Vector Control Working Group (RBM VCWG)
17th Annual Meeting, Session 5: Thursday 5th May 2022

Hosted Online via Zoom

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Session 5 – Work stream 3: Implementing the Global Vector Control Response
Co-Leads: Mark Hoppé & Chadwick Sikaala

Welcome and introduction- Mark Hoppé, Syngenta and Chadwick Sikaala, Elimination 8
Mark welcomes everyone at the 5th session of the VCWG work stream 3, vector control response and thanks everyone attending. He notes that collaboration is a key theme and sharing and contributing is more than welcome. The goal of the VCWG is to reduce the burden and threat of vector-borne disease, which can be achieved by implementation of effective sustainable vector control.

Capacity and Collaboration:

New WHO procedures and insecticide discriminating concentrations for monitoring resistance in adult mosquito vector, Rajpal Yadav, WHO NTD
The WHO multi-center study to establish new DCs (discrimination concentrations) and procedures had a duration of our years with participant laboratories in five WHO regions. The key outcomes include capacity building of laboratories on test methods and procedures, establishment and validation of insecticides, development of a new bioassay method and SOPs, creation of a database of bioassay records of concentration and identification of knowledge gaps.

This study gave outputs on species specific DCs, new DCs for *Aedes* to replace all previous tentative DCs and for pirimiphos-methyl, programs and partners are advised to validate results obtained with the former tentative DC against the new DC. The new WHO bottle bioassay was developed for insecticides that cannot be impregnated on filter papers and is similar to the CDC bottle bioassay with the difference of standardised points of mortality at 24h or 72h depending on the product. The bottle bioassays gave DCs for the different product on *Aedes* and *Anopheles* mosquitos.

A new insecticide resistance monitoring manual has been developed to replace the former, which integrates *Anopheles, Aedes and Culex spp,* and includes DCs for *Aedes* and *Anopheles* and description of WHO bottle bioassay. Moreover, it provides guidance on prioritizing resistance tests amid limited resources, testing representative sample of mosquitoes, data management and using resistance data for decision making. The SOPs for testing insecticide susceptibility in WHO bottle and tube bioassays, evaluation of sterilizing properties of pyriproxyfen and for determining the ability of PBO to restore susceptibility of mosquitoes to pyrethroid resistance will be available at WHO IRIS or at the website (https://www.who.int/teams/global-malaria-programme/prevention/vector-control/insecticide-resistance). The DHIS2 module ran by the Global Malaria Programme will be revised to include new insecticide DCs, new data elements for chlorfenapyr and pyriproxyfen bioassays, new data elements to enter data, to record temperature during bioassay and to capture bottle coating and filter paper impregnation date. Demos are available at https://extranet.who.int/dhis2-ento-vc/dhis-web-commons/security/login.action. The NTD page on insecticide resistance includes all the information insecticide use. For the completion of this work 23 different laboratories collaborated and contributed.

Questions:
Will there be an update of resistance testing for larvicides?
The list of DCs for larvicides was updated in 1985 and there are further studies being coordinated by WHO. It is our next priority, but they are dependent on financial resources. WHO will look for these resources to fill these knowledge gaps.

Since the R test for chlorfenapyr should be run by night, will that be the same for testing nets with chlorfenapyr?
It is not practical to test these nets during the night. WHO did not do any test during night time, all standardization has been done during daytime.

Where the insecticides have oil adjuvants. Have these adjuvant oils have been evaluated for their performance with insecticides or is there a different reason we choose different adjuvants for different insecticides?
In this study, we realized that these insecticides, like chlorfenapyr were difficult to dissolve in acetone or any other solvent including alcohol and that is where the idea came from.

The APMEN Online Resource Exchange Network for Entomology (http://orene.org) - Lea Braack, Shobiechah Aldillh Wulandhari and many others, APMEN
APMEN was established in 2009 to support Member States achieve Malaria Elimination objectives. It has fully integrated with APLMA and currently has 21 Member States across Asia-Pacific. It achieves its technical support via its 3 working groups, the Surveillance & Response WG (MORU), the Vivax WG (MMV) and the Vector Control WG (Malaria Consortium). APMEN VCWG core outputs include capacity building in vector surveillance & control, and information sharing. In order to disseminate knowledge and share information, APMEN organises TechTalk webinars and has developed a website (orene.org) to address an expressed need in Asia Pacific, but the content is globally relevant. Leo offers a virtual tour of the website where someone can find content on global news, latest opportunities (job, scholarships, funding), training, publications, and links to other organizations. An interesting feature of the website is the forum, where someone can discuss entomological issues, share information, ask questions etc. the forum is divided in different issues, like outdoor biting, vector surveillance and other. The TechTalks can be found on the website as well as tutorials about vector surveillance. The idea for this platform is to better understand and document noted gaps within VC across each control programme, and then seek and "match" technical assistance available within the wider APMEN network, soon realized would require substantial dedicated human resources and time. Eventually it evolved more into a knowledge-sharing resource centre. Important work towards this product was done by Tiff Damash and Michael Macdonald, supported by Jeffrey Hii, Alison Tatarsky, Pradeep Srivastava and others.

Updates from the Vector Global Hub, Frederik Seelig, LSHTM
The aims of the Global Vector Hub are to be the first port of call, build community practice, build capacity and maximize preparedness, connect vector control professionals in order to reduce the burden of vector borne diseases. Frederik offered a tour of the website (https://globalvectorhub.lshtm.ac.uk/) and its features, such as global news, online training courses directory and resources and network. An early version of The Global Vector Hub (GVH-Beta) was launched in June 2020, with a full version to follow very soon. This beta version includes data, resources and networking features, focusing on capacity building and systems strengthening for vector control globally, and establish a community of practice for vector control interventions. It also includes a global directory of training courses in medical entomology developed by GVH and Arctech Innovation for WHO-TDR. The resources available include technical documents, guidelines in different languages.

Another feature of the GVH is the Network one where users can share data and information about their fields of expertise and participate in online discussion forums and collaborate on future projects similar to ORENE. The network includes information about universities, research institutions and

government, as well as sections for funding, job opportunities to allow capacity building. The GVH is backed by many key partners within the vector community and enables collaborations. The course directory includes 161 training courses in medical entomology. However, they still have not found courses on *An. stephensi* surveillance and control. There is also a massive open online course (MOOC) and a previous online workshop available on the website.

Questions:

There is an increasing interest in training and resources on An. stephensi. What will be needed to be done to feature these on the global vector hub?

It is becoming increasingly clear that *An. stephensi* is an issue, so obviously, I could play this back to the community. We are always happy to feature any resources or any updates on the blog and to be involved in hosting or chairing an online symposium or a workshop dedicated to the surveillance and the control of *An. stephensi*. In terms of data, we are also quite keen to get the data exchange going with the malaria threats map of the Global Malaria Program and WHO.

Are you able to tell broadly geographically where GVH has been accessed from? Do you know whereabouts in the world most of the accesses is coming from or going to?

We do run a monthly Google Analytics study in terms of user traffic, and we are able to break this down into regions. The access is quite global, users accessing it from every country in the world. Depending on the situation and specific report, there seems to be sometimes a strong focus of user traffic from high income countries, such as Europe and North America. That might be since there is simply more people working and have funds to work on vector control. So, this is again something that might need to be addressed in the future.

Task Team updates- Mark Hoppé and Chadwick Sikaala

The Capacity and Collaboration Task Team proposed some objectives in last meeting. There were three items that came up from discussion with members. The first one was looking into undertaking landscape exercise to identify which regions and organizations have the capacity to use molecular tools to support local vector programs and what is needed to gain molecular capacity in all regions and organizations. Another one was more specific about updating some of the training material, specifically training manual methods in *Anopheles* research was mentioned and how this could include molecular tools as well. Lastly, it was proposed to try to identify areas where the VCWG can support some of these activities.

***Anopheles stephensi*:**

Feedback from the VCWG's *An. stephensi* meetings, and proposed response- Justin McBeath, Bayer

Two meetings were hosted by VCWG during the year. The goal of the meeting was the understanding of the landscape of work being done, but also to identify some of the gaps and from that to better understand how VCWG should play a complementary role. The first meeting in December was a landscaping exercise, while the subsequent meeting in February dug deeper into other topics and other areas.

Some of the observations from the VCWG *An. stephensi* meetings were the inadequacy of surveillance systems and training capacity around detecting the threat caused the lack of evidence and emphasis on robust evidence. A need for policy change and more guidance on interventions to apply beyond LLINs and IRS and in order to affect the policy change you need robust data to support that but that takes time to generate. Finally, we should consider how do we make sure that there is an action that be put in place and what can be done to better help countries and help support them and their neighbouring countries.

After the February meeting some objectives were set. We wanted to streamline the key considerations that were well addressed by the first VCWG meeting, to lay foundations towards the creation of VCWG task team under work stream 3 and identify activities and TOR that could be considered for the Task Team. Some specific actions discussed included increasing visibility and capacity building, identifying gaps and supporting broader visibility and identifying tools relevant to tackling *An. stephensi*. Four other points have a broader ambition, such as engagement of other sectors beyond global health or health control, how to get high level political motivation, emphasis on exploring funding opportunities in combination with broader urban malaria threat and *Aedes* control and to explore opportunities to look at *An. stephensi* as an invasive species in terms of funding, stakeholders etc.

MESA Tracking *Anopheles stephensi* Research and Investment- Helen Nwanosike, MESA

MESA is a neutral platform of individuals and institutions committed to a malaria free world through evidence-based research and learning that responds to endemic country's priorities and engagement among stakeholders. It is an alliance that works in 3 strategic areas. First, mapping the landscape of active malaria research projects, creating effective avenues for stakeholders to use emerging data for policy and strategies and lastly developing strategies and tools to advance from research to impact. One of the tools used by MESA is MESA TRACK, which is an open online platform that helps stakeholders to recognize what research is taking place and what are the challenges most in need of response and the knowledge gaps. It is also the tool to track *An. stephensi* research and investment.
The objectives for the *An. stephensi* research and investment tracking are: (1) describe the geographic scale and scope of ongoing *An. stephensi* research and other projects, (2) overview of the distribution of active *An. stephensi* surveillance or monitoring programmes, (3) describe the funding sources for projects, (4) document the list of questions under evaluation, and (5) identify or draw on any overlaps between the urban malaria Deep Dive and the *An. stephensi* Deep Dive.

The Deep Dive methodology is selection of a topic followed by project research, validation, and gap filling and finally publication of the DD and call for inputs. Currently, the second step is underway- a search has been performed using MESA track platform and other databases and a request has been made to VCWG for the submission of relevant projects. The results so far are 157 projects in total, with the *Anopheles stephensi* projects reaching 83 with main focus gene modifications and vaccine production. Once the research is completed the next steps will be exclusion of duplicates, validation of projects with the PI, input projects to MESA Track, analyse and classify projects, refine the data, and finally write Deep Dive report.

The challenges faced so far, are getting feedback from PIs, and ensuring adequate coverage for effective landscaping. Therefore, it is encouraged to submit any projects on *An. stephensi* directly to MESA, mesa.alliance@isglobal.org or through Konstantina, konstantina.boutsika@swisstph.ch

Questions:

What is DIMENSIONS?
DIMENSIONS is a website that gathers the grants that are given for different projects.

How many of the projects that you are looking at are ongoing?
The projects that we deem relevant are dated from 2012 up to date.

IVM Task Team updates- Mark Hoppé, Syngenta

The IVM Task Team produced three objectives. The first one was to identify examples of vector control programmes that are implementing aspects of IVM, which will show the successes, the challenges and how they can be overcome. There was also some discussion on the impact of agriculture on mosquitos and if an integrated approach could be beneficial. The third one was to identify organisations, institutions that provide advice on training agricultural practices in malaria endemic regions and opportunities to identify agricultural practices that can assist on reducing mosquito populations.

IRM MOOC update- Mark Hoppé, Syngenta

The IRM Massive Open Online Course - 'MOOC' is in the final stages of production and to be launched this summer. Many thanks to all those who have contributed to this and made it possible. The MOOC will be available to study in a supported/moderated three-week course, ca. 3 hours of study per week and it will be available to study at any time in a standalone format.

Some of the material included in the course cover insecticide resistance in mosquitos in the form of animation. The two lead educators are Dr. Keziah Malm and Dr. Fredros Okumu, but also many other. The material is in video and written as well, guided by the University of Basel. The link and further details will be circulated when the launch date has been finalised.

Wrap up

Mark announces that he will not be leading this work stream in the next years and thanks everyone involved in the work stream the last years. The strong point of VCWG is collaboration and bringing together so many diverse groups and encourages people to be involved and lead some of the task teams. Justin thanks Mark for his work in the work stream and informs that the recording is going to be uploaded on the VCWG website, https://endmalaria.org/our-work-working-groups/vector-control

List of acronyms

APMEN Asia Pacific Malaria Elimination Network
APLMA Asia Pacific Leaders Malaria Alliance
CDC Centers for Disease Control
DCs Discrimination Concentrations
DD Deep Dive
GMP Global Malaria Programme
GVH Global Vector Hub
IRS Indoor residual spraying
ITN insecticide-treated net
IVCC Innovative Vector Control Consortium
IVM Integrated Vector Management
LLIN Long-lasting insecticidal net
LSM larval source management
NMCP National Malaria Control Programme
NTD Neglected Tropical Disease
PATH Program for Appropriate Technology in Health
PBO Piperonyl butoxide
PI Principal Investigator
PMI President's Malaria Initiative
PQ Prequalification Programme
RBM Roll Back Malaria
SOP Standard Operation Practice

TOR	Terms of Reference
TDR	Special Programme for Research and Training in Tropical Diseases
TGF	The Global Fund
VBD	Vector borne disease
VCWG	Vector Control Working Group
WHO	World Health Organization
WG	Working Group