

WEBINAR Q&A**APMEN JOURNAL CLUB #2**

16 June 2021

Panelists**Professor Andrew Lover**

Assistant Professor of epidemiology at the University of Massachusetts-Amherst

Dr Rajpal Singh Yadav

Scientist, Co-Chair – Global Vector Control Response, Veterinary Public Health, Vector Control & Environment Unit, Department of Control of Neglected Tropical Diseases, World Health Organization, Geneva, Switzerland

Moderator**Dr Leo Braack**

Co-Chair of APMEN Vector Control Working Group

Senior Vector Control Specialist, Malaria Consortium

Question:

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| Arti Prasad | Both the talk were very informative. I wish to ask Dr Rajpal Yadav, whether the medical entomology should be recommended in the school syllabi? |
| Pradeep Kumar Jangir | Yes, madam this is the need to aware students about medical entomology as vector borne diseases are emerging. |
| Dr Rajpal Yadav | Need to include broader aspects including sanitation and hygiene and vector control aspects because they are integrated together and it will be more beneficial to school (Primary or secondary school). |

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| KHIN MON MON | One course of Ivermectin to the cattle, how many generations of mosquitoes can be affected? |
| Prof Andrew Lover | In our study, we did not rear them for the second generation. But the data from <i>An. arabiensis</i> in Tanzania showed impacts on both the number and viability of the second generation. |

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| Jenny Kerrison | Invermectin - could be one of many tools adopted by countries. How can this be facilitated? |
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| Prof Andrew Lover | We'll need more data using more diverse vector species, and randomized trial data before use as a programmatic tool. All the data to date is entomological outcomes, and we'll need epidemiological outputs to gauge impact on prevalence and incidence. |
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| Mahugnon ZOGO | How long after treating cattles can we still have an effect on vectors? |
| Prof Andrew Lover | There are metabolic difference between vector species in terms of their susceptibility to ivermectin, also blood meal volume is not the same across vector species, so the actual amount of ivermectin that individual vector will ingest changes. Based on many studies, there is strong effect out to a week and then longer term effects. So the numbers we here are the minimum because the vectors are given one opportunity for a blood meal. A 100% of mortality is only in the first few days. |

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| Gune Dissanayake | @Dr Rajpal; What is WHO guidance on proper disposal of expired insecticides in some countries? |
| Dr Rajpal Yadav | We have program with FAO on pesticide management, they published Environmental Management Tool Kit. There is detail procedure of how to manage pesticides, how to estimate the amount of products, how to secure them before disposal. Kindly check EMTK to learn on the procedures for using and disposing pesticide. |

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| KHIN MON MON | Is there any side effects on cattles? |
| Prof Andrew Lover | The side effect is clearing lots of parasites. It's used routinely veterinary drug. For slaughter or dairy cows, there is a washout period before you can sell meat or dairy. |

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| Harsh Rajvanshi | What are the high-level messages from this study? What is the significance at ground-level implementation to achieve the malaria elimination goals? |
| Prof Andrew Lover | We must looking at the specific vector composition in that area and the relative feeding rate on both human and animal feeding. It would be a focus intervention to really push the last little kilometres for malaria elimination. |

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| Dr Susanta Kumar Ghosh | What about species having high anthropophagic nature? |
| Prof Andrew Lover | At least in most areas of Southeast Asia, the vectors are very cattle feeding so people living in very close proximity to their livestock, at least in Vietnam, generally people have it underneath their house. If you do blood meal analysis, it's always mixed, and the proportion change it a bit, so if it is purely anthropophagic species this will have have no impact. Cattle baited stations, in many cases we got 900 to 1200 |

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| | anopheline vectors a night and did HLC you'd get a handful. So, even if the feeding preferences are not exactly what you want them to be, cattle are just so big and pull in massive numbers of vectors for feeding. |
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| Kevin Kobylinski | Were both <i>An. dirus</i> and <i>An. epiroticus</i> fed on the same ivermectin-treated cattle? |
| Prof Andrew Lover | We were not able to do a cross-over; new cattle were randomized between sets. |

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| Dr Issa Lyimo | Andrew, you mention the washing period (withdrawal period) of ivermectin in milk and meat. If is to conduct mass application of ivermectin to cattle as a vectoker control tool, what would recommend to the livestock keepers, and end users of these products? |
| Prof Andrew Lover | This is an issue, certainly but cattle owners are very aware of it, as ivermectin is used routinely in animal health programs. |

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| Jenny Kerrison | How can the research in the use of Invermectin in cattle and pigs be applied in small scale project in Indonesia? |
| Kevin Kobylinski | Dear Jenny, please see this study for ivermectin study in Indonesia: https://mesamalaria.org/mesa-track/sumba-livestock-ivermectin-malaria-control-slim-project Feel free to message me at kobylinskikevin@gmail.com |
| Prof Andrew Lover | The priorities should be identification of vector-livestock systems with "optimal" biological dynamics for this approach. In parallel, this will require understanding human-livestock interactions, and using social science (qualitative studies) to understand community attitudes and willingness to participate in ivermectin-based livestock studies. |

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| Ramesh Dhiman | Very informative presentation DR Yadav: It is indeed missing that leishmaniasis control learns very little from malaria control programme. During 1980s kala-azar got reduced due to collateral benefit of malaria control programme in India. |
| Dr Rajpal Yadav | All these activities are very common even the system of selection for insecticide application are quite similar, indoor residual spraying and so on. |

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| Dr Issa Lyimo | Andrew, Evolutionarily, all existing core interventions (ITN and IRS) are associated with selection of behaviour changes, metabolic and genetic insecticide resistance. Can you comment on chances for ivermectin applied in cattle or humans to select for resistance in malaria vectors? |
| Prof Andrew Lover | Anytime there's mortality impact, then you'd expect there is possibility of selection. Because you're killing off the ones that are susceptible. It's |

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| | a possibility but the data so far don't show any resistance to ivermectin. We haven't observed it yet. |
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| Dahlia Silitonga | Dr. Rajpal, how to begin bottom-up situation analysis from your recommendation during this tough time? Thank you. |
| Dr Rajpal Yadav | Bottom-up meant the decentralized levels of programmes in the countries because when situation analysis is done at the country level then it is much broader and sometimes it may not be applicable to districts level or below. Or example if you take a public health in your district as a unit and starting with the situation analysis at the district level, it will be more relevant to program implementation. |

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| SASI MS | Any findings regarding lack Entomologist and the storage, application, management of insecticides in municipalities |
| Dr Rajpal Yadav | Large number of countries are reporting lack of entomologists at the central level, but this situation is much worse at the district level. This problem is because of the lack of perception by the program manager that these entomologists are often underrated compare with other discipline. |

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| KhinThan Win | Prof Andrew: do you mean A.dirus could survived (20) days after feeding blood contain Ivermectin? if so they can infect another (10) days after having Ivermectin I mean they can infect only (10) days after parasite lifecycle is complete in its body. So it can be only a very short duration, if we consider cost effective aspect. |
| Prof Andrew Lover | The vectors that fed on cattle at day 20 after ivermectin treatment had decreased survival relative to those that fed on control, cattle. The mortality curves in the AJTMH show the proportion surviving at each day after feeding. |

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| Lattupally Sumitra | Offsprings of mosquitoes r resistant to chemical pesticides due to high mutation rate then how could it b possible to use insecticides in vector control |
| Dr Rajpal Yadav | |

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| Ronald Morales Vargas | Dr. Andrew, do you have any data on which Artemisin metabolite is the responsible of obseved effects in the mosquitoes? |
| Prof Andrew Lover | |

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| Dr Anju Viswan K | Excellent presentatians..Congratulations to both speakers. what is the effect of ivermectin on plasmodium infected mosquitoes? |
| Prof Andrew Lover | I am unaware of any studies looking at this question, but I suspect the mortality would be unchanged from uninfected vectors. |

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| Dr Rajander sharma | Management of larvicides in urban settings in absence of susceptibilty test and biologists is a major problem . How the country programme will ascertain malaria elimination in this situation |
| Dr Rajpal Yadav | |

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| SASI MS | how many days before need to introduce ivermectine to animals |
| Prof Andrew Lover | One day; our feeding experiments began the day after administration. |

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| Fazlullah NASIM SAHAR | <i>Anopheles dirus</i> and the other one can be reduced by the cattle? |
| Prof Andrew Lover | There is increased mortality in vectors from both <i>An. dirus</i> and <i>An. epiroticus</i> after feeding on ivermectin-treated cattle in controlled conditions., but large-scale efficacy or effectiveness has not yet been demonstrated. |

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| Lattupally Sumitra | can v control mosquito breeding by feeding them with blood without Globin protein |
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| Lattupally Sumitra | what is the contribution of World's largest mosquito factory in china San yet sen university. |
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Questions from Registration

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| Htun Khin htun.khin@malteser-international.org Malaria Manager Malteser International, Myanmar | When will start to apply usage of Tafenoquine in the replacement of PQ in GMS region? |
| Dr Rajpal Yadav | |

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| Nirmal Subasinghe nirmalsuba@gmail.com Health Entomology Officer Provincial MOH, Sri Lanka | I am working as Health Entomology Officer. So I would like to get more knowledge about Insecticide resistance |
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| Dr Rajpal Yadav | |
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| Dr Pradeep Srivastava pradeepksrivastava@gmail.com Director Absolute Human Care Foundation, India | To Prof Andre, how it is explained considering Mode of Action of Ivermectin? To Dr Yadav, how feasible are management of Insecticide use considering Shelf life of two years and time lapse between manufacture till it reaches to consignee? |
| Prof Andrew Lover | The mechanism of ivermectin is poorly understood in humans, and especially in vectors. |
| Dr Rajpal Yadav | This shelf life of two years is the one which has been set up by WHO for all new manufacture packaging. It doesn't mean that at the end of two years the product is bad because this is just a quality control measure and at the end of two years of storage under appropriate condition the insecticide may still be very good but it requires re-testing by the same manufactures for compliance to the specifications of the pesticides. This 2 years shelf life doesn't begin from the date of manufacture, but it starts from the date it release from the country (buyer). |

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| Dr Naresh Kumar Gill Nareshgill.nvbdc@yahoo.com Deputy Director Dte. of National VBDC Programme, United States | 1. What happens to Insecticides after expiry date? whether there is decrease in efficacy? 2. If an insecticide is tested for various parameters just after expiry and it qualify all parameters, whether it can be used for vector control and if yes, for how long? |
| Dr Rajpal Yadav | If it has raised the expiry date, it can be retested to ensure that the physical chemical properties are complying to the specifications, insecticide is still good and we generally allow for 6 months to 1 year time to use this remaining quantity, provided the local vectors are fully susceptible. |