MYANMAR MALARIA EARLY WARNING SYSTEM (MMEWS)

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MALARIA OCCURRENCE IN GM COUNTRIES HAS DROPPED

Countries of the Greater Mekong are stepping up to end malaria

WHO’s Mekong Malaria Elimination Programme

*Estimate submitted by each country to the World malaria report 2017
GMR REMAINS A KEY MALARIA BATTLEGROUND

Resistance of malaria vectors to pyrethroids in the GMS (2010-2018)

WHO’s Mekong Malaria Elimination Programme

A GROWING THREAT
Artemisinin-resistant parasites are now widespread in the Mekong. Resistance has been linked to mutations in the parasites’ K13 gene; the map shows the percentage of samples with K13 mutations reported since 2010.

MYANMAR – A GREAT SUCCESS STORY

82% drop in malaria cases between 2012 to 2017
[WHO’s Mekong Malaria Elimination Programme]

[World Malaria Report 2018]

[President’s Malaria Initiative (Burma) Abbreviated Malaria Operational Plan FY 2019]
MYANMAR’S ASYMPTOMATIC MALARIA

Our data in Ann Township, Rakhine State, Myanmar:

• Study 1 (n = 990):
  • 1 – RDT positive
  • 92 – usPCR positive

• Study 2 (n = 1,000):
  • 5 – RDT positive
  • 96 – usPCR positive

Malaria elimination may require elimination of all parasites

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MYANMAR’S SURVEILLANCE CHALLENGES

Extreme outliers in terms of development needs and/or exposure to conflict

Conflict-affected areas with poor human development

Hubs in conflict-affected areas

Very low access to basic services and infrastructure

Agricultural townships with the highest profits per capita

Agricultural areas with secondary cities and towns

Up-and-coming peri-urban and urban areas

Affluent, densely populated city centres

Humanitarian Assistance and Resilience Programme Facility & the Myanmar Information Management Unit (2018)
TARGETED MALARIA ELIMINATION IMPERATIVE

As the “malaria lake” is drained, malaria transmission separates into “pools” and then shrinks into “puddles”, understanding malaria risk as it varies over time and space becomes essential for effective targeting of interventions.

MALARIA RISK

- *P. falciparum* – one of malaria-causing parasites
- Anopheles mosquito – a primary vector of malaria

Risk components:
- Hazard
- Exposure
- Vulnerability

Risk assessment methods:
- Satellite data
- Auxiliary spatial data
- CRF surveys
- Entomological surveys
MALARIA BURDEN POTENTIAL (MBP) NEW

Hazard
- Parasitemia (0.5)
- Surface Water (0.167)
- Veg Stress (0.166)
- Surface T (0.167)

Vector Abundance
8-day

Exposure
- Parasitemia
- Population Distribution (0.4)
- Occupational Exposure (0.6)

Access to Care (0.6)
Social Vulnerability (0.4)

Vulnerability

0.25

0.5
MBP

0.25
MALARIA BURDEN POTENTIAL (MBP) NEW

Hazard (as available)
- Parasitemia (0.5)

Vector Abundance
- Surface Water (0.167)
- Surface T (0.167)
- Veg Stress (0.166)

Exposure (annual / as available)
- Population Distribution (0.4)
- Occupational Exposure (0.6)

Vulnerability (annual / as available)
- Access to Care (0.6)
- Social Vulnerability (0.4)

Parasitemia (0.5)
0.25
0.5
MBP
0.25
Access to Care (0.6)
Social Vulnerability (0.4)

8-day
Annual Parasite Incidence (API) by state in 2016: All malaria

HAZARD: PARASITES

Nothing we can do from space here – relying on reported information
HAZARD: MOSQUITOES

Vegetative Stress

Monitoring environmental conditions that support mosquito well-being
HAZARD: MOSQUITOES

Establishing date of onset and end of monsoon season:

4 consecutive weeks of cloudy observations

1st break of cloud cover after 4 consecutive weeks
MALARIA BURDEN POTENTIAL (MBP) NEW

Hazard as available
- Parasitemia (0.5)
- Surface Water (0.167)
- Veg Stress (0.166)

Vector Abundance
- 8-day

Exposure annual / as available
- Population Distribution (0.4)
- Occupational Exposure (0.6)

Vulnerability annual / as available
- Access to Care (0.6)
- Social Vulnerability (0.4)

0.5

MBP

0.25

0.5

0.25
EXPOSURE: WHERE PEOPLE ARE

NEW MODERATE-RESOLUTION (30 M) POPULATION DISTRIBUTION MAP FOR MYANMAR

EXPOSURE
Hazard
Malaria Risk
Vulnerability

Total Population by Village Tract and Ward
- High: 103,804
- Low: 0

Population per grid cell (30m X 30m)
- High: 20,860
- Low: 0
- Missing population data / Correction required
EXPOSURE: WHAT PEOPLE DO

- Plantations/logging
- Mining
- Farming
- Fisheries
- Other forest activities
- Urban lifestyle
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MBP
- 0.5
- 0.25

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0.25
- Population Distribution (0.4)
- Social Vulnerability (0.4)
- MBP

0.25
- Occupational Exposure (0.6)
- MBP
VULNERABILITY: ACCESS TO CARE

Existing roads

Current effort

Falam Township, Chin State

Kale Township, Sagaing State

Bhamo Township, Kachin State

Demoso Township, Kayah State

Vulnerability

Malaria Risk

Exposure
VULNERABILITY: ACCESS TO CARE

New and exciting!
VULNERABILITY: SOCIO ECONOMIC STATUS

VULNERABILITY IN MYANMAR
A SECONDARY DATA REVIEW OF NEEDS, COVERAGE AND GAPS
June 2019

Source: Adjusted Vulnerability from MIMU Vulnerability Analysis
MYANMAR-WIDE MBP MODEL

- Wall-to-wall model of Malaria Burden Potential
  - 30 m resolution
  - 8-day update
  - 1 – 2 months forecast

- Executed: 2017 and 2018
MBP: HIGH RISK
CHIN

Area under "Moderate (2.5 – 3.5)" risk
MBP: MODERATE RISK
TANINTHARYI

Area under "Moderate" risk

Area (km²)

MBP: LOW RISK
MANDALAY

Area under "Moderate" risk

Area under "Moderate" risk
TEMPORAL TRENDS

Area under "Moderate (2.5-3.5)" risk for 3 most malarious states

Rakhine  Chin  Kayin
QUESTIONS?