

RAM Scientific Committee Coordinator Report March 2020

Scientific Developments (not exhaustive):

- a) **Bed nets:** In the past decade 6 dozen countries have reported an uptick in mosquitoes resistant to the pyrethroid chemicals the net strategy has long relied upon. Reinventing nets is not easy – in 2017 WHO approved its first new net in 30 years – lined with pyrethroids and chlorfenapyr. Researchers had worked on the new net for 20 years. Researchers, and high-resistance countries are now looking at other options, the old-school pyrethroid version, the newly approved net, and in Rwanda a promising but untested third option.

Relevance to RAM: Resistance is coming and we have to be flexible in our future net deployments.

- b) **Malaria in Pregnancy:** A vaccine clinical trial for pregnant women yields promising results. For full details follow this link: https://medicalxpress.com/news/2020-02-malaria-vaccine-clinical-trial-pregnant.html?utm_source=Global+Health+NOW+Main+List&utm_campaign=69a2b92eab-EMAIL_CAMPAIGN_2020_02_05_02_12&utm_medium=email&utm_term=0_8d0d062dbd-69a2b92eab-2883217

In essence, a new vaccine known as PRIMVAC has undergone a clinical trial to study safety, tolerance and ability to induce an immune response. The vaccine was developed over two decades at INSERM and the University of Paris and is directed at gestational malaria with the aim of preventing deaths of up to 10,000 mothers and 200,000 babies each year. Specifically, the vaccine is designed to prevent the accumulation within the placenta of red blood cells. Such accumulation promotes anaemia, gestational hypertension and leads to increased risk of spontaneous abortion, premature birth and intrauterine growth delays leading to low birth rate and high rates of neonatal mortality. Full details are available at the end of the hyperlink above, but 100% of recipients developed antibodies after just two injections. The relevant antibodies recognise a parasitic antigen on the surface of infected red blood cells and inhibit the adhesive capacity which is responsible for their accumulation in the placenta.

Relevance to RAM: Within the overall goal of “capacity building” within the countries in which we operate we should have a longer-term goal of having a distributed capacity for health care practitioners to administer vaccines when available.

- c) **Mosquito Ecology:** Follow this link: https://www.sciencedirect.com/science/article/abs/pii/S1471492220300210?dgcid=raven_sd_via_email

In essence, this study asserts that ecological factors modulate mosquito life-history traits, eventually impacting their ability to transmit disease. Adult mosquito traits such as body size respond to environmental changes and co-vary with a breadth of epidemiologically relevant behaviours. It is suggested that epidemiological models for vector-borne diseases can be improved by integration of data across organismal, temporal and spatial dimensions.

Relevance to RAM: We need to identify a suitable PhD research project to follow on from the recently completed studies by Edgar Pollard. Discussions within the RAM Scientific Committee have revolved around possible projects to predict the changes in disease patterns and mosquito behaviour associated with climate variation.

d) Molecular Advances with Potential Application:

<http://msphere.asm.org/content/5/1/e00921-19.abstract?etoc>

In this study, the researchers identified, within *P. falciparum* – infected red blood cells, a protein kinase critical for the release of the parasites from the red blood cells at the end of the red cell proliferation stage – without egress from the red cells the parasites remain trapped and further development is aborted. The research team has identified several proteins targeted by the parasite protein kinase and several proteins not present in human cells that are required to assist parasite egress from red cells. Such proteins are ideal targets for new therapeutics.

Relevance to RAM: Detailed molecular studies continue to identify promising leads for potential therapeutic targets. However, any such therapies are still a long time away from surviving the drug development and registration process. In the meantime, RAM will have to continue doing the best we can with the traditional tools available.

e) Triple Therapies to Treat Malaria are Effective and Safe: (Lancet News Release 11-Mar20)

- First trial of its kind finds that treatment with triple artemisinin-based combination therapies (TACTs) is effective.
- TACTs were safe and well tolerated, but showed slightly higher rates of vomiting and some minor changes in the electrical activity of the heart compared to existing treatment that uses two drugs.
- Drug resistance is a major threat to malaria control and elimination. The authors say that triple therapies are potentially an immediately available new treatment option that could improve outcomes in countries with multidrug resistant malaria.

Relevance to RAM: Multidrug resistance malaria is emerging, particularly in South-East Asia – we need to be alert to any spread to the countries in which we operate and be ready to react accordingly.

f) Climate Change & Malaria Elimination Efforts: The [World Health Organization](#) has [conservatively estimated](#) that climate change will increase global deaths from malaria by 60,000 each year between 2030 and 2050. Click on the links.

Relevance to RAM: As noted above under item c) we have to identify a follow-up PhD Project. We should have an element of climate change in the project.

Bruce Anderson 26 March 2020.