



U.S. President's Malaria Initiative

INFORM ASIA: USAID'S HEALTH RESEARCH PROGRAM

Harnessing surveillance data to improve active case detection in Thailand

May 23, 2023

Jui Shah
Chief of Party

Presentation outline

1. Program overview
2. Active case detection in Thailand
3. Results and recommendations

Program overview



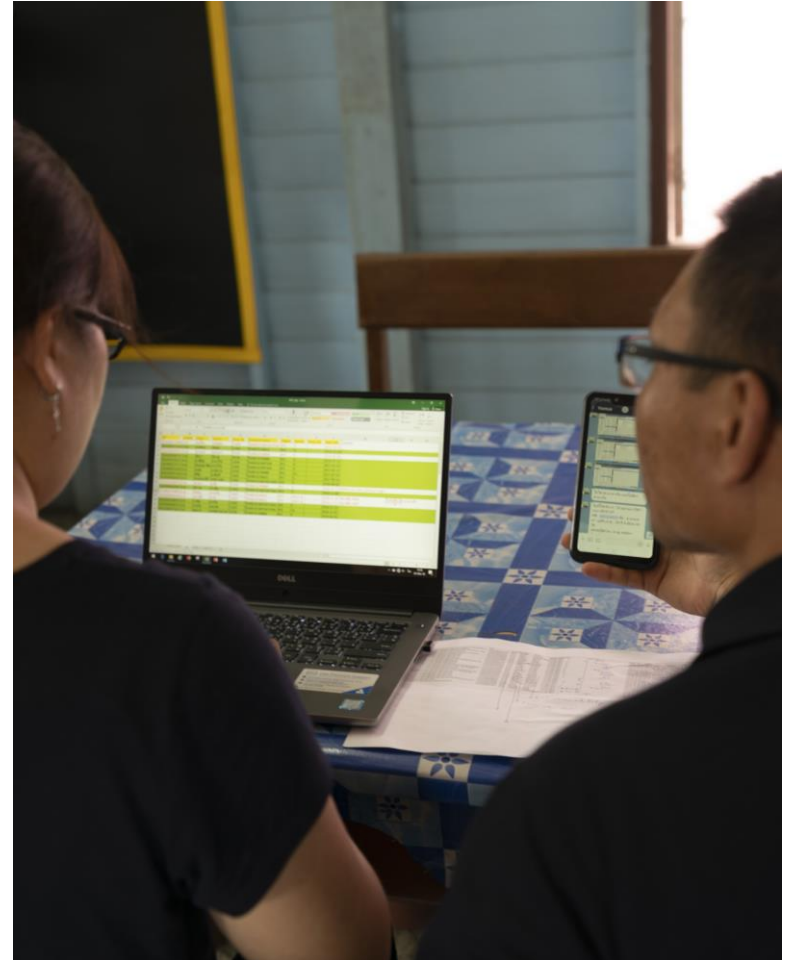
Program purpose

Inform Asia promotes the generation and use of evidence-based strategic information to achieve malaria elimination in Thailand and Lao PDR.

Aligned with USAID's journey to self-reliance principles, the program works alongside government counterparts to share knowledge and foster sustainability.

Intermediate results

1. Strengthened malaria surveillance systems in Thailand and Lao PDR



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2. Evaluated strategies and tools for implementation and scale-up for malaria elimination



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1. Strengthened malaria surveillance systems in Thailand and Lao PDR
2. Evaluated strategies and tools for implementation and scale-up for malaria elimination
3. Strengthened capacity of national malaria programs to generate, analyze, and use strategic information



Research topics

- Cost-benefit analyses
- Drug efficacy
- School-aged children
- Environmental factors
- Increasing border cases
- Malaria in the era of COVID-19
- Stratification for POR
- Active case detection

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The Investment Case for Malaria Elimination in Thailand: A Cost-Benefit Analysis
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Abstract
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In 2015, the W Global Technical strategy describe vision of a world malaria incidence by 2030; 2) elim countries; and 3) that were malaria last 10 years he mortality have b respectively, and— been certified as Sri Lanka (2016), Uzbekistan (2016). Over the past el malaria burden al elimination, makin the countries elim 2016, the annual r from 2.61 to 0.28 ported nationally i cent years, with o from the Thai gov community, particularly the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM), drove this decline in malaria burden.^{1,2} To build on this success, the Thai government developed a National Malaria Elimination Strategy (NMES) (2017–2020) to end the local transmission of malaria in Thailand by 2024.³

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Environmental factors linked to reporting of active malaria foci in Thailand

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Abstract
Thailand has made substantial progress toward malaria elimination, with 46 of the country's 77 provinces declared malaria free as part of the substantial verification program. Nonetheless, these areas remain vulnerable to the reintroduction of malaria parasites and the reestablishment of indigenous transmission. As such, prevention of reestablishment (POR) planning is of increasing concern to ensure timely response to increasing cases. A thorough understanding of both risk of parasite importation and receptivity for transmission is essential for successful POR planning. Routine geospatial time- and facility-level epidemiological and case-level demographic data were extracted from Thailand's national malaria information system for all active foci from October 2012 to September 2020. A spatial analysis examined environmental and climate factors associated with remaining active foci. A logistic regression model utilized surveillance data with remote sensing data to investigate associations with the probability of having reported an indigenous case within the previous year. Active foci are highly concentrated along international borders, particularly Thailand's western border with Myanmar. Although there is heterogeneity in the habitats surrounding active foci, land covered by tropical forests and plantation was significantly higher for active foci than other foci. The regression results showed that tropical forest, plantations, forest disturbance, distance from international borders, historical foci classification, percentage of maize, and percentage of short-term residents were associated with high probability to report indigenous cases. These results confirm that Thailand's emphasis on border areas and forest-going populations is well placed. The results suggest that environmental factors alone are not driving malaria transmission in Thailand; rather, other factors, including demographics and behaviors that interact with complex settings, may also be contributors. However, these factors are applicable to human activities in areas covered by tropical forests and plantations may result in malaria importation and potentially, local transmission, in foci that previously had been cleared. These factors should be addressed in POR planning.

Keywords: SEA; spatial analysis; environmental drivers; malaria elimination; disease modeling

1. Introduction
Malaria remains a major public health threat across the world, with over 241 million cases and 627,000 deaths in 2020 [1]. The Greater Mekong Subregion (GMS), an area of Southeast Asia composed of Cambodia, Lao People's Democratic Republic (PDR), Myanmar, Thailand, China's Yunnan Province, and Vietnam, is now an area of low malaria incidence but high population connectivity [2]. To accelerate progress in the region, GMS countries have jointly committed to eliminating Plasmodium falciparum (P. falciparum) by 2025 and to eliminating all forms of human malaria by 2030, following guidelines set in the World Health Organization's (WHO) Strategy for Malaria Elimination in the Greater Mekong Subregion (2015–2030) [3].

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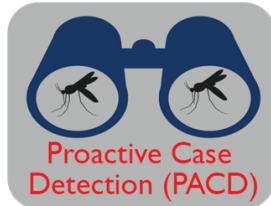
Active case detection in Thailand



Proactive and reactive methods



Passive Case Detection



Seeks new cases in high-risk areas and among specific high-risk groups based on national surveillance data



Within endemic and high-risk areas, targets population with an unusual event (i.e migration, increasing incidence, recent travel)



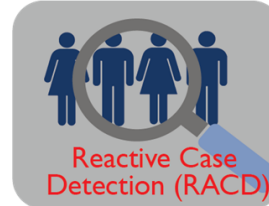
Ad-hoc events at unplanned sites to reach epidemic-prone, high-incidence, or endemic areas



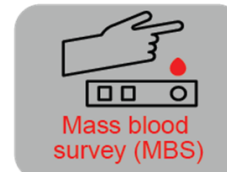
Planned events during malaria outbreaks with fixed schedule and place to encourage community participation (i.e weekend market, village monthly meeting, temple)



Active Case Detection



Seeks new cases near a passively detected index case by screening nearby individuals. RACD triggers interventions to prevent further transmission.



Tracing all foci (sub-village) members when >1 simultaneous index cases



Tracing 50 community members or ≥ 10 households in a radius of 2 kms of an index case

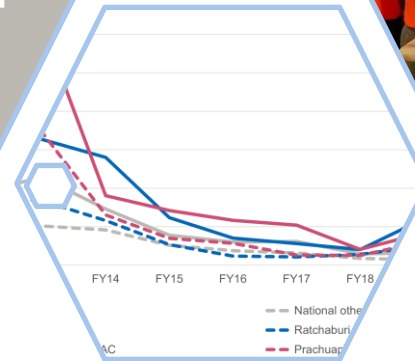
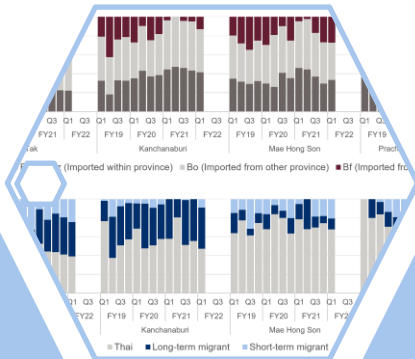
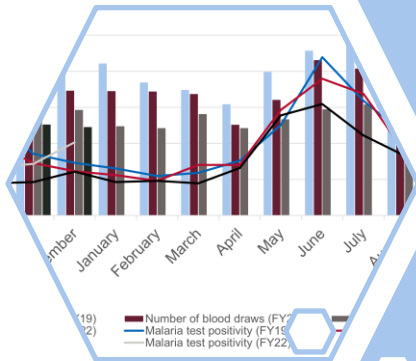
Balancing surveillance needs and resources

Resources per case for elimination

Inform Asia closeout 2023

Thailand elimination goal 2024

Leaner staff at national program



Analysis to support program optimization

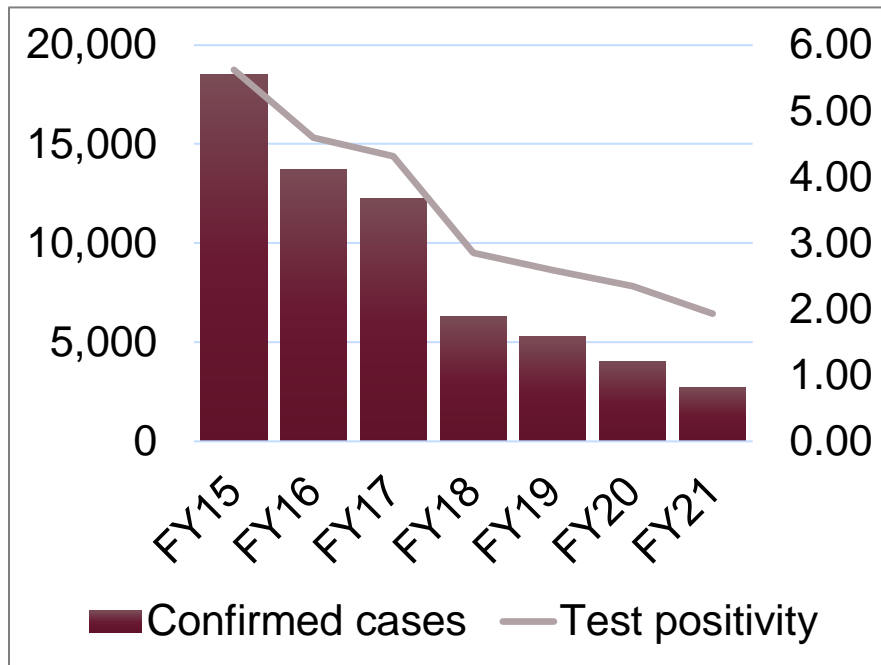
- Since FY20, incidence <0.1 per 1,000 population
- Resource-intensive surveillance strategies may yield diminishing returns for malaria elimination
- How can we assess and optimize ACD?

Results and recommendations

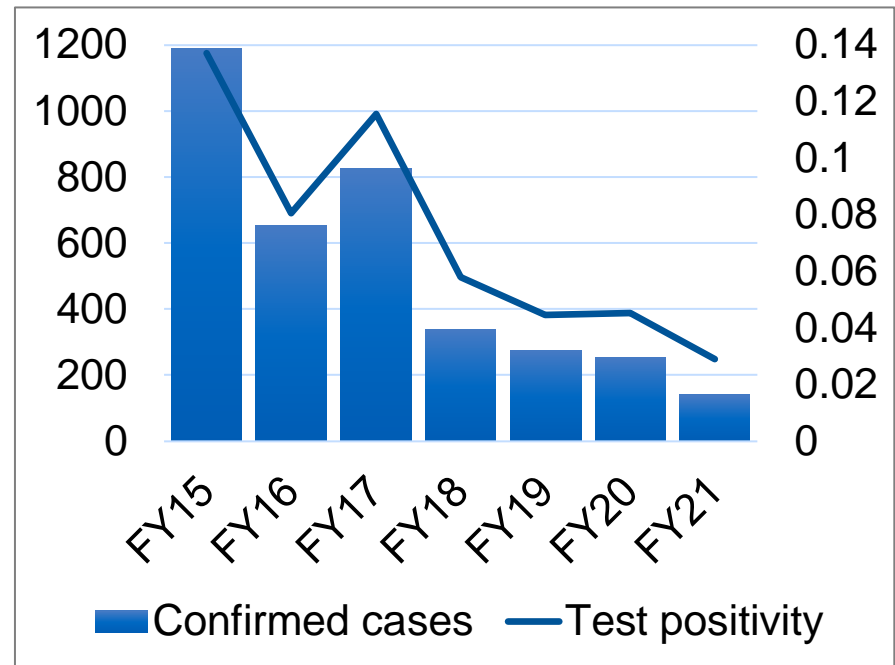


Malaria cases and test positivity, FY15–21

Passive case detection

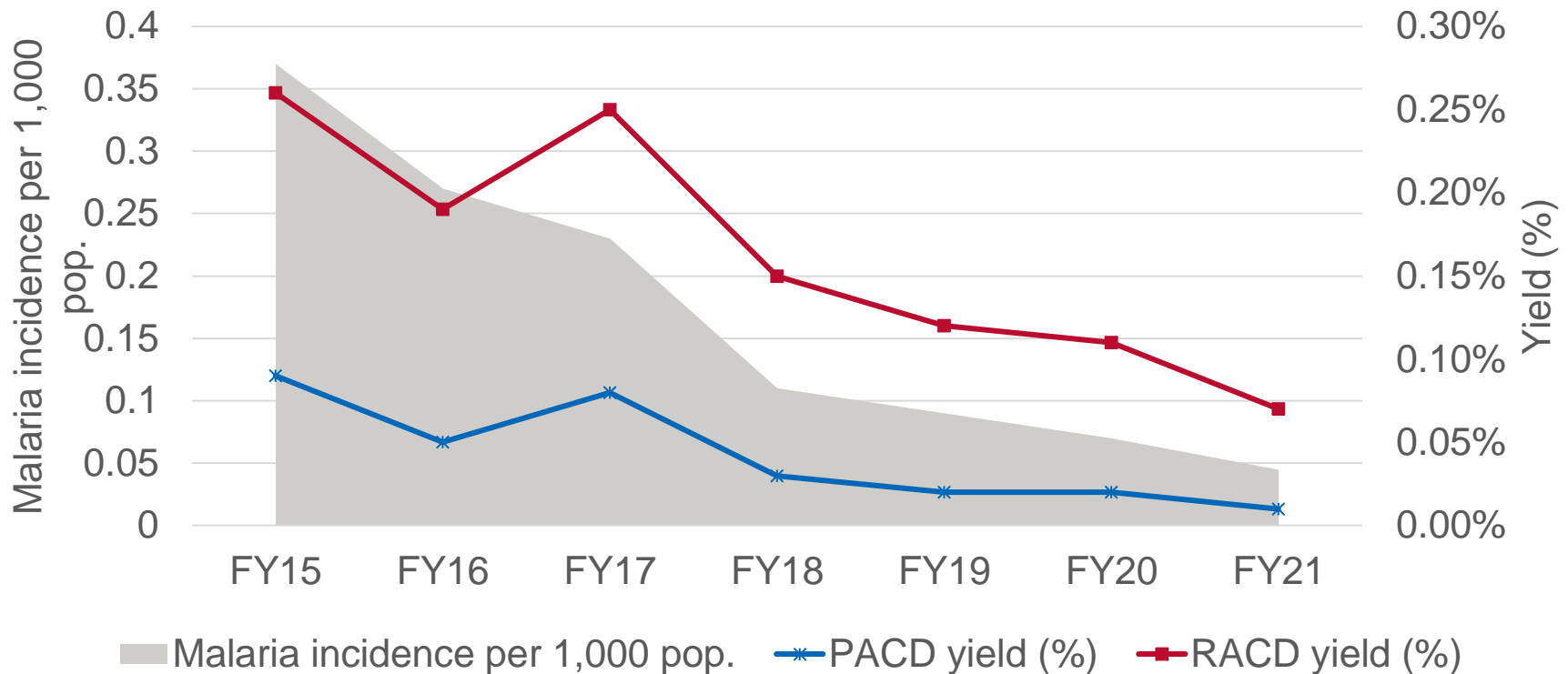


Active case detection



- TPR 1.06% (3.81% for passive, ACD 0.08%)
- ACD is 73.75% of blood tests but just 5.53% of confirmed cases

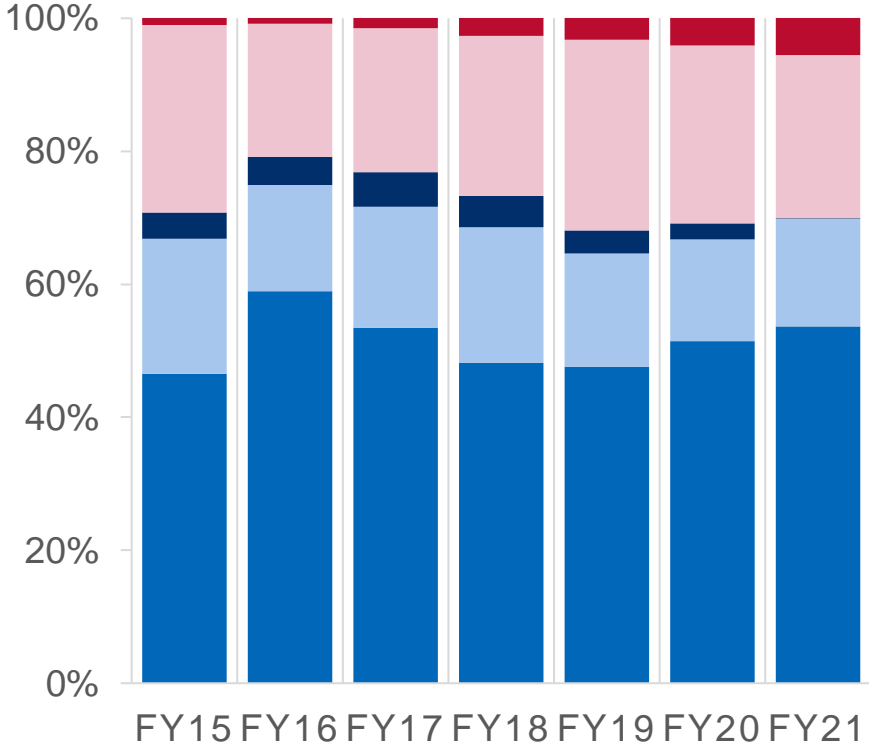
Malaria incidence and PACD and RACD yields, FY15–21



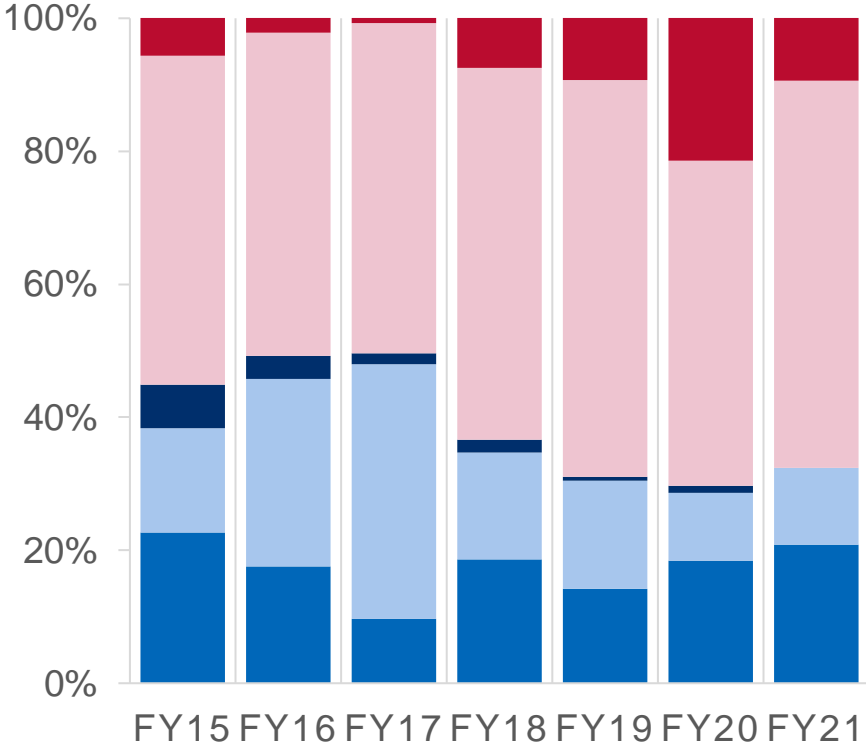
- By FY21, PACD represented just 32.37% of ACD cases
- Results align with evidence from other low-burden settings

Contribution of tests and cases, by ACD method, FY15–21

Malaria tests



Confirmed cases



■ PACD SCD ■ PACD MMC ■ PACD FSMC
■ RACD CIS ■ RACD MBS

Enhanced surveillance infrastructure

- Utility of current ACD strategies is diminishing
- Further analyses could confirm *how* to optimize PACD and RACD, accounting for the variation in methods, subnational epidemiology, and costs
- ACD can continue to contribute to elimination but with more deliberate targeting, guided by the country's high-quality surveillance data to balance known operational costs

Developing a PACD protocol

- Waning PACD yield could be an indication that this strategy is no longer relevant
- PACD is most likely to remain useful only in specific micro-contexts
- PACD could be alternatively implemented to maximize yield and reduce wastage
 - Identifying high-risk individuals and areas
 - Timing of blood draws
 - Flexibility in implementation cycles

Thank you





Thank you



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