Case Report: Plasmodium vivax infections in Northern Kenya detected by routine Acute Febrile Illnesses surveillance

P2-S13

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The burden of *Plasmodium vivax* infections in Kenya is largely unknown but a recent study on Acute Febrile Illness (AFI) surveillance reported that 0.8% of study participants in a health facility in Northern Kenya were infected with the parasite.

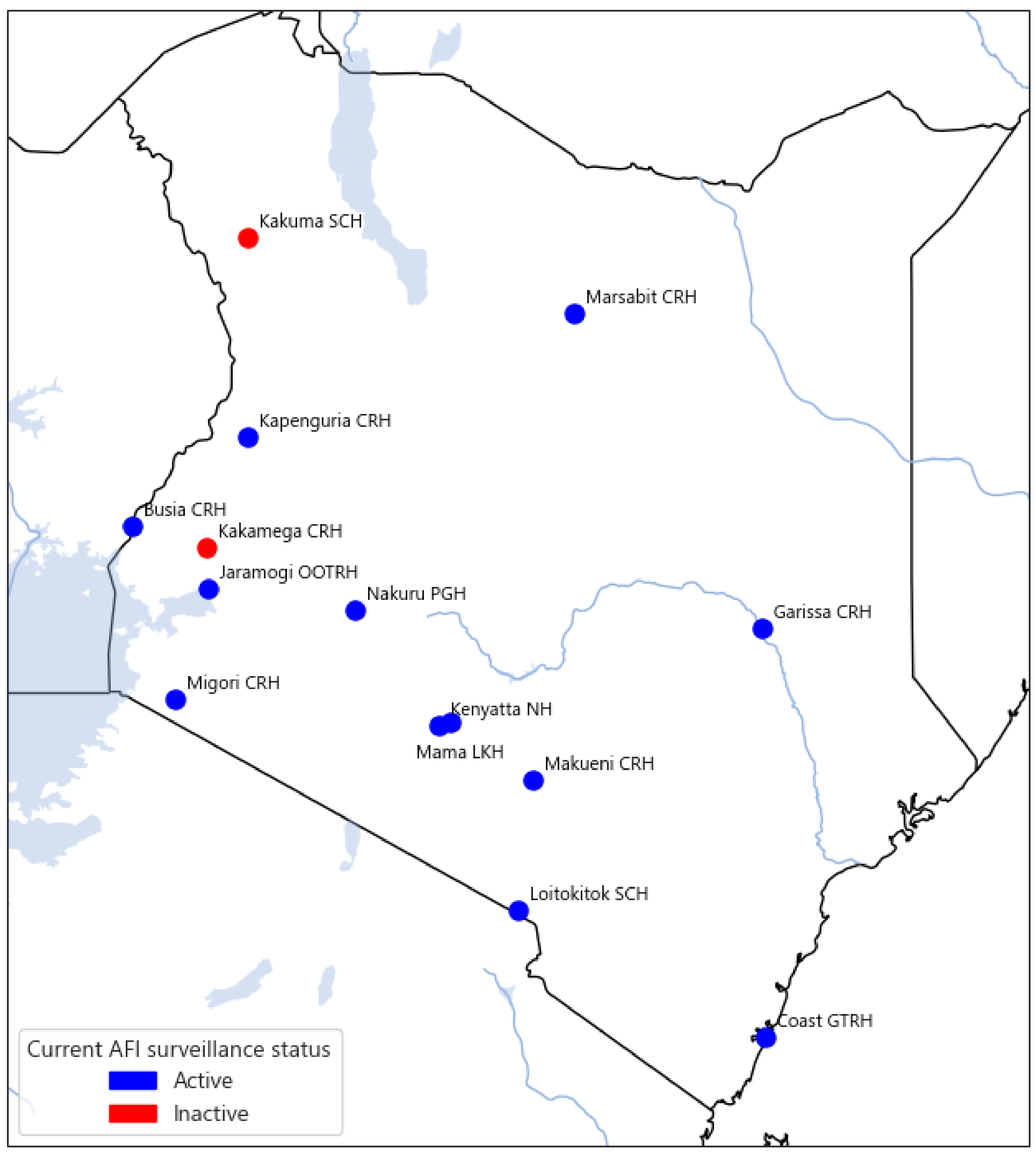
BACKGROUND

- The high prevalence of the Duffy negative phenotype in Sub-Saharan Africa may account for the relatively low incidence of *Plasmodium vivax* in regions such as Kenya, where *Plasmodium falciparum* has a broader geographic distribution and is the primary cause of malaria
- Consequently, most rapid diagnostic tests (RDTs) used in Kenya are designed to target HRP-2, a biomarker specific to *P. falciparum*, thereby focusing exclusively on detecting this predominant species
- Acute febrile illness (AFI) surveillance, can facilitate detection of emerging infectious diseases and other plasmodium species that are not typically tracked.
- Since June 2017, CDC Kenya, in collaboration with the Kenya Ministry of Health and ICAP Kenya, has implemented AFI surveillance in multiple sites across the country.
- We sought to determine the Positivity of *P. vivax* infections in specimens collected and tested through this surveillance.

METHODS

- Patients presenting with AFI at inpatient or outpatient departments in 14 hospitals in Kenya, were enrolled into the surveillance.
- In Marsabit County Referral Hospital (CRH), patients are primarily enrolled at outpatient department.
- Case definitions for AFI: temperature ≥38.0° C on admission; onset <14 days prior; not previously enrolled for same illness
  - Undifferentiated fever (UF): AFI without diarrheal illness (≥ 3 loose stools within 24 hours); lower respiratory tract infection (LRTI 0; cough or difficulty breathing plus oxygen saturation <90% or [in children <5 years] sub-costal retractions)
- Data and sample collection
  - Epidemiologic and clinical data on all AFI cases
  - Venous whole blood sample from UF cases
- Laboratory testing
  - At collection site: Malaria RDT, malaria smear.
  - At CDC-KEMRI lab Nairobi: Real-time PCR using TaqMan Array Cards (TAC):
    - Testing for 33 Pathogens
    - Ct <37 considered positive
  - P. falciparum and P. vivax determination was initiated in 2020

AFI surveillance sites in Kenya



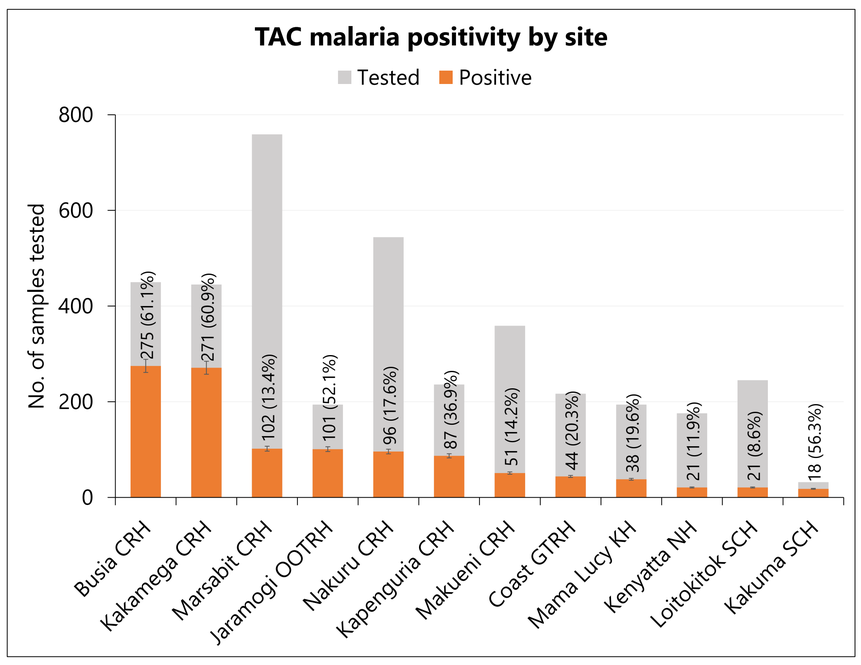
RESULTS

Results of all sites

- Between Aug 2020 and Aug 2024, 3,851 whole blood samples were collected across all sites and tested by TAC, 3,782 by RDT, and 3,265 by microscopy.
- Of 3,851 patients, 2,228 (57.7%) were male, with a median age of 3.1 years (interquartile range [IQR]: 1.3 – 9.9)
- Of the TAC-tested samples, 1,125 (29.2%) were positive for Plasmodium, with 594 (15.4%) cases of *P. falciparum*, and 6 (0.2%) cases of mixed infections with *P. falciparum* and *P. vivax*
- Of the samples tested by RDT, 690 (18.2%) were positive, and of those tested by microscopy, 304 (9.3%) were positive

Results of Marsabit CRH, in Northern Kenya

- During the same period, 759 samples were collected at Marsabit CRH and tested by TAC, 753 tested by RDT and 752 by microscopy
- Among the 759 patients, 400 (52.7%) were male, with a median age 18.5 years (IQR: 6.0 – 34.4)
- Of the TAC-tested samples, 102 (13.4%) were positive for Plasmodium, with 67 (8.8%) cases of *P. falciparum*, and 6 (0.8%) cases of mixed infections with *P. falciparum* and *P. vivax*
- RDT detected 16 (2.1%) positive cases, while microscopy detected 14 (1.9%)



Demographic characteristics of the six *P. vivax* malaria cases in Marsabit CRH

Characteristic	n (%)
Gender	
Male	5 (83.3%)
Female	1 (16.7%)
Age group	
18 - 50 yrs	4 (66.7%)
5 - 17 yrs	2 (33.3%)
Year	
2020	2 (33.3%)
2024	4 (66.7%)

DISCUSSION

- Successful malaria control may be hampered by dual infection with both *P. vivax* and *P. falciparum*, further complicating diagnosis and clinical management of such cases.
- Malaria control programs in Northern Kenya might consider including diagnostic tools and treatment to address malaria caused by *P. vivax* infections.
- The presence of P. vivax as reported in this study in Northern Kenya which is largely made up of a Duffy-negative population suggests the need for further research to better understand P. vivax transmission patterns.

REFERENCES

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