



# Papua New Guinea National Malaria and Vector Borne Disease Control Program-led Implementation Research Partnership

**STRIVE PNG:** Strengthening vector-borne disease surveillance and use of data for decision making in PNG

**NATNAT:** Newly Adapted Tools and Network Against Mosquito diseases Transmission

Vanuatu Health Research Symposium 2023

**Annie Dori**

**Senior Malaria Partnership Manager**

[Annie.dori@burnet.edu.au](mailto:Annie.dori@burnet.edu.au)

# Background - Malaria in PNG

## **Malaria - remains an important cause of both acute and chronic illness in PNG**

- 2021: PNG accounted for nearly 87% of the total malaria cases and >94% of malaria deaths observed in Western Pacific Region
- 4 species of human malaria endemic, high diversity of Anopheline Vector Species

## ***P. vivax* - a major challenge to malaria control efforts**

- biological ability to lie dormant in liver cells (hypnozoites) - escape detection & treatment
- source of relapsing infections – cause illness, death and sustain transmission
- 80% of *P. vivax* infections in PNG children are from hypnozoite-derived relapses

## **Vector control is an important component of malaria control in PNG**

- approx. 2 million long-lasting insecticidal nets (LLINs) are distributed in PNG per year with the aim to achieve universal coverage
- challenges related to reduced bio-efficacy of current LLINs, early/outdoor biting vectors, emergence of pyrethroid resistance in local vectors

# NMVBDP-led implementation research partnership

Designed to address priority knowledge gaps, inform policy and scale up of new approaches to strengthen surveillance and control whilst simultaneously strengthening the health and vector control workforce

## Identified priorities

- Building and maintaining effective principles-based partnerships to realise meaningful and sustained change
- Strengthening surveillance and use of local data for local decision-making
- Investigating new vector control strategies to prevent malaria transmission
- Strengthening *P. vivax* malaria radical cure case management strategy

Leo Makita,  
Head, NVBDP



Dr Moses Laman,  
Deputy Director,  
PNGIMR



Annie Dori, NMCP  
Partnership  
Coordinator



# Implementation research programs aiming to support NMVBDP objectives towards malaria control and elimination



**STRIVE  
PNG**

STRONGER SURVEILLANCE  
FOR VECTOR-BORNE PATHOGENS

**Strengthening VBD surveillance and response system** to allow rapid identification and containment of outbreaks, resurgence and resistance.

**Developing policy options** for key health systems supports to strengthen surveillance and respond to signals in PNG

*DFAT CHS Funded*



**NATNAT**

Newly Adapted Tools Network Against  
mosquito borne disease Transmission

**PAPUA NEW GUINEA**

**Strengthening vector control infrastructure and capability to support the evaluation and selection of alternative/novel tools to reduce malaria transmission in PNG**

*IVCC Funded (through DFAT CHS)*



Moses Laman, Deputy  
Director, PNGIMR



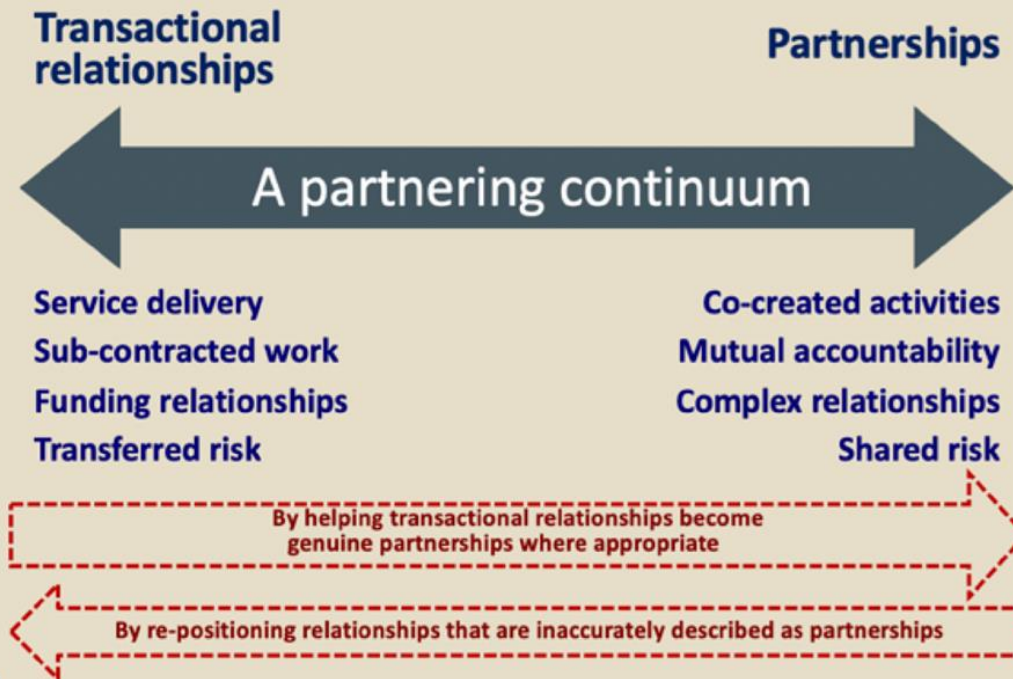
Leanne Robinson, Program Director  
Health Security Burnet Institute



Stephan Karl, Principal Research Fellow,  
James Cook University

# Strengthening VBD Partnerships

- Infectious disease research requires expertise from multiple diverse backgrounds
- PNG has a decentralized health system
- Partnership-based approach has been used across all the research programs to conduct infectious disease research at different levels of the health system



*“Partnerships in Papua New Guinea are the door into technical work and research activities across the country.” – NMCP Program Manager & Project Partnership Manager*

# NMCP Partnership Management Unit (PMU)



*Rachael Farquhar  
– Internal Broker*



*Annie Dori  
– Internal Broker*



*Paul Daly  
– Internal Broker  
(NATNAT)*



*Alexa Murray  
– Internal Broker  
(STRIVE)*



*Kaia Gamoga  
– Internal Broker*



*Sarah MacCana  
– External Broker*

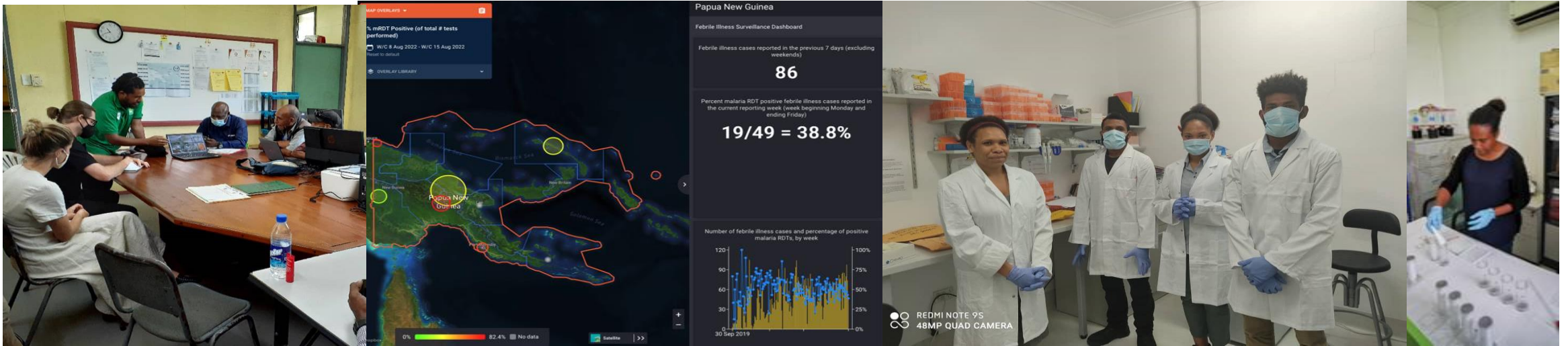


PAPUA NEW GUINEA  
INSTITUTE OF  
MEDICAL RESEARCH



*“We wanted to recruit someone neutral, someone that does not belong to any particular organisation, and embodies partnership principles and mindset” (STRIVE Co-Principal Investigator)*

# STRIVE PNG: Stronger surveillance and systems support for the rapid identification and containment of resurgent or resistant vector-borne pathogens in Papua New Guinea



# Project aims

**01**

**Real-time spatial febrile illness surveillance and response**

**03**

**Vector monitoring for IR and arbovirus detection**

**05**

**Supply chain options for stock out early warning and AMR prevention**

**02**

**Molecular monitoring of VB pathogens and resistance**

**04**

**Strengthening support to health workers**

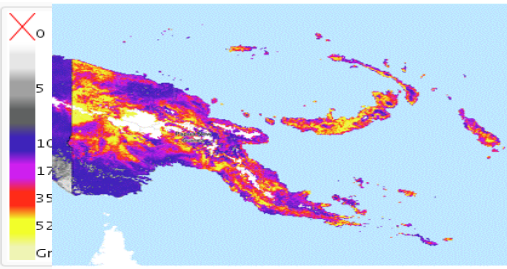
**06**

**Policy-relevant modelling for efficient resource allocation**



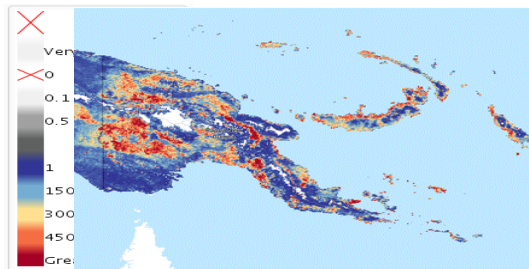
# Malaria surveillance in PNG - context

*Plasmodium falciparum* incidence<sup>1</sup>



2000

*Plasmodium vivax* incidence<sup>2</sup>



2000

## NDOH passive surveillance (eNHIS)

- Line listed case data (daily)
- Aggregated reporting
- Monthly data reporting
- RDT diagnosis only
- Indicator-centric reporting for program M&E

## STRIVE sentinel surveillance value-add

- Case level reporting
  - Demographic, clinical history, disability, illness history, risk factor
- Real-time electronic – early warning signal
- Localised working groups (DDM)
- Malaria RDT quality
- Dengue NS1 Ag
- Sample collection for molecular surveillance
  - Malaria species (QMAL, Pf, Pv, Pm, Po)
  - Markers of artemisinin resistance (K13 C580Y resistance marker)
  - Arboviruses (DENV, CHIKV, RRV/BFV, JEV, MVE, WNV/Kunjin)
  - Established model for multi-pathogen sero-surveillance informing COVID-19 and VBD program
- Further downstream genomic surveillance
- Base for conducting entomological surveillance

2. Battle KE, Lucas TCD, Nguyen M, et al. Mapping the global endemicity and clinical burden of *Plasmodium vivax*, 2000–17: a spatial and temporal modelling study. Lancet 2019; published online June 19 [http://dx.doi.org/10.1016/S0140-6736\(19\)31096-7](http://dx.doi.org/10.1016/S0140-6736(19)31096-7)

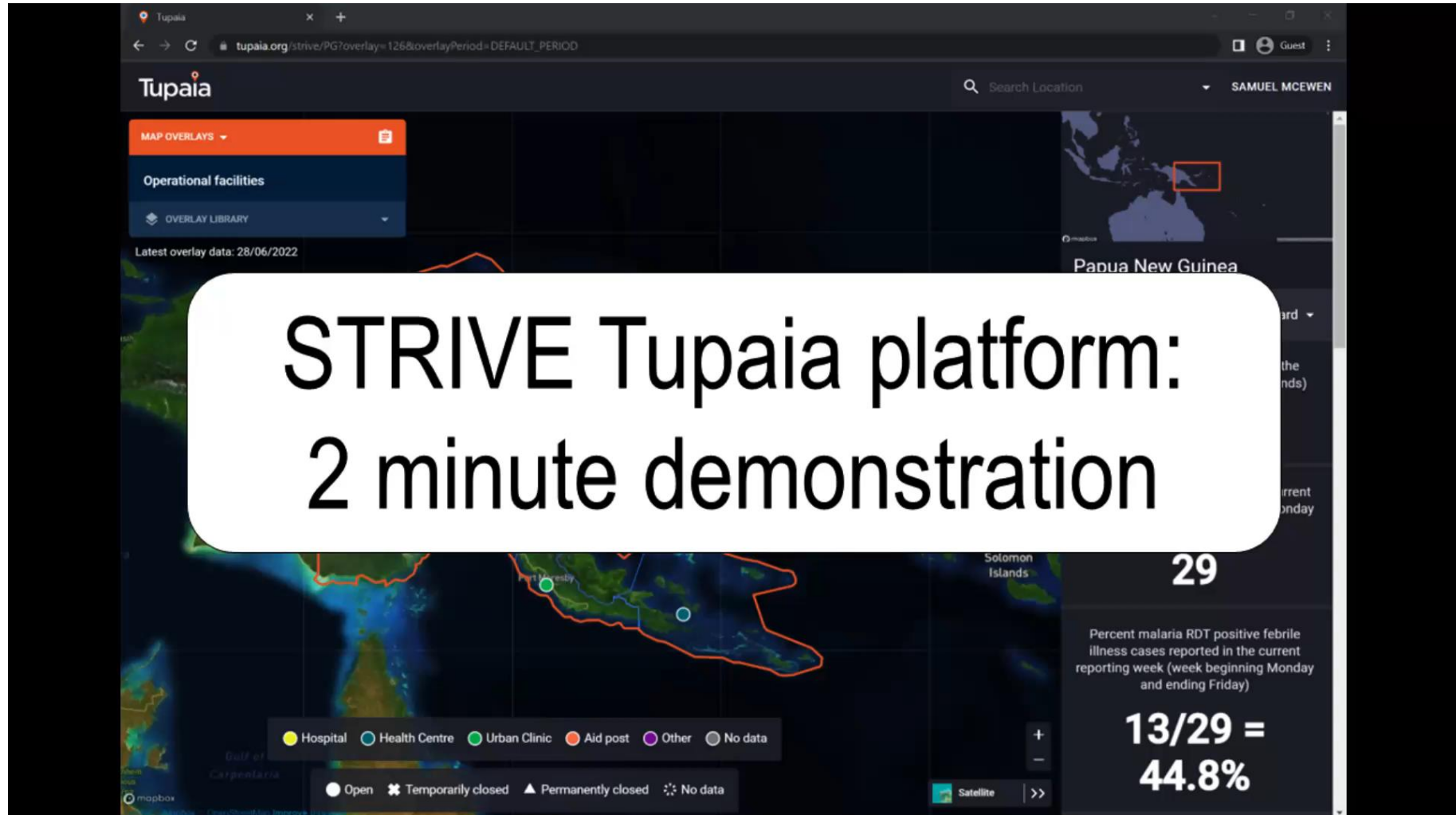
1. Weiss DJ, Lucas TCD, Nguyen M, et al. Mapping the global prevalence, incidence, and mortality of *Plasmodium falciparum*, 2000–17: a spatial and temporal modelling study. Lancet 2019; published online June 19. [http://dx.doi.org/10.1016/S0140-6736\(19\)31097-9](http://dx.doi.org/10.1016/S0140-6736(19)31097-9)

# STRIVE PNG Sentinel surveillance sites



- Febrile illness surveillance established at 8 primary care facilities
- Purposely selected based on surveillance objectives (i.e. detection of resistance, emerging threats & outbreak potential)
- PNGIMR Research Nursing Officers embedded at each sentinel site

# Implementation of integrated sentinel surveillance system and supply chain support tools



# Improving the use of data at Provincial and National Levels to inform Decision Making

## Data for Decision-Making Workshop

Engagement with public health officials to strengthen the use of project data for decision-making by equipping public health decision makers with the knowledge and skills to conceptualize data in the context of VBD surveillance.



## Molecular Testing Framework



Technical expertise between NMVBDP, SMHS, CPHL, PNGIMR and Burnet used to strengthen the use of molecular diagnostic data to inform policy relevant options for the NMVBDP e.g. *the use of the NS1 Dengue Test in PNG*

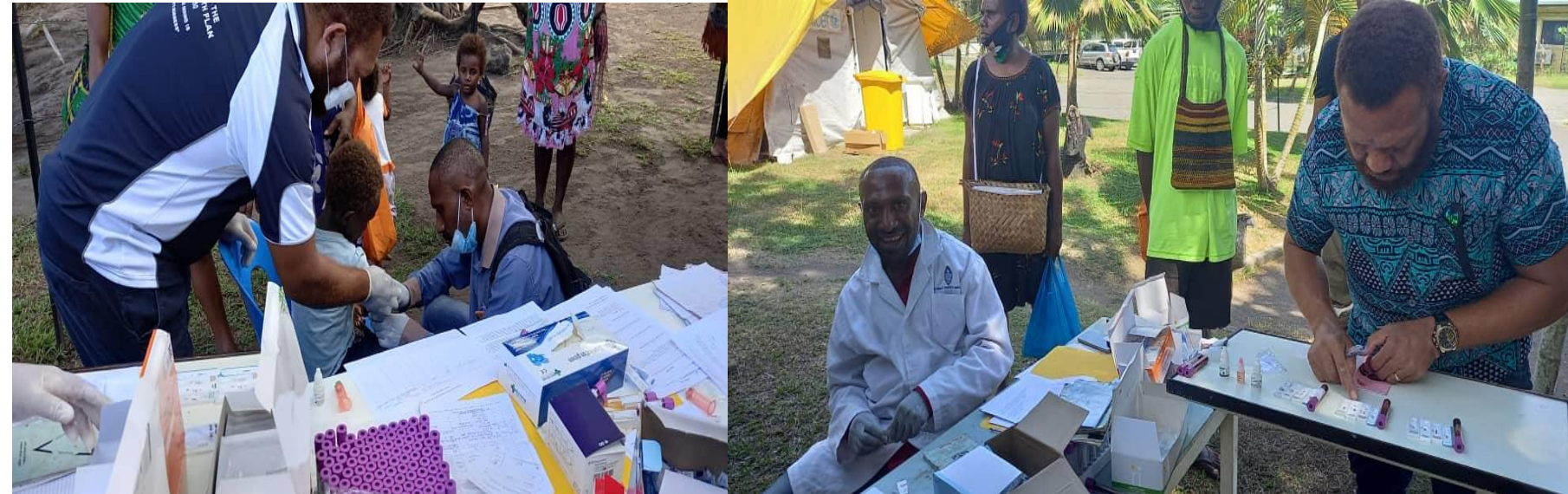
## Co-development of Provincial Vector Surveillance and Monitoring Plans

Support to Provincial Health Teams to co-develop localised vector surveillance and monitoring plans by strengthening the vector surveillance capacity within the province to collect entomological data that informs local priority areas.



# Quality Assurance for Malaria Rapid Diagnostic Test (mRDT) and Monitoring of Malaria Rapid Diagnostic Test

## Validation of mRDTs in the field



## Monitoring Invalids

~ KIUNGA HC

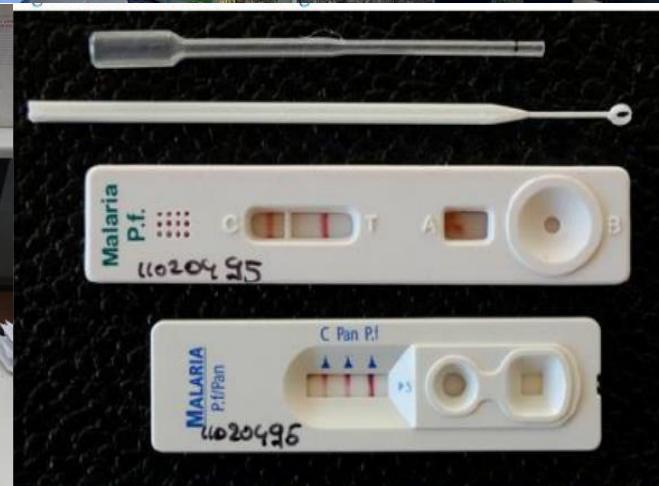
Good afternoon team. No invalid results from Kiunga for last 2 weeks. Using Biocredit test kits. Lot # H006B009D Sub : A Exp: Date: 2024.09.13 C32RHG25 Diluent Lot :H006BSB009

14:06

~ Sausi

Good afternoon team.No invalid mRDT for last week and this week.still using parascreen brand. Lot #:101482 Mgf date:2022-07 Expiry date:2024-06 Thankyou everyone,may all have peaceful weekend ahead.

18:01





**NATNAT**  
 Newly Adapted Tools Network Against  
 mosquito borne disease Transmission  
**PAPUA NEW GUINEA**



PAPUA NEW GUINEA  
 INSTITUTE OF  
 MEDICAL RESEARCH



NATIONAL  
 DEPARTMENT OF HEALTH



***Building a pathway for testing & implementation of effective, evidence-based, vector control tools in Papua New Guinea.***

**NATNAT priority vector control tools:**



Residual  
 Spraying  
 (IRS)



Larval  
 Source  
 Management



Spatial  
 Emanators



Long Lasting  
 Insecticidal  
 Nets (LLIN)



1. Strengthen laboratory, semi-field and field capacity to test new VCTs



2. Conduct field evaluations of alternative VCTs



3. Investigate the community and health system acceptability and cost analysis of new VCTs

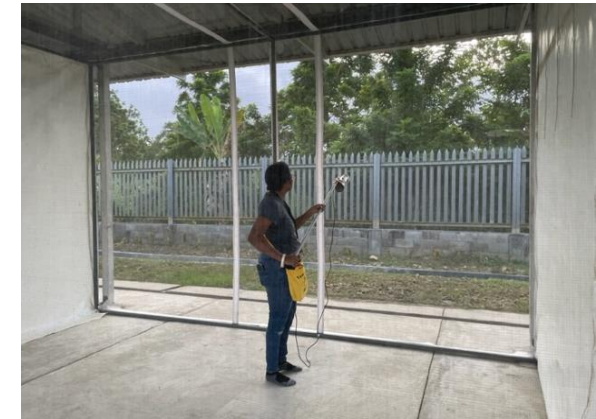


4. Support a NMCP-led network for vector control in PNG

# 1. Enhanced laboratory, semi-field & field capacity to test new vector control tools



## BELNA NATNAT CENTRE



## 2. Field evaluations of priority vector control tools

### RESIDUAL SPRAYING

**Aim:** Evaluate the impact of residual spraying with Fludora Fusion® on vector and malaria indicators in the community in a PNG village setting.

- interrupted time series study design
- entomological and epidemiological surveys



### LARVAL SOURCE MANAGEMENT



### SPATIAL EMANATORS

- peridomestic spaces



- experimental hut study



### 3. Understanding acceptability of vector control tools in the PNG health system

- Mixed methods research to provide evidence on barriers and enablers to the uptake of novel vector control approaches in PNG

**1. National Level:** *policies*

**2. Provincial & District Level:** *implementation*

**3. Community Level:** *perceptions, ease of use, engagement & improved implementation*



Focus Group Discussions  
North Coast Madang, PNG



Provincial & district level  
Semi-structured interviews

### 4. National Malaria Control Program-led formal network for vector control in PNG



- Supporting a Provincial Health-led IRS pilot feasibility study in New Ireland Province



# Acknowledgements



**PAPUA NEW GUINEA  
INSTITUTE OF  
MEDICAL RESEARCH**

## Madang

Moses Laman  
Maria Ome-Kauis  
Mary Malai  
Tamarah Koleala  
Christine Pombreaw  
Stephen Gideon  
Wesley Tint  
Rebecca Vinit  
Michelle Katusele  
Kaia Gamoga  
Desmond Sui  
Daisy Mantila  
Henson Dima  
Zebedee Kerry  
Alma Auwan  
Benishar Kombut

## Goroka

William Pomat  
Diana Timbi



**DEPARTMENT OF HEALTH**

Mr Leo Makita  
Late Prof Evelyn Lavu  
Ms Pauline Mukura  
Ms Mavis Abaya  
Mr John Deli  
Ms Mary Daun



Leanne Robinson  
Alexa Murray  
Rachael Farquhar  
Samuel McEwen  
Paul Daly  
Rebecca Narokobi  
Dulcie Lautu-Gumal  
Fiona Angrisano  
Jessie Kingston  
Freya Fowkes  
James Beeson



Nakapi Tefuarani  
Willie Nigani  
Paul Pumuye



Stephan Karl  
Petrina Johnson  
Tanya Russell  
Tom Burkot  
Paul Horwood



Alyssa Barry  
Zahra Razook  
Kirsty McCann  
Jessy Vibin



Jermelyn Oki  
Ameni Yaruta  
Stella Jimmy  
Therese  
Kearns



David Williams



**Walter+Eliza Hall**  
Institute of Medical Research

**DISCOVERIES FOR HUMANITY**

Ivo Mueller  
Shazia Ruybal-Peasantez



Erin Nunan  
Michael Nunan



**INSTITUTE  
OF TROPICAL  
MEDICINE  
ANTWERP**

Koen Peeters



Michael White  
Thomas Obadia

## Institut Pasteur

Papua New Guinea Provincial Health Partners  
from;

- West Sepik Provincial Health Authority
- Western Provincial Health Authority
- Simbu Provincial Health Authority
- New Ireland Provincial Health Authority
- Madang Provincial Health Authority
- Morobe Provincial Health Authority
- Milne Bay Provincial Health Authority
- National Capital District

# Thank you!

