L'INITIATIVE
sida, tuberculose, paludisme

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A HOLISTIC APPROACH TO ADDRESSING MALARIA AND OTHER DISEASES WITHIN THE SAME ECOSYSTEM

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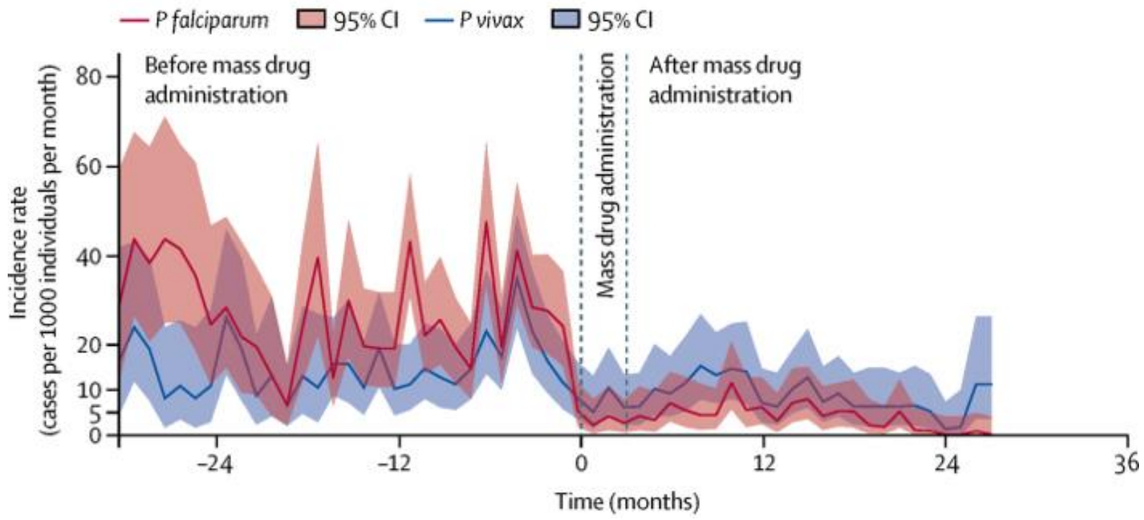
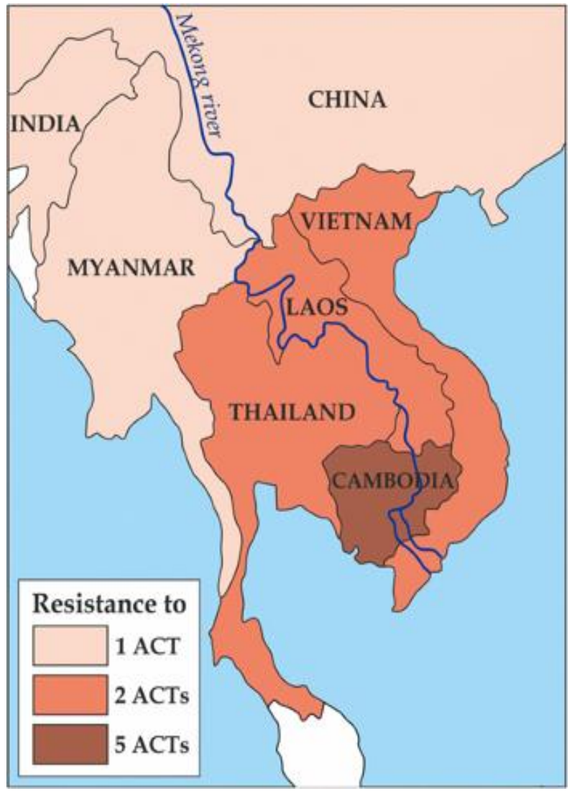
CONTEXTUAL BACKGROUND-1

1. PLASMODIUM FALCIPARUM

- The most severe and deadly type of malaria.
- Associated with high mortality if not properly treated
- ACT (Artemisinin Combination Therapy)- has been universally deployed for more than two decades and associated with reduction in malaria incidence.
- Resistance is established for both artemisinin and partner drug.
- But elimination is proven to be possible in SouthEast Asia.



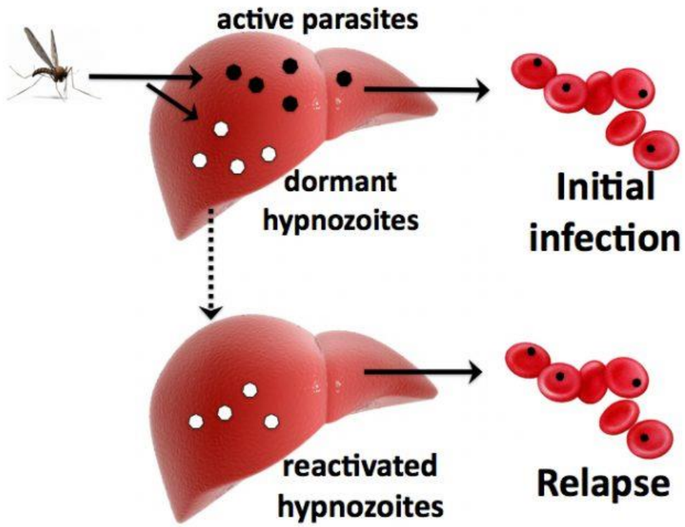
P. falciparum infection prevalence decreased by a median 92% (IQR 81–100) while *P. vivax* prevalence decreased by a median 19% (8–47)....



CONTEXTUAL BACKGROUND-2

2. PLASMODIUM VIVAX

- Less deadly than *P. falciparum* but difficult to eliminate
- Hypnozoites, dormant stage in the liver reactivate in months or years after the initial infection.
- Inadequate coverage of radical cure- primaquine treatment due to G6PD deficiency, compliance & adherence problem.



Myanmar – Compliance and Adherence to Primaquine

Summary of findings from literature and reports

Patients do not generally adhere to longer treatment regimens.

More than half of patients are likely to be non-adherent to a 14-day *P. vivax* treatment. Adherence tends to decrease starting at day 3 and this decrease doubles after day 7 of treatment.

Why?

- Patient recovery and cessation of malaria symptoms after 3-day blood-stage treatment with chloroquine.
- Limited patient understanding of the importance of completing *P. vivax* treatment.
- Patient forgetfulness.
- Gastrointestinal side effects.

CONTEXTUAL BACKGROUND-3

Conventional vector control such as

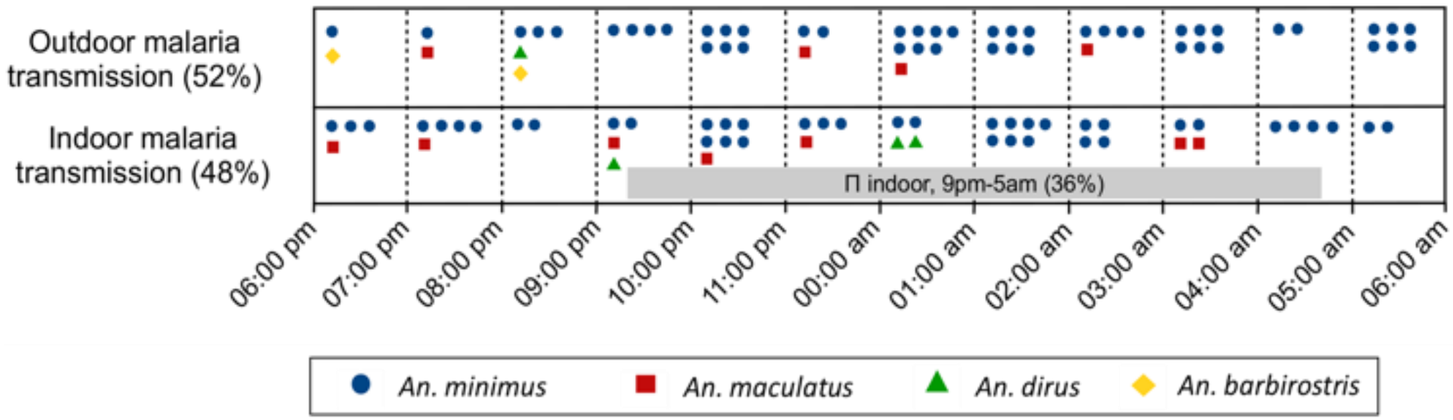
- Insecticide Treated Nets

- Indoor Residual Spraying

are less effective because of the nature of the mosquitoes in this area.

CONTEXTUAL BACKGROUND-4

Only 36% of the infected mosquitoes were collected indoors between 09:00 pm and 05:00 am, suggesting that mosquito bed-nets would fail to prevent most of the infective bites in the study area.



CONTEXTUAL BACKGROUND-5

Landmark reached as 3 billion mosquito nets shipped since 2004, protecting millions of people from malaria

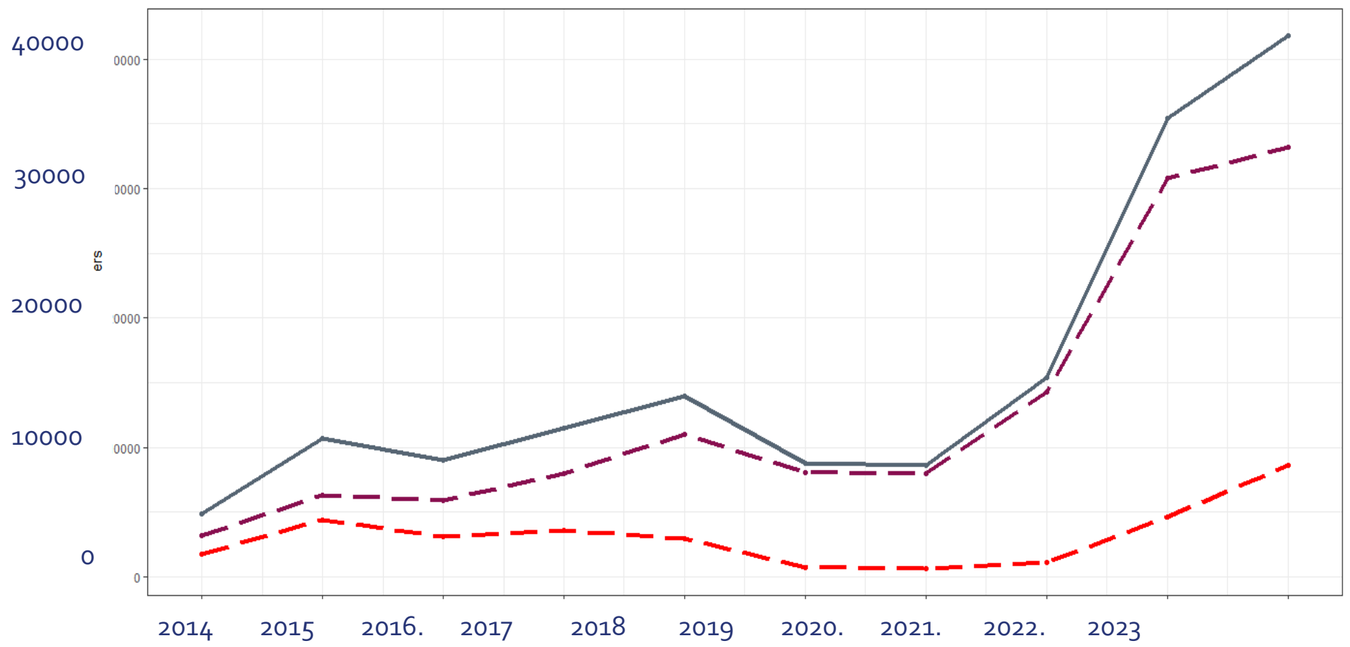
World Health Organization

Geneva – 30 Nov 2023

- Compliance
- Nature of the mosquitoes in this area
- Cost-effectiveness

THE RESURGENCE OF MALARIA

Number of malaria cases detected by RDT (N) [1]



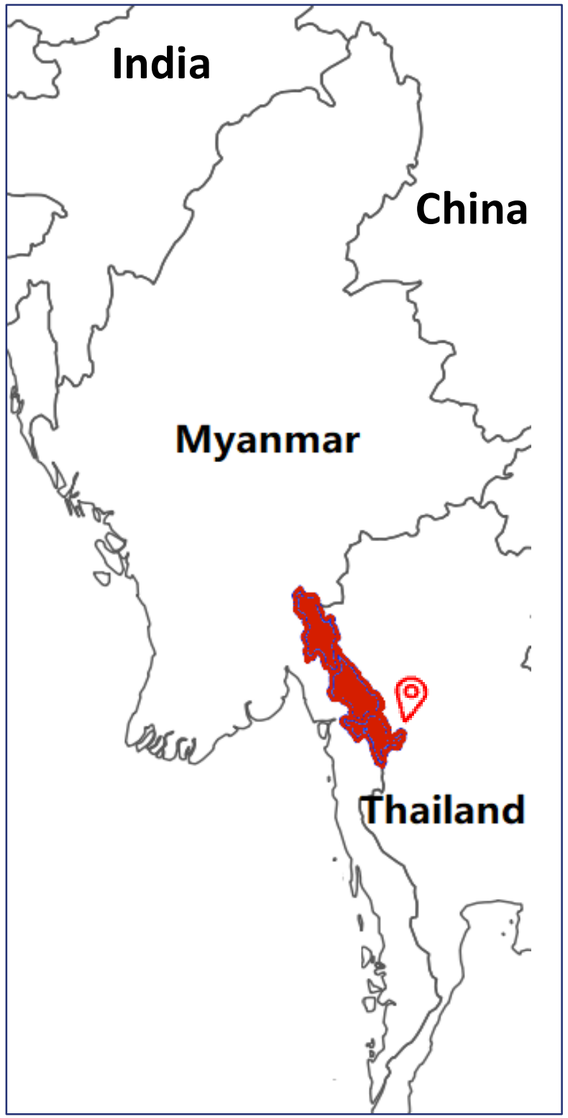
The Telegraph 3 April 2023 • 2:11pm

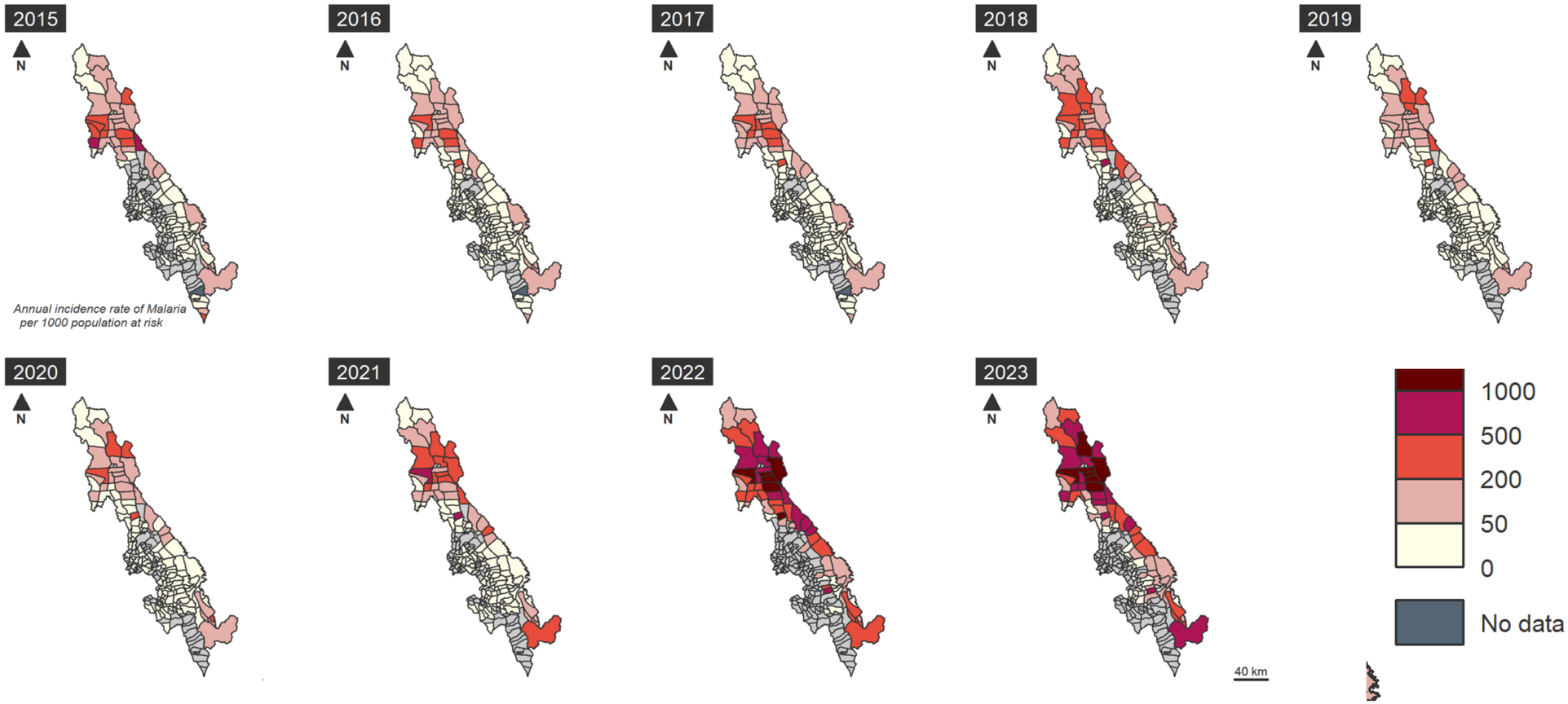
War-torn Myanmar hit by 1,000pc leap in malaria cases

Malaria has surged by more than 1,000 per cent in eastern Myanmar since 2020, a blow in a region pushing to eliminate the deadly parasitic disease by 2030.

Across Kayin state – a mountainous, forested province also known as Karen – 4,510 cases were reported in January 2023, compared to just 399 over the same period in 2020. Last year, roughly 32,000 cases were reported overall – in both 2019 and 2020, that figure hovered at around 8,000.

P. vivax annual incidence at village track level

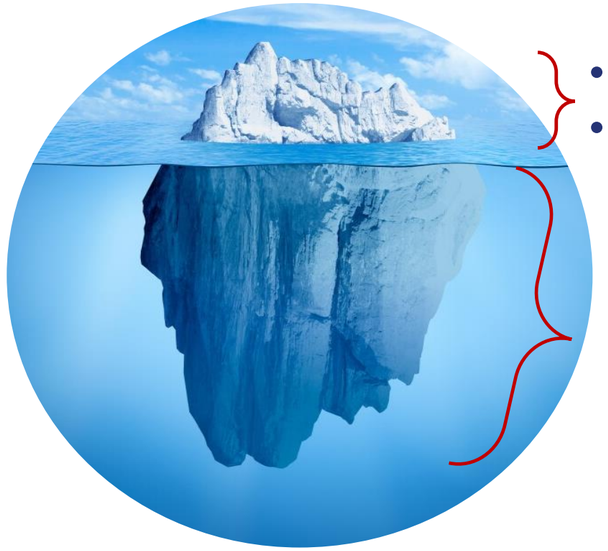




>30,000 cases in 2023

HIDDEN RESERVOIRS OF MALARIA PARASITES

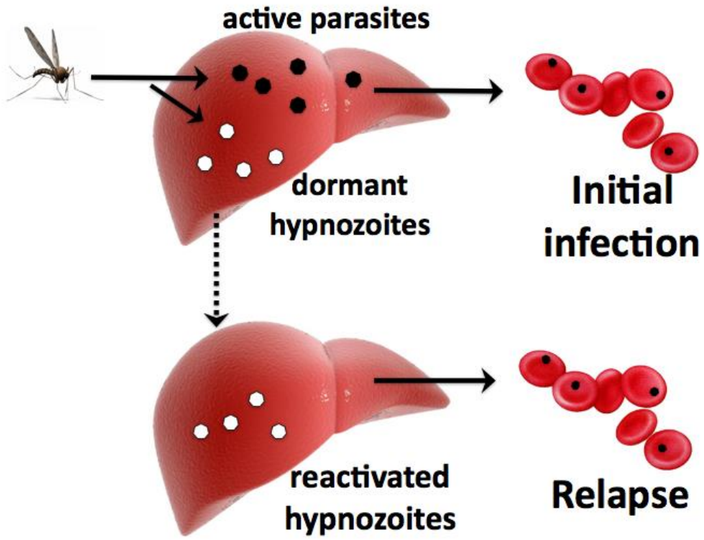
- Undetected by conventional RDT or microscopy
- Contribute for ongoing transmission



- Microscopy
- Rapid Diagnostic Test

Hidden reservoir

Dormant hypnozoites



80% of recurrence *P. vivax* are due to relapse from liver stage [1]

Ref: [1] R J. Commons PMID: 32524950

Sub-microscopic parasites

Contribution of Asymptomatic *Plasmodium* Infections to the Transmission of Malaria in Kayin State, Myanmar

Ref: [2] V. Chaumeau PMID: 30500927

… the studied community, 90.2 % of Plasmodium infections were submicroscopic and asymptomatic..

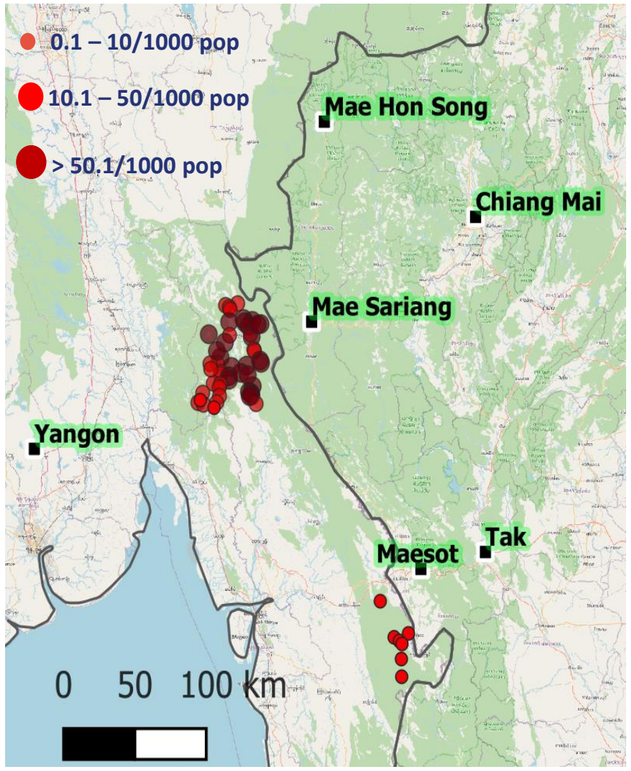
…Despite a great decline ……., transmission is still ongoing at levels undetectable by traditional methods

Ref: [1] E. Baum PMID: 25849211

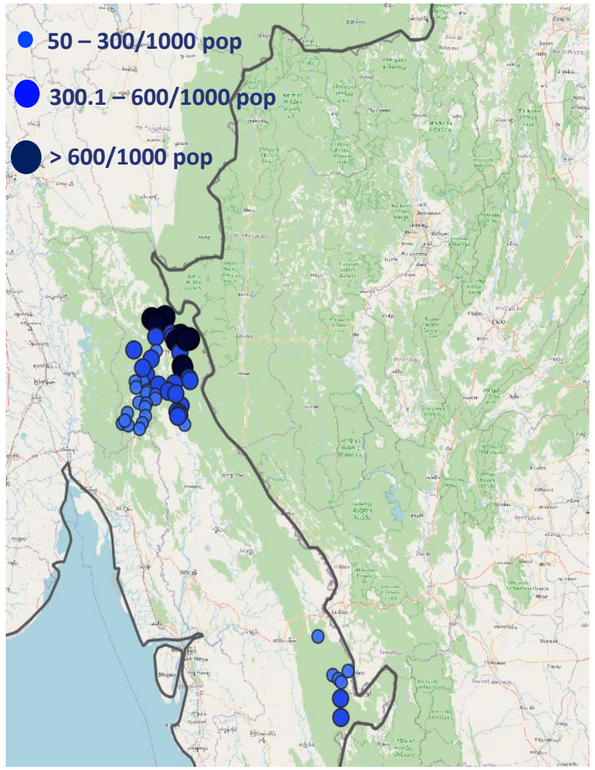
MULTIPLE PARASITE INFESTATIONS-1

- ***P. falciparum*** annual incidence median 69.1 (IQR 10.4 – 171.8) per 1000 [1]
- ***P. vivax*** annual incidence 503.30 (IQR 216.0 – 807.2) per 1000 [1]
- ***Microfilaria*** prevalence 2.9 (1.7 – 5.3) per 100 (incidental finding) [1]
- ***Intestinal helminths*** prevalence 16.7 (15.9 – 17.5) per 100 in migrant population [2]
- ***Scabies*** Myanmar is one of the top ten countries with the highest scabies burden [3]

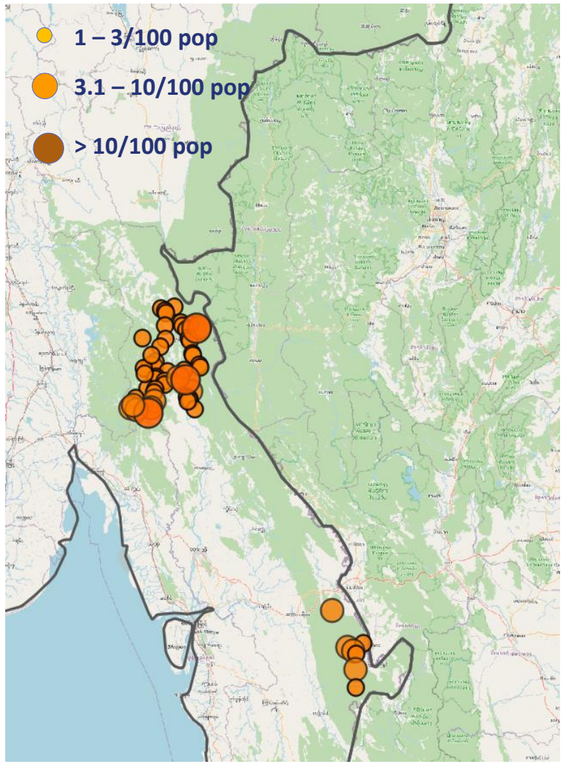
P. falciparum



P. vivax



Wuchereria bancrofti

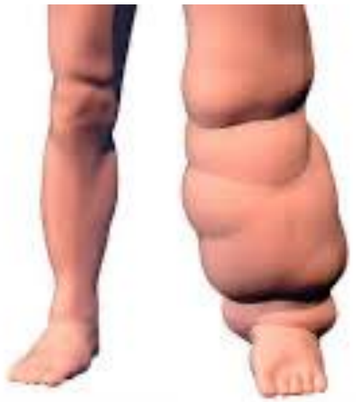


Ref: [1]SMRU Data [2] T Brummaier PMID: 33647061 [3]C Karimkhani PMID: 28941561

MULTIPLE PARASITE INFESTATIONS-2

Filariasis, also known as elephantiasis, infection with filarial worms transmitted to humans through mosquito bites. It leads to severe swelling and thickening of the skin and underlying tissues especially legs and genitals.

Over 50 million people globally are infected with lymphatic filariasis.

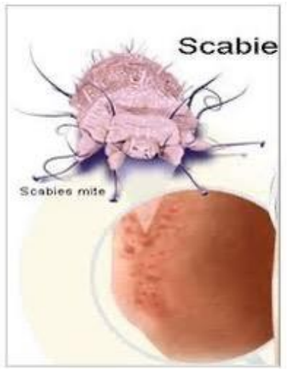


Intestinal helminths or worms, majority are roundworms, whipworms, and hookworms. These infections can lead to malnutrition, anemia, and impaired growth and cognitive development, especially in children.

Globally, it is estimated that over 1.5 billion people are infected.

Scabies is a highly contagious skin infestation caused by the mite Sarcoptes scabiei results in intense itching and a pimple-like skin rash. It is estimated to affect over 400 million people annually.

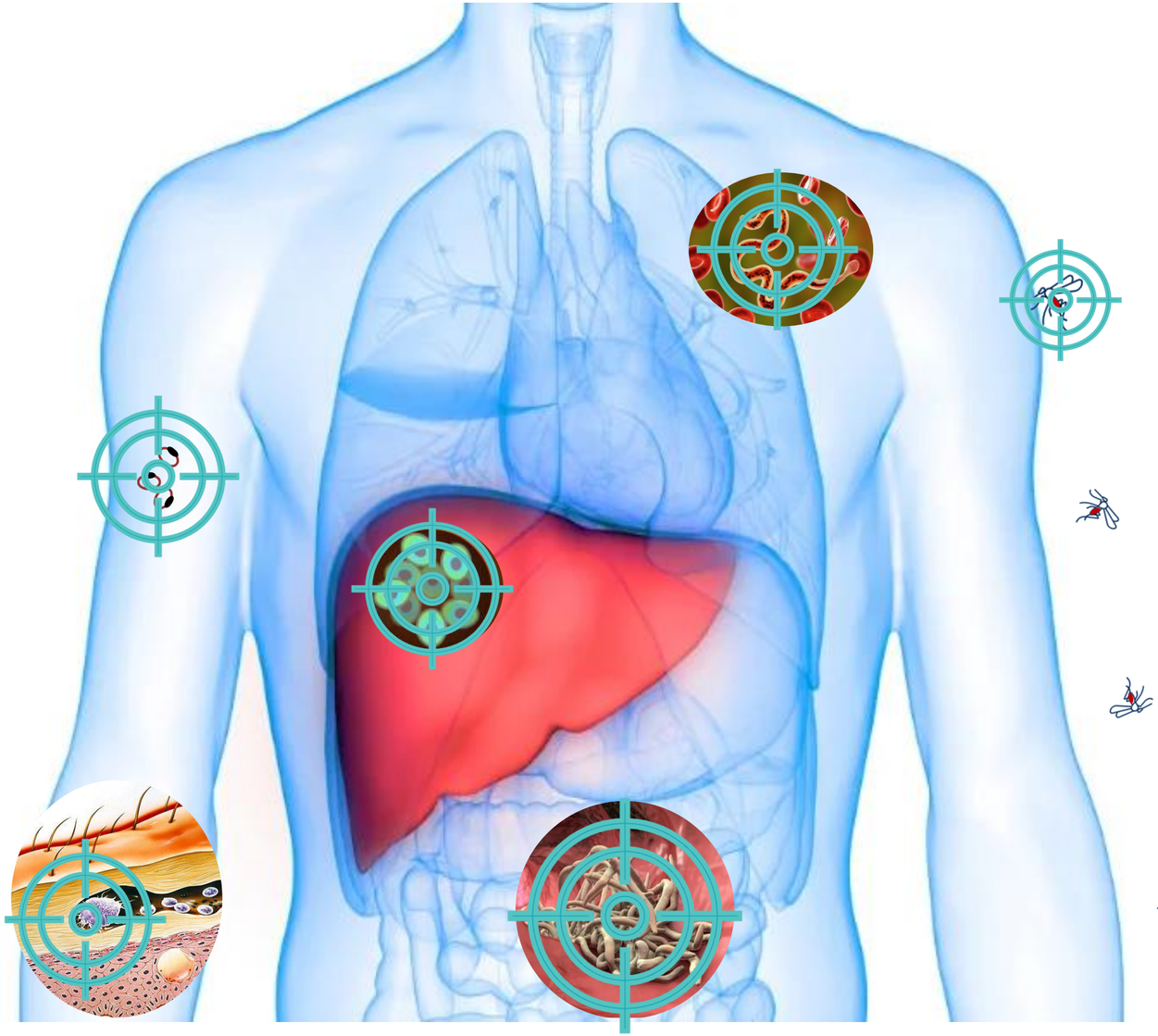
The infestation can lead to severe complications, including secondary bacterial infections like impetigo, sepsis, acute glomerulonephritis, and rheumatic heart disease.



ONE SHOT MULTIPLE TARGETS

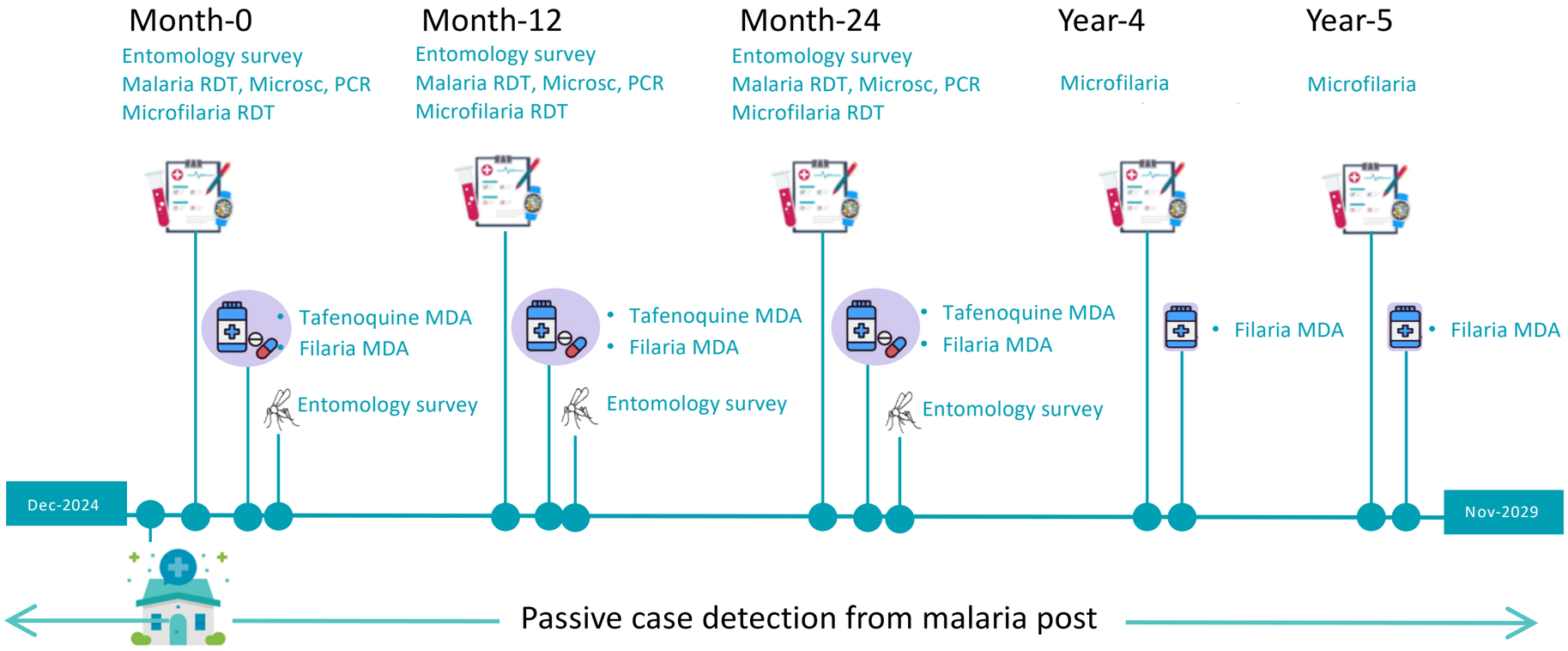
Tafenoquine

Ivermectin+DEC+Albendazole



COMPREHENSIVE APPROACH

- Population in this context has glucose-6-phosphate dehydrogenase (G6PD) enzyme deficiency ~15% [1]
- Village residence with G6PD enzyme deficiency will not receive Tafenoquine due to the risk of haemolysis. Chloroquine prophylaxis 10 mg/kg base [2] and primaquine 0.75 mg/kg [3] on weekly basis for total 8 weeks will be given instead.
- Pregnant women will also receive weekly chloroquine prophylaxis but no tafenoquine nor primaquine [2]



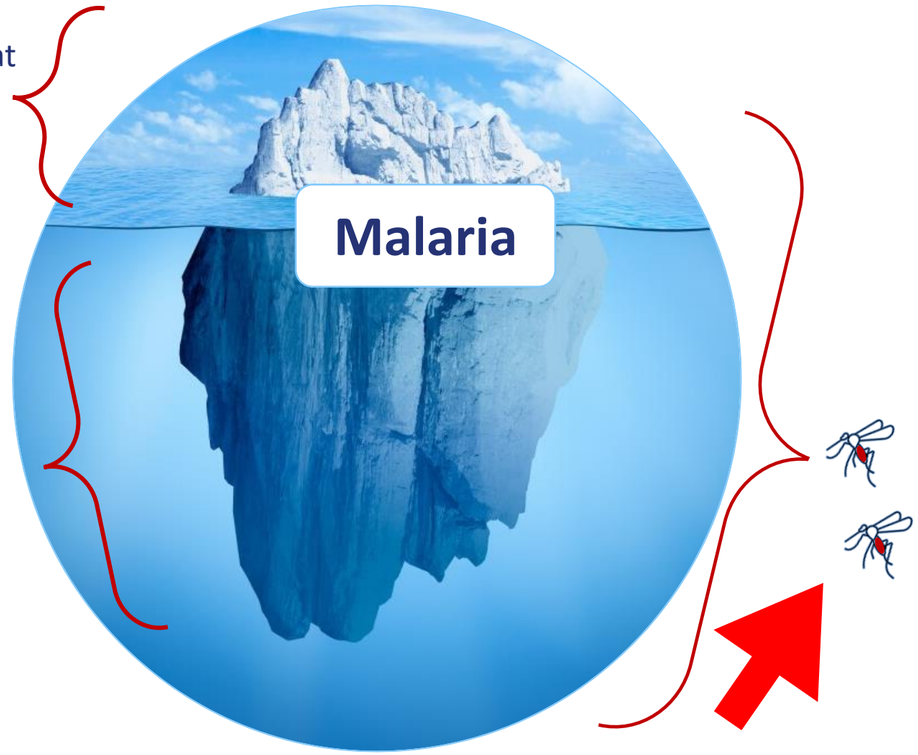
Ref: [1]G Bancone PMID: 29181452 [2]L Villegas PMID: 17300627 [3]W Taylor PMID: 37672548

PROJECT'S POSTULATE

Ongoing Case Detection

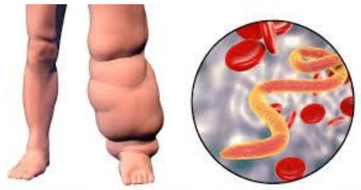
MSAT
Mass Screening (with RDT and Microscopy) And Treat

Malaria Post
Early Detection & Treatment

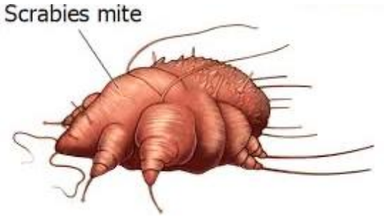


MDA
Mass Drug Administration
- with Tafenoquine (+ACT)

MDA
Mass Drug Administration with Ivermectin
DEC, albendazole



Filaria, Intestinal Helminths, Scabies



Thank you for your attention!

METF & SMRU team:

Partners and their staffs:

Funders:

Community in Karen state