



# **Report of the 6<sup>th</sup> Annual Meeting of The Roll Back Malaria Partnership Vector Control Working Group**

7-9<sup>th</sup> February 2011  
IFRC, Geneva, Switzerland

VCWG Co-Chairs: Jo Lines and Michael Macdonald  
VCWG Secretariat: Konstantina Boutsika  
Meeting Rapporteur: Sarah Hoibak

## Executive Summary

Recent reductions in the global burden of malaria have been achieved largely through the massive scale up of vector control interventions and maintaining universal coverage of vector control is one of the main tasks of the RBM partnership. Overwhelming support for the roll of vector control drew one hundred thirty six participants representing all regions, including national programs, the commercial sector, academia, foundations, NGOs, and multi-lateral and bi-lateral organizations to the 6<sup>th</sup> annual Vector Control Working Group (VCWG), the largest to date. This diverse partnership has been structured around eight complementary work streams, collaborating over the past year to respond to specific threats and challenges to global malaria vector control efforts:

***Insecticide Resistance:*** Rapidly increasing insecticide resistance threatens to undermine recent gains against malaria in Africa. Work stream partners are expanding monitoring sites, standardizing procedures and reporting, developing a global strategic plan for insecticide resistance and providing more coordinated support as national resistance management strategies are developed and implemented.

***Outdoor Malaria Transmission:*** A more recently formed work stream, has an initial focus on personal protection for mobile populations in the Mekong, where emerging artemisinin resistance poses the other great threat to global malaria control efforts. The work stream brings together the commercial sector, academia, and national programs to inventory resources, and create common protocols for examining efficacy and community acceptability to adapt repellents and other treated materials that could supplement current vector control tools.

***Continuous LLIN Distribution Systems:*** Complementing the *Alliance for Malaria Prevention* work on mass distribution, this has been a very active group identifying and developing “best practices” and guidance for sustaining universal LLIN coverage through the integration of an array of public and private sector strategies.

***Durability of LLINs in the Field:*** Recognizing that LLINs have a variable lifespan both in terms of physical condition, insecticidal effect and perceived usefulness depending on the geographic and cultural context, this group collaborates with WHOPES and GMP to develop guidelines for determination of LLIN durability in the field and recommendations to help extend product lifespan.

***Capacity Building for Indoor Residual Spraying:*** A large and active work stream with five sub-groups, increasing advocacy and financing for scaling up IRS and building links between private sector work-place programs and national IRS roll-out; training and capacity building for IRS delivery structures and systems; documenting evidence, experience and high quality reporting on IRS; Supervision, reviews and evaluation of IRS programs and support for IRS procurement and supply management.

**Larval Source Management:** New to the VCWG, the work stream will work to develop the evidence base, the protocols and skills training to help national programs identify where investments in larval source management could or likely could not contribute to malaria control.

**Optimal Choice of Vector Control Methods:** This group is coordinating evidence from current field trials to optimize investments in combinations such as LLINs and IRS, and on new product categories such as durable wall linings. In the future they will work on protocols and products for area risk mapping and stratification.

**Entomological Monitoring and Integrated Vector Management (IVM):** An extension of the WHO IVM Initiative, this work stream will support countries to undertake a Vector Control Needs Assessment and Strategic Planning. With materials produced through the broader WHO IVM partnership, including the IVM Handbook, Core Training Curriculum and Policy Guidance, partners are developing the cadre of field entomologists and vector control specialists, with the supporting health systems, that are essential of all our work.

Vector Control is the foundation of malaria control and elimination, and in terms of commodities, the majority of investment. Yet, we are challenged by insecticide resistance, outdoor transmission, and our capacity for scaling up cost-effective and sustainable LLIN, IRS, and larval control programs. Transmission ecology is changing, in some places towards elimination, in others, resurgence. National programs need capacity to monitor and adapt. The large and diverse VCWG renewed its commitment to better coordinate with the larger RBM Partnership, WHO and National Programs to develop and deliver specific products and activities in 2011 to meet these challenges.

## DAY 1: February 7<sup>th</sup>

### Session 1: Introductions and Objectives (Chairperson Jo Lines)

#### Opening Remarks

*Michael Macdonald*

The co-chair of the Vector Control Working Group (VCWG) Michael Macdonald (USAID-Global Health Bureau) welcomed and thanked the 136 participants for their attendance and new and continued support to the Roll Back Malaria Partnership (RBM) and the VCWG (*see Annex 1: List of Participants*). This year marks the largest VCWG with participants from all constituencies: endemic countries, foundations, private sector, multi and bilateral organizations, non-governmental organizations (NGOs), academia and RBM. The impressive number of participants showed the importance and commitment to the VCWG and its activities in global malaria control efforts.

Though it was stressed the importance of this three day meeting, the presentations, plenary discussions and work streams, the co-chair could not stress enough the importance of the “over the coffee break” discussions between partners here to develop the ideas, the plans and the outputs for collective action.

#### Meeting Objectives and Agenda

*Michael Macdonald and Jo Lines*

Co-chair Jo Lines (WHO-Global Malaria Program-Vector Control Program) stressed that one cannot take for granted the strength of the VCWG, and the importance that the group stays technically solid for the enterprise (RBM) to stand on. Though the vector control working group has a very small budget it will work together to determine what are the procedures and what are the priorities, and it must be remembered that it is within the work streams that the “real business” and the “real outputs” happen. It is here in the work stream that the accomplishment of products will be dependent on how some of the partner organizations can contribute to funding these.

<b>Two day plenary plus eight individual work stream meetings</b>
Plenary: presentations focus on work stream issues followed by discussions. Focus on: the problem; the partnerships; the products; the framework for finding a solution (timelines and deadlines).
Work stream: review status of products; reaffirm contributions of partners; costed workplan with assignments and due dates.
Overall outcome: work stream products, structure and communications, plan for 2011. Improve structure and processes of overall working group.

*See Annex 2: Agenda.*

In planning for 2011, the co-chairs would like the VCWG to work together and determine by the end of the meeting how we can structure the group best in order to elicit the best outputs and impact from the large collaboration within the VCWG. They apologized for their lack of consistent communication and recognize that there could have been improved communication and with more transparency, an area that they hope will be better with the support of Konstantina Boutsika from Swiss TPH, funded by SDC to help manage the VCWG.

## Update on Last Year's Work Plan and Budget

### Jo Lines

The Global Malaria Action Plan (GMAP) has specific objectives with-targets, deliverables and activities. VCWG fit for budgeting under targets and deliverables. It is often a clash in priorities and difficult to match RBM and GMAPs objectives with those of the VCWG, which is about getting vector control done.

September 2010, the co-chairs were requested to submit to the RBM partnership workplan plan (PWP) for the VCWG a complete new set of activities freshly budgeted to match the new financial situation. RBM was seven millions underspent and needed to budget some more activities that would actually work that minute. A plan submitted to financial committee in RBM requested a budget of \$820 000.

It was then indicated that the requested amount was not available and the budget was negotiated to \$310 815 (*see image below*) for 2011 of which approximately \$80 000 has been allocated to the current meeting. A priority was given to work surrounding insecticide resistance, which remains the most urgent topic for RBM.

Slide 1: RBM VCWG Budget 2011.

Deliverables	Total Budget	SAF
<b>- Activity as defined in work plan</b>		
Timely and appropriate response to long- and short-term assistance requests		
GOV: Management support for two annual meetings of 5 RBM WG (WIN, MIP, MERG, MAWG, HWG) and 3 participants from MEC review for possible duplication with PF activities, deliverables on roadmaps above; Facilitation for WIN, RWG, CMWG	9,590	9,590
Planned reports generated in line with 2010 reporting framework		
Identify and report on malaria operational research agenda - including VCWG Annual Meeting	82,752	
Mobilize high level political commitment (advocacy for policies) of donor community and endemic countries		
Revise GMAP Vector control to insecticide resistance: estimate of commodity costs over 20 years		261175
Develop, revise, and update best practices for tools and guidance on GMAP strategy		
Entomological Capacity Building		91367
Insecticide Resistance	152227	
Maintain Universal ITN Coverage		
analysis of delivery systems for ITNS included in current GFATM proposals		110000
a practical guidance document on delivery of ITNs through ANC and EPI		
a collation of country case studies and best practices in delivery of ITNs		
a strategic fraemwork for maintaining universal coverage		
Optimize vector control		20000
Forest Malaria Control		57897
Build IRS capacity		35487
Combining IRS with ITNs, selecting the right vector control methods for the eco-epidemiological context (a wall-chart based on classical WHO stratification), (input from AMP)		20000
Develop operational good practice for achieving 100% vector control coverage; Improve strategies for the replacement of LLIN and the integration of Vector Control tools to achieve 2015 goals	29248	
Foster communication between scientific expertise and elimination groups (MalERA and MEG) to prepare for commodities transition		58172
Foster communication between countries and scientific expertise (VC Group)	36998	36496
All Constituencies are implementing a WHO GMP agreed resistance management strategy	0	0

Though less than requested it is an increase of 86%, and will be able to fund small products designed by each of the work streams. Work streams need to consider developing short reports on agreements to perform work (APWs) that will be funded via the WHO/RBM accounting procedures. It is possible that if VCWG can show productivity and use of funds by the next board meeting (RBM moves from board meeting to meeting in 6 month intervals), then more funds may become available. It is important to focus especially on products the board considers critical, such as “insecticide resistance”, as additional products are considered.

### **Discussion**

Partners raised the issue that most of activities other than insecticide resistance and the VCWG meeting fall under the Supplementary Activity Framework (SAF) funding, and that it would be then difficult for work streams to show that we have produced outputs in the six month period if there is not the funding. It was explained that proposals for these other activities can be considered and referred to RBM for additional funding. As the budgets may be adjusted every six months, there is a strong possibility that focused activities and products to address critical challenges can be funded.

There is optimism that with the recognition that the VCWG is beginning to attract that funds will become available. For the moment there is \$200 000 to support activities and it is up to the work streams to design products, which can then be brought forward for potential funding.

Allocation of RBM funding among the different working groups, including the VCWG was discussed. Again it was stressed that the budgeting is an evolving process and if the VCWG work streams have good ideas and products, they can be pushed forward.

### **Lessons Learned and Charting the Way Forward**

*Michael Macdonald*

Co-chair Michael Macdonald stressed the opportunity for the VCWG to show donors and other partners in the malaria community the importance of vector control and the specific challenges being addressed by each of the individual work streams. These are challenges, or problems, that can only be solved by the broad partnerships represented by the VCWG, the national programs, the commercial sector, international and bi-lateral partners, academia etc. If we can work collectively to address some of these challenges we should be able to look forward to better funding next year. Reviewing the work stream priorities:

- *Insecticide Resistance* is our most critical challenge. We need to emphasize monitoring of basic entomological processes, especially the evolution of resistance. Pyrethroid susceptibility appears to be decreasing rapidly in a number of countries; more monitoring needs to be put into place. Plans and guidelines are imperative; some have been drafted and ready for finalization. We also need to be looking at developments in the Agriculture sector,

particularly CropLife and the Insecticide Resistance Action Committee (IRAC) who have developed the policy of rotations and mosaics to slow development of resistance. Any move beyond pyrethroids will increase complexity and cost.

- *Durability of Tools (LLINs and IRS)*. A Protocol is coming out from WHOPES and GMP to help countries measure the physical durability of the LLINs. Liverpool Associates in Tropical Health (LATH) has developed a decay of residual insecticide test that measures the decay rates on IRS using a colorimetric assay and the Centers for Disease Control and Prevention (CDC) has developed an X-ray fluorometer to measure content of deltamethrin. While not part of the present work stream, durability of IRS is also an essential parameter. For example, through good entomological monitoring of insecticide decay rates, Rwanda was able to continue with one round of spray per year.
- *Continuous LLIN Distribution Systems*. Complementary to the support to mass campaigns by the Alliance for Malaria Prevention (AMP) this workstream is developing the evidence for best practices for continuous LLIN distributions, in between, beyond and after the mass campaigns. This is especially important in light of constricting financial resources for the mass campaigns.
- *Optimal Choice of Vector Control Methods*. This is maybe not the most descriptive name for this work stream; we will work on something more apt, but it is focused on the protocols and evidence for determining epidemiological impact of vector control tools. For example, the balance between LLINs and IRS. How do we make the comparison on the cost benefit of LLINs and IRS and the benefit of their combinations? Likewise the work stream is looking at new product categories and what it will take for proof of principle, community effectiveness, approval and registration. The work stream is currently looking at the new category of Durable Wall Linings. Answers to these questions, as well as questions in the other work streams, could influence millions of dollars of vector control investments. When National Malaria Control Programmes (NMCPs) ask, we should no longer say “it depends” but provide clear evidence, and with WHO, guidance on how they should invest.
- *Indoor Residual Spraying*. IRS, in essence, is a systems strengthening exercise, involving planning, logistics, financial and human resource management, monitoring and evaluation. The work stream is very strong and active, including national programs, private sector partners, academia NGOs and other international partners, including the President’s Malaria Initiative (PMI) and collaborating agencies to build capacity for the most efficient use of IRS. The work stream is closely related to the work of the insecticide resistance work stream listed earlier and the entomological monitoring and Integrated Vector Management Work stream next.
- *Entomological Monitoring and Integrated Vector Management*. This is really a foundation of all our work. We need to build capacity for entomological monitoring and vector management in all of our countries. The lack of entomologists, entomology technicians and vector control specialists in Africa is critical. But there is a core platform to build upon with a number of

research and training institutions in Burkina Faso, Senegal, Mali, Sudan, Ghana, Nigeria, through Kenya, Tanzania down through Zambia, Malawi and South Africa (I apologize for the countries I left out) who can support the training and mentoring. Likewise in WHO South East Regional Office (SEARO) and West Pacific Regional Office (WPRO) there are institutions and resources that can be built upon. This work stream—really an extension of the WHO IVM initiative and with support from USAID and RTI International—has developed an IVM Handbook, core training curriculum and policy guidelines that will soon be ready for dissemination.

- Larval Source Management. This is a new proposed work stream. It is intended to seriously tackle the ambiguity and uncertainty of larval source management and its contribution to malaria vector control.
- Outdoor Malaria Transmission. This is another work stream with an evolving name. Formerly named “forest malaria” its focus is on personal protection and vector control outside the house. The most immediate challenge is in the Mekong, where in the face of emerging artemisinin resistance we need to supplement the traditional ITNs, with other existing technologies, including topical and spatial repellents and other treated materials. These same technologies are also applicable to other regions—e.g. personal protection for forest workers, treated blankets and shelter for emergency relief response.

In conclusion there was a famous quote by President Obama’s former chief of staff Rahm Emanuel “Never let a serious crisis go to waste”. We have a crisis in vector control; and it is the time to change the way we do things. Prevalence, morbidity and mortality have gone down in many places, but this remains a very fragile win. There are basic challenges, crises even, that we need to address: resistance; LLINs and what to do if funding for mass campaigns decreases; how do we maximize combinations, and where is the capacity to build the basic cadre of individuals to maximize the impact of IRS, LLINs and larval source management.

### **Discussion**

There was concern from partners that insecticide resistance could become an excuse for not scaling up, when long-term funding is needed to reduce malaria transmission over large areas and do it well, instead of relying on individual *ad hoc* projects. This requires full-time trained personnel, not one that is a “part-time basis”. Countries do not necessarily agree full-time jobs for vector control specialists and entomologists and do not have full-time persons for them. This is seen in the LLIN distributions that do not have full time teams and require expensive short term technical assistance support from international partners to implement the programmes. Capacity building needs to be a priority, and yet this does not seem to be reflected in the GMAP or in the Global Fund grants.

There was mention from the country level to remember that national policy is driven by WHO policies and recommendations. It appears that often the main emphasis is case management, with weak emphasis on vector control. It is important that as we emphasize prevention measures, policy makers within the Ministries of Health

should also a biological and entomological understanding and recognize malaria control is not just as medical issue, but equally an entomological issue.

Knowing what interventions are the most cost-effective over the long-term, over just short term is key; countries should be assessing sustainability and long-term impact rather than just initial cost. There may be LLINs or an IRS insecticide that last longer, but are more costly resulting in the end in a more cost-effective result. Cost-effectiveness studies can be expensive and may require skills not immediately available to many NMCPs. Included in cost-effectiveness analysis are investments needed for associated communications and behavior change, for example “hang-up” campaigns following a mass LLIN distribution, or the community mobilization and communications associated with IRS operations. These supportive activities are often underfunded and/or not included in costing analyses.

Malaria control investments should be done in the context of overall health system strengthening; thinking “in silos” will often result in duplication and waste, without benefiting the systems that are vital to the sustainability of programmes. Systems strengthening is an increased focus of the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) support which should result in health structures more able to deliver and sustain malaria control interventions.

Scaling up and maintaining coverage of LLINs through continuous mechanisms does not assume that less money will be needed for continuous vs. campaign-style distribution. Currently we know very little on cost-effectiveness in terms of unit delivery. There may be large amounts of costing data generated by LLIN mass campaigns and continuous distribution campaigns that could be analyzed to begin to answer these questions.

The information and messages developed by this expanded VCWG should be carried forward to the other RBM working groups and other partners. Products, projects and tools need to be completed quickly so that the VCWG can begin to provide the support so urgently needed by national programs and other implementing partners.

## **Session 2: Progress on Work Plan (Chairperson Michael Macdonald)**

### **WHO-GMP: Update on progress and view of current issues for VCWG**

*Jo Lines*

Current issues for the WHO-GMP related to LLIN procurement and distribution includes:

#### *Durability of LLINs under field conditions*

GMP and WHO Pesticide Evaluation Scheme (WHOPES) are developing guidelines for monitoring LLIN durability in the field. This includes the overall “survivorship” or retention vs. attrition and loss of net; the physical integrity of the nets and a classification and quantification of holes; and the bio-efficacy, the residual insecticidal activity and the interaction between insecticide and holes. Product

performance can differ greatly between locations and contexts and so it is important for a broad set of data collection points. It's better to determine this information by country, and even regionally within a country, instead of WHO giving a global ranking of LLINs, which would not necessarily result in the best net procured for the given context and could hinder a competitive bidding process.

These are prospective guidelines and so avoid the major limitations of retrospective surveys, including unreliable recall and attrition of the entire net (i.e. given away, sold or thrown away because it had too many holes?).

#### LLIN preference and use

In addition to durability, user preference (and actual use) should be another factor in procurement decisions. It is still to be decided if there is a crude and reductive, objective and transparent method to determine user preference that would result in useful data to guide country procurement decisions. This could be done through a standard consumer preference test, or in a random distribution of a number of different kinds of nets one surveys usage rates for the different types. It was later noted in discussion that the former NetMark project and other partners have a significant amount of data and protocols related to net preference and use that should be reviewed.

#### LLIN procurement decisions

With both durability and preference monitoring, there would be a constant flow of location-specific data from trials that cost about US\$100-300,000. At a price tag of 1% of the procurement of LLINs it could result in extending the effective life of nets in the field by 10%. Similar testing is done for RDTs at a cost that represents 1% of the global market.

#### Insecticide resistance

WHO-GMP is developing guidance on management of insecticide resistance among malaria vectors. This will include advice on the judicious use and good pesticide management practices, diversification of methods, IVM and as in Agriculture rotations and possibly combinations of insecticides. While the use of these methods will be more expensive than our current near-exclusive reliance on pyrethroids, it will be more cost effective in the long-term. It is imperative that insecticide resistance data be collected and available for making insecticide procurement decisions. The push for new active ingredients and new tool is vital to meeting the challenge of resistance.

#### Universal coverage

WHO recognizes that "routine", or continuous LLIN delivery needs to be given as much priority as campaigns in order to achieve and sustain Universal Coverage (UC). Correct quantification is vital. One needs to factor in households with an odd number of people and not just go by the overall ratio of one-net for two persons. With this considered the quantification for procurement should really aim for 1 net per 1.8 persons. Additional nets may be needed if sleeping patterns vary by region. Nets delivered through campaigns should not be considered "stand alone" but just

the start of the continuous distribution mechanism. Additional nets can be rolled into antenatal clinic (ANC), Expanded Programme on Immunization (EPI) and alternate distributions mechanisms.

## **Discussion**

### *New products and market stability*

There were questions for WHO-GMP and WHOPEs about how to take a new product from the “proof-of-principle” stage through a WHOPEs process in a timely and equitable way. There was also concern about the need for a more stable investment environment for insecticides that would stimulate more investment in R&D on new insecticides. Now there seem to be mixed messages coming from different United Nations (UN) bodies and from European and US regulatory authorities. Some are very restrictive and feel there is no need for new insecticides, others are cautionary. This could delay investment and development of new products. Strong leadership at the highest levels of WHO is needed to ensure a stable investment climate.

## **Update on ‘The Alliance for Malaria Prevention’**

*Jason Peat*

Jason Peat, co-chair of the Alliance for Malaria Prevention (AMP) provided an update on activities planned in 2011. The AMP is an RBM body that grew out of the International Federation of Red Cross and Red Crescent Societies (IFRC) support for mass LLIN campaigns. Within the RBM structures AMP is part of the Harmonization Working Group. AMP has been an extremely productive working group with a primary focus on supporting countries for the free mass LLIN campaigns. Their work is complemented within the VCWG through the “Continuous Distribution” work stream—indeed most of the members of the continuous distribution work stream are also active members of AMP.

AMP supports countries to plan and implement LLIN mass campaigns, and is looking towards the support to continuous distribution mechanisms. They are a consortium defined by:

- 1) Partner coordination (40 partners).
- 2) Country driven request to Technical Assistance (TA) via subregional networks (SRN) focal point or direct to AMP.
- 3) Building country capacity (TA, mentoring program, theme specific trainings).
- 4) Seven working groups—Behavior Change Communication (BCC), Emerging issues, Monitoring and Evaluation (M&E), Netmapping, Operational Research, Sustaining Gains, TA, Toolkit.

TA missions have supported Implementation and Logistics; however there is an increasing demand for M&E and communication (IEC/BCC) support. There are many excellent TAs in the group and many countries with strong in country experiences that help facilitate mentoring to other countries, with 2011 trying to move towards more regional support. A second version of the toolkit will be released this year, and four trainings are planned for 2011 on implementation and logistics in both French and English.

Issues for AMP surround:

- Net quantification.
- Mop up distributions.
- What is UC, maximum number of LLINs per household (HH).
- Lifespan of nets.
- HH registration.
- Management of data.
- Quality of supervision and training.
- What to do with packaging?
- How to move from a push to a pull mechanism.

What is surprising is that many country TA requests are coming from countries that have already implemented a mass distribution and have had significant support. Comment, is this a reflection on the number of staff dedicated to the distributions in country? Are LLINs treated as a full-time job, but on a “part-time” basis? Perhaps dedicated teams are required for sustainability of LLIN mechanisms.

For those wishing to participate in AMP meetings:

Weekly on Wednesdays 10:00 EDT/15:00 GMT/UTC/16:00 CEST

Dial in numbers:

USA toll-free 888-808-6929

International dial in number: +1-213-787-0529

Access code: 3904916

For more information on AMP and access to their resources visit:

[www.allianceformalariaprevention.com](http://www.allianceformalariaprevention.com)

## **Insecticide Resistance Work Stream-Update and Plans**

*Janet Hemingway*

Consider the quote “Horse is still in stable, well the horse has bolted and nothing in the stable” when thinking about insecticide resistance. We have resistance, and we do not really have anything ready to tackle it.

There has been much fragmentation of partners working on this issue, who have now been pulled together through a Global Alliance: IRAC, PMI, VCWG. What we must do is draft guidelines for resistance management under the GMP banner, and get it out there and used. We have one off snapshots of resistance data, but need to have a continuous stream, and to do that you need an accessible database and mapping. We do have database (IRbase which is housed on the Vectorbase site) which holds much of the data from Africa, much of it historical. However it is very difficult to access the data unless you are an IT expert and there is no mechanism for keeping this site up to date.

The work stream has ensured a Cochrane style review has been commissioned-526 papers on insecticide resistance, of which 150 conform to include in a Cochrane style review, and comprised data on Africa solely. The aim is to have it out by mid 2011.

An advisory panel is to be established to help countries interpret their data will be set up and needs to be done under WHO's guidance. With dissemination of data in space and time, the questions asked by countries will be along the lines of: with pyrethroid resistance at this level-what do we do? We see unexplained increases in transmission, are they related to insecticide resistance?

Quality Assurance (QA) for insecticides and insecticide containing products are being produced, and we have diagnostic kits that could be used, but who is going to recommend their use, and how are we going to make sure that they get used? They could be a part of procurement in checking nets e.g. UNICEF branded net-got into the procurement line-something was not quite right with the nets and it turned out that no insecticide was on the nets. The use of a simple diagnostic-could have stopped that shipment dead, and nets would never have got into that system.

There are gaps in several areas. Need for:

- New insecticide formulations. How do we accelerate getting these validated and out into field?
- Utilisation of non-pyrethroid insecticides in different interventions.
- Improvements in modeling of insecticide resistance.
- Standard Operating Procedure (SOP) for resistance testing.
- Capacity building on site to be able to interpret data.
- Diagnostic of insecticides. It has been 22 years since WHOPES last visited this. How are diagnostic doses going to be established for any new insecticide? Who does it? How is it funded? How do we get there?

### **Discussion**

WHOPES (Morteza Zaim) provided a reminder that we all know that insecticide resistance comes from sources other than vector controls. This means overall national policies need to be in place for better management of pesticides, including monitoring insecticide resistance for ALL pesticide products. Regarding establishing diagnostic dosage, the multicenter studies to determine diagnostic doses and come up with WHO recommended concentration are lacking. In cases where there is no WHO recommended dose, there are recommendations from outside bodies. Also, in regards to diagnostic tests that will determine the active ingredient (AI) it needs to be considered that, for instance, an LLIN may have all the AI, but the AI may not be released in time to be considered an LLIN. It was agreed that there is the need for a QA before products are delivered to country (quick diagnostic), however that there should be a broader set of quality assurance as well.

WHO reminds the VCWG that the Vector Control and Prevention (VCP) is in a dire situation, with what amounts to be 45 000 income for a team of five to do their work. Which means that industry, PMI, academia, we have a collective problem, how are we going to answer it? There is an agreement that this is a serious situation if the unit is to produce guidelines and recommendations. VCWG agrees here much of the work will not amount to anything if our primary mechanism to bring us together is not functioning.

Capacity building is an overall issue to make sure that the insecticide resistance tools are appropriately used. Despite the African Network for Insecticide Resistance (ANIR), with reference institutions-South Africa, Kenya, Cote D'Ivoire, and numerous trained staff at national level, activities are being hampered due to resources. Realizing that capacity on the ground delivers the results, but that these need to be visible nationally and internationally to maintain resource mobilization, it befits to ask the question how do we pull together that internationally for one unified voice to mobilize resources to build capacity?

Addressing the comment on modeling, RAPID mathematical modelers (US department homeland Security) is modeling infectious disease. A workshop on insecticide resistance will include mathematical modelers to move forward on this as a well recognized important issue. On global mapping of resistance, it is suggested that working with Simon Hay at Oxford on the malaria atlas project (MAP)-mapping vector distributions globally and using the same ontology for cross referencing would be advisable.

Current issues reflecting the urgency of insecticide resistance included reports from Zanzibar, Tanzania from PMI (Peter McElroy) where there was detection of pyrethroid resistance in Pemba-for a second time around. They have been comparing this to weekly epidemiological data, however no changes in morbidity. It was emphasized that knowing what kind of pyrethroid resistance is very different in terms of entomologic impact which would produce different epidemiological differences. One type of resistance to another is like comparing apples with oranges.

## **Session 2 (cont.): Progress on Work Plan (Chairperson Jacob Williams)**

### **Continuous LLINs Distribution Systems Work Stream-Update and Plans**

*Don de Savigny and Jayne Webster*

Continuous LLIN distribution systems can be considered as part of the “catch up and keep up” to achieve Universal Coverage where all age-groups are targeted. It is recognized that continuous delivery systems are insufficient to achieve universal coverage and that periodic campaigns are insufficient to maintain universal coverage.

The work stream convened two meetings in 2010:

- October meeting in Geneva
  - Four products in the following 6-9 months.
    - Consensus statement.
    - In-depth review of LLIN distribution methods in Global Fund Proposals.
    - Case-studies of continuous distribution channel experiences.
    - Strategic Framework for choosing continuous distribution channels.
- November ASTMH meeting in Atlanta
  - Taking stock of progress-Terms of Reference (TORs) for consultants for all products reviewed.

**Progress to date:**

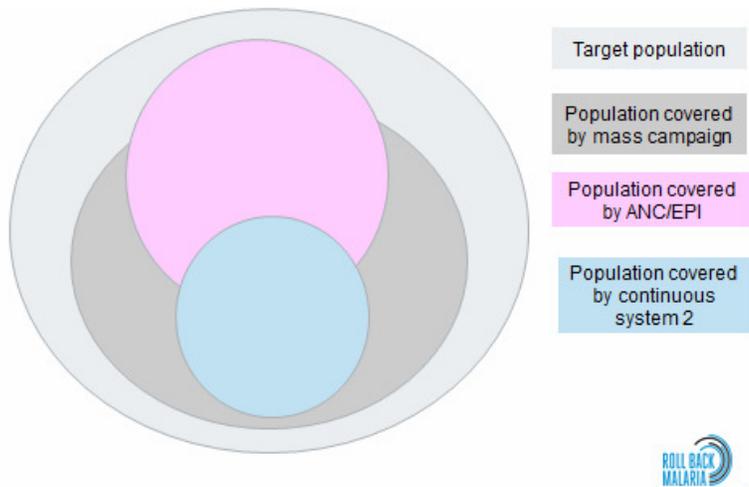
Products	Update	Funding
1. Consensus Statement.	Completed and on RBM website.	-
2. Review of LLIN distribution methods in GFTAM grants.	Ongoing via analysis of workplans, Procurement and Supply Management (PSM) plans, M&E plans. Gap analysis through net tracking project and RBM roadmaps.	SDC \$5000 WHO \$5000 Product available in Q2
3. Case Studies and Best Practices.	Possible countries-Kenya, Malawi, Tanzania, Ghana, Mozambique (Zambia, Mali, Senegal, Cambodia).	USAID/NetWorks \$65 000 Product available by August 15 <sup>th</sup> for Rd 11 TRP
4. Strategic framework for choosing continuous distribution channels.	1) Present a variety of options for continuous distribution, broad pros and cons of each, major requirements in infrastructure, human resources. 2) Decision making framework.	USAID/NetWorks \$15 000 Product available by August 15 <sup>th</sup> for Round 11 Global Fund Technical Review Panel (TRP)

Currently in the distribution mechanisms we are unable to determine what size of the populations will end up being covered by:

- Population covered by mass campaign.
- Populations covered by ANC/EPI.
- Population covered by continuous system 2 (for example the use of schools).

We do have data by which we can find these sizes (overlap increasing costs)- incremental coverage-we need to start looking at this data to find this out (slide 2).

*Slide 2. Understanding the proportion of the population covered by different distribution mechanisms.*



## **Discussion**

If we want to ensure that countries are including the recommendations of the VCWG on continuous LLIN distributions in their submissions, it is important to have this information go out to TAs and countries during the writing process before the TRP meets, and increasingly important is to have recommendations included in the country's five year national strategic plan, which GF will be increasingly referring to. WHO produces a policy brief for the GF proposal development where it refers to these various documents, which could help get outputs of the work stream into practice. In the meantime the field is making long terms plans that don't take into account what we are discussing in these high level technical discussions.

A question to ask related to what population is covered by each of the distributions mechanisms, is to find out in evaluation if nets do move between families, which opens up much more opportunity for routine plus additional nets as a means of sustaining coverage. It would also be interesting on nets to have some mechanism of tracking them-with SMS number, bar code etc.

## **Optimal Choice of Vector Control Methods-Update and Plans**

*Christian Lengeler*

This work stream has been looking primarily at three issues:

1. LLINs vs. IRS and their relative impacts and cost-effectiveness, on their own or in combination. This will in the future also include combinations with other interventions.
2. New vector control methods-of which the most advanced of the new tools, are Durable Wall Linings (DL). We want to contribute to the development of an overall road map.
3. To understand the epidemiological, entomological and logistical parameters those are crucial for the implementation of vector control tools-which would lead to a framework to better plan and target control.

Two meetings in 2010 targeted the first two issues.

1. Comparative assessment of IRS and LLINs and their combination: (meeting report not completed) we did not invite industry because of the obvious issue of conflict of interest. The main focus of the discussions was on the coordination of the current data on LLINs and IRS in combination; we synthesized that evidence and identified gaps in our understanding.

Further issues that were discussed included the following:

- USAID needed a review of the evidence in order to make decisions on further funding to studies; one such study is currently funded but the names of the winner could not yet be made public.
- There was an immediate need for evidence by GMP-VCP to advise the Global Fund on LLINs and IRS combinations in country proposals; to this effect the lack of solid evidence was pointed out and the

recommendation was only to fund small scale pilot implementation to generate country-specific data.

- The need to always include a cost assessment in future studies; most costing analysis of additional interventions will involve the calculation of marginal costs versus marginal benefits.
- Preliminary evidence is available for Bioko, Gambia, Kenya, Malawi, Mozambique and was presented by Immo Kleinschmidt. Overall there seems to be an additional effect of adding a second intervention, especially when the first intervention is not implemented well.
- When doing such assessments we must consider the following: insecticide resistance status and insecticide in use, coverage level for the different interventions, effects of a second intervention on acceptability of the first one, effect on mosquito populations.

2. Durable Wall Linings (DL): Industry was invited and a meeting report is available. The main aim of the meeting was to review and discuss the epidemiological and entomological proof of principle of DL as large-scale vector control tool. Additional issues were WHOPES requirements for the testing of DL and advice to USAID/CDC on how its investment in DL work in Malawi and Kenya could be most effective.

- A new vector control product requires a huge body of work in order to generate a sufficient the required body of knowledge on entomological and epidemiological impact. But history has shown that it is worth to invest up to USD 10 millions into the intervention knowing that donors will potentially invest several billions into purchasing future products (e.g. LLINs). Hence, the cost of development and costing is small compared to the long-term investment.

#### Outcomes to the meeting

- DL is a new and distinct product-not long-lasting IRS.
- It has characteristics of both IRS and LLIN-therefore it must be tested properly as new intervention.
- So far it is impossible to define a target product profile (TPP) for the whole class of products, since there are many experimental concepts. This struggle will certainly continue for the next years.
- Solid epidemiological evidence needs to be generated before DL can be recommended for large-scale implementation. One study at least should take place in an area where there is substantial pyrethroid resistance.
- For the first-in-class product a pyrethroid can be used (this is the case with the most advanced product developed by DART) since we cannot wait until a non-pyrethroid version comes out. Subsequent products, however, should include a non-pyrethroid, and possibly a mixture of at least two insecticides.

## **Discussion**

**How do we support WHOPES and GMP to help accelerate the approval process of new vector control products, as there appears to be a structural deficit? There is no answer to this question at this point, but a close link with WHOPES should be maintained. The Innovative Vector Control Consortium (IVCC) could also provide some support.**

Knowing that house screening has a clinical impact on malaria infection, it would be worthwhile evaluating experimentally DL over the eyes. This is actually already done in most cases. We should also look more seriously at house screening as an intervention into one of the weapons against malaria vectors.

A costed work plan should be produced by the group and submitted as soon as possible to the co-chairs of the VCWG.

## **Open Session-Advocacy and Funding**

Advocating for funding had never been a strength of technical experts such as many of those in the VCWG. Advocacy is very important to encourage governments—including endemic country governments to fund malaria vector control and supporting activities. There is a danger in too much attention and focus on achieving the UC targets in a short time frame, where some may consider the job finished and reduce or shift investments away from malaria control. Advocacy must emphasize the need to sustain these gains over the long term and not just the achievement of short-term targets.

The VCWG should recognize that advocacy for malaria has generally been successful. However in some cases this advocacy may have oversimplified the needs with slogans such as “buy a net, save a life”. This has done a disservice for malaria and vector control in general. We could learn from the HIV/AIDS community who has been aggressive with dealing with problems and policies that undermine effective disease control programs. The vector control community needs to be upfront and bold in defining “appropriate” and sustained vector control. That starts with discussing the additional threat of evolving insecticide resistance that we need to slow down enough so that new processes and products can be deployed in response—“Accelerate development and decelerate resistance”. This is a complex advocacy tasks that needs to focus beyond “buy a net, save a life” to address the real needs of malaria vector control. It is critical that scientists do not just speak to each other, but are involved in the public communications and advocacy.

The private sector malaria control efforts offer excellent examples of advocacy and the positive return for investment in malaria control. In addition to the corporate social responsibility many companies faced a straightforward investment decision. For many operating in Africa, malaria was the most serious public health threat to their operations with level of absenteeism to illness reaching 50%. The impact of investment was not only on productivity of employees, but on the community as a whole with improved school attendance and a positive relationship with the

government in this public-private partnership. Examples from the private sector on positive return for investment for vector control will soon be published by the Global Business Coalition for HIV/AIDS, Tuberculosis (TB) and Malaria [www.gbciimpact.org](http://www.gbciimpact.org)

Advocacy through RBM should focus on the contribution of malaria control, which is primarily vector control to the Millennium Development Goal targets related to under 5 mortality and maternal mortality. There is an expressed need for economic arguments for increased investments in malaria vector control, especially as one of the key audiences are the Ministers of Finance who need to see demonstrable economic returns on investments. Work similar to what is being done for the private sector by the Global Business Coalition should also be done for public sector investments.

The group was reminded of the Abuja Declaration, where in 2000, forty four heads of state met in Abuja, Nigeria to pledge their commitment to malaria control. In 2006 there was another summit committing to targets for universal coverage. Now more than 10 years have come and gone, and we need to give feedback to our heads of state what we have achieved with the resources provided. Equally, we need to be clear on what those African endemic countries have done themselves to increase malaria control investments from their own internal resources. There were strong statements that national level support and funding to sustain the country capacity was missing; that there needs to be increased financial flows within the countries themselves. How do we motivate countries to mobilize their own funds to pay for the interventions?

There are numerous examples of reduced investments in malaria control, resulting in program failure and disease resurgence. If we remain dependent on one form of funding that is not reliable and consistent, we will never be able to adequately address malaria control. Unless we look at taxes and other set subsidies that will support interventions, funding will continue to remain volatile and unpredictable.

## **Roll Back Malaria Partnership**

*Thomas Teuscher*

RBM wants to show how their working groups contribute and add value to the partnership. At the last RBM Board meeting in Lusaka the board discussed what should be the targets beyond UC of 2010 for the years 2012-2015. This was discussed with WHO and Bill and Melinda Gates Foundation but no targets have been adopted. Identified three objectives: GMAP targets; reducing global malaria cases by 75% by 2015; continuation of 2010 push. Some countries have gone done along the UC track and are now faced with a challenge to sustain, but additionally there is a large group of countries that have not yet achieved UC. If board adopts there is significant catch up.

Priority area across objectives-containing spread of resistance (Global Plan for Artemisinin Containment (GPAC) and a plan for insecticide resistance). This will drive the advocacy efforts and we are looking at requirements of 6 billion investment

containing 600 million/annual R&D, though there may be elements missing around this. This is domestic/regional/international. There is now a resource mobilization sub-committee with key participants from Medicines for Malaria Venture (MMV) and Product Development Partnerships (PDP), resulting in many different mechanisms to add to the 600 billion-each interest group is represented in these committees.

### **Discussion**

From Jo Lines-GMP/VCP, the crisis in vector control is that it requires more than just the VCWG and getting out some handbooks and guidelines, but that the implications of resistance and vector control impact much more widely around the partnership. Mechanisms to raise money and advocate are beyond what this working group would normally do. If resistance will impact across other sectors-elimination, case management, surveillance, we need to mobilize across constituencies.

Given that we have the GPAC plan for medicines with a relatively good buy in from interest groups to have that plan implemented in the next two years, can vector control not have a similar document that plans around “one common worry”? Having a clear agenda of how each of the various interest groups must contribute to insecticide resistance to drive forward a multiple stakeholder agenda would help RBM to digest the implication of insecticide resistance for everyone.

## **DAY 2: February 8<sup>th</sup>**

### **Session 2 (cont.): Progress on Work Plan (Chairperson Janet Hemingway)**

#### **Durability of LLINs in the Field Work Stream-Update and Plans**

*Albert Kilian*

We need clear criteria for program managers to choose the LLIN product with the most value for money and to move away from procurement where price is the only criteria rather than including specifications of performance as well. All nets should not be considered the same, but there should not be an “overall LLIN ranking” as we have evidence that net brands perform differently in varying cultural and environmental contexts.

How do we get there?:

- A clearer definition and agreement on what “useful life of a net” is (e.g. median survival in years of a specific product in a specific environment).
- Need comparable data on different LLIN products in different environments using suitable methods.
- Correlate field data with laboratory testing and identify those combinations that correlate best.
- Identify BCC strategies that will prolong life of the LLIN by influencing care and repair behavior as well as perception of when a net is “too torn”.

Definition of “Useful Life”-when is this net dead-when is the net “useless”

- Insecticidal effect-insecticide content.
- Physical condition-how many holes.
- Perceived uselessness-alternative use.

What we know or have-Hole counting and Index:

- Count holes in three categories of size.
- A field guide to assist the collection of data in large surveys (field guide).
  - Plasticized template of hole size definitions to facilitate assessment.
- Tally sheet to record holes on each side of the net. Summarize total number of holes per size and net.
- These tools have been field tested in one site (Uganda). Variability mainly on the size 1-but reasonably accurate. Excellent results for size 2 and 3.
- Takes approximately 5-7 minutes/net. Time to assess net is dependent on number of holes.
- Use a hole index calculation to calculate the relative proportion of net surface area that is holed. This provides a single measure of fabric integrity for each net.

Moving forward:

- Help countries to collect data on durability using these guidelines that will be finalized by WHO-GMP, WHOPES and partners.
- Encourage hut trials on hole-insecticide combinations and resistance and look at the relative protection provided to the individual.
- Develop a consensus around definitions on when a net has expired, by setting thresholds and tools to define.

### **Discussion**

Immo Kleinshmidt has analyzed data from Malawi looking at two sizes of holes (AA sized batteries and D sized batteries). Results indicate that small holes or no holes do not show difference in terms of protection (parasitemia in children), but having larger holes does. It was agreed that more data of this kind (but using a more standardized approach) is needed.

Other parameters that need to be taken into consideration: mosquito density, types of holes produced, location of the holes, vector resistance, perceived usefulness and level of protection.

### **Larva Source Management Work Stream-Update and Plans**

*Steve Lindsay*

Larval source management (LSM) includes

- 1) Habitat modification (drainage)-not enough engineers in malaria control.
- 2) Habitat manipulation-flushing.
- 3) Biological control-fish.
- 4) Larviciding-either chemicals or microbials.

There has been significant historical success in the control and elimination of certain vectors, i.e. the eradication of *An. gambiae* using larviciding from Brazil and Egypt. Whilst larviciding declined during the Global Eradication Program, it is still used extensively in Europe and the US for mosquito control. Recently there has been renewed interest in larval control with large-scale field trials being conducted in The Gambia, Dar es Salaam, Tanzania and the Western Highlands, Kenya. These studies show that hand application of larvicides is not effective in areas of extensive flooding, but will be highly effective where there are well-defined and accessible breeding sites. Importantly, they provide additional protection against malaria when used in combination with LLINs, and by extension IRS. LSM is likely to be particularly valuable as a tool for controlling outdoor-biting vectors, for insecticide-resistance management and, in some cases, for dealing with malaria 'hot spots'.

### Products

- Cochrane review on the use of fish for larva control.
- Cochrane on LSM (a protocol has been developed and the literature is being reviewed. The work in reviewing several thousand publications is enormous and help is sought to complete this task by recruiting a research assistant).
- WHO review on global use of LSM is in progress.
- Updated review on LSM.

### Way forward

- Support for NMCPs that are considering or are using LSM.
- M&E of LSM programmes.
- Training courses on LSM.
- Refinement of where and when to use LSM.
- Assessment of different AIs and formulations.
- Financial support for these activities.

### **Discussion**

There are many success stories of LSM: the German mosquito control program have been using LSM for 35 years against nuisance vectors as have many parts of the USA. Sudan (Khartoum), Cuba, and Angola are using LSM as an integrated vector control measure. The application in the winter (cold) months with less breeding sites to eliminate in pre-seasonal transmission, may be enough to reduce vector population and drive down transmission. New larvicide technology (new AI) has extended residual activity which may have greater impact. This work stream will need to help countries determine where and when to use LSM for maximum effect, and what they need to do to improve control of malaria in their country.

## **Entomological Monitoring and Integrated Vector Management (IVM) Work Stream-Update and Plans**

*Jacob Williams*

IVM is defined as “a rational decision-making process for the optimal use of resources for vector control” (WHO 2008). IVM promotes the establishment of appropriate policies and institutional frameworks, the establishment and effective

utilization of local competencies/capacities, as well as the generation of local data to drive inter-sectoral decisions and actions on tailored responses to ongoing changes in local disease eco-epidemiology. The desired objective is to make vector control ecologically sound, cost-effective and sustainable.

Malaria endemic countries require concerted technical support to assist national orientation to IVM. Urgent needs include:

- IVM manuals and guidance to country implementation.
- Support for national vector control needs assessments (VCNAs) to enable informed country orientation to IVM. Experiences from AFRO, EMRO and RTI supported countries, are salient.
- Strengthening of entomology monitoring and surveillance capacities.
- Improved access to institutionalized training (utilizing harmonized IVM curriculum), to create appropriate human resources.
- Evaluation toolkits to assist assessment of both the extent of national reorientation to IVM, as well as the impact of such change on vector control and local malaria burdens.

The above priorities require close partnership by all VCWG constituencies, including the private sector. A global IVM stakeholder Group under the auspices of WHO, has already initiated work on some of the above priorities and the RBM Work Stream on IVM and Entomology, provides additional opportunity to complement and accelerate efforts. The Work Stream will further discuss and prioritize work for FY11.

### **Discussion**

- The private sector brings core business competencies that are relevant to the success and sustainability of malaria control, in the light of constrained country level resources.
- Country adoption of IVM will require clear guidelines and support from WHO, since even countries with strong local expertise, still face challenges deciding on appropriate methodologies for entomology and program evaluation.
- AFRO is developing a pocket guide that contains the critical procedures for vector monitoring across all vector-borne diseases (VBDs). Also the IVM unit (WHO/HQ) is developing a manual on M&E for IVM. WHO-EMRO is presenting a technical discussion paper on pesticide management.
- A significant challenge to vector control is motivating communities to take charge, and identifying the appropriate incentives. While there is no easy answer few countries doing quite well and lesson should be drawn from such experiences.

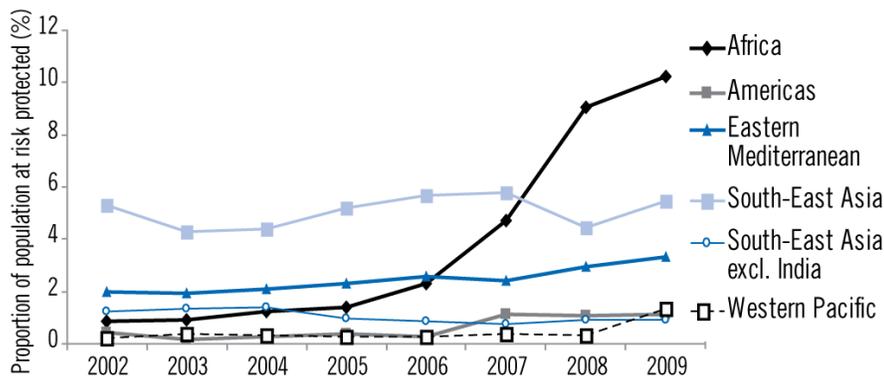
## Session 2 (cont.): Progress on Work Plan (Chairperson Don de Savigny)

### Capacity Building Activities for Indoor Residual Spraying (IRS)

Shiva Murugasampillay

There is increasing momentum for scaling up IRS in Africa since 2005-2006 with the support of PMI and World Bank malaria Booster program (see slide 4). USAID, CDC and PMI building capacity and IRS coalition and proactively leveraging more funding for scaling IRS up from MOH, GF, and other bilateral partners.

Slide 4. Proportion of population at risk protected by IRS.



In 2010 there was broad consultation with key stakeholders including SRNs, industry, NGOs, academia, RBM-PSMWG in order to catalyze joint action on IRS. Areas of interest-policy, advocacy, insecticides, spray equipment, M&E, financing, capacity building, training etc.

There are several cross cutting issues within IRS work stream and other VCWG work streams. Some issues will be left to others while the IRS work stream will be now subdivided into five sub work groups:

- IRS training and country capacity building. Support for the development of training within countries and regions with global expertise (Manuel Lluberas).
- IRS procurement and supply management: selection and procurement based on highest international standards. Clear WHOPEs specifications (Rabindra Abeyasinghe).
- IRS evidence and reporting-documenting, outcome and impact from research studies and reporting program delivery (Rajendra Maharaj and Immo Kleinschmidt).
- IRS supervision, reviews and evaluation (John Govere).
- IRS advocacy and financing (Richard Tren and Patrick Moonasar).

2010 initial outputs:

- Starting the work IRS WS subgroup.
- IRS Global/Regional Training centre-Limpopo South Africa.
- Key issues on IRS PSM and link with RBM PSMWG.

- Global and regional IRS bi-annual conference.
- IRS country data base and annual IRS country report.
- IRS program review Gambia and Eritrea.
- IRS documentation and case studies. Lubombo Spatial Development Initiative (LSDI) and PMI.

### **Discussion**

Capacity building needs to be considered from “the hands on side and the other planning and managerial”. Would there be the possibility to integrate this training and use of human resources with other malaria control activities, like larva source management, active case detection etc as usually IRS teams only work a few months a year.

Funding and release times are critical to IRS activities. GFATM and other donors need to recognize that IRS has a window of effectiveness and annual funding cycles need to support this.

### **Forest Malaria-Outdoor Transmission Malaria**

*Michael Macdonald*

Michael Macdonald presented on behalf of Marc Coosemans who was unable to attend the meeting. Currently the focus has been mostly on South East Asia and the mobile populations working in forested areas. But the same issues of personal protection against outdoor transmission apply to populations in the Amazon basin, to rubber tappers who are out working and exposed to vectors in the early hours before dawn, and in general, any situation where there is significant transmission “outside the house” that has been the focus of our LLIN and IRS strategies. Many of these same issues of personal protection would apply to emergency relief for displaced populations (e.g. insecticide treated blankets and emergency shelter). The primary vectors of concern are *An. dirus* and *An. minimus* in the Mekong region. *An. darlingi* in the Amazon but also extremely important earlier biting *An. arabiensis* in Africa, and potentially the new cryptic species of *An. gambiae* recently described as living entirely outdoors, and showing physiological competence to malaria infection in the lab; it’s vectorial capacity and actual role in transmission has yet to be determined.

There are a number of potential tools available for personal protection, including:

- Topical repellents. There are some published studies from the Peruvian Amazon on paramethene-diol lemon oil. This product has also been recently tested for community acceptivity in Western Cambodia. The late Nigel Hill was doing some similar studies with PMD (p-menthane-3,8-diol) in China. There is on-going work in Cambodia and Vietnam on collaboration with the Institute of Tropical Medicine in Antwerp (ITM Antwerp) and commercial partners in Indonesia.
- Spatial repellents. Trials of spatial repellents such as metofluthrin are being conducted by a commercial partner and a number of research institutes in both Africa and Asia.

- Treated clothing, sheets and blankets. There have been a number of trials or permethrin treated materials, including uniforms, in the Americas and South Asia. The US Department of Defence has a well-developed program for soldier personal protection, including treated uniforms and repellents. A recent Grand Challenges Grant was awarded to investigate permethrin-treated traditional scarves (Kramas) in Cambodia.
- ITNs. Even in areas where there is significant early biting, traditional ITNs do have some impact and should never be dis-regarded.
- Treated hammocks and hammock nets. Work in Vietnam and Cambodia, again supported by ITM Antwerp and by commercial partners is showing significant, if not complete transmission impact from this technology.
- Insecticide treated plastic sheeting/tents. Developed primarily for emergency shelter, treated tarpaulins and durable wall linings could also possibly be adapted for use by farmers in their temporary field shelters, or by workers setting temporary camps in the forest.

In summary, there is a promising variety of personal protection technologies that could be adapted and used in combinations to improve protection outside the house where our traditional methods of IRS and LLINs are not sufficient. These technologies are all in essence, consumer products, entirely dependent on acceptability and appropriate use, whether provided for free or accessed through the markets. Commercial sector partners are therefore the key in their development and deployment.

The work stream would like to:

- Compile an inventory of institutions working on personal protection products.
- Developing common protocols for evaluating these interventions.
- Confirm proof of principle.
- Confirm community acceptability.

### **Discussion**

In Myanmar there is significant work on use of repellents in coordination with the other Vector Borne Disease programmes. In collaboration with the International Office of Migration they are targeting mobile populations in the areas of artemisinin resistance in the south-eastern part of the country bordering Thailand.

The VCWG agreed that the name of the work stream should be changed since it goes beyond forest populations, and beyond solely personal protection. We need to look at this as a complementary measure to LLIN and IRS, or as an alternate tool. We need to be cognizant that as programs are more successful with IRS and LLINs against transmission occurring indoors, outdoor transmission may become increasingly important.

### **Session 3: The Way Forward for 2011 (Chairperson Michael Macdonald)**

#### **Professional Associations, Networking and Capacity Building for Malaria Entomology and Vector Control**

Three members of the VCWG are currently engaged in national, regional and global professional associations for entomology and vector control, patterned on the American Mosquito Control Association.

Samson Awolola (National Institute of Medical Research-Nigeria): In Nigeria they are setting up a national council whose aim is to bring together a critical mass of people trained in entomology, IRS and larval control that can be called upon to support the malaria control program for entomological and insecticide resistance monitoring. There will be a registry of scientists, university lecturers that can implement and assist in training.

Charles Mbogo (KEMRI-Kenya): With a secretariat based in Kenya, the regional, Pan African Mosquito Control Association (AMCA) is patterned after the European and American Mosquito Control Associations as a model. The association was started at the 2009 Multi-lateral Initiative on Malaria meeting in Nairobi with an elected board (two Anglophone and two Francophone countries). Their aim is to promote African participation in a professional association of entomologists and vector control specialists to solve problems. Registered in Kenya and housed at KEMRI it is open globally. There are three types of members: students, corporate, and those working in the field. Fundraising was required to set up the secretariat in Nairobi.

Norbert Becker (Germany): On the global level, there are efforts to develop the World Mosquito Control Association, that brings together AMCA [www.mosquito.org](http://www.mosquito.org) and the new European Mosquito Control Association that brings together 23 organizations dealing with mosquito control <http://www.emca-online.eu/>

#### **Discussion**

The VCWG was challenged us to look into the future where there is less core, centrally coordinated, money, but where mosquito control operators will still be there. They will be valuable resources where these people have good experience.

There is concern that these networks would duplicate/replicate the work of RBM or of national programs. Reassurance that these are not to do either, but to provide a clearing house of trained individuals that can discuss mosquito control with the public and private industries in general and can be used as a resource to be called upon by national programs. NMCPs would like the modalities clearly laid out and would prefer such an organization, if it is to support capacity building and coordination of entomologists, to be called something like “the entomologists association” rather than a “mosquito control” association so as not to appear in competition with the national programmes.

Entomologists are endangered species, there are very few and those that exist are nearing retirement. With the associations there is hope to attract new entomologists, and use the associations to bring fresh minds into the profession.

### **Discussions on what should be modified for next year**

#### Workplans and budgets

- Produce a concept note per product (1/2 page-1 page) in your work streams, with an associated budget.
- Share those with Jo Lines and Michael Macdonald, who will pull the work stream leaders together to decide together what the priority products to fund now are.
- Jo Lines and Michael Macdonald will then discuss with RBM-Jan Van Erps and Thomas Teuscher.
- Even if this year the product doesn't go through look to secondary resources after that.
- Within this group there are many people who are managing donor funded projects and have resources from other places. Donors want to be funding the best technical interventions and VCWG is a group of leading experts that can assist them in identifying those products.

#### Linking with RBM

- What comes out of the RBM board is a language and form that is not the way that the VCWG reports. How they structure their tasks, VCWG needs to relate to those objectives and in better means with the other working groups.
- The working groups are mechanisms to provide technical leadership to facilitate collaborative action. Board looks for the key technical issues that need attention. VCWG needs to figure out the appropriate response and to prioritize those for the board. Board may agree or disagree.
- This is the largest working group. The work streams then become the equivalent-to the working groups in the other areas. This is going to be the test can each of the work streams provide the board that input.
- Advantage this group has-the range of partners. Academia, implementers from the field, private sector, board constituencies-few working groups are like that. This is a powerful advantage to build consensus forward.

#### VCWG products/WHO products

- Are the products of the work streams products of the VCWG as a whole, and how can we make them more effective and used at the country level?
- To come to a consensus send your documents around to everyone in your work stream to invite comments. The chairs share this work with other work streams for final input to finalize the product as a VCWG product.
- Before things become labeled as policy at WHO, a formal process should be considered. If there is evidence that WHO can consider making a recommendation, then this is to be discussed with WHO.

### WHOPES

- One of the authorized channels if we produce new products/tools is WHOPES.
- The vector control advisory group will oversight the proof-of-principle and will discuss product by product.
- It is important for the private sector to see the pathway to market to know how new products will go along the safe passage into the market.

### Communications

- Do we need to have an internet forum to continue our discussions?
- All the documents will be on the RBM website. Will create one page for each of the work streams.
- Last year there was not sufficient communication. This year will aim for quarterly updates to the VCWG.
- There is a debate forum on malaria world where we can discuss different themes on malaria, instead of recreating perhaps we can use this platform.

## **DAY 3: FEBRUARY 11<sup>TH</sup>**

### **Summing up the Outcomes of the Work Stream Meetings**

**Michael Macdonald**

#### ***Durability of LLINs in the Field Work Stream***

- Use of a proportionate Hole Index to standardize categorization of LLIN physical condition.
- Improved methods to test textile performance in lab.
- Testing field used LLIN in hut trials to observe protection as function of insecticide-holes.
- Incorporate hole measure in large surveys to establish epidemiological effects.
- Potential of care and repair. Behavior Change Communication (BCC) to prolong durability.

#### Products

- Review of existing literature (published and grey).
- Make different tools for measuring durability available on RBM website.
- Organize meeting on new methods of textile testing.
- Consensus statement on the hole index.
- Inclusion of durability (netlife) questions to Monitoring and Evaluation Reference Group (MERG) for Malaria Indicator Surveys/Demographic and Health Surveys (MIS/DHS) and other surveys.

#### ***Continuous LLIN Distribution Systems Work Stream***

- Four terms of reference for products have all moved forward with funding.

#### Products

- Continued support of work stream to consultants working on the country examples and review of different methods of routine distribution.
- Dissemination of products via channels that will influence the GFATM process, national strategic plans, other donor investments.
- Collaboration with AMP sustaining gains working group. Inclusion of a day on routine distribution in two implementation workshops, two logistics workshops, and a chapter in the 2<sup>nd</sup> edition of the toolkit.

### ***Entomological Monitoring and IVM work stream***

IVM is a cross-cutting to all VCWG work streams, as it relate issues critical to the effective vector control. 4 outputs were identified by the work stream, recognizing that other complementary products are being addressed by a global IVM stakeholder group under the auspices of WHO/HQ.

#### Products

- Advocate national Vector Control Needs Assessment (VCNA) inclusion in country proposal requirement under GFATM, to promote adequate preparation of overarching national vector control strategies.
- Develop costing template based on the WHO VCNA protocol, mobilize resources and provide technical support to country assessments.
- Produce IVM Handbook and Policy document on IVM.
- Develop harmonized IVM training tools and curriculum to facilitate institutionalization of IVM training courses by countries and regional centers of excellence.

### ***Insecticide Resistance Work Stream***

Priority area of VCWG, urgent area of focus to avoid an emergency. Fifteen outputs for the work stream in order of priority, the first four to be reported at the RBM May Board meeting.

#### Products

1. Establish an outline Global Plan for insecticide resistance monitoring, management and impact assessment. The plan should cover a two year time frame and identify the contribution of different interest groups (countries, industry, academia, transnational and industrial organizations, donors etc.) and indicate who owns the actions. It should include an assessment of resources (capacity and information) needed.
2. Support an international advisory panel convened by WHO to assist countries interpret resistance data. Panel should also provide guidance or entomological investigations in areas where outbreaks or significant unexpected increases of malaria have occurred. Draft recommendations and TORS for such a panel.
3. Dissemination and Linkage: there should be a webpage for malaria vector insecticide resistance information, on the RBM or WHO GMP websites with links to IRAC, Malaria Research and Reference Reagent Resource Center

- (MR4) et al. Suggest GMP to host with the RBM work stream to collect resources.
4. Establish Standard Operating Procedures for assessing the underlying resistance status of field populations in locations where new formulations or AIs can be tested. Would need to be formally adopted and part of the protocol for WHOPES assessment to avoid duplication of effort.
  5. Aid in the development of draft guidelines for the minimum criteria, assessment and validation of resistance breaking products.
  6. Complete the Cochrane style review on insecticide resistance impact on entomological and epidemiological indicators and publicize the outputs.
  7. Establish a slot for presentation of the resistance group findings at the next RMB Board (May 2011).
  8. Establish a global network for supporting and linking regional networks such as ANVR, Asian Collaborative Training Network for Malaria AIs: Active Ingredients (ACTMalaria), Amazon Malaria Initiative (AMI), TDR Resistance Network etc. Assess potential linkages with WorldWide Antimalarial Resistance Network (WWARN).
  9. Support WHO in establishing the discriminating dosages for public health pesticides where a formal WHO dosage does not exist but where products are in active use.
  10. Provide Quality Control support for insecticide procurements.
  11. Undertake a systematic review of the type and frequency of known broad and narrow spectrum resistance in Anopheles.
  12. Establish whether non pyrethroid interventions (e.g. IRS, DL) in LLIN areas where pyrethroid resistance has become an operational issue would be beneficial.
  13. Encourage supply of impregnated papers (and kits) via industry or other Good Laboratory Practice (GLP) lab production facility to fulfill demand.
  14. Encourage the use of studies evaluating alternative sampling strategies to replace human landing catches. Sampling strategies must include indoor and outdoor methods and any biases in species compositions from different trapping methods evaluated.
  15. Capacity building is needed in some countries in line with ongoing vector control needs assessments.

#### ***Outdoor Malaria Transmission Work Stream (Forest Malaria)***

A new work stream, the forest malaria title has changed to outdoor transmission work stream to reflect the broader issue of developing products for individual and community protection, and how to operationalize them.

#### **Products**

1. Inventory institutions researching these tools.
2. Develop common protocols for evaluating new tools (entomological and epidemiological).
3. Confirm proof of principle and community acceptability.
4. Decision tree for which tools should be used when and where (entomology, cultural context etc.).

5. Develop key research questions on how to operationalize the tools.

### ***Capacity Building for IRS Work Stream***

The work stream's 5 sub-groups met individually to prioritize their areas of action for 2011 under the following areas:

- IRS evidence and reporting.
- IRS procurement and supply management.
- IRS training and country capacity building.
- IRS supervision, reviews, evaluation.
- IRS advocacy and financing.

### Products

#### IRS advocacy and financing

1. Increasing financing for IRS.
2. Raising the profile of IRS.
3. Enabling insecticide for public health use.

#### IRS evidence and reporting

1. Systematic review of published IRS studies on epidemiological/entomological impact (Cochrane like)-No cost (LSHTM).
2. Retrospective multi-country review of selected indicators of IRS impact-\$40,000.
3. Review and update standard monitoring and evaluation procedures and tools for future IRS implementations-\$10,000.

#### IRS training and country capacity building

1. Evaluate and consolidate existing IRS training manuals (2nd ½ of 2011).
2. Establish IRS regional training program for middle level managers and national training for spray operators (2nd ½ of 2011; national or regional) to address.
3. Provide consultancy training to IRS program managers to support other programs.

#### IRS supervision, monitoring and evaluation/review

1. Standardize IRS supervisory checklist and minimum frequency of supervision from district and national.
2. Standardize minimum operational, entomological, epidemiological and social indicators for monitoring IRS program.
3. Standardize tools/checklists for IRS program review and pilot in two countries.

#### IRS procurement and supply chain management

1. Determination of a lead time amounting to a minimum of 4 months before spray programs commence for contract signature with manufacturers.
2. Convening of a meeting with key stakeholder participation for agreement of lead times.

### ***Optimal Choice in Vector Control Work Stream***

The focus of the work stream is looking at IRS/LLIN relative effectiveness and combination, and bringing new products, such as DL, through testing. There is much cross over with other work streams-IVM, IR, IRS, outdoor transmission. After pushing the work stream ahead with two meetings last year to establish working areas, the work stream will continue to move towards those objectives focusing on the following products.

1. Support data collection through studies establishing the relative effects of IRS, LLINs and their combination.
2. Setting Target Product Profile (TPP) for Wall Linings.
3. Continued support to the coordination of field trials to establish the epidemiological and entomological effects of DL.
4. Working with WHOPES to determine what evidence is required for new product types, to establish a route clearly through WHO to become a new class of products.

### ***Larva Source Management Work stream***

Network of interested RBM partners established, this will become the 8th work stream in the RBM vector control working group. The work stream has a Draft consensus statement on LSM.

### **Products**

1. LSM webpage to be added to RBM website established containing consensus statement, executive summary of LSM, key documents on LSM effectiveness and training and outline of the agenda of this work stream over the next 12 months.
2. Decision-making framework to identify where LSM will work.
3. Country case studies: narratives of successes and failures.
4. WHO Training Manual on LSM (1st draft).
5. Outlined research priorities.
6. Future meeting of interested partners planned at ASTMH Philadelphia 2011:
  - a) present examples of where LSM has worked;
  - b) present draft decision-making framework for LSM and get feedback to fine tune.
7. Funding is required from partnership to support secretariat and working group.

*N.B. Please see the individual work stream meeting reports which are posted on the RBM website on each of the work stream pages.*

## **CONCLUDING REMARKS**

On behalf of the VCWG Birkinsh Ameneshewa from WHO-AFRO presented some concluding remarks to the meeting. She eloquently reminded us that we, as global experts, are here to help countries build the capacity for malaria control and fill in the essential gaps in knowledge, as the capacity for malaria control is limited. It is our role to keep the visibility of vector control at a global level and to achieve the

targets we have set out for the working group and work streams in this week's meeting despite the fact that political and financial support not easy to coordinate with competing interests. Our job in this partnership is pulling together the advocacy, commitment and resources to address the priorities.

The co-chairs thanked the participants for such a rich participation at the largest VCWG meeting, and extended a special thanks to Swiss Tropical and Public Health Institute (Swiss TPH) who over the past 7 years has supported the VCWG and the WIN, and without their assistance the VCWG would not be such a success.

## ACRONYMS AND ABBREVIATIONS

ACTMalaria: Asian Collaborative Training Network for Malaria  
AIs: Active Ingredients  
AMCA: African Mosquito Control Association  
AMI: Amazon Malaria Initiative  
AMP: Alliances for Malaria Prevention  
ANC: Ante-Natal Care  
ANIR: African Network for Insecticide Resistance  
APWs: Agreements to Perform Work  
BCC: Behavior Change Communication  
CDC: Centers for Disease Control and Prevention  
DHS: Demographic and Health Surveys  
DL: Durable Wall Linings  
EPI: Expanded Programme for Immunization  
GFATM: Global Fund to Fight AIDS, Tuberculosis and Malaria  
GLP: Good Laboratory Practice  
GMAP: Global Malaria Action Plan  
GPAC: Global Plan for Artemisinin Containment  
HH: Household  
HQ: Headquarters  
IEC: Information, Education and Communication  
IFRC: International Federation of Red Cross and Red Crescent Societies  
IRAC: Insecticide Resistance Action Committee  
IRS: Indoor Residual Spray  
ITM: Institute of Tropical Medicine  
IVCC: Innovative Vector Control Consortium  
IVM: Integrated Vector Management  
KEMRI: Kenyan Medical Research Institute  
LATH: Liverpool Associates in Tropical Health  
LLINs: Long Lasting Insecticidal treated Nets  
LSDI: Lubombo Spatial Development Initiative  
LSHTM: London School of Hygiene and Tropical Medicine  
LSM: Larval Source Management  
M&E: Monitoring and Evaluation  
MAP: Malaria Atlas Project  
MERG: Monitoring and Evaluation Reference Group  
MIS: Malaria Indicator Surveys  
MMV: Medicines for Malaria Venture  
MOH: Ministry of Health  
MR4: Malaria Research and Reference Reagent Resource Center  
NGOs: Non-Governmental Organizations  
NMCPs: National Malaria Control Programmes  
PDP: Product Development Partnerships  
PMI: President's Malaria Initiative  
PSM: Procurement and Supply Management  
PSMWG: Procurement and Supply Management Working Group

PWP: Partnership Workplan Plan  
QA: Quality Assurance  
RBM: Roll Back Malaria  
R&D: Research and Development  
RTI: Research Triangle Institute  
SAF: Supplementary Activity Framework  
SDC: Swiss Agency for Development and Cooperation  
SEARO: South East Regional Office  
SOP: Standard Operating Procedure  
SRN: subregional networks  
Swiss TPH: Swiss Tropical and Public Health Institute  
TA: Technical Assistance  
TB: tuberculosis  
TORs: Terms of Reference  
TPP: Target Product Profile  
TRP: Technical Review Panel  
UN: United Nations  
UNICEF: United Nations Children's Fund  
USAID: United States Agency for International Development  
VBDs: vector-borne diseases  
VCNAs: vector control needs assessments  
VCP: Vector Control and Prevention  
VCWG: Vector Control Working Group  
WHO World Health Organization  
WHO/AFRO: WHO Regional Office for Africa  
WHO/EMRO: WHO Regional Office for the Eastern Mediterranean  
WHOPES: WHO Pesticide Evaluation Scheme  
WPRO: West Pacific Regional Office  
WWARN: WorldWide Antimalarial Resistance Network

## ANNEXES

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## ANNEX 2: AGENDA

### Objectives of the 6<sup>th</sup> Annual RBM VCWG Meeting

To discuss current and emerging issues that should be addressed by the Working Group and establish a 2011 work plan coordinated with WHO-GMP and other partners. The meeting will have the style of short presentations to set the stage for extensive discussions.

Monday 7 <sup>th</sup> February 2011-Day 1		
8:30-9:00	Registration/coffee and tea	
<b>Session 1</b>	<b>Introductions and Objectives</b>	<b>Chairperson: Lines</b>
9:00-9:10	Introductions	Macdonald
9:10-9:20	Welcome remarks from the RBM Partnership	Teuscher
9:20-9:30	Meeting objectives and agenda	Macdonald
9:30-9:50	Update on last year's work plan and budget	Lines
9:50-10:10	Lessons learned and charting the way forward	Macdonald
10:10-10:40	Discussion	All
10:40-11:10	Morning break/coffee and tea	
<b>Session 2</b>	<b>Progress on Work Plan</b>	<b>Chairperson: Macdonald</b>
11:10-11:30	WHO-GMP: update on progress and our view of current issues for VCWG	Lines
11:30-11:40	Brief update of 'The Alliance for Malaria Prevention' (AMP)	Peat
11:40-12:00	Discussion	All
12:00-12:20	Insecticide resistance work stream-update and plans	Hemingway
12:20-12:50	Discussion	All
12:50-13:50	Lunch (sandwiches)	
<b>Session 2</b>	<b>Progress on Work Plan (cont.)</b>	<b>Chairperson: Williams</b>
13:50-14:10	Continuous LLINs distribution systems-update and plans	de Savigny/Webster
14:10-14:40	Discussion	All
14:40-15:00	Optimal choice of vector control methods-update and plans	Lengeler
15:00-15:30	Discussion	All
15:30-16:00	Afternoon break/coffee and tea	
16:00-17:00	Summing up the 1 <sup>st</sup> day	Lines/Macdonald
17:00-19:00	<i>Meeting of the 'optimal choice of vector control methods' work stream-Christian Lengeler</i>	
18:00-20:30	Reception/wine and food	

Tuesday 8 <sup>th</sup> February 2011-Day 2		
8:30-9:00	Coffee and tea	
<b>Session 2</b>	<b>Progress on Work Plan (cont.)</b>	<b>Chairperson: Hemingway</b>
9:00-9:10	Durability of LLINs in the field-update and plans	Kilian
9:10-9:30	Discussion	All
9:30-9:45	Larva source management	Lindsay
9:45-10:15	Discussion	All
10:15-10:30	Entomological monitoring and IVM-update and plans	Williams
10:30-11:00	Discussion	All
11:00-11:30	Morning break/coffee and tea	
<b>Session 2</b>	<b>Progress on Work Plan (cont.)</b>	<b>Chairperson: de Savigny</b>
11:30-11:40	Capacity building activities for IRS-update and plans	Shiva M
11:40-12:00	Discussion	All
12:00-12:10	Forest malaria-update and plans	Macdonald
12:10-12:30	Discussion	All
12:30-13:30	Lunch (sandwiches)	
<b>Session 3</b>	<b>The way forward for 2011</b>	<b>Chairperson: Macdonald</b>
13:30-15:00	Discussions on what should be modified for the next year	All
15:00-15:30	Wrap-up discussions/Close of the meeting	Lines/Macdonald/All
15:30-16:00	Afternoon break/coffee and tea	
16:00-19:00	<i>Meeting of the 'insecticide resistance' work stream-Janet Hemingway</i>	
16:00-18:00	<i>Meeting of the 'continuous distribution systems' work stream-Don de Savigny and Jayne Webster</i>	
18:00-20:30	Reception/wine and food	

**Wednesday 9<sup>th</sup> February 2011**  
Day 3

8:30-9:00	Coffee and tea	
9:00-11:00	Meeting of the ' <i>durability of LLINs in the field</i> ' work stream-Albert Kilian	
9:00-11:00	Meeting of the ' <i>larva source management</i> ' work stream-Steve Lindsay	
11:00-11:30	Coffee and tea	
11:30-12:30	Meeting of the ' <i>outdoor transmission</i> ' work stream-Michael Macdonald	
11:30-18:00	Meeting of the ' <i>capacity building activities for IRS</i> ' work stream-Shiva Murugasampillay (all day with coffee and lunch breaks)	
12:30-13:30	Lunch (sandwiches)	
13:30-15:30	Meeting of the ' <i>entomological monitoring and IVM</i> ' work stream-Jacob Williams and Raman Velayudhan	
15:30-16:00	Coffee and tea	
16:00-17:00	Summing up the outcomes of the work streams meetings	Lines/Macdonald/All
	End of the meeting	

Sponsorship of developing country participants is provided by RBM, Swiss TPH, Swiss Agency for Development and Cooperation, IFRC-AMP and USAID through NetWorks project.