows are early or mid-career staff they do not always have the power to influence key decision makers in their Home Institutions. As such, some Fellows became disappointed when realising upon return that their skills, while valued by their Home Institutions, were not always priority areas for action as many had envisioned.

MOBILISING RESOURCES TO SCALE-UP ACTIVITIES

Those Fellows who were able to implement new activities upon returning to their Home Institutions often found that their institutions lacked the resources to scale-up the implementation of these activities. Most Fellows took the initiative to share the results of the Fellowship with their colleagues and many developed official training programs or collaborations to transfer their knowledge to their broader institutions. However others lacked the time, funding or training skills to share their skills beyond their immediate network of colleagues. This reflects a broader challenge facing many country programs that wish to scale up activities as they near elimination, only to face limited and sometimes shrinking resources.

LEARNING QUICKLY IN A CHALLENGING ENVIRONMENT

Although almost all Fellows reported their Fellowships as a highly rewarding personal experience, many found it challenging to learn new technical skills in a relatively short period of time while they were also adapting to working in a new language, with new colleagues and in institutions with unfamiliar internal structures and processes. While most Fellows enjoyed the opportunity to travel to and work in a new country, many also faced difficulties learning to navigate a new and unfamiliar country and workplace with language barriers.

It is a testament to the APMEN Fellows that most were able to adapt to their new working environments not only to learn the new skills they sought, but also to develop positive working relationships with their new colleagues. Overall, most Fellows noted that they enjoyed the cultural exchange elements of their Fellowship, however almost all said that working in an unfamiliar environment was a much greater challenge than they had anticipated.

TECHNICAL PROBLEMS THAT DELAYED FELLOWSHIPS

In addition, a very small number of Fellowships were delayed for technical reasons including visa difficulties, shortfalls in budgets, or unexpected outcomes in the lab that changed the activities of the Fellows. In one case the content of the Fellowship did not match the expectations of the Fellow. These difficulties were managed on a case-by-case basis by the Fellow with support from the APMEN Secretariat and the Host Institution.

Overall however, the reported successes of the APMEN Fellowship Program far outweighed the challenges facing Fellows during or after their Fellowships. The impact of the Fellowship Program on the skills of fellows and on the capacity of their Home Institutions is discussed in details in the pages below, which profile the APMEN Fellowship Alumni.

For more details refer to Annex Three.



5. APMEN FELLOWSHIP PROGRAM ALUMNI

APMEN Fellowships enable Fellows to build their expertise in areas that have been identified as crucial to their country elimination programs. APMEN Fellowships have focused on themes as diverse as surveillance and response, *P. vivax* diagnostics and management, program capacity development, community participation and vector control. While some Fellows elect to undertake short courses at academic institutions in specialised topics, others seek tailored, peer-to-peer training at regional research institutions with specialised equipment and expertise.

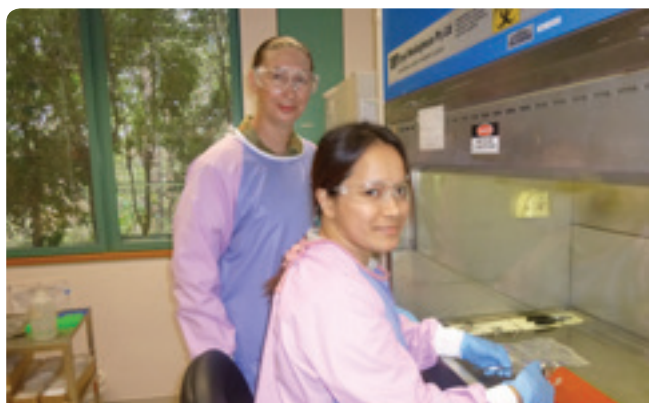
The Fellowship Program has been proven to be highly regarded by Fellows and by the broader APMEN network. Fellows learn new technical and professional skills rapidly and return to their countries with increased confidence and motivation. In addition many experienced unexpected learning outcomes of their Fellowships, such as developing an awareness of the regional and global context of malaria elimination, learning professional skills such as grant writing, and developing an awareness of the broader policy environment informing elimination programs. These additional benefits differentiate the APMEN Fellowship Program from training that is focused exclusively on supporting technical capacity of direct participants in a training activity.

Between 2010 and 2013, APMEN awarded 17 Fellowships to Fellows from nine countries. The APMEN Fellowship Alumni are profiled in the following pages, with details of the thematic focus of each Fellowship and the work that has been continued by Fellows since completing their Fellowships.

For more details, refer to Annex Four.



Sir Richard Feachem with Fellows at AP MEN Annual Business and Technical Meeting, Kota Kinabalu, 2011



Ms Jo-Ann Bibit from the Research Institute for Tropical Medicine (RITM), Philippines, with supervisor Lt. Simone Dowd at the Australian Army Malaria Institute, Brisbane



Mr Ho Viet Hieu at the Insectary Section, Department of Entomology, AFRIMS, Thailand

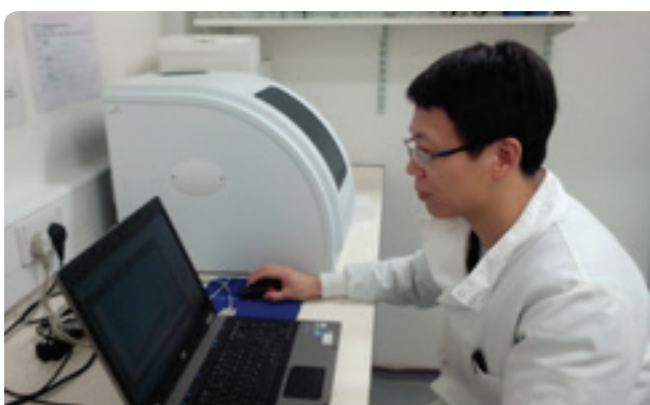
FULL LIST OF APMEN FELLOWSHIP ALUMNI 2010 TO 2013

YEAR	Name of Fellow	Title of Fellowship	Home Institution	Host Institution	Mentor
2010	Ms Majhalia Torno	Anopheline taxonomy and mapping of species to correlate vector distribution and disease incidence	Research Institute for Tropical Medicine, (RITM), Philippines	The Armed Forces Research Institute for Medical Science (AFRIMS)	Dr Alongkot Ponlawat
	Ms Ervi Salwati	Genotyping for <i>P. vivax</i> isolates as a tool for monitoring the emergence and spread of drug resistant parasites	Molecular Biology Laboratory, Center for Biomedical and Pharmaceutical Research and Development, National Institute of Health Research and Development (NIIHRD) Jakarta, Indonesia.	Australian Army Malaria Institute (AMI), Brisbane Australia	Dr Qin Cheng
	Dr Jun (Joe) Cao	The establishment of enzyme-linked immunosorbent assay (ELISA) based high-throughput serological methods including modelling data analysis and interpretation	Jiangsu Institute of Parasitic Diseases, Wuxi, China	London School of Hygiene and Tropical Medicine (LSHTM)	Prof. Chris Drakeley
	Mr Pema Samdrup	Geographical information system mapping	Vector-borne Disease Control Programme, Bhutan	The Faculty of Tropical Medicine, Mahidol University, Thailand	Dr Irwin Chavez
	Ms Tshering Dema	Community Action Groups and Behaviour Change Communication in malaria elimination	Chengmari Bhutan Primary health care centre, Samtse, Bhutan	National Vector Borne Disease Control division of the Disease Control and Environmental Health, Ministry of Health, Indonesia,	Dr Rita Kusriastuti

YEAR	Name of Fellow	Title of Fellowship	Home Institution	Host Institution	Mentor
2011	Mr Leonard Boaz	Human resource capacity building of the Vector Borne Disease Control Program	Vector Borne Disease Control Program (VBDCP), Solomon Islands	ACT Malaria	Ms Cecil Hugo
	Ms Frilasita Yudhaputri	G6PD deficiency diagnosis in the context of a mass screening in connection with a primaquine challenge clinical trial in Cambodia	Eijkman Institute, Jakarta	Institut Pasteur Cambodia	Dr Didier Menard
	Dr Choo Huck Ooi	Geographical Information Systems (GIS) and Spatial Analysis Methods	Vector Borne Diseases Control Section, Sarawak Health Department, Kuching, Malaysia	London School of Hygiene and Tropical Medicine, London (LSHTM), United Kingdom.	Dr Jonathan Cox
	Mr Liu Yaobao	<i>Plasmodium vivax</i> genotyping for molecular characterising parasite population and for identifying imported cases from local transmission	Jiangsu Institute of Parasitic Diseases (JIPD), Wuxi, China	Australian Army Malaria Institute (AMI) Queensland Institute of Medical Research (QIMR)	Dr Qin Cheng
	Dr Supawadee Pongsombha	Geographical Information Systems (GIS) and Spatial Analysis Methods (for understanding spatio-temporal dynamics of malaria on Thailand's international borders)	Bureau of Vector Borne Disease, Nonthaburi, Thailand	London School of Hygiene and Tropical Medicine in London (LSHTM), United Kingdom.	Dr. Jonathan Cox

YEAR	Name of Fellow	Title of Fellowship	Home Institution	Host Institution	Mentor
2012	Mr Ho Viet Hieu	Repellents as added control measure to Long Lasting Insecticide-treated nets to target residual transmission to Southeast Asia – a step forwards for malaria elimination	Department of Entomology, Institute of Malariology, Parasitology, and Entomology, Quy Nhon, Viet Nam	National Centre for Entomology, Institute of Malariology, Parasitology, Cambodia; and Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok Thailand	Dr Tho Sochantha Dr Alongkot Ponlawat
	Ms Jo-anne Bibit	<i>Plasmodium vivax</i> genotyping to support therapeutic efficacy studies	Research Institute for Tropical Medicine (RITM), Manila, Philippines.	Australian Army Malaria Institute (AMI)	Dr Qin Cheng Lieutenant Simone Dowd Prof. Dennis Shanks
	Mr Rinzin Namgay	Training on Molecular Techniques for Malaria Diagnosis and Vector Incrimination, Bhutan	Vector Borne Disease Control Program, (VDCP), Bhutan	Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok Thailand	
	Mr Guoding Zhu	Pyrethroid resistance mechanisms in <i>Anopheles sinensis</i> , the major malaria vector in China	Department of Malaria Control, Jiangsu Institute of Parasitic Diseases (JIPD), Wuxi, China	Liverpool School of Tropical Medicine	Dr David Wheetman

YEAR	Name of Fellow	Title of Fellowship	Home Institution	Host Institution	Mentor
2013	Mr Pema Sandrup	Malaria Atlas Project (MAP) Thematic Fellowship	Vector-borne Disease Control Programme, Bhutan Department of Public Health, Gelephu Bhutan	Malaria Atlas Project (MAP), based at the University of Oxford, United Kingdom	Dr Catherine Moyes
	Dr Prayuth Sudathip	Surveillance and Response Thematic Fellowship	Epidemiology and Monitoring and Evaluation Department, National Malaria Program, Thailand Ministry of Public Health	USCF Global Health Group, University of California, USA.	Dr Roly Gosling
	Mr Bui Le Duy	VecNet Thematic Fellowship	Vietnam National Institute of Malariology, Parasitology and Entomology (NIMPE)	VecNet University of Notre Dame, USA	Prof. Tom Burkot Dr Frank Collins



Mr Guoding Zhu at Liverpool School of Tropical Medicine



Jun Cao, from the Jiangsu Institute of Parasitic Diseases, Wuxi China, carrying out a field survey in China



APMEN Fellowship Program Alumni

MAJHALIA TORNO

"I would like to conduct sampling of anopheline adults and larvae along elevational gradients, compare mosquito diversity between different habitat types and assess the vulnerability of communities based on this research ... we have not been able to include updated vector diversity profile and I would like to learn how to do this. I hope that through the APMEN Fellowship I would be able to bridge the gaps in understanding the continued spread and transmission of malaria in [the Philippines] and the ecology of malaria vectors."

PHILIPPINES

Anopheline taxonomy and mapping of species to correlate vector distribution and disease incidence

Majhalia Torno is an entomologist with the **Research Institute for Tropical Medicine (RITM) in the Philippines**. She has a Bachelor of Science in Zoology and a Master of Science in Wildlife Studies from the University of the Philippines. Majhalia is currently responsible for research activities in relation to mosquito systematics, and serves as quality assurance officer for field and laboratory testing of bioassay, and detection of susceptibility of malaria vectors against common insecticides used in public health. She also assists in training activities for capacity building of local health workers in the conduct of vector surveillance aligned with principles of integrated vector management (IVM).

Ms Torno's 2010 Fellowship focused on anopheline taxonomy and ways to apply vector diversity mapping to understanding of disease incidence. Her Fellowship was hosted by the **Armed Forces Research Institute for Medical Science (AFRIMS)**, under the supervision of **Dr Alongkot Ponlawat**, Chief of the Department of Entomology in the Vector Biology and Control section of AFRIMS.

Ms Torno's Fellowship was highly successful. In addition to helping to develop a malaria vector map for the Philippines she has also expanded her role to develop a training program to share these skills with her colleagues not only in malaria elimination activities, but also with other mosquito-borne disease control programs in the Philippines. Ms Torno has taken on a number of new responsibilities that contribute toward the Philippines elimination strategy.

"Upon my return from my APMEN fellowship, I was able to immediately use the knowledge and skills I gained from this fellowship through the on-going projects of our laboratory that required high level skills in taxonomic identification of mosquitoes and GIS know-how for the malaria vector map we were trying to re-evaluate for the whole country. The skills I've developed on the morphological identification of mosquito vectors was also applied to other mosquito-borne diseases such as chikungunya, dengue, filariasis



(LEFT IMAGE) Ms Majhalia Torno, from the Research Institute for Tropical Medicine (RITM) in the Philippines at the Armed Forces Research Institute for Medical Science, Thailand

(RIGHT IMAGE) Ms Majhalia Torno (Research Institute for Tropical Medicine in the Philippines) learning vector taxonomy and GIS skills at the Armed Forces Research Institute of Medical Sciences (AFRIMS) in Thailand.

and Japanese B encephalitis especially during outbreaks and transmission investigations. Also, we established a basic training program for mosquito collection, preservation, transport and storage among regional sanitary inspectors and other public health workers involved in vector surveillance ... This strengthened collaborative activities between our Institute and Regional Department of Health Offices (RDHO) where I served as validator of mosquitoes submitted by the RDHO field personnel. I joined the Malaria-free Assessment Team of the Philippine Department of Health where I am responsible for the evaluation of vector diversity of each province. Data collected from the assessment was also included in the development of

an update vector map. I have since been designated as training and quality assurance officer on mosquito systematics and am now tasked to train new personnel on mosquito identification and conduct trainings in other regions in relation to mosquito collection and taxonomy. I have also acted as lead for vector mapping and entomological investigations for malaria and filariasis.”



APMEN Fellowship Program Alumni

ERVI SALWATI

"In this APMEN Fellowship I am interested to know how to look for single nucleotide polymorphisms in the sequence of these PfCRT and PvMDR1 genes, to be used as molecular markers in the surveillance of CQR in P. vivax."

INDONESIA

Genotyping for *P. vivax* isolates as a tool for monitoring the emergence and spread of drug resistant parasites

Ervi Salwati works with the **Molecular Biology Laboratorium Center for Biomedical and Pharmaceutical Research and Development, National Institute of Health Research and Development (NIIHRD) in Jakarta, Indonesia**. Ms Salwati has a degree in biology from the University of Indonesia and was awarded a Master of Biomedicine (Parasitology) from the University of Indonesia in 2006.

During Ms Salwati's 2010 APMEN Fellowship she looked at ways to establish molecular markers of *Plasmodium vivax* resistance to antimalarial drugs by looking for single nucleotide polymorphisms (SNPs) from the candidate genes potentially involved in drug resistance.

Ms Salwati's Fellowship was hosted by the **Australian Army Malaria Institute (AMI)**, under the supervision of **Dr Qin Cheng**, a molecular parasitologist and head of the Drug Resistance and Diagnostics department at the Australian Army Malaria Institute (AMI).

Ervi Salawati's Fellowship strengthened her skills used in her ongoing work at the NIIHRD:

"By attending this APMEN Fellowship, now I know how to analyze the sequence of the pvmdr1 gene and look for the SNPs. Besides that, I learned how to design a primer ... I want to apply them by doing a research for our archive samples (from different endemic area and also has the samples with treatment failure)."

Since completing her Fellowship, Ms Salawati has gone on to develop new research projects examining the molecular markers for drug resistance in other parts of Indonesia. Her most recent research project looks at SNP pvmdr 1 gene in patients with *P. vivax* infections in Southeast Minahasa, Sulawesi, Indonesia.



APMEN Fellowship Program Alumni

JUN (JOE) CAO

"This fellowship will assist me to develop the skills to lead a serology study which could provide valuable information for intervention targeting and evaluation and finally accelerate malaria elimination in China ... I am very keen to bring home vivax malaria serology study techniques currently not available in China."

CHINA

The establishment of enzyme-linked immunosorbent assay (ELISA) based high-throughput serological methods including modelling data analysis and interpretation

Dr Jun Cao is the Deputy Director of the **Jiangsu Institute of Parasitic Diseases (JIPD), Wuxi, China**. He obtained his Master's degree from Jiangsu Institute of Parasitic Diseases and his PhD from Suzhou University, Suzhou, China.

Dr Jun Cao is a leader in malaria research and malaria elimination programs in Jiangsu province, making him ideally situated to transfer his skills to the Chinese malaria community to enable them to assess transmission intensity and to evaluate the impact of elimination activities. Dr Jun Cao's APMEN Fellowship examined vivax malaria serology techniques that were not readily available in China.

Dr Jun Cao carried out his Fellowship in 2010 at the **London School of Hygiene and Tropical Medicine (LSHTM)**, under the supervision of **Prof. Chris Drakeley**, a global expert on immuno-epidemiology and Director of the LSHTM Malaria Centre.

Jun Cao was able to share the results of his Fellowship with his colleagues at his home institute, and has carried out a number of training activities and collaborations with his Host Institution, his colleagues in China, and other colleagues in the region. Dr Jun Cao strongly values the ongoing relationship that he has been able to build with the LSHTM and his mentor Prof. Chris Drakeley. Since completing his fellowship Jun Cao has also developed new collaborations on vivax serology markers with colleagues from the Republic of Korea.

"After I went back to China, the technology acquired from the fellowship program was transferred to the malaria team in home institute, and developed a project titled "Sero-epidemiological analysis for monitoring vivax malaria elimination in China." This was supported by the APMEN Vivax Working Group and the Jiangsu Provincial government. Upon the success of the project, we will try to roll out this technology and methodology to other malaria endemic areas in the country. We expect that this serology method will finally become not only a unique tool of elimination intervention targeting, but also an indicator of national malaria elimination program evaluation and confirmation.



APMEN Fellowship Program Alumni

PEMA SAMDRUP

"The outcome of this training will be the first introduction of GIS in the Ministry of Health in Bhutan. We will begin in a few endemic districts on a pilot basis and then follow up with a gradual implementation to the remaining districts at risk of malaria transmission."

BHUTAN

Geographical information system mapping

Pema Samdrup is the Program Officer with Vector-borne Disease Control Program, and looks after the Malaria Program under the Department of Public Health, Ministry of Health, Bhutan. He has a Diploma in Public Health from the Royal Institute of Health Sciences, Thimphu, Bhutan. Mr Samdrup's main responsibilities are to plan, implement and monitor the malaria and other vector-borne disease activities at a National and District level. He is the focal person for submission and preparation of PUDR reports to Global fund and prior to joining to the Malaria Program he worked in many districts as a District Health Officer.

Mr Samdrup's 2010 fellowship enabled him to assist his colleagues in providing technical support in the design, management and utilization of epidemiologic data within a GIS structure in the health sector in Bhutan.

Mr Samdrup's Fellowship was hosted by the Faculty of Tropical Medicine, within Mahidol University, Thailand. He was mentored by Dr Irwin Chavez, a lecturer and specialist in the epidemiology of infectious diseases, statistical methods and the application of Global Information Systems for disease control.



Mr Pema Samdrup (left), Department of Public Health, Ministry of Health, Bhutan, undergoing training in GIS for malaria elimination with Mahidol University, Thailand



APMEN Fellowship Program Alumni

TSHERING DEMA

"The APMEN Fellowship will allow me to see first-hand the impact that community action groups and behavioural change communication can make at the grassroots towards malaria elimination."

BHUTAN

Community action groups and behaviour change communication in malaria elimination

Tshering Dema is a Community Nurse at the Chengmari **Bhutan Primary Health Care Centre** located in the District of Samtse, Bhutan. Tshering has a certificate in community nursing from the Royal Institute of Health Sciences, Bhutan. Ms Dema trained in malaria microscopy and is involved in active case detection and the Indoor Residual Spraying program. She has been involved in creating awareness for populations at high risk of malaria such as pregnant women and children. Ms Dema is a working member for a Community Action Group committee in Chengmari, an initiative of the National Malaria Program with support from the Global Fund. This committee is actively involved in grass root level planning, implementation and monitoring of health activities focusing especially on malaria and other vector-borne diseases.

Ms Dema's 2010 Fellowship was hosted by the **National Vector-borne Disease Control Division** within the Indonesian Ministry of Health. She was mentored by **Dr Rita Kusriastuti**, who was at the time the Director of the Vector Borne Disease Control Division. In her Fellowship Ms Dema travelled to North Maluku to observe the role of community action groups and behaviour change communication within malaria elimination activities in North Maluku, Indonesia.



Amanda Murphy Vivax training World Malaria Day 2013 Gelephu Bhutan



APMEN Fellowship
Program Alumni

LEONARD BOAZ

"This Fellowship will assist me to collaborate with other institutions to run trainings and be able to coordinate the human resource capacity building of the Vector Borne Disease Control Program."

SOLOMON ISLANDS

Human resource capacity building of the Vector Borne Disease Control Program

Leonard Boaz is the Deputy Director and Human Resource Manager for the **Vector Borne Disease Control Program (VBDCP)** in the **Solomon Islands**. Mr Boaz has a Bachelor of Science from the University of Suva, a Postgraduate Diploma in Applied Parasitology and Entomology from Kuala Lumpur and a Master's of Science in Public Health and Tropical Medicine from Manila.

During Mr Boaz's 2011 APMEN Fellowship, he designed a local malaria management training course for current field officers or new recruits within the Vector Borne Disease Control Program in the elimination provinces in the Solomon Islands.

Mr Boaz's Fellowship was hosted by the **Asian Collaborative Training Network for Malaria (ACTMalaria)**, an inter-country training and communication network composed of the national malaria control programs of 12 Asian countries. He was supervised by **Ms Cecil Hugo**, the Executive Coordinator of ACTMalaria.



Outdoor breeding vectors and vector diversity are major challenges facing the Asia Pacific.



APMEN Fellowship Program Alumni

SUPAWADEE PONGSOMBAT

“Through my APMEN Fellowship I will be able to gain the basic knowledge of the GIS application and the spatio-temporal autocorrelation analysis technique for analysing and making the best utilization of the existing malaria data.”

THAILAND

Geographical Information Systems (GIS) and Spatial Analysis Methods

Dr Supawadee Pongsombat is a Senior Public Health Specialist for the **Bureau of Vector Borne Disease in Nonthaburi, Thailand**. Dr Supawadee has a Bachelor of Science majoring in Biology, a Master’s of Science majoring in Medical Science, and a PhD in Tropical Medicine from Mahidol University, Thailand.

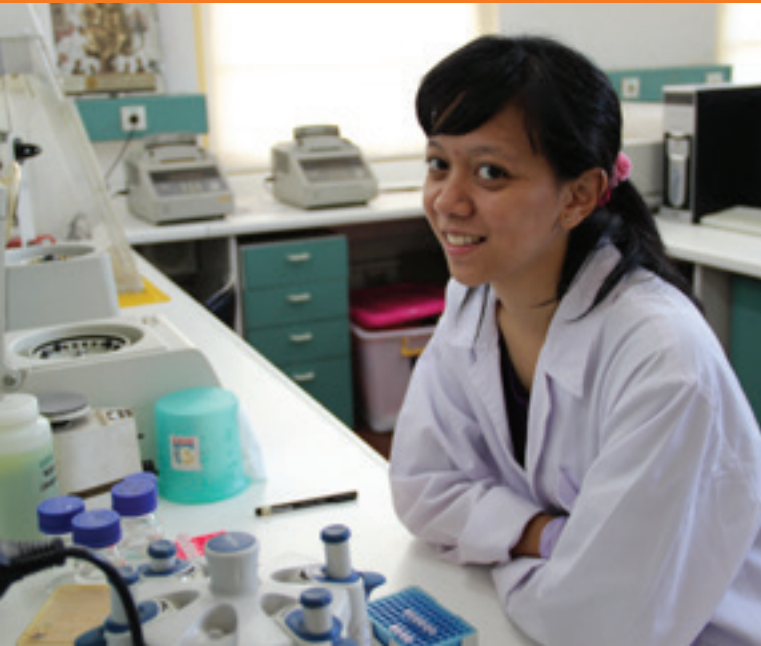
Dr Pongsombat’s Fellowship equipped her with skills to better utilize data for monitoring and predicting malaria epidemics, especially along Thailand’s international borders. Dr Pongsombat was able to analyse district level malaria incidence data from 2000-2010 in endemic provinces by using spatio-temporal autocorrelation analysis technique. The objective of this study was to analyse the data on different spatial scales and the association between *Plasmodium falciparum* (*P. falciparum*) and *P. vivax* and to describe the spatio-temporal dynamics of malaria parasites in endemic provinces along the international borders of Thailand.

Dr Pongsombat undertook her 2011 APMEN Fellowship at an intensive GIS Course at the **London School of Hygiene and Tropical Medicine**. Dr Pongsombat was supervised by **Dr Jonathan Cox**, a world-renowned specialist in spatial epidemiology and the application of GIS in disease control.

Since completing her Fellowship Dr Pongsombat has gone on to share her knowledge and skills on GIS and its potential role in monitoring and surveillance with her colleagues at the Bureau of Vector-borne disease. In 2011 Dr Pongsombat submitted a proposal on “Spatial epidemiology of malaria incidence in endemic provinces along the International borders of Thailand” to the Thai Government.

Recognising the growing importance of drug resistance in Thailand, in 2012 Dr Pongsombat developed a new project, “Factors influencing the misdiagnosis of microscopists in malaria clinics along the Thai-Myanmar and Thai-Cambodia border provinces,” which she implemented in 2012-2-13 with support from the Department of Disease Control. Dr Pongsombat presented the results of this research at the Joint International Tropical Medicine Meeting (JITMM) 2013 which was held during 11-13 December in Bangkok, Thailand.⁴

Dr Pongsombat has now changed roles and is applying her expertise in GIS to the prevention and control of dengue fever, which is a major public health problem in Thailand. She also works with her colleagues to respond to emerging diseases such as leishmaniasis and scrub typhus.



APMEN Fellowship Program Alumni

FRILASITA YUDHAPUTRI

“By participating in laboratory support of the screening effort that will identify potential study subjects for that important clinical trial, I will see first-hand how a mass survey for G6PD deficiency and other blood disorders are accomplished by both qualitative and quantitative methods.”

CAMBODIA

G6PD deficiency diagnosis in the context of a mass screening in connection with a primaquine challenge clinical trial in Cambodia

Frilasita Yudhaputri started as a Research Assistant at the **Eijkman Institute for Molecular Biology in Jakarta, Indonesia**. Ms Yudhaputri has a Bachelor of Science in biology from the University of Indonesia. Following her APMEN Fellowship Ms Yudhaputri was awarded a Master of Biomedical Science with Honours from Monash University, Australia.

Ms Frilasita Yudhaputri's 2011 APMEN Fellowship focused on G6PD deficiency diagnosis in the context of a mass screening in connection with a primaquine challenge clinical trial in Cambodia. This Fellowship provided Ms Yudhaputri with first-hand experience on how a mass survey for G6PD deficiency and other blood disorders can be accomplished by both qualitative and quantitative methods, as well as High Resolution melting (HRM) technique based on Real time Polymerase chain reactions (PCR).

Ms Frilasita Yudhaputri's Fellowship was hosted by the **Institut Pasteur Cambodia**, under the supervision of **Dr Didier Menard**, a malariologist with expertise in anti-malarial drug resistance of *Plasmodium falciparum* (*P. falciparum*) and *P. vivax* and in the epidemiology of *P. vivax*.

Ms Yudhaputri's Fellowship was highly successful, and she was able to build a number of laboratory and field skills that she has since used to develop new projects.

By participating in this Fellowship, I gained experience in both field study and laboratory support of a G6PD screening effort that potentially identifies study subjects for important clinical trial. I experienced first-hand how a mass field survey for G6PD deficiency and other blood disorders were accomplished by both qualitative and quantitative methods. Also, the high resolution melting technology that I learned during the fellowship would be very useful to be applied in Indonesia as first hand screening of G6PD variants ... The work that I have done during the fellowship provides me all the invaluable skills in a state of the art laboratory screening for G6PD deficiency having the rigor of an important policy shaping clinical



(LEFT IMAGE) Ms Frilasita Yudhaputri from the Eijkman Institute for Molecular Biology, Jakarta, Indonesia.

(RIGHT IMAGE) Ms Yuhaputri's fieldwork component involved travelling to remote locations to work amongst minority ethnic groups in Cambodia

trial. It served to bridge technological know-how at the Institut Pasteur with my home Indonesian institute and Indonesia in general.

Ms Frilasita Yudhaputri developed the research she began during her Fellowship during her Master of Biomedical Science at Monash University and was awarded first class honours. Together with her research partners, she has developed this work into an article to be published in an international journal.

The Fellowship that I received from APMEN has been a tremendous bridge for my networking. It was one of the achievements that helped me during my interview for grant proposals and other awards ...

After graduation Ms Frilasita Yudhaputri was promoted to Project Coordinator of the sequencing program at her Home Institution, the Eijkman Institute for Molecular Biology, Indonesia. In her new role as Project Coordinator, Ms Yudhaputri is responsible for identifying new study sites and building new collaborations for national surveillance in Indonesia.

The most important aspect of this fellowship has been the opportunity to be creative and innovative in conducting our research interest. In addition I had the chance to build strong networks with researchers sharing same interest.



(ABOVE IMAGE) The fieldwork component of Ms Yudhaputri's Fellowship involved mass screening for G6P deficiency amongst minority group in Cambodia



APMEN Fellowship Program Alumni

OOI CHOO HUCK

"I will bring back to Sarawak new knowledge and skills on the application of GIS that I will acquire during this APMEN Fellowship at the London School of Hygiene and Tropical Medicine. With this newly acquired knowledge I am very sure I will be able to further work on the application of GIS for malaria elimination in Sarawak."

MALAYSIA

Geographical Information Systems (GIS) and Spatial Analysis Methods

Dr Ooi Choo Huck is a Senior Principal Assistant Director in the **Vector Borne Diseases Control section for the Sarawak Health Department, in Kuching Malaysia**. Dr Ooi completed his medical training at the University Sains Malaysia in 1988. Since then, Dr Ooi has completed a Diploma in Tropical Medicine and Hygiene a Master's degree in Public Health.

During Dr Ooi's 2011 APMEN Fellowship he further developed his skills in geographical information systems (GIS) by undertaking a six week placement at the London School of Hygiene and Tropical Medicine. Dr Ooi had previously georeferenced a significant proportion of the malaria cases in Sarawak for the four years leading up to his Fellowship. Dr Ooi brought this dataset to his Fellowship to learn how to analyse the data using an advanced spatial analysis method.

Dr Ooi's Fellowship was hosted by the **London School of Hygiene and Tropical Medicine (LSHTM)**, under the supervision of **Dr Jonathan Cox**. Dr Cox is a medical geographer and well-known expert in spatial epidemiology and the application of Global Information Systems to malaria control and elimination.

Following his Fellowship, Dr Ooi helped his national program to scale up the application of GIS activities within the malaria elimination activities in Sarawak. Malaysia is making impressive gains in eliminating falciparum and vivax malaria in the state of Sarawak, and Dr Ooi believes that the application of GIS technology has played an important role in helping Malaysia to achieve these successes.

"After I came back from the "Geographical Information Systems (GIS) and Spatial Analysis Methods" Fellowship, I started applying GIS in malaria control activities in the state of Sarawak. I started by making GIS part of the work for malaria activities in Sarawak. I geo-referenced all our malaria activities (location of malaria cases, health facilities, all malaria foci, malaria vectors distributions, and localities with malaria activities e.g. Indoor Residual Spraying, Insecticide Treated Nets, Active Case Detection, Mass Blood Survey, etc). I also trained our officers in the field to capture geographical coordinates using Global Positioning System Receivers (GPSr).



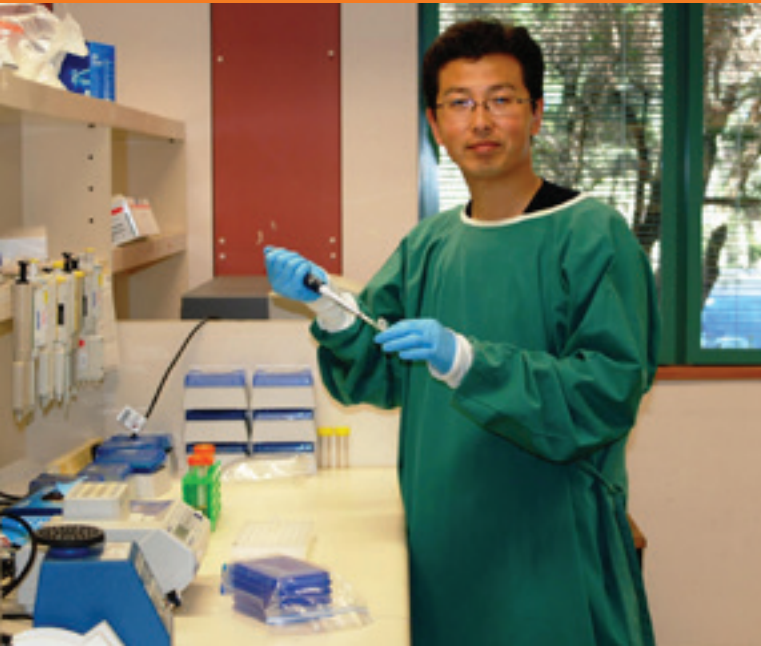
(LEFT IMAGE) Dr Ooi Choo Huck, from the Vector-borne Disease Control Section of the Sarawak Health Department, Kuching Malaysia
(RIGHT IMAGE) Malaysia has scaled-up its use of GIS technology within elimination activities

I have done spatial clustering analysis of malaria cases in areas with a high incidence of malaria. The results of the spatial cluster analysis have been used to planned malaria activities. The work on applying geographical information system in malaria activities is on-going.

*I believe that applying geographical information system in malaria activities together with other intensive malaria activities being done in Sarawak has significantly contributed to the great reduction in indigenous human malaria (*P. falciparum* and *P. vivax*) in Sarawak. For the first time in history, we had no indigenous *P. falciparum* case in 2013. We had more than 2,000 indigenous *P. vivax* cases in 2010, and from 2010 to 2013 there has been a tremendous reduction of indigenous *P. vivax* cases*

*to less than 100 cases in Sarawak in 2013. This year we are experiencing a further reduction of indigenous *P. vivax* cases. We had set our target to eliminate indigenous *P. falciparum* and *P. vivax* in Sarawak by the year 2020. I believe Sarawak will be able to eliminate indigenous *P. falciparum* and *P. vivax* in Sarawak much earlier than the target of 2020.”*

Dr Ooi continues to carry out research on the application of GIS technologies to elimination in Sarawak to help his national program achieve their elimination goals.



APMEN Fellowship Program Alumni

LIU YAobao

"My APMEN Fellowship will provide a valuable opportunity to learn genotype techniques which are urgently needed but currently not available in China. This Fellowship will contribute to the establishment of a P. vivax genotyping technique."

CHINA

Plasmodium vivax genotyping for molecular characterising parasite population and for identifying imported cases from local transmission

Liu Yaobao is a research assistant at the Department of Malaria, **Jiangsu Institute of Parasitic Diseases (JIPD)** in **Jiangsu, China**. Mr Liu Yaobao has completed a Bachelor of Public Health and a Master's of Medical Science.

During Mr Liu Yaobao's 2011 APMEN Fellowship he gained knowledge and skills related to genotyping *P. vivax* and population genetics analyses. Mr Liu Yaobao's Fellowship allowed him to analyse a set of *P. vivax* samples his institute had previously collected from Jiangsu and neighbouring provinces in China and compare genetic diversity of these parasites. He did this by genotyping microsatellite markers and by conducting genetic analyses. The APMEN fellowship also supported Mr Liu for training in field detection of G6PD deficiency in human populations.

Mr Liu Yaobao's Fellowship was hosted by the **Australian Army Malaria Institute (AMI)** with support from the **QIMR Berghofer Medical Research Institute**, both in Brisbane, Australia. Mr Liu Yaobao was mentored by **Dr Qin Cheng** and **Dr James McCarthy**. Dr Qin Cheng is a molecular parasitologist and is currently Head of the AMI Drug Resistance and Diagnostics Department. Dr McCarthy is an infectious disease specialist and a molecular parasitologist and Heads the Clinical Tropical Medicine Group at QIMR Berghofer Medical Research Institute.

Mr Liu Yaobao's Fellowship supported his country program to analyse epidemiological data on mass drug administration for anti-relapse treatment in Jiangsu province to inform elimination strategies.



(LEFT IMAGE) Mr Liu Yaobao from the Jiangsu Institute of Parasitic Diseases, China, at the Australian Army Medical Institute, Brisbane Australia
(RIGHT IMAGE) Jiangsu Institute of Parasitic Diseases, Wuxi, China.

I have grasped two key techniques which are very important in the progress of China malaria elimination program through this program. One technique is on Plasmodium vivax genotyping using microsatellite markers which were recommended by APMEN and have been already validated in Qin's group in AMI. The other technique is on G6PD deficiency detection using a WST8/1-methoxy PMS method which was adapted by James' group in QIMR. The filter paper based method is very suitable for population screening on G6PD.

Upon completing his fellowship Mr Liu Yaobao shared the knowledge and skills he gained through his fellowship with his colleagues in the malaria department of Jiangsu Institute of Parasitic Diseases (JIPD). He also developed methods for G6PD assay in collaboration with research institutes in Hainan CDC, of China.

Mr Liu Yaobao has gone on to develop two research projects using the techniques gained from his APMEN Fellowship. One is the study of *P. vivax* population genetics in central China, and the other is a study of G6PD deficiency prevalence in central and south China. His Fellowship led to the publication of an article in *Malaria Journal*.³ The techniques Mr Liu developed became the foundation for his doctoral research, which he is currently pursuing at Soochow University.



APMEN Fellowship Program Alumni

JO-ANNE BIBIT

“The main objective of my fellowship was to gain knowledge of parasite genetic diversity and population dynamics. Genotyping is an important tool for supporting therapeutic efficacy studies (TES) that are regularly conducted in the Philippines.”

PHILIPPINES

Plasmodium vivax genotyping to support therapeutic efficacy studies

Ms Jo-Anne Bibit is a Science Research Specialist at the **Research Institute for Tropical Medicine (RITM)**, based in **Manila, Philippines**. Jo-Anne has a Bachelor of Science in Public Health from University of the Philippines, and a Diploma in Applied Parasitology and Entomology from the Institute for Medical Research, Kuala Lumpur, Malaysia.

Ms Bibit's Fellowship focused on genotyping *P. vivax* parasites and *P. falciparum* parasites using microsatellite genotyping methods. The main purpose of Ms Bibit's genotyping was to distinguish recrudescence from new infections providing support to therapeutic efficacy studies in the Philippines which are the most direct way of detecting drug resistance and are recommended by the WHO to conduct every second year for national first and second line drugs. In addition, she also wishes to use the technique to study genetic diversity of parasite populations in the Philippines. Ms Bibit hopes to establish relevant *P. falciparum* and *P. vivax* molecular technologies in RITM that contribute towards the elimination efforts of the Philippines national malaria elimination program.

Ms Jo-Anne Bibit completed her APMEN Fellowship at the **Australian Army Malaria Institute (AMI)** in Brisbane, Australia. Ms Bibit worked under the supervision of **Dr Qin Cheng**, with the close support of **Lieutenant Simone Dowd** and **Professor Dennis Shanks**.

Due to visa delays, Ms Bibit completed her Fellowship in 2014. She plans to use the skills learned in her fellowship to establish relevant *P. falciparum* and *P. vivax* molecular studies in RITM that contribute towards the Philippines Malaria program's elimination efforts. Ms Bibit plans to engage genotyping techniques in RITM's plan to conduct population genetic surveys to map the diversity and structure of the parasites and to help in the assessment of drug resistance particularly in determining recurrent *P. vivax* infections.

Some of the specific activities Ms Bibit is planning with her RITM colleagues include:

1. Develop capacity of Malaria National Reference Laboratory for molecular studies of the two major malaria parasites through skills and technology transfer
2. Identify circulating parasite strains, prevalence and distribution of genotypes and compare population diversity within different time periods and identify any changes or expansion in the diversity over time from samples collected from therapeutic efficacy studies carried out by RITM.



APMEN Fellowship Program Alumni

HO VIET HIEU

"The highlight of the fellowship was that I had a chance to learn and perform experiments in two different countries. The experts are very willing to share their knowledge in the research field. I hope to introduce the APMEN scholarship to more candidates."

VIETNAM

Repellents as added control measure to Long Lasting Insecticide-treated Nets to target residual transmission in Southeast Asia - a step forwards for malaria elimination

Mr Ho Viet Hieu is a researcher at the Entomology Department, **Institute of Malariology, Parasitology and Entomology**, based in **Quy Nhon, Vietnam**. He has a Bachelor of Science from Hanoi University and a Master of Biology from the Vietnam National University.

Mr Ho Viet Hieu's 2012 Fellowship focused identifying innovative control methods for Anopheles Dirus, a common malaria vector found in Mekong forest regions.

Mr Ho Viet Hieu's Fellowship was hosted by two institutions in Cambodia and Thailand. In Cambodia, he was hosted by the **National Centre for Parasitology, Entomology and Malaria Control** in Cambodia, where he worked under the supervision of Dr **Tho Sochantha**. He also travelled to Thailand to receive further training from the **Armed Forces Research Institute of Medical Sciences (AFRIMS)**, where he was mentored by Dr **Alongkot Ponlawat**, Chief of the Department of Entomology in the Vector Biology and Control section of AFRIMS.

Mr Ho Viet Hieu had the opportunity to work with colleagues in both Cambodia and Thailand. Through his Fellowship he learned the following techniques: method of Identify mosquitoes Anopheles, Aedes, Culex, etc; identify tick, mite, dust mite; new knowledge and skill in rearing the mosquito, tick and mite; methods for catch Anopheles dirus. Since completing his Fellowship Ho Viet Hieu has gone on to share his skills with colleagues working in the fields of advanced epidemiology and mosquito identification.

The APMEN Fellowship helped me a lot in updating my skills in lab work and fieldwork as well as writing skills for publication ... From my studies, the communities are more aware of controlling malaria. Moreover, they helped policy-makers to have clearer view of the disease conditions and then apply more suitable control measures for malaria in Central Vietnam.



APMEN Fellowship Program Alumni

RINZIN NAMGAY

“The skills I acquired from my Fellowship will be of immense importance to the VDCP, Bhutan. As the country moves forward to malaria elimination with the vision ‘Bhutan with no indigenous malaria’, the knowledge gained will be crucial in strengthening the surveillance system (parasitology and entomology).”

BHUTAN

Training on Molecular Techniques for Malaria Diagnosis and Vector Incrimination, Bhutan

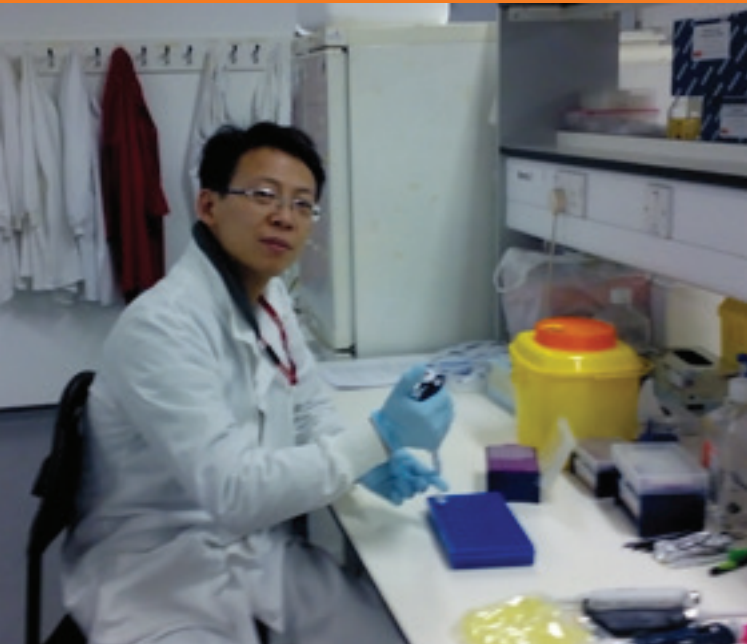
Mr Rinzin Namgay is Head of the **Vector Borne Disease Control Program (VDCP) in Bhutan** and has worked as an Entomologist with the Program since 1995. Mr Namgay has a Bachelor of Science from Sherubtse College, Bhutan, and a Postgraduate diploma in medical entomology from the Vector Control Research Centre, Pondicherry, India.

Mr Namgay completed his APMEN Fellowship Program at **The Armed Forces Research Institute for Medical Science (AFRIMS) in Bangkok, Thailand**. Mr Namgay’s 2012 Fellowship focused on developing PCR techniques for active case detection, prompt and adequate treatment, case investigation and follow up, foci investigation and follow up, gene banking of malaria parasites, intensified vector surveillance and intervention activities within Bhutan’s six border screening centres.

Some of the activities of Mr Namgay’s fellowship included: PCR techniques; mosquito identification & vector incrimination; and methods for mosquito colony development in insectary. The insectary at AFRIMS has the most mosquito productive colonies in the world with 10 species. Mr Namgay’s Fellowship also gave him access to PCR technology and reagents required to develop a PCR Lab in Bhutan. Mr Namgay carried out networking discussions with the Heads of Entomology Department of AFRIMS, for future collaborations with the Bhutan Ministry of Health.

Together with AFRIMS, Mr Namgay is working to apply this knowledge not only to his country’s malaria program but to the control of dengue fever, scrub typhus and leptospirosis, which are also important public health problems in Bhutan.

The basic molecular biology genetics I learnt long time back (18-19 years) were out of date and I have deal with DNA and RNA during my PCR training. I have to revisit those subjects and I did it using internet. The other rewards ... I made acquaintances with many scientists of AFRIMS who are willing to collaborate with Bhutan for research on malaria, dengue, leptospirosis, scrub typhus and medical entomology (mosquitoes, chiggers mites, ticks and fleas) in near future. I also met friends in Bureau of Vector Borne Disease, Department of Disease Control, Thailand and discussed the malaria and leishmaniasis situation in Thailand.



APMEN Fellowship Program Alumni

GUODING ZHU

“This APMEN fellowship will help provide new tools to monitor insecticide resistance and help delay its emergence and spread in China.”

CHINA

Pyrethroid resistance mechanisms in *Anopheles sinensis*, the major malaria vector in China.

Mr Guoding Zhu is Research Associate in the Department of Malaria Control at the **Jiangsu Institute of Parasitic Diseases (JIPD), Wuxi China**. Mr Guoding Zu has a Bachelor of Science in public health from Anhui Medical University, a Master of Science in pathogen biology from Jiangsu Institute of Parasitic Diseases, and is currently nearing completion of his PhD at Soochow University.

During the three-month fellowship in 2012, Mr Guoding Zhu undertook research activities focused on insecticide resistance mechanisms in *Anopheles sinensis*, the major malaria vector in China. His Fellowship focused on: candidate gene expression verification; the detection of G119S (resistance-linked mutation) in the insecticide target site *Ace-1*; cloning and sequencing of the most promising candidate P450 genes, and introduction to the 16 genomes annotation pipeline.

Mr Guoding Zhu completed his APMEN Fellowship at the **Liverpool School of Tropical Medicine (LSTM)**. He worked under the supervision of **Dr David Weetman**, a population geneticist specialising in insect vectors of disease, including the evolution and consequences of insecticide resistance and the development and application of DNA diagnostic markers.

Since completing his fellowship Mr Guoding Zhu has gone to share his knowledge with his colleagues in the malaria department through reports and seminars. He has continued informal collaborations with the Liverpool School of Tropical Medicine. Mr Guoding Zhu has gone on to publish work on *Anopheles sinensis* in *BMC Genomics*¹ and *Parasites & Vectors*.² In 2014 he gained a grant from the Science Foundation in Jiangsu province to continue his research monitoring insecticide resistance in China.

“The APMEN Fellowship provided me an opportunity to visit an advanced organization associated with my research interests. The knowledge and skills learned from the fellowship helped me a lot in my research activities. After the Fellowship I increased my professional development and was able to play a more important role in my department and the Institute.”



APMEN Fellowship Program Alumni

PEMA SAMDRUP

“By using GIS and GPS mapping, targets and coverage can be easily accessed by program decision makers. This improves the overall health system and means resources are invested based on evidence. By incorporating GIS, Bhutan can achieve malaria elimination by 2020 and the ultimate goal of “Gross National Happiness.”

BHUTAN

Malaria Atlas Project (MAP) Thematic Fellowship

Pema Samdrup is a Programme Officer at the Vector-borne Disease Control Program of the **Bhutan Department of Public Health based in Gelegphu, Bhutan**. He has a Certificate in General Health Sciences (1990) and a Diploma in Public Health (2002) from the Royal Institute of Health Sciences in Bhutan.

In 2013 the APMEN Network decided to allocate a dedicated thematic fellowship to be supported by the **Malaria Atlas Project (MAP)**, which is associated with the **University of Oxford**. MAP is comprised of a group of expert researchers in various fields including public health, mathematics, geography and epidemiology who together are generating new and innovative methods of mapping malaria risk around the globe. Mr Samdrup’s MAP Fellowship was supervised by **Dr Catherine Moyes**, research manager of the Spatial Ecology and Epidemiology Group at the University of Oxford.

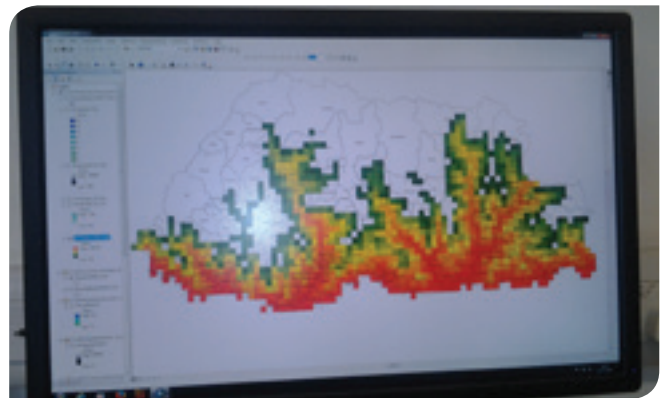
In his 2013 Fellowship, Mr Pema Samdrup trained in the use of spatial temperature suitability data developed by Malaria Atlas Project (MAP) for *P. falciparum* and *P. vivax* transmission. Mr Samdrup learned about the development of temperature suitability data layers using models of vector survival and sporogony. He then used these data layers to refine the limits of malaria transmission as defined by Annual Parasite Index data from 206 sub-districts in his home country, Bhutan.

Mr Samdrup’s Fellowship allowed him to develop the skills to map the Bhutanese Annual Parasite Index (API) data from 2011 to 2013. The opportunity to access world-class facilities and expertise at the University of Oxford has boosted his confidence and his motivation in his work. Mr Samdrup has produced an article manuscript based on his Fellowship research which will be submitted for publication.



(LEFT IMAGE) Mr Pema Samdrup of the Vector-borne Disease Control Program, Department of Health, Bhutan.
 (RIGHT IMAGE) Mr Pema Samdrup, following his APMEN Fellowship, developed training modules for national staff in the use of GIS for malaria elimination

My knowledge and skills has enhanced further to generate the API maps which are one of main indicators for evidence based tools for strategy developments and also focus interventions of the program. After the training, with use of temperature and aridity data masking, correct API can be generated and focused interventions planned. For example, our previous API maps were generated without masking the temperature and aridity data. Since, Bhutan is a mountainous country aridity data has not much impact as compared to temperature data. Temperature data will further enable us to generate maps for the potential transmission of malaria and integration of interventions.



(ABOVE IMAGE) Mr Pema Samdrup's MAP Fellowship allowed him to map vector survival and sporogony using Annual Parasite Index data from his home country, Bhutan.



APMEN Fellowship Program Alumni

BUI LE DUY

This Fellowship will improve my ability to help the implementation of the malaria program in Viet Nam, and my understanding of the EMOD and Open Malaria models using data from Vietnam to analyse malaria transmission, control and elimination.

VIETNAM

Vector-borne Disease Network (VecNet) Thematic Fellowship

Mr Bui Le Duy is a researcher from the Vietnam National Institute of Malaria, Parasitology and Entomology (NIMPE). He has a Master of Biology from Vietnam National University College of Science in Hanoi and is currently completing his PhD in Entomology at the NIMPE.

In 2013 the APMEN Network decided to allocate a dedicated thematic fellowship to be supported by the **Vector-borne Disease Network (VecNet)**. Prof. Tom Burkot from James Cook University, Australia, is orchestrator of VecNet and played a major role in facilitating this VecNet Fellowship. Mr Bui Le Duy carried out his Fellowship at **Notre Dame University, USA**, under the guidance of **Dr Frank Collins**, an expert in the molecular biology, genetics and genomics of malaria vectors.

During his 2013 APMEN Thematic Fellowship, Bui Le Duy learned to design in-silico experiments by parameterizing and running models to ascertain the effectiveness of different vector control interventions in Vietnam. He developed a basic understanding of the EMOD model for the analysis of malaria transmission control and elimination using data acquired from the National Malaria Control Program of Vietnam, his home country.

During his fellowship Mr Bui Le Duy learned how to use the software OpenMalaria and EMOD. He used EMOD to build models of malaria transmission based on three years of malaria data from Binh Phuoc, Vietnam. The software generated data (see right image) showing the variations in the malaria situation and the dominant malaria vectors *An. dirus*, *An. minimus* and *An. minor* over the three year period. This data can be used to inform better targeted vector control strategies in Binh Phuoc. Mr Bui Le Duy intends to return to Vietnam to use EMOD and OpenMalaria to generate similar data for other districts, which will support the Vietnam elimination strategy by enabling targeted vector control interventions.



APMEN Fellowship Program Alumni

PRAYUTH SUDATHIP

"As my country moves toward malaria elimination, active case detection along with case investigation is important. The prompt detection and treatment of indigenous cases can prevent the spread of transmission ...This fellowship will certainly improve my ability which will help to improve the implementation of the malaria program in Thailand, and also contribute to other countries in the region."

THAILAND

Surveillance and Response Thematic Fellowship

Dr Prayuth Sudathip is a Public Health Technical Officer in the Epidemiology and Monitoring and Evaluation Department of the **National Malaria Program** in the **Thailand Ministry of Public Health**. In 2004, Dr Sudathip was a recipient of a full scholarship from the Thai Royal Government to study a Doctorate of Public Health from the University of Kentucky, United States, which he completed in 2008.

During his Surveillance and Response Fellowship at the **UCSF Global Health Group**, USA, Dr Prayuth Sudathip will use the current Thailand web-based malaria information system to monitor and evaluate the effectiveness of reactive case detection. Dr Sudathip will be supervised by **Dr Roly Gosling**, Associate Professor of Epidemiology and Biostatistics, lead of the UCSF Global Health Group's Malaria Elimination Initiative and Co-Coordinator of the APMEN Joint-Secretariat.

This Fellowship is part of a larger USCF Global Health Group project that is creating a user-friendly tool for National Malaria Control Programs to easily and efficiently collect data to evaluate the effectiveness of reactive case detection. This evaluation tool will aim to answer key questions such as: How quickly are passively-identified cases investigated? What proportions of cases are investigated? How many actively-detected cases are identified during reactive case detection? What are the costs of conducting reactive case detection?





6. 2014 FELLOWSHIPS

As this report was going to print the APMEN Fellowship Committee announced the selection of the 2014 Fellowship recipients. In 2014 APMEN will support seven Fellows. APMEN will also support a special Joint-Fellowship awarded to two Fellows from the Democratic People's Republic of Korea (DPRK). This encouraging development will help to further support capacity building amongst all of APMEN's Country Partners.

DR DUOQUAN WANG

Dr Wang is manager of the **National Malaria Elimination Surveillance System, China**.

This Fellowship will promote malaria elimination in Yunnan Province, China. The purpose of the Fellowship is to revise current strategies and develop innovative tools for active case detection for strengthening malaria surveillance response system along the China-Myanmar border region. This Fellowship will be hosted by the **USA Centre for Disease Control and Prevention (CDC)** and the **Malaria Elimination Initiative at UCSF Global Health Group**.

MS DECHEN PEMO

Ms Pemo is Assistant Program Officer at the **Vector-Borne Disease Control Program, Ministry of Health Bhutan**.

Ms Pemo's Fellowship will examine biochemical techniques to detect insecticide resistance mechanisms and monitoring in malaria vectors in Bhutan. The Host Institution will be advised on the APMEN website.

MR XUAN THANG NGUYEN

Mr Nguyen is a researcher at the **Malaria Epidemiology Department, National Institute of Malariology, Parasitology and Entomology, Vietnam**.

Mr Nguyen's Fellowship will develop and coordinate operational research to establish a model for malaria posts for malaria control and surveillance among mobile people and migrants in high endemic communities in Vietnam. The Host Institution will be advised on the APMEN website.

MS INDEEWARIE ERANGA GUNARATNA

Ms Gunaratna is currently the Registrar in Community Medicine and focal point for COMBI activities with **Anti-Malaria Campaign, Colombo Sri Lanka**.

Ms Gunaratna's Fellowship has two aims: 1. To gain a greater understanding of effective communications strategies for disseminating important health messages to the public through increasing awareness and advocacy to administrators in health and other government and non-government organisations; 2. To develop skills to more effectively train facilitators in the preparation, delivery and evaluation of training programmes related to communication. The Host Institution for this Fellowship will be advised on the APMEN website.

DR PATCHARA SRIWICHAI

Dr Sriwichai is Instructor and Researcher at the **Department of Medical Entomology, Faculty of Tropical Medicine, Mahidol University, Thailand**.

Dr Sriwichai's Fellowship will involve in-depth data analysis and mathematical modeling of entomological, ecological and human interactions that affect malaria transmission in the endemic area along Thai-Myanmar border. Dr Sriwichai's Fellowship will be hosted by the **Walter and Eliza Hall Institute, Australia**.

MR SONG GUK IM AND MR PYONG CHOL KIM

Mr Im is researcher at the **Pyongyang Medical College, DPR Korea**. Mr Kim is Section Chief of the **CDC Central Hygiene and Anti-epidemic Institute (CHAEI), Pyongyang City, DPR Korea**.

This special Joint-Fellowship has three key learning aims related to case detection and treatment in an elimination setting. The Fellows will learn: 1. knowledge and skills on key profiles for reactive case detection; 2. knowledge and skills on PCR based genotyping and building an isolates bank; and 3. methodology and skills on drug resistance based on PCR corrected results. This Fellowship will be hosted by the **National Institute of Parasitic Disease (NIPD), in Shanghai, China**.

More details of the 2014 round of Fellowships will be available on the APMEN website.



7. FELLOWSHIP HOST INSTITUTIONS AND MENTORS

The Fellowship Program could not be a success without the support of the Host Institutions. Host Institutions dedicate time, expertise, facilities and resources to support the technical training and professional development of APMEN Fellows and to the goal of regional malaria elimination.

Many Host Mentors have enthusiastically participated in Fellowship Program, offering Fellows practical, tailored mentoring and greatly enriching their Fellowship experience. Host Institutions help Fellows and their Home Institutions to establish strategic partnerships to support regional elimination. It is this collaborative approach that differentiates the APMEN Fellowship Program from conventional education and training, since Fellowships build the professional and technical capacity of Fellows while also facilitating the collaborative partnerships that will be required to achieve malaria elimination.



Dr Qin Cheng (far right), Prof. Dennis Shank (second from right), and Lt. Simone Dowd (far left) from the Australian Army Malaria Institute (AMI), with Fellow Ms Jo-Ann Bibt (second from left).



Dr Rita Kusriastuti, National Vector Borne Disease Control, Ministry of Health, Indonesia



Dr Alongkot Ponlawat from AFRIMS (front, second from left) with APMEN Fellow Majhalia Torno (front, second from right) and AFRIMS colleagues



Mr Pema Samdrup, Ministry of Health, Bhutan (far right), with colleagues from Mahidol University, Thailand

ACTMALARIA

The Asian Collaborative Training Network for Malaria (ACTMalaria) is an inter-country training and communication network that operates within Asia. Office of the ACTMalaria's secretariat is based in Manila, Philippines. ACTMalaria is composed of the National Malaria Control Programs of 12 Asian countries. The network aims to provide collaborative training that meet the needs of malaria control in Southeast Asia and the Greater Mekong Subregion and improve communications among member countries on malaria problems affecting common borders.

ACTMalaria has supported an APMEN Fellowship on the topic of human resource capacity building for malaria control and elimination. This Fellowship was supervised by **Ms. Cecilia Hugo**. Ms Hugo is the Executive Coordinator of ACTMalaria and is responsible for the management of the Secretariat, on behalf of the Coordinating Country Director.

www.actmalaria.net/home

ARMED FORCES RESEARCH INSTITUTE FOR MEDICAL SCIENCE (AFRIMS)

AFRIMS was established in 1962 to help combat a cholera outbreak in Thailand. AFRIMS is a joint initiative between the US military and the Royal Thai Army. AFRIMS now has programs in fields including malaria vaccine and drug development, HIV-AIDS research and vaccine development, enteric diseases (diarrheal infectious diseases), viral disease vaccine development especially dengue and hepatitis, entomology, and emerging diseases. AFRIMS is a widely recognized institution, possessing an impressive record of significant medical research achievements.

AFRIMS has been a highly active partner in the Fellowship Program and has hosted three APMEN Fellows, Ms Majahlia Torno, Mr Rinzin Namgay and Mr Ho Viet Hieu. These Fellows have benefited from close mentoring by AFRIMS staff, especially **Dr Alongkot Ponlawat**, the Chief of the Vector Biology and Control Section Department of Entomology of AFRIMS.

www.afrims.org

AUSTRALIAN ARMY MALARIA INSTITUTE (AMI)

The Army Malaria Institute (AMI) is an Australian Defence Force organisation whose role is to provide its personnel with the best possible protection against vector borne diseases. Primarily focused on malaria, the AMI has recently broadened its interests to include the arboviruses, particularly dengue and Japanese encephalitis. The Institute was established in Sydney in the late 1960's and relocated to a purpose-built research laboratory complex in Brisbane in 1997.



Ms Cecil Hugo, Executive Director of ACTMalaria

To date AMI has hosted three APMEN Fellowships, with Ms Ervi Salwati, Mr Liu Yaobao and Ms Joanne Bibit. These Fellowships have been supported by the expertise of **Dr Qin Cheng, Lieutenant Simone Dowd and Prof. Dennis Shanks**.

Dr Qin Cheng heads the Drug Resistance and Diagnostics department at AMI, and is an Associate Professor at the University of Queensland and a visiting scientist at the Clinical Tropical Medicine Group at the QIMR Berghofer Medical Research Institute. Dr Cheng is a molecular parasitologist and has been conducting research in the field of malaria for over 25 years. Dr Cheng's current research interests are the mechanism and evolution of drug resistance, evaluation and improvement of malaria diagnostics, parasite biology and molecular epidemiology. APMEN Fellows also worked under the guidance of **Lieutenant Simone Dowd**, AMI Scientific Officer and molecular biologist. Fellows benefitted from mentoring by **Prof. Dennis Shanks**. Prof. Shanks is Director of AMI, Professor in Health Sciences at the University of Queensland, and a retired US Army Medical Corps Officer. Prof. Shanks is a physician with expertise in paediatrics, infectious diseases, malaria elimination and the development of anti-malarial drugs.

www.defence.gov.au/health/ami/i-ami.htm

INSTITUT PASTEUR IN CAMBODIA

Institut Pasteur in Cambodia (IPC) is a research organisation located in Phnom Penh that works in close collaboration with the Ministry of Health in Cambodia. IPC is part of an international network of Institut Pasteur (Institut Pasteur International Network, <http://www.pasteur.fr/en/international/institut-pasteur-international-network>) working collectively and in collaboration with the national centres for infectious disease control, the WHO, public health research institutes and hospitals. IPC specialises in biomedical research and the surveillance of infectious diseases, including researching and monitoring mechanisms of resistance. IPC

also carries out education and vocational training for medical and public health professionals.

Under the guidance of **Dr Didier Menard**, IPC hosted the Fellowship of Frilasita Yudhaputri. Dr Menard is a malariologist and has been the head of Malaria Molecular Epidemiology Unit at the IPC since December 2009. Dr Menard's recent research interests include anti-malarial drug resistance of *P. falciparum* and *P. vivax* parasites and the epidemiology of *P. vivax*. Before taking his post in Cambodia, Dr Menard previously worked at the Institut Pasteur in Madagascar.

www.pasteur-kh.org

LIVERPOOL SCHOOL OF TROPICAL MEDICINE (LSTM)

The Liverpool School of Tropical Medicine (LSTM) is a global leader in research and training in tropical medicine. LSTM works in over 60 countries to reduce the burden of sickness and mortality through effective health interventions. LSTM works together with health ministries, universities, and research institutions to train doctors, scientists, researchers and public health professionals.

LSTM has hosted one APMEN Fellowship, which was supervised by **Dr David Weetman**. Dr Weetman is a population geneticist specialising in insect vectors of disease, including the evolution and consequences of insecticide resistance and the development and application of DNA diagnostic markers.

www.lstmed.ac.uk/about-lstm

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE (LSHTM)

The London School of Hygiene and Tropical Medicine (LSHTM) is Britain's national school of public health and a leading global institution for research and postgraduate education in global health. Part of the University of London, the London School is the largest institution of its kind in Europe with a remarkable depth and breadth of expertise encompassing many disciplines. The School brings together the expertise of clinicians, epidemiologists, statisticians, social scientists, molecular biologists and immunologists.

LSHTM has participated in the APMEN Fellowship Program by hosting three APMEN Fellows, who were supervised by **Prof. Chris Drakeley** and **Dr Jonathan Cox**. **Prof. Chris Drakeley** is Professor of Infection and Immunity and Director of the LSHTM Malaria Centre. Prof. Drakeley is a world renowned expert in the transmission biology and epidemiology of malaria. His research aims at defining malaria transmission more accurately through identifying serological markers for infection. Prof. Drakeley's research aims to identify and evaluate strategies to block malaria transmission, including



Dr Jun Cao (APMEN Fellow), Prof Gao Qi (Home Institution, Jiangsu Institute of Parasitic Diseases) and Prof Chris Drakeley (Host Institution, London School of Hygiene and Tropical Medicine)

drugs and vaccines. **Dr Jonathan Cox** is a medical geographer and a specialist in spatial epidemiology and disease surveillance in epidemics and in low-endemic settings. Dr. Cox has vast experience in the application of GIS in malaria control and has published many scientific publications on this topic. Dr. Cox is Senior Lecturer and Course Director for the Doctorate in Public Health program at the LSHTM.

www.lshtm.ac.uk/

MAHIDOL UNIVERSITY, FACULTY OF TROPICAL MEDICINE

The Faculty of Tropical Medicine was founded in 1960 as one of the faculties of the University of Medical Sciences (presently Mahidol University). The Faculty supports teaching and research in the medical sciences, with an emphasis on tropical diseases. Within the Faculty, the Department of Tropical Hygiene offers graduate programs and specialised short courses focusing on tropical medicine, epidemiology, data analysis, medical statistics, Geographic Information Systems, remote sensing, and spatial analysis. The department serves as the Regional GIS Unit for the SEAMEO-TROPED Network.

Mahidol University supported an APMEN Fellowship under the mentorship of **Dr Irwin Chavez**, from the Department of Tropical Hygiene within the Faculty of Tropical Medicine. Dr Chavez mentored Mr Pema Samdrup in his Fellowship focused on GIS mapping. In addition to the application of GIS for disease control, Dr Chavez is also an expert in statistical methodologies, OneHealth approach and the epidemiology of infectious diseases.

www.tm.mahidol.ac.th/eng/index-eng.php

MALARIA ATLAS PROJECT (MAP)

The Malaria Atlas Project (MAP) is comprised of a group of researchers in various fields covering public health, mathematics, geography and epidemiology, who are generating new and innovative methods of mapping malaria risk around the globe. MAP provides global and national estimates for populations at risk of *P. falciparum* and *P. vivax* malaria, distributions of the dominant malaria vector species and prevalence of key human genetic variants such as G6PD deficiency.

In 2013 MAP supported APMEN to develop a MAP thematic fellowship, which was supervised by **Dr Catherine Moyes**. Dr Moyes managed the Malaria Atlas Project's activities at the University of Oxford, leading the development of an online repository for open access data provided by MAP, and overseeing data coming into MAP from National Malaria Control Programs, research groups, NGOs and others. Dr Moyes is an expert on the geographical extent of *P. knowlesi* malaria and her work also includes research on the spatial variation of insecticide resistance in malaria-transmitting mosquitoes.

www.map.ox.ac.uk

NATIONAL CENTRE FOR PARASITOLOGY, ENTOMOLOGY AND MALARIA CONTROL, CAMBODIA

The National Centre for Parasitology, Entomology and Malaria Control Cambodia, was established by the Cambodian Ministry of Health to carry out research, training and supervision of public health interventions into vector-borne diseases. The Centre has four main programs focusing on malaria, dengue haemorrhagic fever, filariasis and schistosomiasis and intestinal parasitic diseases. The Centre co-hosted the Fellowship of Mr Ho Viet Hieu with the support of **Dr Tho Sochantha**.

www.cnm.gov.kh/index.php?action=ID1

NATIONAL VECTOR BORNE DISEASE CONTROL DIVISION, MINISTRY OF HEALTH, INDONESIA

The Indonesian Ministry of Health hosted a Fellowship based at the National Vector Borne Disease Control Division within the Department of Disease Control and Environmental Health. This Fellowship involved visits to the Indonesian Ministry of Health and to field sites in local malaria centres in the North Molluccos.

This Fellowship was possible thanks to the special support of **Dr Rita Kusriastuti**. Dr Rita Kusriastuti is an epidemiologist and has a special interest in policy for malaria elimination and community empowerment through Village Malaria Volunteer programs. From 2008 to 2013 Dr Rita Kusriastuti was Director of Vector Borne Disease Control at the Indonesian Ministry of Health, where she oversaw 5 sub-directorates: malaria; arboviruses; filariasis; zoonotic diseases and vector control. Since finishing her role at the MoH Dr Kusriastuti has worked for WHO and is currently a Senior Consultant for UNDP Indonesia. Dr Rita Kusriastuti is Head of the Indonesian Parasitic Association.

www.indonesia.go.id/en/ministries/ministers/ministry-of-health/1659-profile/176-kementerian-kesehatan

QIMR BERGHOFER MEDICAL RESEARCH INSTITUTE

The QIMR was founded more than 65 years ago to support research into infectious diseases in Northern Australia, including Q fever, scrub typhus and leptospirosis. The first Director of the Institute was the entomologist responsible for malaria control in the Australian Army. Today QIMR Berghofer has expanded to become a prestigious institute that is home to more than 700 scientists and support staff, carrying out medical research into a wide range of diseases.

The QIMR Berghofer Medical Research Institute continues to support scientific research into malaria through a number of activities, including research into drug effectiveness; investigating transmission patterns; research into the malaria parasite genome; studies of malaria immunity in humans and animals; and clinical trials of malaria vaccines. Together with AMI, the Clinical Tropical Medicine laboratory of the Institute supported the Fellowship of Mr Liu Yaobao into field detection of G6PD deficiency individuals for supporting the use of primaquine to prevent *P. vivax* relapses. The laboratory is headed by **Dr James McCarthy**.

www.qimrberghofer.edu.au/



The University of Notre Dame, USA, worked with VecNet to host the Fellowship of Mr Bui Le Duy (third from left, back row) from the National Institute of Malariaology, Parasitology and Entomology

UCSF GLOBAL HEALTH GROUP

The Global Health Group at the University of California, San Francisco (UCSF) is an 'action tank' that bridges the gap between evidence, policy and implementation to stimulate practical international and local action to solve critical health challenges. The UCSF Global Health Group carries out targeted research and advocacy to expand global understanding and engage a wide network of partners. Within the UCSF Global Health Group, the Malaria Elimination Initiative advocates for and supports the progressive elimination of malaria. The UCSF Global Health Group is part of the APMEN joint-Secretariat.

The UCSF Global Health Group hosted a 2013 APMEN Thematic Fellowship in surveillance and response, which was supervised by **Dr Roly Gosling**. Dr Gosling is Associate Professor of Epidemiology and Biostatistics, Lead of the UCSF Global Health Group's Malaria Elimination Initiative, and Co-Coordinator of the APMEN Secretariat. He has worked around the world, mainly in the UK and West Africa on clinical trials for malaria drugs and prevention and tuberculosis treatment. Dr Gosling has a broad interest in public health in developing countries and specific interests in strategies to reduce malaria transmission, methods to detect reductions in transmission and ways to monitor malaria in low-endemic or post-elimination settings.

www.globalhealthsciences.ucsf.edu/global-health-group

UNIVERSITY OF NOTRE DAME

Founded in 1842, the University of Notre Dame, embraces an approach to education that is intellectual, moral and service-oriented. The University is based in South Bend, Indiana, USA. The University's contribution to malaria elimination comes through a number of programs supported by the Department of Biological Sciences, which amongst other collaborations is a partner in VecNet.

The Department of Biological Sciences supported the 2013 VecNet Fellowship undertaken by Mr Bui Le Duy. The Department contributes to scientific research into malaria vectors including through studies of Vector population ecology, ecological genetics and the epidemiology of malaria transmission. The VecNet Fellowship was supervised by **Dr Frank Collins**, who is a leading expert on the molecular biology, genetics and genomics of malaria vectors, especially *Anopheles gambiae*.

www.nd.edu/

VECNET

The vector-borne disease network (VecNet) is a consortium of institutions that seeks to identify new strategies for malaria elimination that build from an understanding of the differential transmission of malaria across geographical areas with a range of malaria transmitting mosquitos. VecNet has developed a range of tools to progress vector control for elimination, including: a transmission simulator, risk mapper, product impact evaluator (PIE), a digital library and a data warehouse browser. In 2013 VecNet supported a Thematic Fellowship that was hosted by the University of Notre Dame, USA.

This Thematic Fellowship was facilitated by **Professor Tom Burkot** from **James Cook University** in North Queensland, Australia. Prof. Burkot is the orchestrator of VecNet and an expert in the ecology and biology of malaria vectors. **Dr Frank Collins** was mentor for the VecNet fellow at the **University of Notre Dame**. Dr Collins is an expert on the molecular biology, genetics and genomics of malaria vectors, especially *Anopheles gambiae*.

www.vecnet.org/



8. THE FUTURE OF THE APMEN FELLOWSHIP PROGRAM

As one of APMEN's most successful capacity building activities, the Fellowships Program will continue to strengthen the capacity of future leaders in elimination and to facilitate strategic partnerships both within the region and globally.

The APMEN Fellowship Program supports the goal of regional malaria elimination by strengthening the capacity of countries in areas that are vital for achieving elimination – such as monitoring the genetic markers of drug resistance, vector identification and taxonomy, surveillance and response and community engagement and health promotion. The thematic focus of Fellowships will continue to grow and change over time, as regional capacity in some areas develops and as APMEN Country Partners identify new priorities.

In addition to increasing technical capacity, the Fellowship Program also performs a vital function in strengthening strategic partnerships throughout the region and globally. Since APMEN sees that regional malaria elimination can only be achieved through collaboration, this partnership building function is critical to the success of the Fellowship Program and to elimination. While continuing to develop linkages with peak global partners, the Fellowship Program will sustain its focus on the Asia Pacific region, supporting collaborations between regional countries and allowing partners to identify solutions to the unique opportunities and challenges facing the region.



APMEN Fellows Mr Pema Samdrup and Ms Tshering Dema present the results of their Fellowships at APMEN III, Kota Kinabalu Malaysia, May 2011

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³ Liu Y, Auburn S, Cao J, Trimarsanto H, Zhou H, Gray KA, Clark TG, Price RN, Cheng Q, Huang R et al: Genetic diversity and population structure of *Plasmodium vivax* in Central China. *Malar J* 2014, 13:262.

⁴ <http://www.jitmm.com/client/displayContent.php?cpID=8>

⁵ APMEN: Evaluation of the Asia Pacific Malaria Elimination Network, 2009-2013: A mixed method approach using internal and external evaluation, March 2014. <http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=OCB8QFjAA&url=http%3A%2F%2Fapmen.org%2Fstorage%2FAPMEN%2520Evaluation%2520of%2520APMEN%2520March%25202014%2520DRAFT.pdf&ei=eil7VKTiMZPh8AXM3IGICQ&usg=AFQjCNGgLgO1aYb00HNo3jUPOYrUFESWKw&bvm=bv.77161500,d.dGc>

ANNEX ONE: SELECTION CRITERIA AND PROCESS

Applications for APMEN Fellowships are assessed by the APMEN Fellowship Committee.

The functions of the Fellowship Committee include:

1. To evaluate the Fellow's applications and assess the quality of fellowship applicants and provide feedback to unsuccessful applicants
2. To link fellowship applicants (with a chosen topic of study) without an identified host mentor to an appropriate organisation
3. To make recommendations to the APMEN Advisory Board of the nominated Fellowship awardees
4. To maintain an ongoing list via the APMEN Secretariat of Host Institutions (including a description of the training opportunity that can be provided) for applicants to consider in their proposals
5. To receive and accept the Fellow's final report upon completion of their fellowship
6. To assess the Fellowship Program's processes and report any recommendations to the APMEN Advisory Board and Network

The APMEN Fellowship Program Committee is composed of three Country Partner representatives; one Partner Institution representative; and one representative from the APMEN Secretariat. Members are appointed after responding to an Expression of Interest (EOI) process which is facilitated by the UQ Secretariat. The members will be elected for two years, and there is no limit to the number of times a member can serve on the Committee. The APMEN Fellowship Program

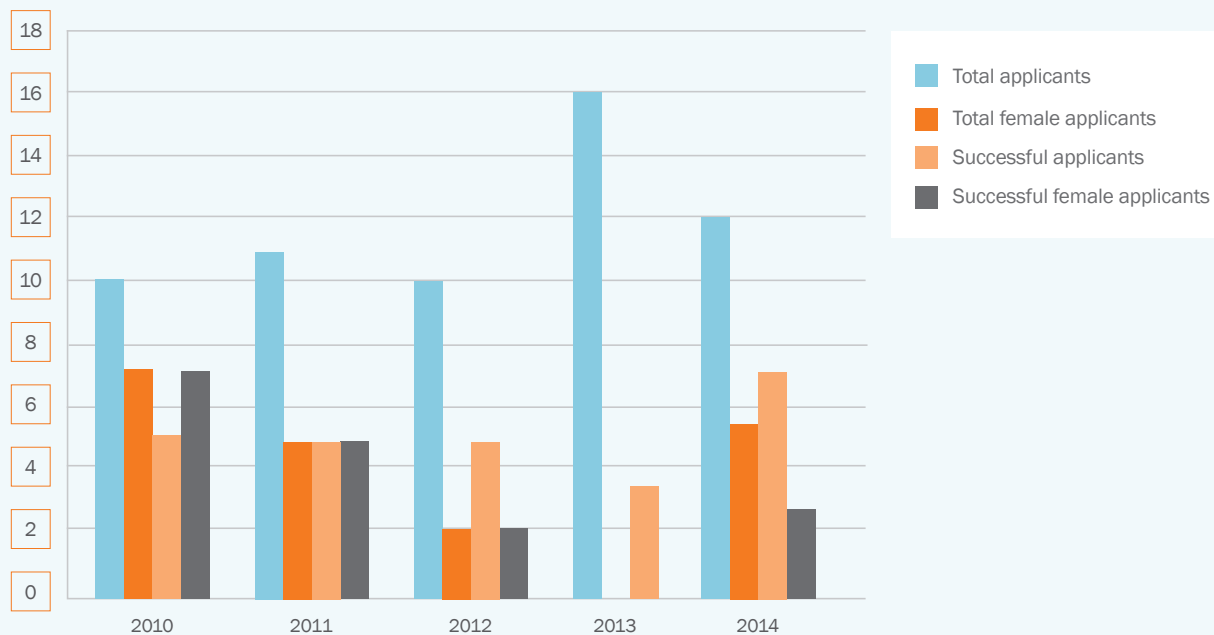
Committee may call upon external reviewers with expertise in a given field to help assess an applicant's proposed study if this expertise is not available within the APMEN Fellowship Program Committee. The experts will be identified by the APMEN Fellowship Program Committee and will ideally be located in an APMEN Partner Institution. These experts will be made aware of their responsibilities and obligations in respect to APMEN's privacy and confidentiality policy.

The Fellowship Committee assesses applications according to the following criteria:

1. Topic is malaria elimination focused
2. The proposed training is not customarily available in the Fellow's home country
3. Training builds the capacity of home mentor, evidenced by a Letter of Support from home mentor
4. Clear learning objectives are identified and feasibility that these goals can be achieved within the 1-3 month timeframe
5. Consistent with the National Malaria Control Program
6. Transferability and sustainability of learning and experience to home country
7. Candidate has a strong educational background as well as experience and accomplishments that reflect a commitment to malaria elimination in their country
8. Appropriate Use of Fellowship Funds

ANNEX TWO: GENDER SEGREGATED DATA ON TOTAL APPLICANT POOL

APMEN FELLOWSHIP RECIPIENTS 2010 -2014



ANNEX THREE: SUMMARY OF SUGGESTIONS FOR IMPROVEMENTS TO THE FELLOWSHIP PROGRAM RESULTING FROM INTERNAL MONITORING AND EVALUATION ACTIVITIES

Please note that this table is a compiled summary of suggestions made by Fellows and other APMEN Partners through the Internal Evaluation of the Network. This feedback is part of the ongoing monitoring and evaluation of the Network and is used to support decisions made by the Network. The future development of the Fellowship Program will be decided by the Network, and any changes to the Fellowship Program must be approved by the Advisory Board in line with APMEN governance processes.

RESPONDENT GROUP	BRIEF SUMMARY
Fellow perspectives	<ul style="list-style-type: none"> • Time frame: post-Fellowship time frame of Fellowship should be established based on work load; some Fellowships may require a longer duration • Post Fellowship communications: -newsletter and website is well used and established. There should be a community space where technical information can be shared among like focused research efforts (registered account other than google group)
Home Institutions	<ul style="list-style-type: none"> • Sustainability: Research grant as follow up to the Fellowship is a great way to continue work which has been started and is lacking sustainability when brought back to home country; Lack of financial support is listed to be the most common cause of a stall in research efforts (APMEN could help with this) • Focus: An increase in malaria surveillance is highly important for proper control (future considerations), malaria elimination efforts aren't enough in some areas • Selection: Some suggested having more clarity into the Fellowship selection process
Host Institutions	<ul style="list-style-type: none"> • Timeframe: Arrange duration linked to work-load for the Fellows • Externalities: Time was also disturbed with visa issues, other factors outside of control of APMEN and host country • Selection: some questioned the selection process and whether Fellows were placed with ideal Host Institutions

ANNEX FOUR: TABLE OF RESPONDENTS' ASSESSMENT OF BENEFITS OF THE FELLOWSHIP PROGRAM

Please note that these recommendations in Annex Four and Annex Five are based on the results of the Internal Evaluation of the Network carried out in early 2013.⁵ In addition, the APMEN Secretariat carries out ongoing monitoring and evaluation through administering end-of-placement reports, and one-year follow up reports, to ascertain the impact of the Fellowship on the Fellow and their country program.

RESPONDENT GROUP	BRIEF
Fellow: Personal and professional benefits	
1.1 Post-APMEN Fellowship Roles	<ul style="list-style-type: none"> • post Fellowship some have been promoted and some continue same position but with added technical knowledge • such knowledge is passed on to staff in home organization • capacity building when fellow goes home • added skills and knowledge benefit personal and professional development of fellow • Fellowship experience attending to appropriate knowledge gaps in home country
1.2 Fellowship experience:	<ul style="list-style-type: none"> • knowledge and skill gained on both personal and professional level • cultural exposure • exposure to technologies not available in Home Institution • mentorship which might not exist in Home Institution (lack of funding, professor's time, technical expertise, etc)
Home organization Advancement:	
1.1 Activities and technical advances	<ul style="list-style-type: none"> • skill and knowledge gap filled and/or attended to • develop malaria elimination focused program • collaborate with Host Institution (papers, programs, etc) • further training of staff, locals, to attend to more efficient Malaria elimination program • bring technical skills otherwise unavailable in home country • fast track knowledge and skill learning for new/future young scientist otherwise unable to start own research study (personal/Home Institution) • all fellows have managed to return to Home Institution and make small or substantial developments in Home Institution (training, technical capacity building, advocating through presentations, preparing research manuscripts) • technical skill and knowledge transfer address appropriate country knowledge gap • implementing skills and knowledge gained within Fellowship • continue research collaboration for publication and malaria elimination advancement • address policy and standards where changes are required for new procedures (national plans or lab work focused) • knowledge share among staff and national malaria elimination efforts • those with little benefit due to changes within national malaria program/health department
1.2 Training and capacity building	
1.3 Existing challenges	Majority find difficulties in having resources provided from their local government; in order to make some of the program changes national standards more research needed, and for that more resources needed
Benefits derived from partnerships by Host Institution	Brief summary
Fellow and home institution	<ul style="list-style-type: none"> • partnership in capacity building with PI with a focus on similar research activities • publication and research efforts which benefit both institution • advancing research in Malaria elimination efforts through added project funding • not all Home Institutions have established formal partnerships • most are keeping research/program development collaboration efforts • few are informal interactions with host mentors • results include: publications, training syllabus development, GIS mapping which is new to some areas, etc)
Host organization	<ul style="list-style-type: none"> • advancing local research work, topics which people might not have time for at Host Institution • benefit from Fellows samples, brought from home • collaboration on papers and projects • standardize malaria elimination method within APMEN Country Partners • assist with host organisation's malaria efforts



