Surveillance of malaria transmission in South-East Myanmar

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Introduction

- Myanmar has the highest malaria burden in the Greater Mekong Sub-region.
- It is critical to eliminate malaria from Myanmar to prevent the spread of malaria parasites, Plasmodium spp., including drug resistant strains which could result in regional and global tragedy.
- There is a goal of Asia-Pacific free of malaria by 2030.
- At risk populations include geographically, economically and socially hard to reach populations (e.g. migrants and forest dwellers).
- An accurate definition of populations at risk of malaria is important for monitoring and surveillance in malaria elimination.
- Different methods to detect malaria

- Microscopy – traditional gold standard, relatively cheap, indication of infection at time of sampling
- RDT – widely available, can be implemented with basic training, cheap, indication of infection at time of sampling PCR - can detect submicroscopic infection, expensive, can’t get real time diagnosis to treat patient in the field

Serology (ELISA) - measures antibodies and provides indication of recent exposure

Aim

To investigate malaria transmission in South-East Myanmar by Rapid Diagnostic Tests (RDT) and serology to better inform malaria elimination programs

Method

- A longitudinal study of malaria exposure was undertaken in 114 villages in 8 townships in South-East Myanmar between April 2015 and February 2016.

- Village Health Volunteers (VHV) performed 26,125 RDT for spot diagnosis, and collected 11,745 Dried Blood Spots (DBS) to determine previous exposure to Plasmodium spp. by serology (IgG antibodies measured by Enzyme-linked Immunosorbent Assay).

- The research was integrated into the malaria control program run by Burnet Institute.

- Ethics were approved by in-country ERC and Alfred Hospital (Melbourne).

- IgG to P. falciparum schizont extract was determined by Enzyme Linked ImmunoSorbant Assay (ELISA)

Overall RDT positivity for Plasmodium species was very low (<1%) more than 50% of samples tested positive for IgG against P. falciparum

Discussion

- Overall RDT positivity was very low however seroprevalence was high that most likely represent higher malaria transmission in the areas prior to recent substantial reductions in malaria prevalence.

- Non-PF malaria positivity was higher than PF malaria measured by RDT and serology that might be because of relative increase in non-PF malaria prevalence in recent years.

- Forest dwellers had the highest RDT positivity and seropositivity that identify the malaria at risk population of forest dwellers.

- Both RDT positivity and seropositivity was peak in June that is in line with the high malaria transmission at the start of the rainy season

Limitations and challenges

- Drop out and inactive villages/VHVs (technical and data demands, time consuming, no immediate effect).

- Security concerns (staff were threatened by armed groups).

- Hpapun had relatively very high positivity but we couldn’t collect filter papers from Hpapun and couldn’t compare the serology results.

- Terrain difficulties (storage, transportation, monitoring & evaluation).

- Community engagement (reluctant to get tested due to prolong duration).

- Unwillingness to provide signatures especially in conflict affected areas.

- Frequent testing led to misunderstanding between the VHV & the community.

- Used whole schizont extract and by examining more specific antigens, ELISA responses may be more specific

Conclusions and future directions

- The combined use of RDT and serology may be a useful tool for malaria surveillance in areas where the prevalence of malaria detected by RDT alone is low.

- VHVs can be trained to collect RDT and DBS for serology and parasite genetics for surveillance purposes.

- Seroprevalence was very high and further longitudinal research is required to determine the suitability of serosurveillance to track recent declines in malaria transmission in elimination settings that will inform the elimination programs to target malaria interventions.

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