

**Roll Back Malaria Vector Control Working Group (RBM VCWG)**

**11<sup>th</sup> Annual Meeting, 3<sup>rd</sup>-5<sup>th</sup> February 2016**

**Moevenpick Hotel, Rue de Pré Bois, Geneva**

**1<sup>st</sup> Integrated Vector Management, Evidence and Capacity Work Stream meeting**

**15.00-18.00, Wednesday 3<sup>rd</sup> February 2016**

**Moevenpick Hotel, Rue de Pré Bois, Geneva**

**Chairs: Christian Lengeler and Michael Macdonald**

**Rapporteur: Lucy Tusting**

***Introduction to the work stream – Christian Lengeler, Swiss TPH, Switzerland***

This new work stream combines the former *Optimizing Evidence for Vector Control Interventions* and *Entomological Monitoring and Integrated Vector Management (IVM)* work streams. The overall aim is to generate evidence to promote the effective delivery and integration of vector control interventions and to support related country capacity strengthening. The work stream will not cover areas to be addressed by other work streams including IRS as a standalone intervention, insecticide resistance or new insecticides, housing and socioeconomic development as malaria interventions, multi-sectoral collaboration, new tools in vector control such as ATSBs, ivermectin and repellents, or LLIN-related issues (new nets, durability, delivery, markets). Likewise the overlap with LSM will be more on evaluation frameworks rather than LSM implementation itself.

***Case studies***

***Role of political commitment, inter-sectoral collaboration and community involvement in malaria elimination achievements in the Islamic Republic of Iran – Ahmad Raeisi, Ministry of Health, Iran***

Malaria transmission has declined in recent years in Iran. A national strategic plan for malaria elimination was approved by the High Council for Health in 2010. The responsibility for malaria elimination lies not only with the Ministry of Health but is a broader government program. Inter-sectoral collaboration is evidenced by the Minister of Energy agreeing to prioritise the electrification of malaria endemic areas in three south-east provinces, for example. Community education and involvement is a priority in agricultural areas and to enable *Bti* distribution by communities.

***Discussion***

It is impressive that collaboration between universities and the government has been successful as has multisectoral collaboration. Advocacy to other government departments has emphasised the role of malaria control in reducing poverty as one of the primary drivers of government commitment, among other potential benefits. It was queried what the total budget for the programme is 20% of the cost is supported by the Global Fund and 80% domestically.

***Prospects and entomological challenges for malaria elimination in Latin America – Martha Quinones, World Health Organization, Switzerland***

Most malaria transmission in Latin America occurs in the north. Major progress has been made in controlling malaria in recent years with the exception of Haiti, Guyana and Venezuela. For example,

malaria has been controlled successfully in Colombia using LLINs and IRS and prompt and effective diagnosis and treatment. The Latin America International Centres of Excellence for Malaria Research (ICEMR) 2000-2017 is being led by the Caucesco Scientific Research Center, Colombia with research ongoing in Colombia, Guatemala, Panama and Peru.

<http://www.niaid.nih.gov/labsandresources/resources/icemr/centers/Pages/latinamerica.aspx>

The study aims to understand the basic biology of malaria vectors and transmission. Seventeen vector species have been confirmed and four new species identified. Most are outdoor and early-evening biting. Since Larval Source Management (LSM) has been used in Mexico among other locations with some success, larval habitats have also been characterised. Most larval habitats are manmade, including fish ponds and wells. Challenges to malaria control in the region are the new species to describe and study, early and outdoor human vector contact, the need for supplementary control measures and the need for entomologists to address other vector-borne diseases including Zika, chikungunya and dengue. Insecticide resistance has to date not been a major problem in the region.

#### *Discussion*

Latin America has been the forerunner for the elimination of other diseases (e.g. polio); other regions can learn from its approach. The status of malaria control in Venezuela was queried; unfortunately the situation has worsened especially in the Amazon region bordering Brazil. An important point for the VCWG to note is that while LSM is ongoing in some countries it is poorly evaluated.

#### ***The role of vector identification – Dan Strickman, Bill and Melinda Gates Foundation, USA***

Identification changes assumptions into knowledge for (i) risk assessment, (ii) targeting of control efforts and (iii) evaluation. The main elements to characterise for risk assessment are the spatial, seasonal and diel (biting, oviposition, sugar feeding, humidity seeking) distribution of all stages of the insect and vectorial capacity. A case example of Honduras was given. For targeting, vector identification is important to direct control efforts where they are needed e.g. larval habitats for treatment, priority homes for IRS, priority areas for space sprays and the timing for each. For evaluation, vector identification is important to be able to correct failed control efforts and to provide a historical record to justify resources and to understand the changing dynamics of transmission.

#### *Discussion*

Vector ecology is considered central to mosquito control programs in the developed world and this approach could be transferred to other settings.

#### ***Design and conduct of vector control field trials – Anne Wilson, Durham University, UK***

Vector control intervention development follows a stepwise process from Phase I (including lab assays), Phase II (semi-field and small-scale field trials), Phase III (epidemiological field trials) to Phase IV (implementation pilots). Common problems with vector control studies include non-randomised studies, no or poor control groups, no blinding, short follow-up duration, no sample size calculation, an overreliance on entomological outcomes (rather than epidemiological outcomes) and contamination/spillover effects. Randomised controlled trials are the gold standard. Important study

design considerations include the choice of control group, quality assurance of the intervention, appropriate choice of outcomes, standardised measurement of outcomes, the need for sample size calculations even for studies with only entomological outcomes, randomisation, blinding and the choice of appropriate data analysis methods. Key principals to apply to monitoring and evaluation (M&E) of vector control programmes include making sure there is a control group, considering other factors that might be affecting results and quality assurance of interventions.

#### *Discussion*

It is important to consider how vector species determines the effectiveness of interventions in different settings. Interventions are expensive so money spent on evaluation is well spent.

#### ***Integrated Vector Management (IVM) Manual status update – Steve Lindsay, Durham University, UK***

IVM is a rational decision-making process for optimal use of resources for vector control. World Health Organization (WHO) recommendations on IVM were first outlined in the Global Strategic Framework for Integrated Vector Management in 2004. The new IVM manuals are targeted at program managers at national and first administration levels. Separate toolkits for Sub-Saharan Africa (SSA), Latin America and Asia are being produced and these provide a complete framework for planning and implementation including: (i) disease situation, (ii) selection of vector control methods, (iii) needs and resources, (iv) implementation and (v) M&E. The development process has been collaborative, with contributions from vector control experts, programme managers, the WHO including its Eastern Mediterranean Regional Office, and the Pan American Health Organization, in addition to expert WHO review. The SSA toolkit will be published in Q1 2016. Ideally these manuals would be translated into a web-based toolkit. An IVM operational manual for India is also in development to assist the National Vector Borne Disease Control Programme, which will be presented to the Prime Minister in February 2016.

#### ***Technical assistance and capacity building for entomology and vector control – Leonard Ortega, World Health Organization, Switzerland***

Despite major progress in global malaria control, there remains much to achieve. Resolution WHA68.2 on the Global Technical Strategy (GTS) calls upon WHO's international partners to mobilise sufficient and predictable funding, to support knowledge generation, research and innovation and to harmonize and integrate the provision of support to national malaria programmes. Key areas for technical support include strengthening of entomological surveillance, insecticide resistance monitoring, malaria program review and situation analysis, updating of national strategic plans, stratification of risk, micro-planning and field operations for malaria vector control, training in entomology and vector control and operational research.

#### *Discussion*

- Much entomology teaching material is now out of date; bringing together samples from different members of the VCWG would be valuable. Old taxonomy documents also need to be updated and made electronic/interactive.
- The global malaria community should be consulted in developing new manuals and taxonomic keys. MalariaWorld is a good forum for dissemination ([www.malariaworld.org](http://www.malariaworld.org)).

- Capacity building is becoming a buzz word and talked about extensively but ‘we know how to do it, we have the money to do it and we should get on with it’. It is important to remember that in many countries there is no entomology capacity and training is a serious issue.
- The name of the work stream does not include monitoring and evaluation. IVM provides a structure within which all the elements of this work stream can be framed.

***Work plan discussion – led by Christian Lengeler and Michael Macdonald***

Comments were invited on the proposed scope of the work stream (to generate and share evidence on effective and efficient deployment of existing and new vector control interventions, to generate and share evidence on integration of all vector control tools and to work with all RBM partners to build entomology and vector control capacity in endemic countries. An updated scope will be circulated for comment.

- There should be a move away from vector control interventions towards vector control practices/programmes as a whole.
- Many elements of multisectoral collaboration go beyond housing and these should be included in this work stream.
- While some countries do have extensive malaria-specific knowledge, we can learn from other disease elimination programmes such as guinea worm eradication.
- Capacity building does not only include program managers but also field staff.

***Proposed SMART actions, stakeholders and potential funding:***

1. Explore the potential of an internet based repository (e.g. VecNet database [www.vecnet.org](http://www.vecnet.org)) and mobile technology to make reference materials and guides available in the field (e.g. mosquito identification, with mapping).
2. Software or an app for mosquito identification would be useful; collaborate with Witwatersrand University in South Africa, the Walter Reed Biosystematics Unit and the UK National History Museum.
3. Share best practices for mosquito surveillance and vector control.
4. Help to ensure that capacity building funding is included in Global Fund concept notes.
5. Explore geographical information systems and risk mapping capacity (overlap of different vector borne diseases).
6. Translate the GTS into a realistic action plan.
7. Support country coordination (see WHO guidance on capacity building for Public Health Entomology).

***Discussion – All***

***Capacity building:***

- The VCWG has endlessly discussed capacity building. There is a need to identify and fund a group of experts to focus specifically on capacity building. It is imperative to have a cadre of malaria specialists. We need to address not only the international ‘brain drain’ but also internal ‘brain drain’ from NMCPs to non-governmental organisations (NGOs).
- It is unlikely that the Global Fund would support a dedicated regional training program for capacity building, but countries could build a capacity building component into their concept notes.

- A template staff structure for NMCPs could be developed / roles in NMCPs catalogued.
- WHO guidance on capacity building for Public Health Entomology is a great resource. [http://www.who.int/malaria/publications/atoz/who\\_guidance\\_cap\\_building\\_entomology/en/](http://www.who.int/malaria/publications/atoz/who_guidance_cap_building_entomology/en/)
- Good practices done by many countries is not documented e.g. Iran. While the VCWG cannot do this itself it would be good for someone with resources to do so.
- The 2010 Directory of African Institutions with Existing Capacity for Training in Integrated Vector Management (IVM) could be updated and expanded to Asia and South America.

*Vector distribution/identification:*

- The US Army has produced many useful resources through the Walter Reed Biosystematics Unit (WRBU), including an app for the *Anopheles* of central America which could be expanded to other regions, the mosquito barcode initiative which has a huge repository of samples that are an excellent training resource; the WRBU Vector Map (sample contributions are always welcome). <http://www.wrbu.org/>
- USB-based software for fungi identification exists (see the Fungicide Resistance Action Committee <http://www.frac.info/publications>).
- Simple tools are needed in the field because lengthy paper-based keys are complicated to use.
- A central repository for species, vector bionomics and resistance would be valuable.
- VecNet is no longer being funded by the Bill and Melinda Gates Foundation.

*Communication and role of the work stream:*

- MalariaWorld is an excellent facility for people to give comments anonymously.
- The LinkedIn Vector Control group is also a good forum.
- The main purpose of the VCWG is to translate policy to practice. Policies could be examined systematically and an implementation plan developed accordingly.

Participants were thanked and the meeting closed.

### **Day 3: Friday 5<sup>th</sup> February**

#### **Session 3: Feedback from the work stream meetings**

*Chairperson: Jacob Williams*

#### ***1<sup>st</sup> Integrated vector management, evidence and capacity work stream meeting – Michael Macdonald, World Health Organization, Cambodia***

The scope of the work stream was summarised as follows: (i) to generate and share evidence on *effective* and *efficient* deployment of prior, existing and new vector control interventions and practices including management, monitoring and evaluation; (ii) to generate and share evidence on the integration of all vector control tools, including lessons from other regions and disease eradication programs and (iii) to work with WHO and all RBM partners to build entomology and vector control capacity at all levels in endemic countries.

*Priority areas for the work stream:*

1. Mosquito identification:
  - a. Disseminate improved morphological keys, including electronic applications.
  - b. Facilitate collaboration with national reference centers for molecular identification.
2. Surveillance, evaluation and mapping:
  - a. Best practices for a basic entomological monitoring package.
  - b. With the Monitoring and Evaluation Reference Group (MERG), work towards:
    - i. Including entomology in surveillance and outbreak investigation.
    - ii. Producing an evaluation tool kit.
    - iii. Developing capacity for geographical information systems and vector mapping.
3. Capacity:
  - c. With the RBM Harmonization Working Group (HWG), include entomology capacity component in country concept notes to the Global Fund.
  - d. Collaborate with GMP technical assistance.
  - e. Link with national and regional institutions.
4. Document dissemination:
  - f. Support regional IVM toolkits and field trial design guidelines.
  - g. Repository for training materials, sharing best practices.
5. University linkage for capacity building and reference laboratory services:
  - h. Update and expand the 2010 Directory of African Institutions with Existing Capacity for Training in Integrated Vector Management curated by Clifford Mutero.
  - i. Explore other mechanisms with the WHO Special Programme for Research and Training in Tropical Diseases (TDR), WHO or the National Institutes of Health to re-invigorate the African Network on Vector Resistance model.

**Discussion – All**

*Capacity building:*

- It is important that universities provide the necessary training for junior scientists to specialise in medical entomology and that there is a clear career path for junior entomologists.
- Universities in malaria-endemic countries should be better engaged and this can be achieved through networks such as PAMCA.
- Capacity building could be better supported within the VCWG if separated out from interventions within the work stream structure.
- For several years, TDR has been supporting approximately five regional training centres and seven universities for capacity building, but this support does not cover entomological training; rather it is more for overall university finance, structure and support. A structured entomological proposal could be useful to TDR to guide their efforts. In March 2016 TDR is organising a meeting in Lisbon to provide a forum for those running courses in entomology to meet and discuss.
- TDR can also help guide how universities can more closely link with NMCPs. Sudan is an excellent example of this. Two centres of training offer entomological training courses as does the University of Khartoum. Courses are also organised for people from West and

Central Africa which include molecular species identification, field trips, etc. There is clear career progression thereafter as graduates are recruited into the NMCP.

*Monitoring and evaluation:*

- Monitoring and evaluation (M&E) should be more carefully focused in-country.
- M&E is critical outside the academic/research sphere to improve the availability of data on products and the effect of different interventions, which is needed to guide product choice and Global Fund decisions. It may be necessary to have a separate work stream to address the financing for this type of M&E and to adequately support NMCPs.
- There is a US\$6 billion dollar deficit for global malaria control. There is a critical need for better program targeting to reduce overall costs. Entomological surveillance has a real economic benefit in supporting such targeting.

*Work stream scope:*

- There is a risk that we may lose the momentum that we have worked hard to build behind IVM and LSM. This work stream encompasses all the principles of IVM and the name should reflect this. Similarly LSM also risks being buried if its own work stream is not preserved.
- It was agreed to rename the work stream as ‘Integrated Vector Management, Evidence and Capacity’.
- Within each of the priority areas for the work plan, there are interested individuals who are well positioned to champion these.
- It is important to support entomological monitoring to better guide programme strategy.