Building Data-Based Defenses Against Infectious Diseases

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National University of Singapore - May 28th, 2025

Nuffield Department of Medicine
CENTRE FOR TROPICAL MEDICINE AND GLOBAL HEALTH

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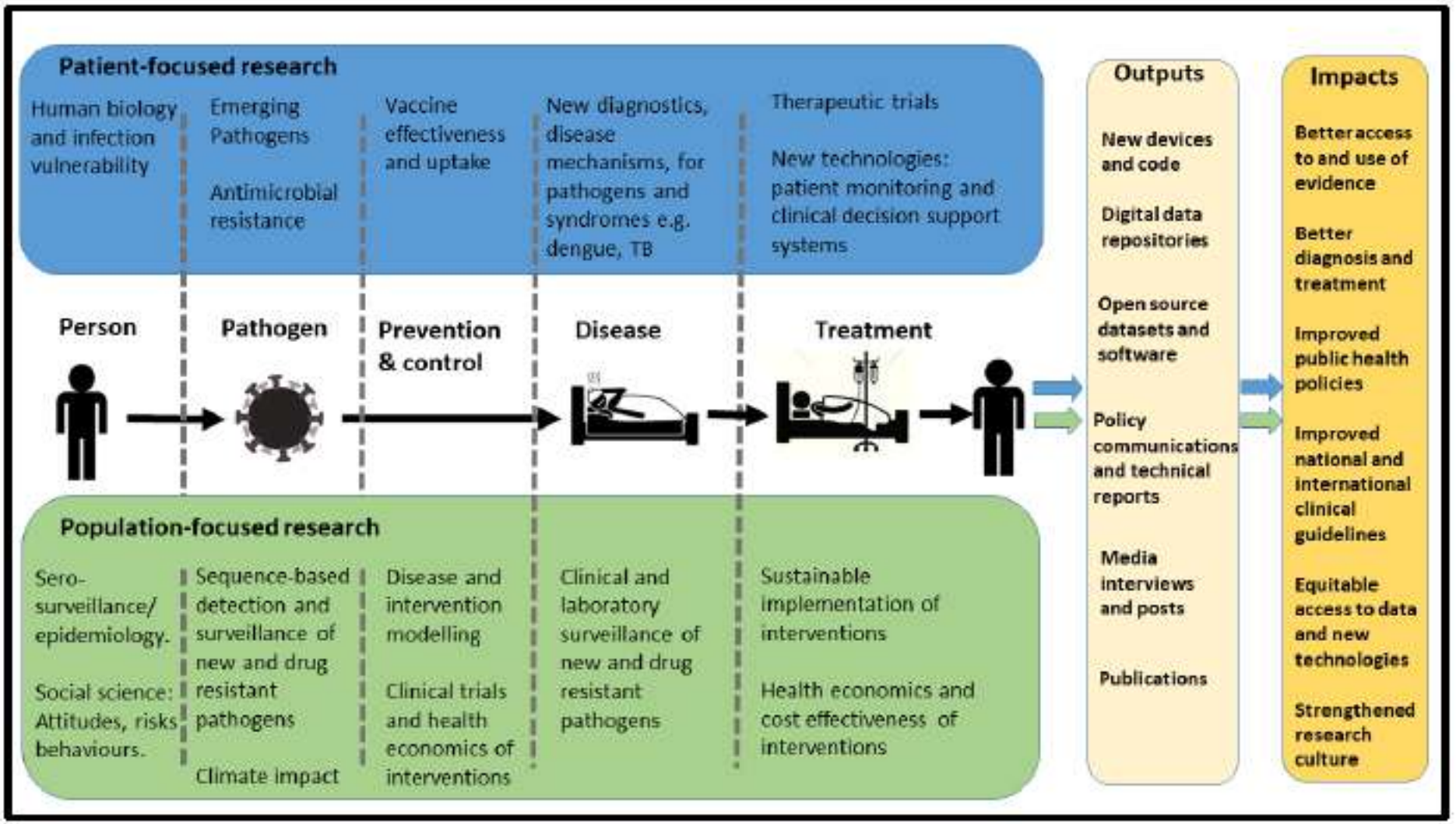
RESEARCH ORIENTATION

The **Oxford University Clinical Research Unit (OUCRU)** is a large-scale clinical and public health research unit with site offices in Viet Nam, Indonesia, and Nepal.



OUCRU PROGRAMME - https://www.oucru.org/

OUR ACHIEVEMENTS

What We Accomplish Through The Years

178	2,500	+80	128
Clinical Trials Completed	Publications	Local Partnerships	PhD Graduates

Guy Thwaites
OUCRU Programme Director - HCMC

Rogier van Doorn
OUCRU-Ha Noi

Kevin Baird
OUCRU-ID

Abhilasha Karkey
OUCRU-Nepal

Molecular Epidemiology

Social Science and Implementation Research

Tuberculosis

Drug-Resistant Infections

Emerging Infections

Hepatitis

Leprosy

Malaria

Mathematical Modelling

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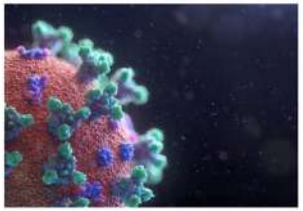
Typhoid

Zoonoses

Biostatistics



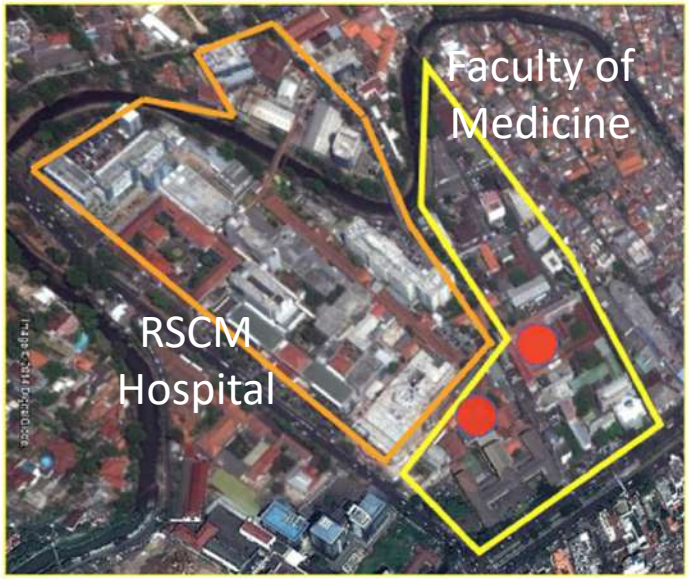
Covid-19

Dengue

OXFORD UNIVERSITY CLINICAL RESEARCH UNIT INDONESIA

- Established in 2008.
- Hosted by the Faculty of Medicine, Universitas Indonesia in Jakarta.
- Centre of excellence in biomedical research focused on **infectious diseases** that significantly impact the health of Indonesians, the broader Asian population, and humanity at large.

- https://www.oucru.org/location/oucru-indonesia/



OXFORD UNIVERSITY CLINICAL RESEARCH UNIT INDONESIA

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Geospatial Epidemiology

Malaria

Community Health

RESEARCH SERVICES

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Laboratory Services

Research Grants & Contracts

Public & Community Engagement

FINANCE SERVICES

Finance Manager

OPERATIONS SERVICES

Operations Manager

Administration

Procurement

Human Resources

AA

Information Technology

Health & Safety

Staff training

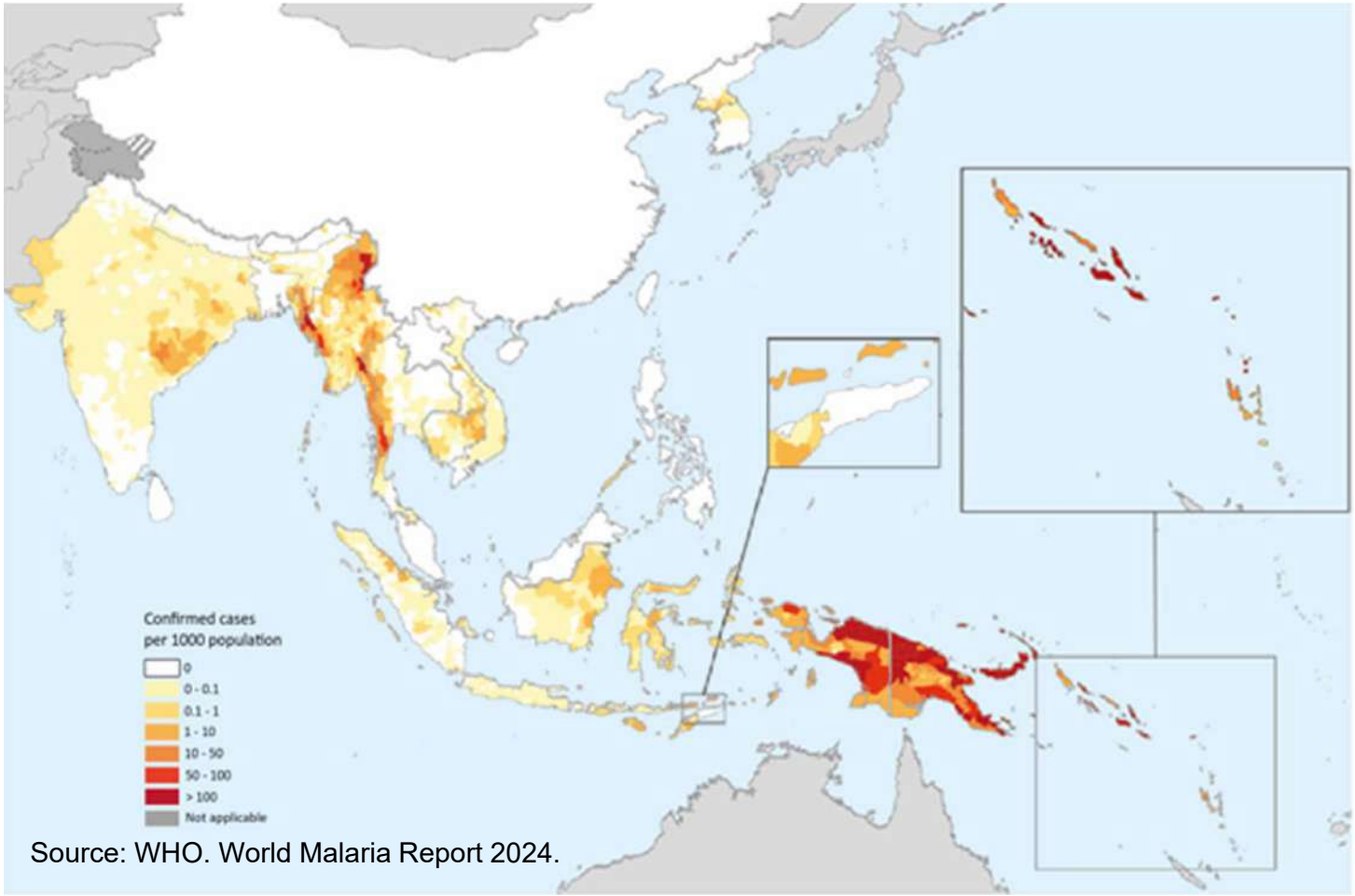
- ~110 staff (researchers, services, finance and admin)
- 96% Indonesians; 4 expatriates
- Revenue: ~2-5 million USD/year

GEOSPATIAL EPIDEMIOLOGY – CORE BUSINESS

1) Generating a knowledge landscape of infectious diseases by :
   - *Quantifying of infectious diseases burden and associated risk factors.*
   - *Producing high spatial resolution maps using geospatial analysis techniques.*
   - *Modelling of disease interventions and assessing impact.*
   - *Utilizing sero-surveillance analytics*
2) Strengthening research capacity and policy engagement at local, national and regional
3) Strengthening epidemiological and statistics analysis for clinical trials and epidemiological studies

Keywords: mapping, statistics, modelling

OUR REGIONAL WAR ZONES



Source: WHO. World Malaria Report 2024.

22 countries

5 countries with no local transmission: Singapore (1982), Brunei Darussalam (1987), Maldives (2015), Sri Lanka (2016), Timor Leste (2025)

17 countries with local transmission: ~ 1.9 billion people live at risk of getting infection

Year 2021-2023

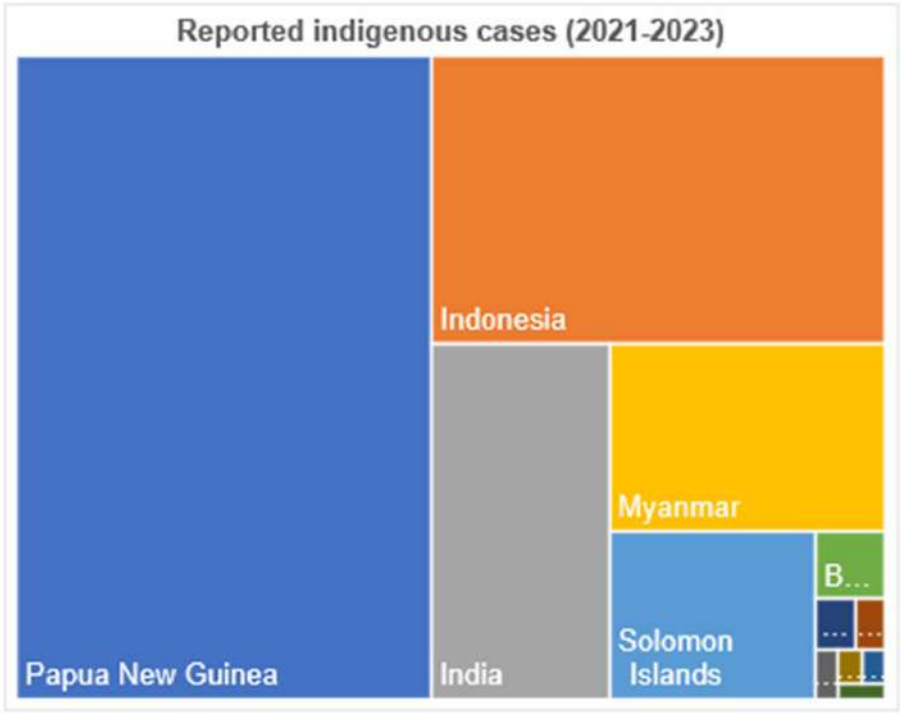
~5 million reported cases (estimate: ~20.2 million)

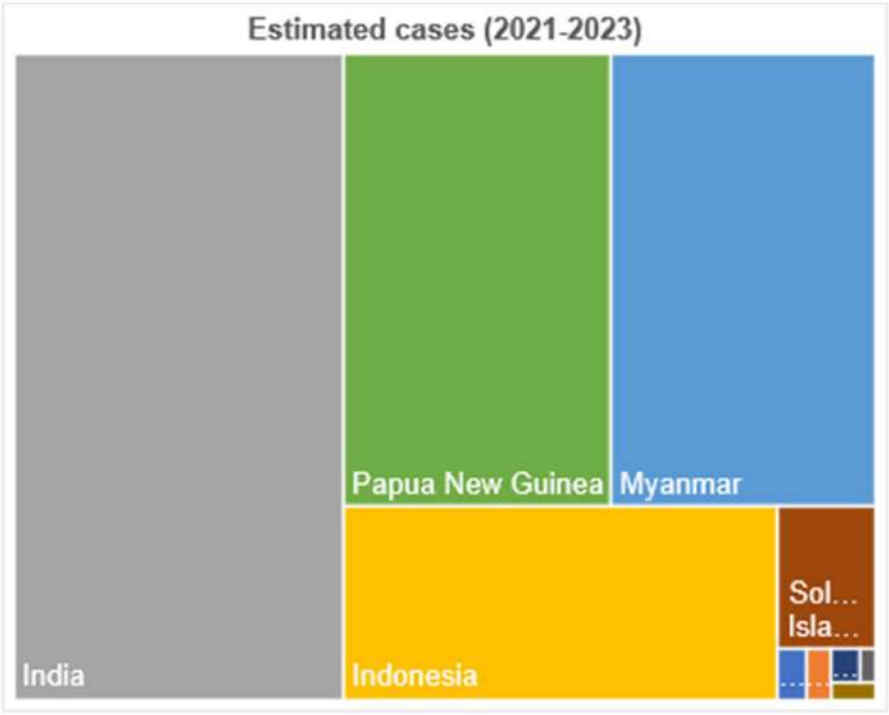
~1.4K reported fatalities (estimate: ~30K)

"Adjustment factor" :

4x (case); 21x (fatalities)

THE UNEQUAL FIGHT





Top four countries contributed 97% of total region estimated cases:

India (38%), Papua New Guinea (22%), Myanmar (21%) and Indonesia (15%).

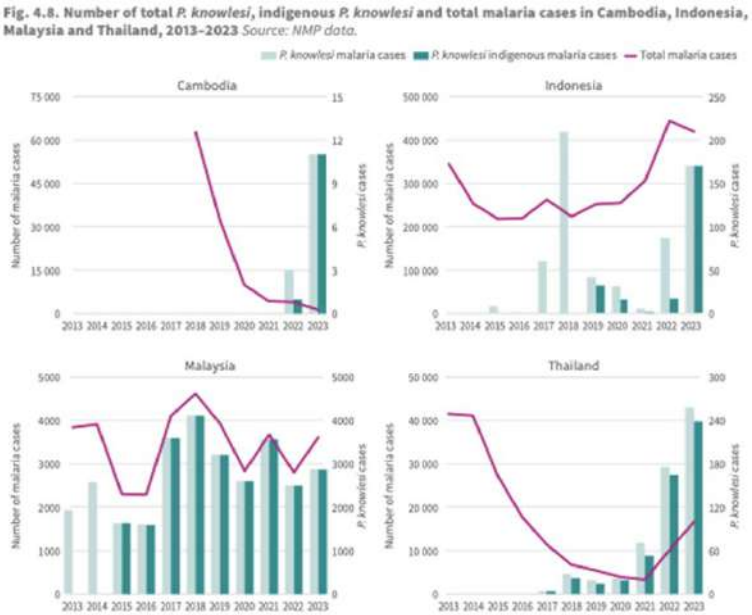
ONE REGION – MULTIPLE THREATS

The NEW ENGLAND JOURNAL of MEDICINE

Artemisinin Resistance in *Plasmodium falciparum* Malaria

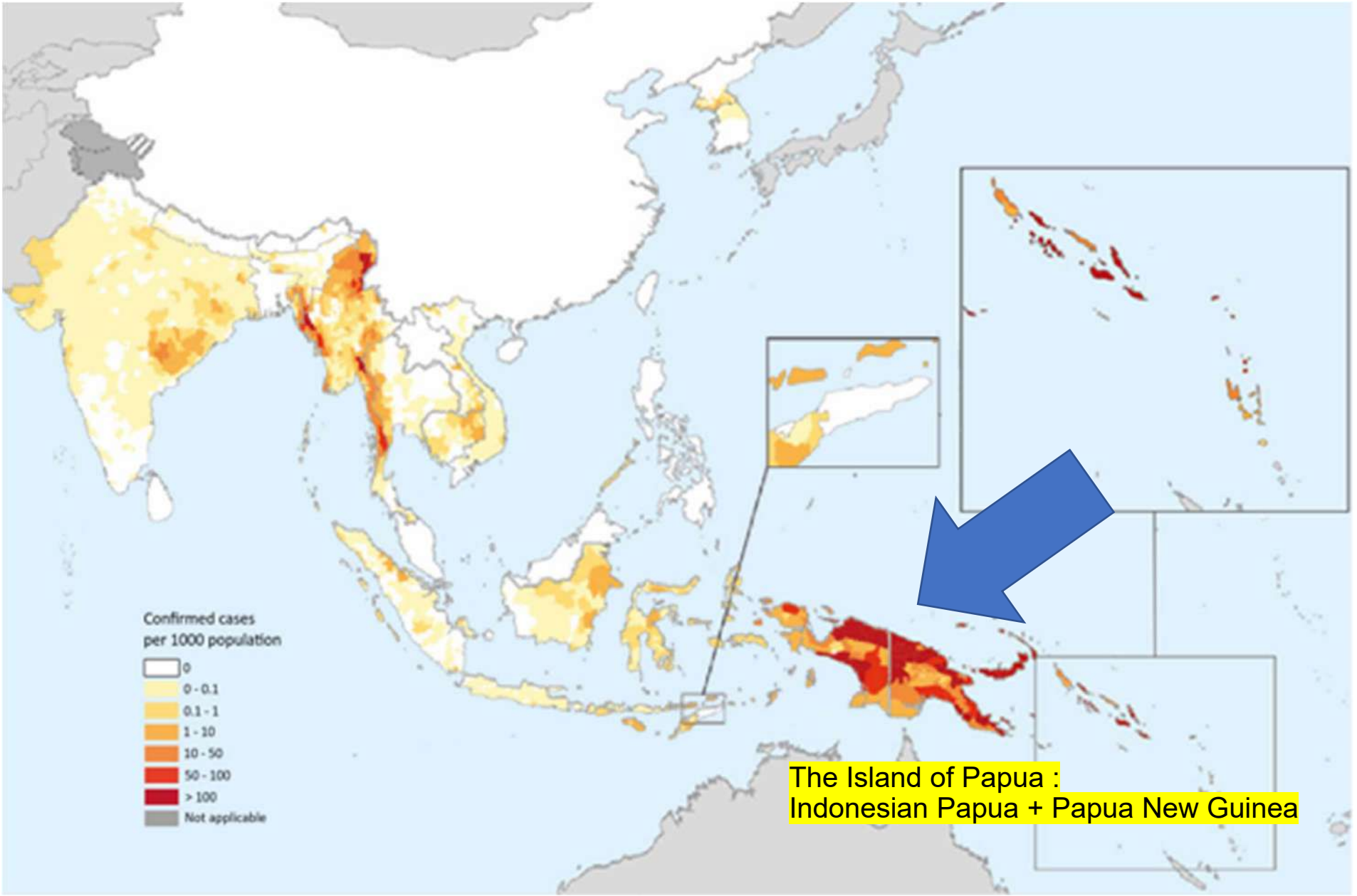
Arjen M. Dondorp, M.D., François Nosten, M.D., Poravuth Yi, M.D., Debashish Das, M.D., Aung Phae Phyo, M.D., Joel Tarning, Ph.D., Khin Maung Lwin, M.D., Frederic Ariey, M.D., Warunee Hanpithakpong, Ph.D., Sue J. Lee, Ph.D., Pascal Ringwald, M.D., Kamolrat Silamut, Ph.D., Mallika Imwong, Ph.D., Kesinee Chotivanich, Ph.D., Pharath Lim, M.D., Trent Herdman, Ph.D., Sen Sam An, Shunmay Yeung, Ph.D., Pratap Singhasivanon, M.D., Nicholas P.J. Day, D.M., Niklas Lindegardh, Ph.D., Duong Socheat, M.D., and Nicholas J. White, F.R.S.

Plasmodium knowlesi



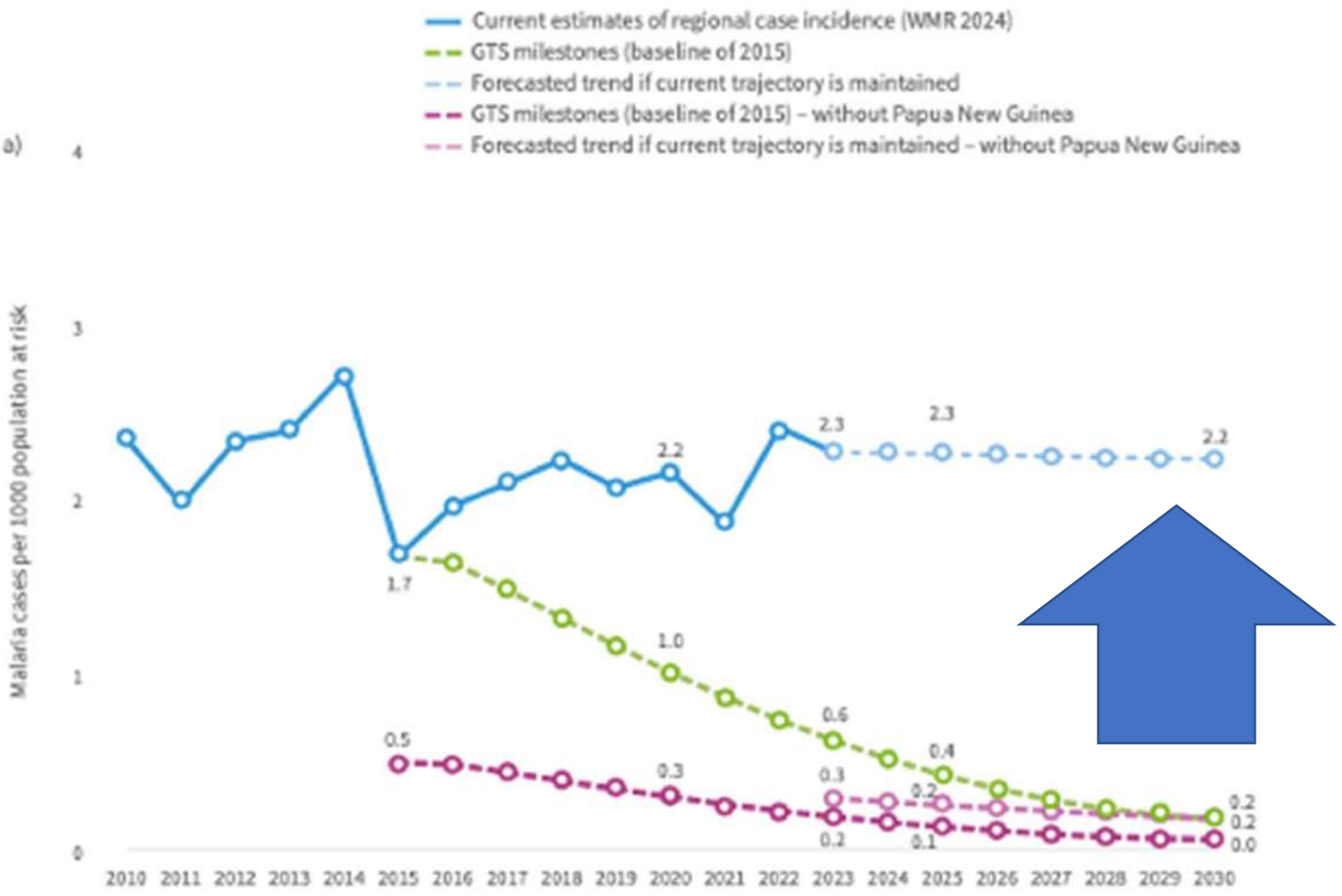
- The potential spread of artemisinin resistance in *P. falciparum* → reducing effectiveness of first-line malaria treatments.
- The dominance of *P. vivax* infections → difficult to eliminate due to dormant liver stages and frequent relapses.
- *A zoonotic parasite, P. knowlesi* → elimination efforts cannot focus solely on human cases.
- The expansion of insecticide resistance in *Anopheles* mosquitoes → reduces the impact of vector-based interventions.
- Low sensitivity of diagnostic tools → miss low-density parasitemia.
- Weak cross-border coordination
- Unoptimized regional surveillance and response systems.

PROGRESS THERE, PROBLEM HERE



BUSINESS AS USUAL IS FAILING THE REGION

Fig. 3.8. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO Western Pacific Region considering four scenarios with and without the inclusion of Papua New Guinea: current trajectory maintained (blue; light purple) and GTS targets achieved (green; dark purple) *Source: WHO estimates.*



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report*.

PROBLEM 1: HIGH UNDETECTED INFECTIONS

	All infections	*P. falciparum*	*P. vivax*
Total blood samples	2016	2016	2016
Number of infections by microscopy (%)	149 (7%)	57 (3%)	411 (20%)
Number of infections by microscopy or PCR	540 (27%)	105 (5%)	80 (4%)
Number of submicroscopic infections	391 (20%)	48 (2%)	331 (16%)
Proportion of submicroscopic infections	**391/540 (72%)**	**48/105 (46%)**	**331/411 (80%)**

Sutanto I, Kosasih A, Elyazar IRF, et al. Negligible Impact of Mass Screening and Treatment on Mesoendemic Malaria Transmission at West Timor in Eastern Indonesia: A Cluster-Randomized Trial. Clin Infect Dis. 2018 Oct 15;67(9):1364-1372.

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UN-TREATED INFECTIONS → TRANSMISSION CONTINUES !!

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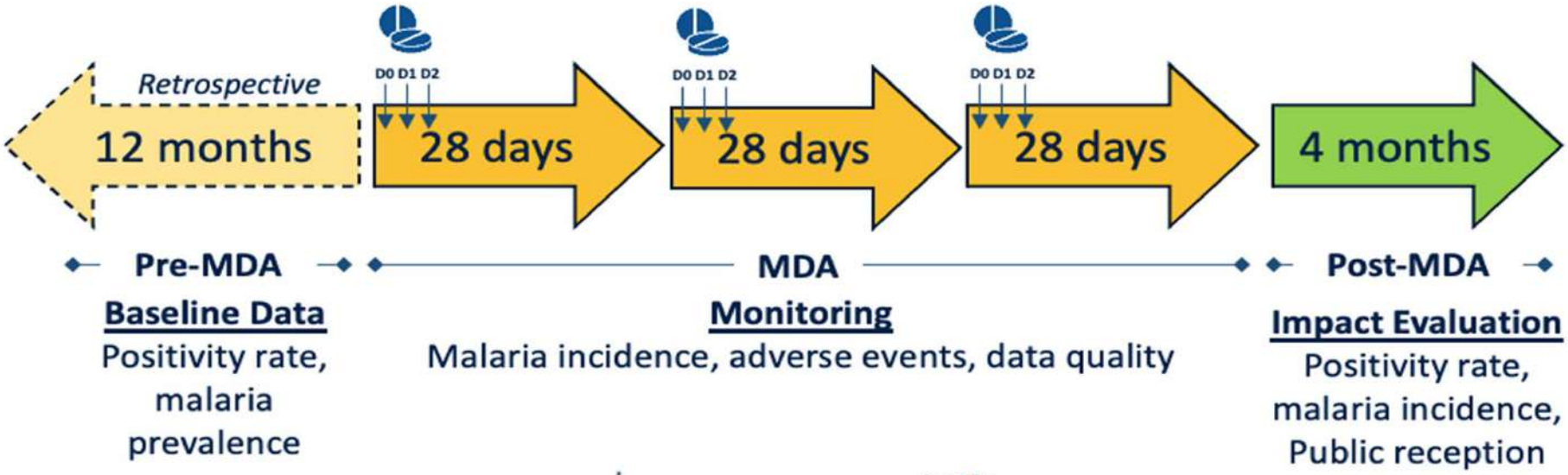
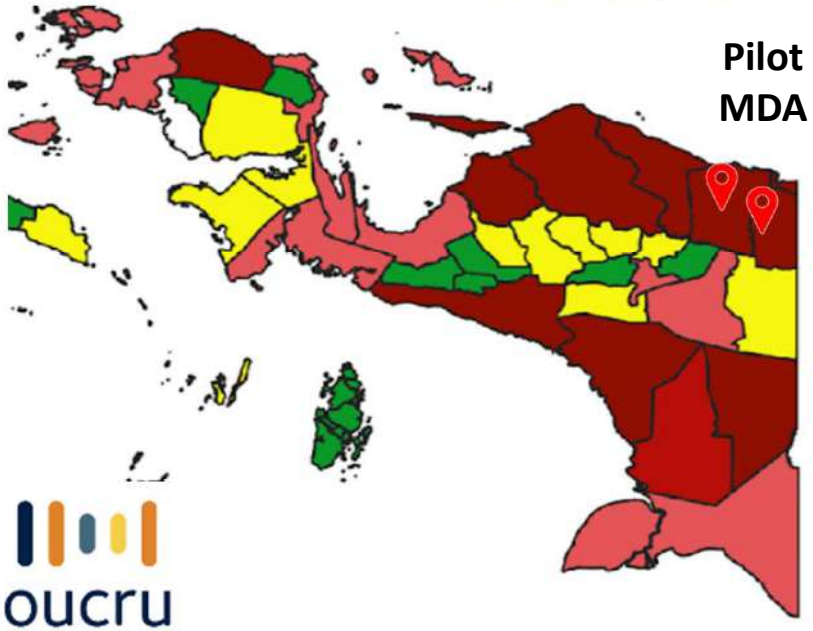
PILOT MASS DRUG ADMINISTRATION





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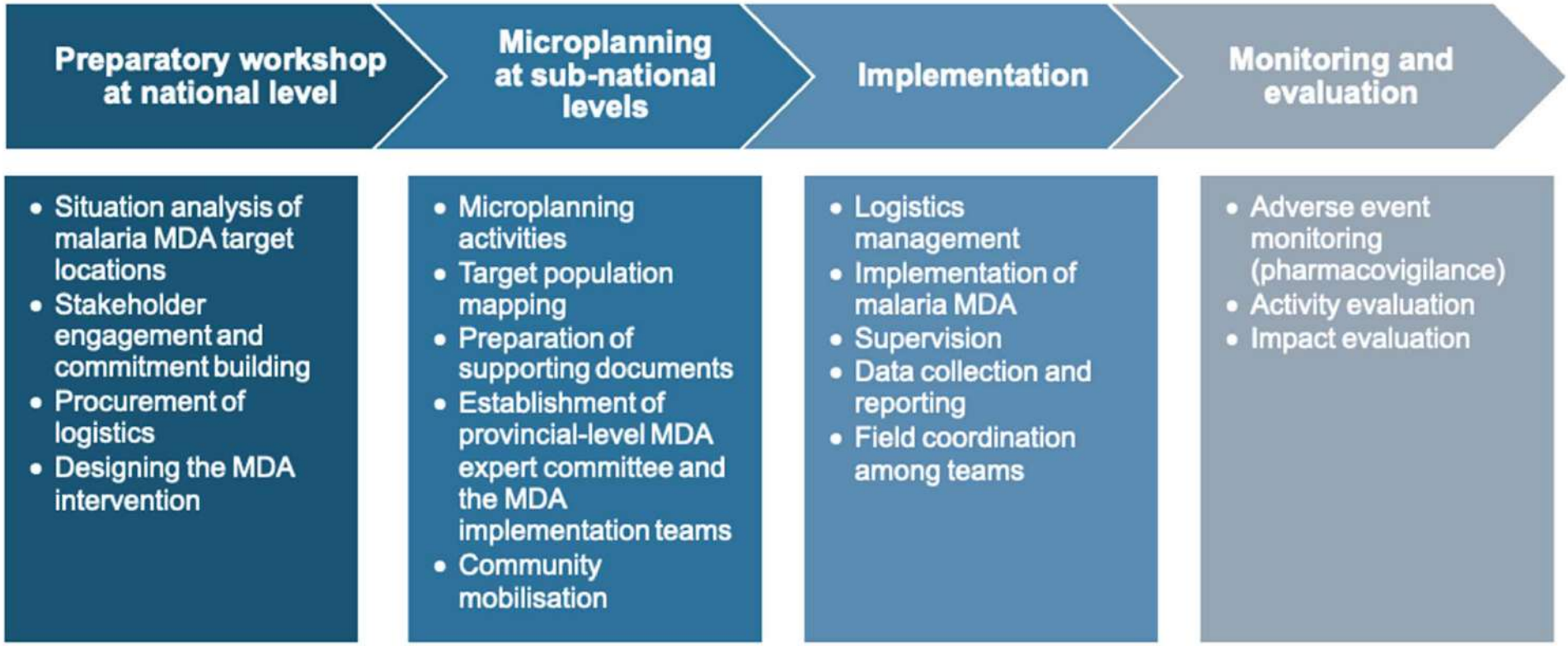
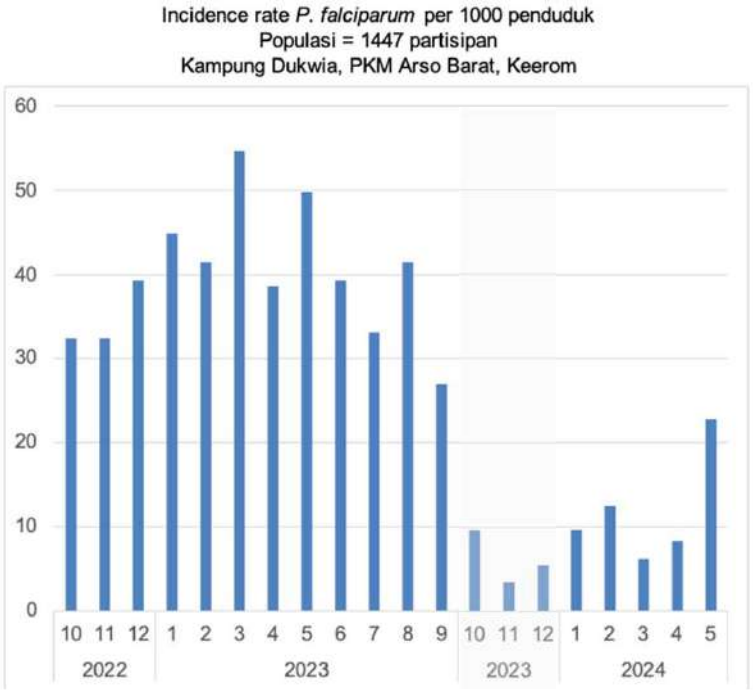
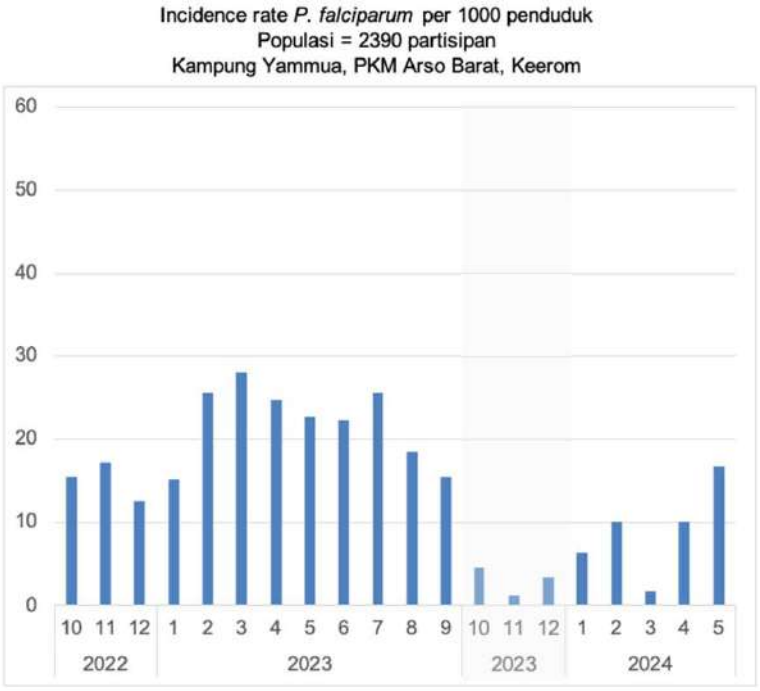
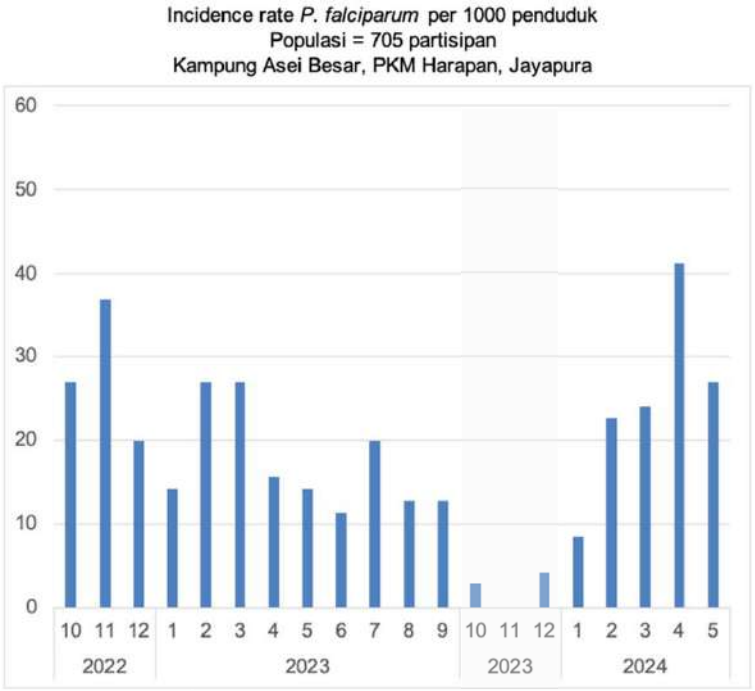
PILOT MASS DRUG ADMINISTRATION

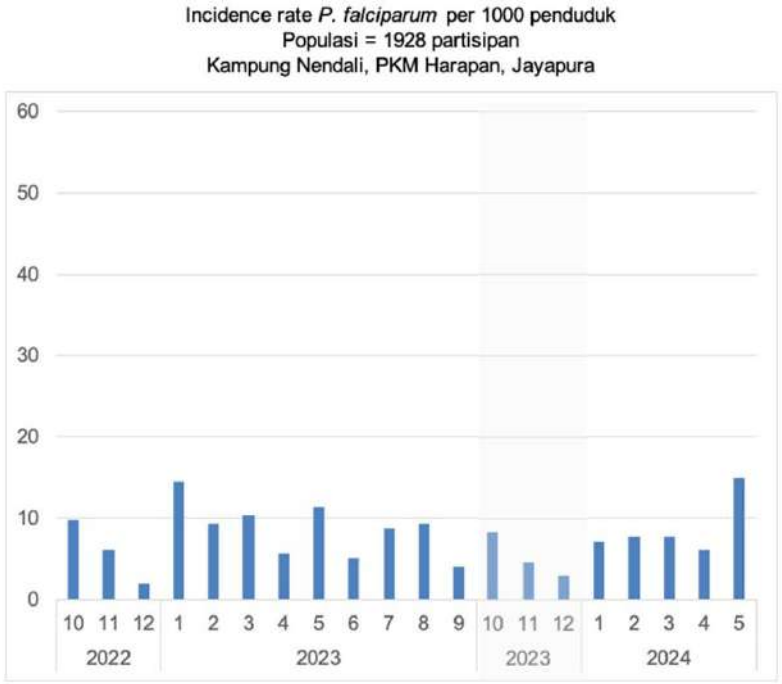






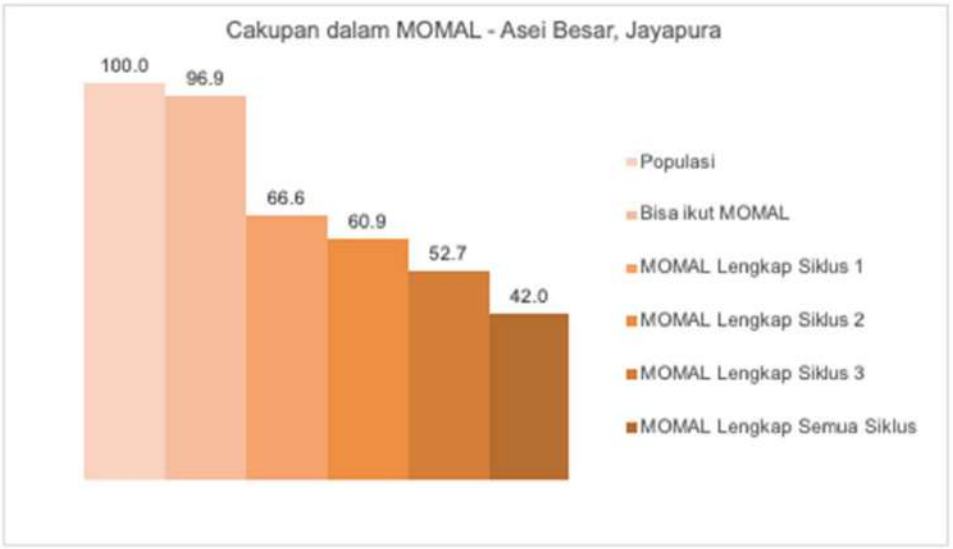
MDA	Dukwia (n = 1447)		Yammua (n = 2390)	
	Average incidence rate per 1000 population	Change	Average incidence rate per 1000 population	Change
Before	40	Reference	20	Reference
During	6	-84%	3	-85%
After	12	-70%	9	-56%

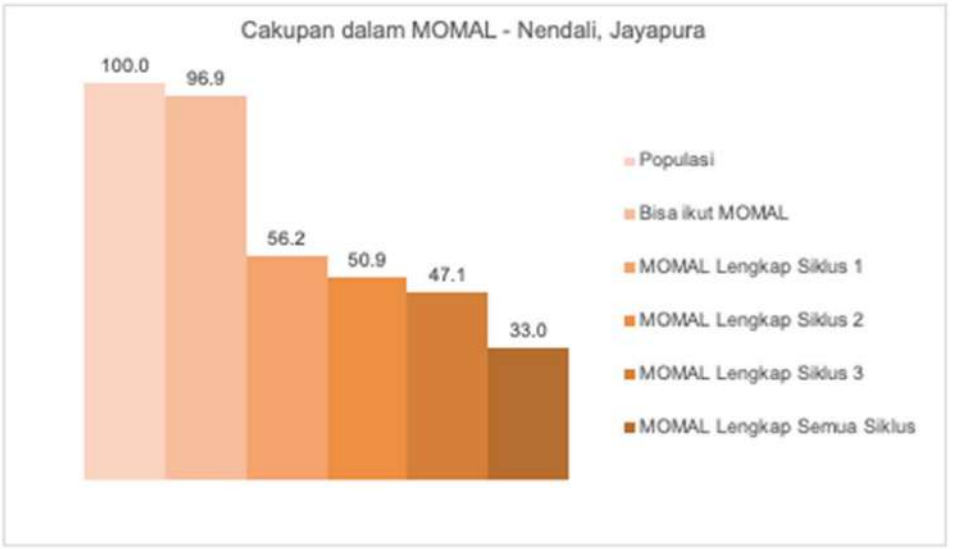


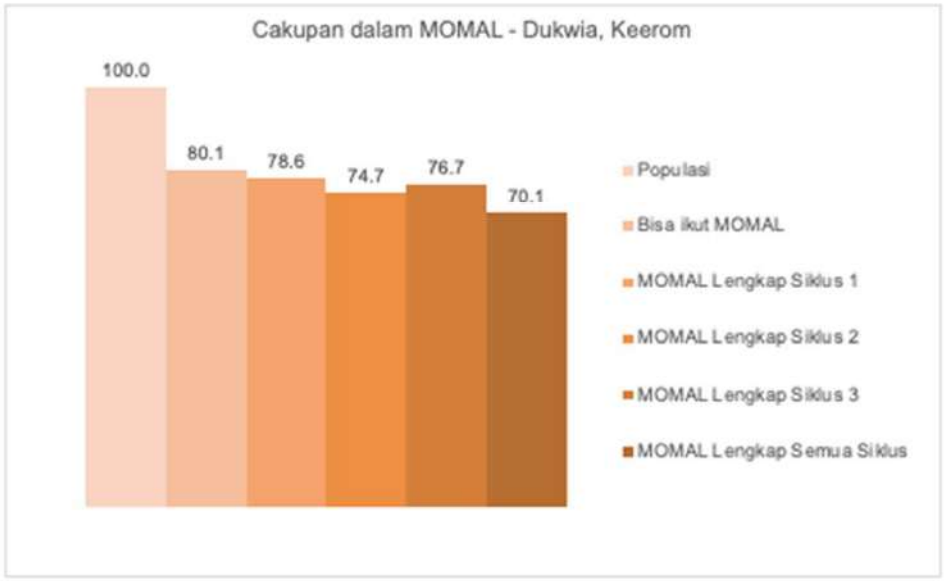


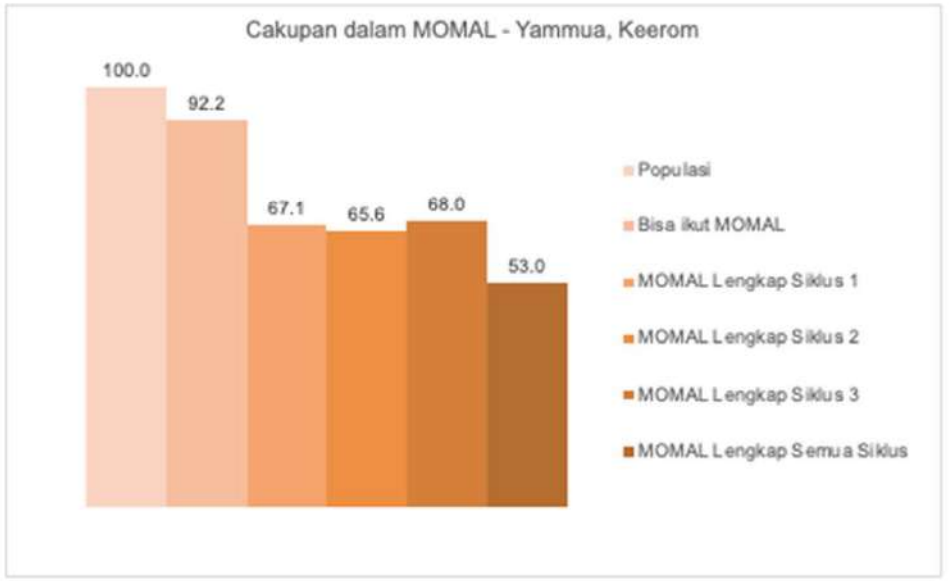
MDA	Asei Besar (n = 705)		Nendali (n = 1928)	
	Average incidence rate per 1000 population	Change	Average incidence rate per 1000 population	Change
Before	20	Reference	8	Reference
During	2	-88%	5	-34%
After	25	+24%	9	+9%

PILOT MASS DRUG ADMINISTRATION









PROBLEM 2: ANTI-RELAPSE DRUGS

- **Latent liver-stage hypnozoites** of *Plasmodium vivax* can cause **repeated malaria episodes**, known as **relapses**.
- Currently, **only two drugs** are effective against hypnozoites: Primaquine/PQ (since 1950s) and Tafenoquine/TQ (clinical trials).
- **Challenges** with PQ use:
  - National guidelines recommend **0.25 mg/kg/day for 14 days**, but some studies suggest **0.5 mg/kg/day** may be more effective.
  - **Poor patient adherence**: Only around **10%** of patients complete the full 14-day course **without supervision**.
  - **Higher doses increase the risk of** destruction of red blood cells (haemolysis).
  - Higher dose + shorten period (7 days) requires prior **G6PD enzyme testing** — individuals with **G6PD deficiency must not take primaquine**, due to the risk of severe haemolysis.
- **These drugs** may also depend on **CYP2D6 enzyme activity** for therapeutic effect.
- The effectiveness of primaquine (and possibly tafenoquine) may depend on **CYP2D6**, a **genetically variable liver enzyme** that activates the drug.
- G6PD and CYP2D6 testing may become increasingly important in guiding anti-relapse reatment.

PROBLEM 2: ANTI-RELAPSE DRUGS

Nelwan, E.J., Ekawati, L.L., Tjahjono, B. *et al.* Randomized trial of primaquine hypnozoitocidal efficacy when administered with artemisinin-combined blood schizontocides for radical cure of *Plasmodium vivax* in Indonesia. *BMC Med* **13**, 294 (2015).

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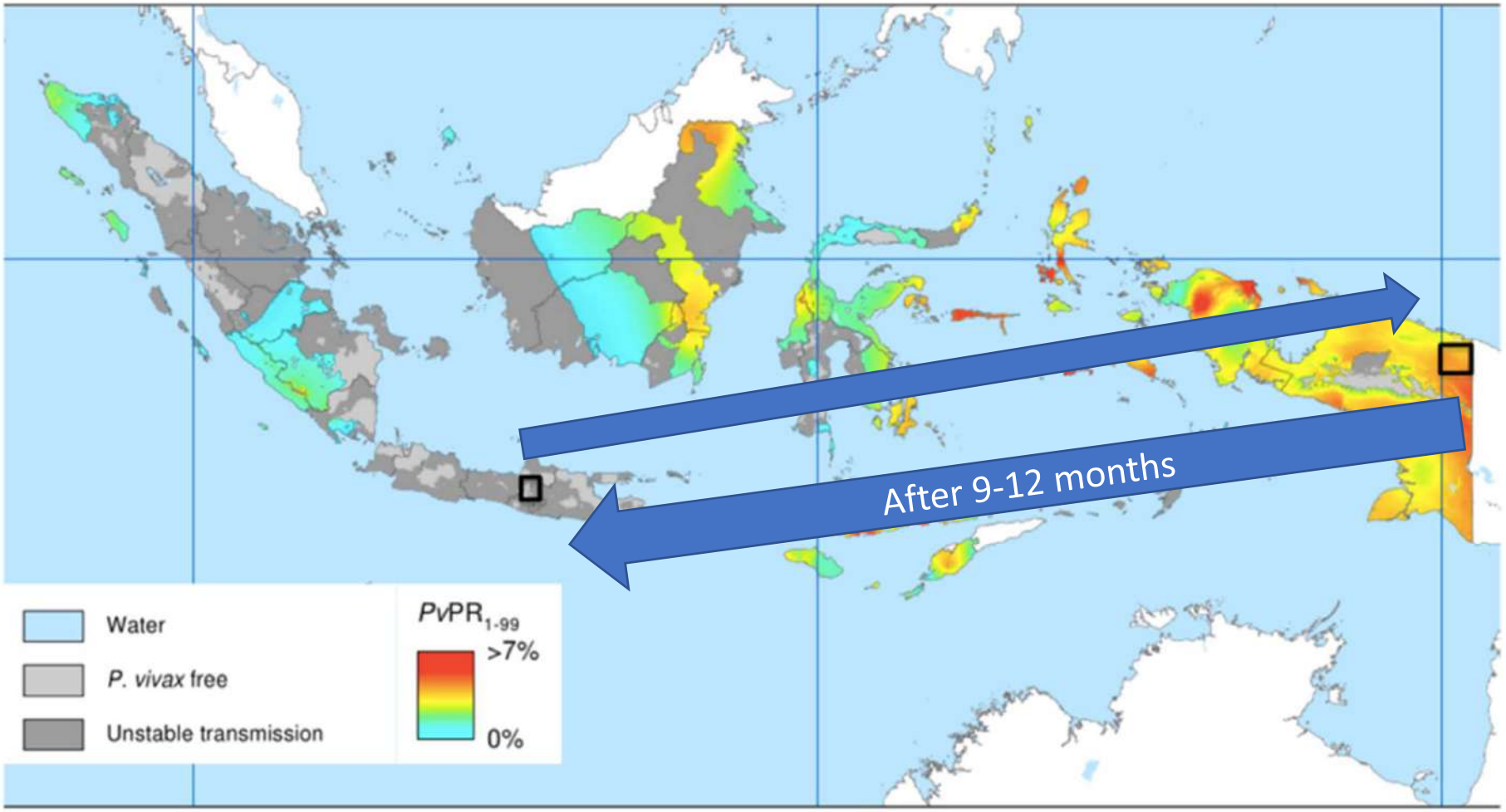

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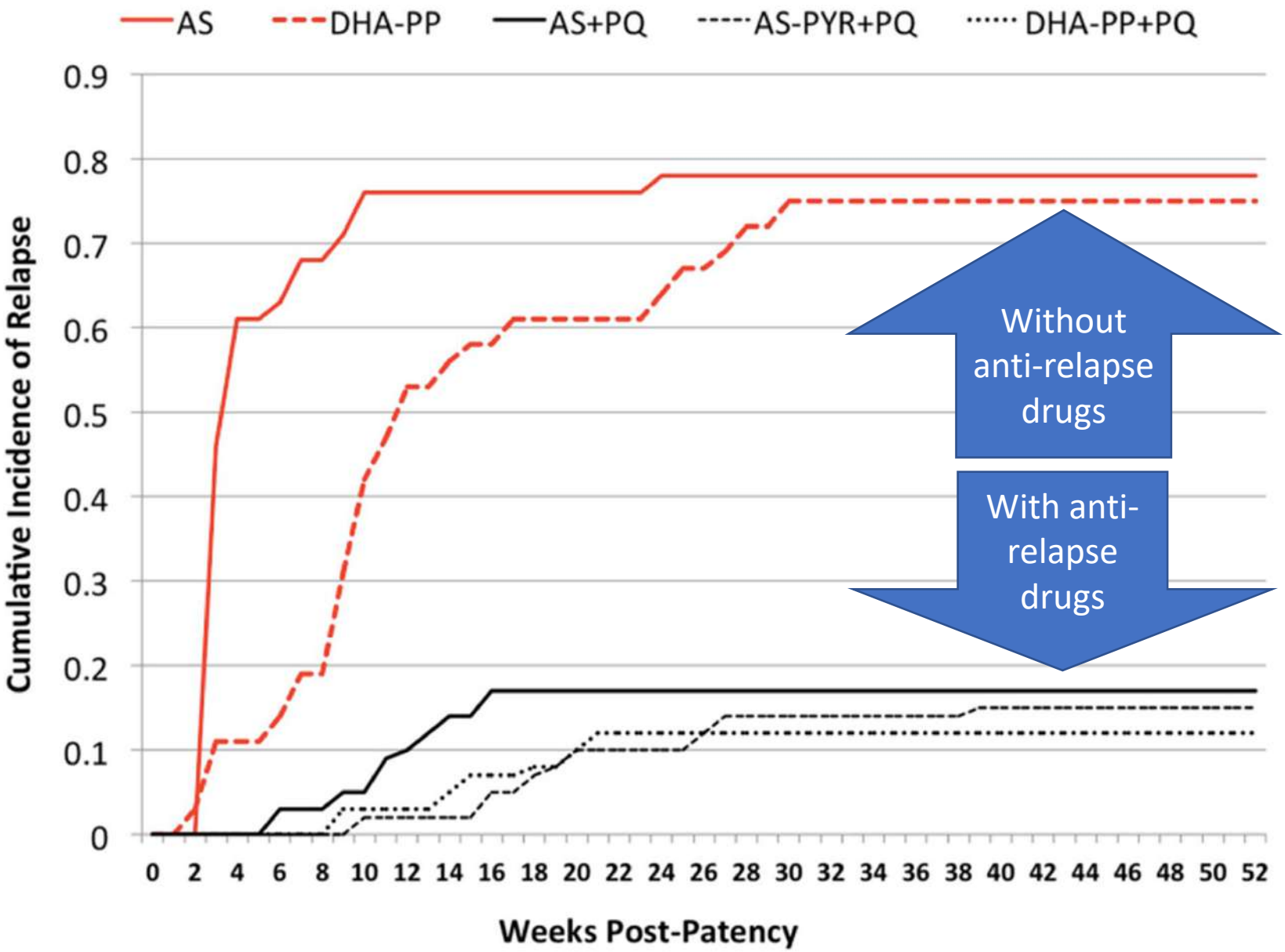
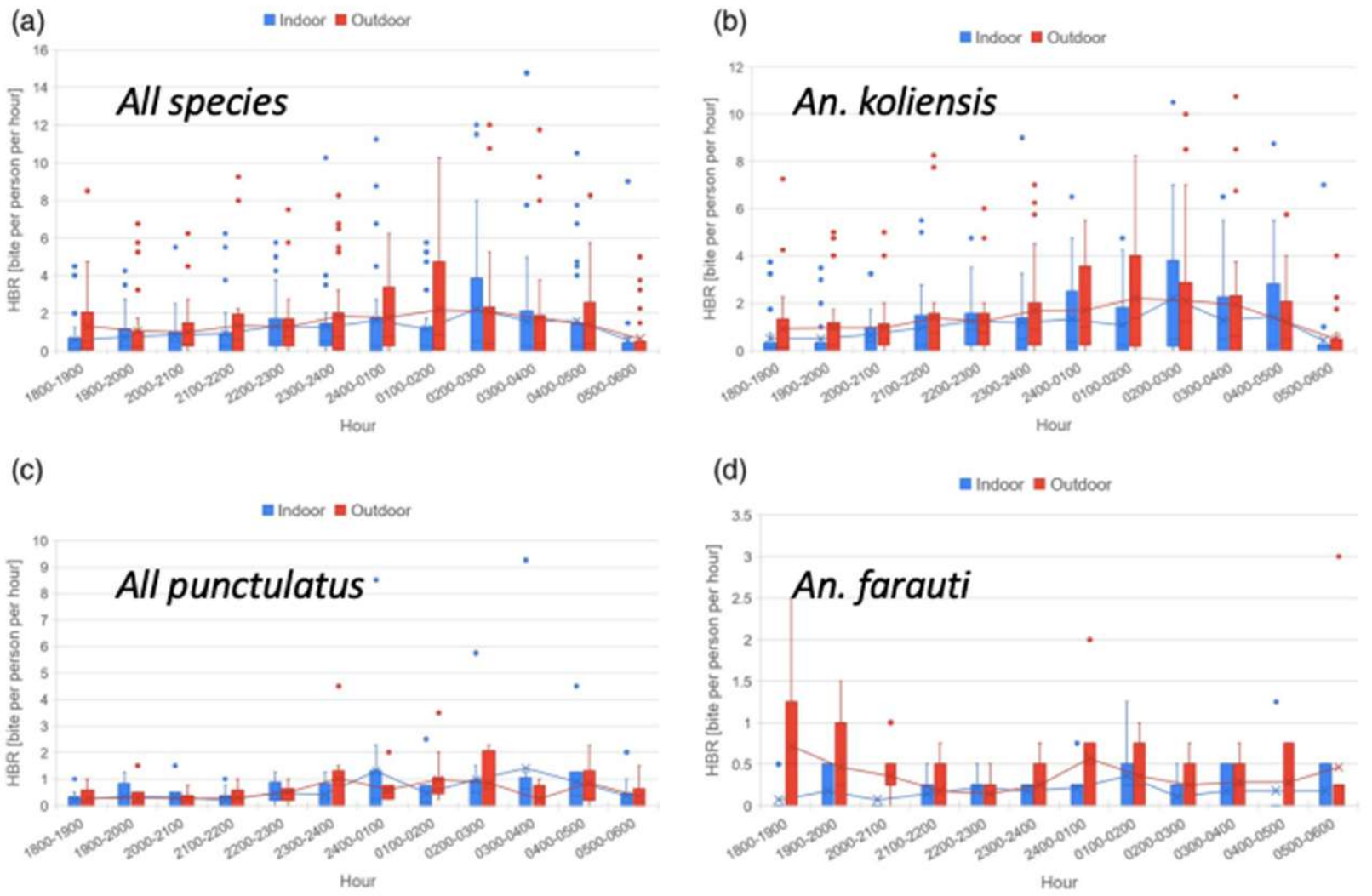


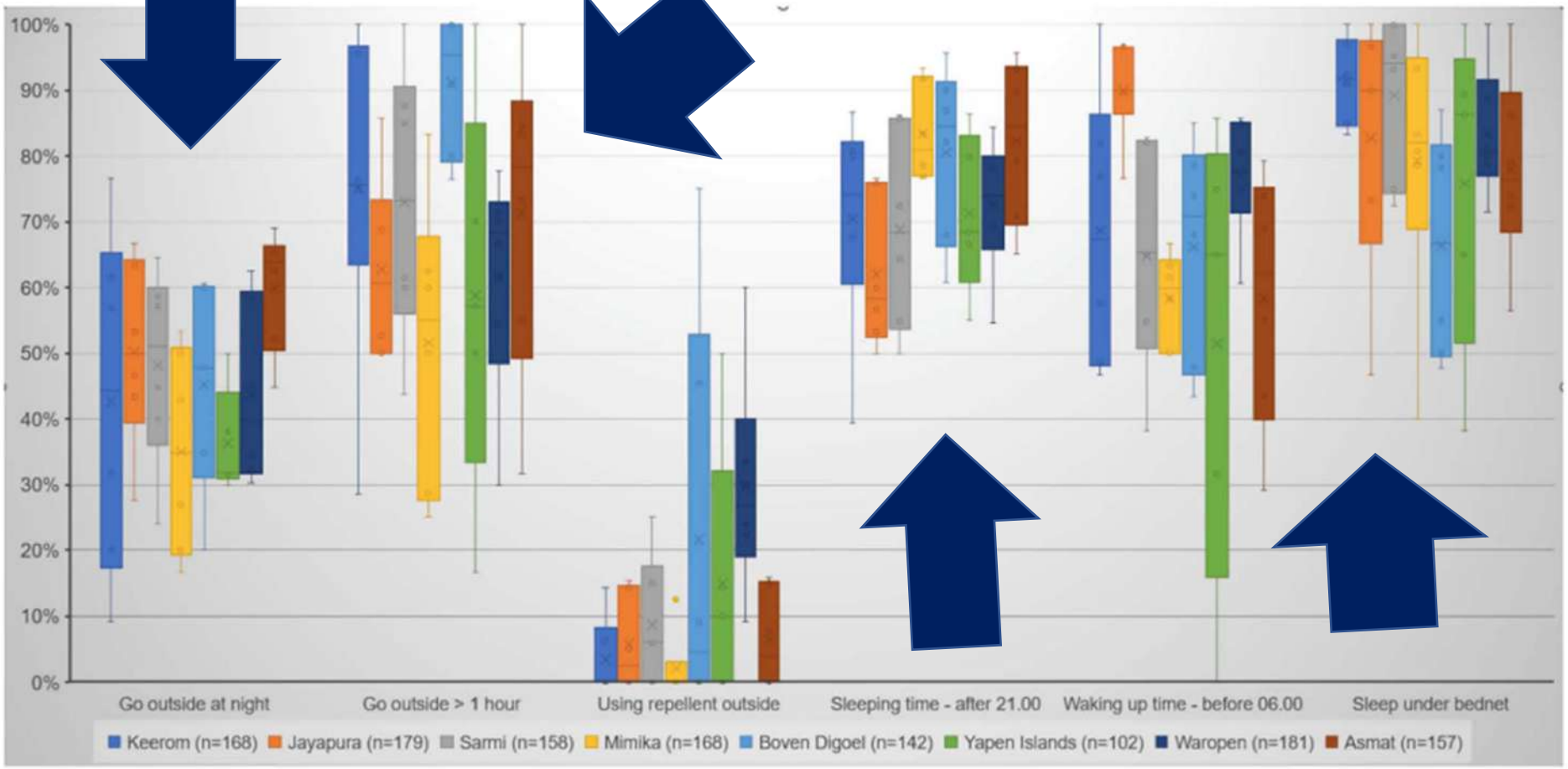
PROBLEM 3: OUTDOOR AND EARLY BITERS



1.6 infectious bites per person per night.

PROBLEM 3: OUTDOOR AND EARLY BITERS

UN-PROTECTED BEHAVIOURS



Rozi IE, Syahrani L, Permana DH, Asih PBS, et al. Gaps in protection to Anopheles exposure in high malaria endemic regencies of Papua Province, Indonesia. PLoS One. 2025 Apr 11;20(4):e0311076.

WHAT ARE THE POTENTIAL SOLUTIONS

PROBLEMS	POTENTIAL SOLUTIONS
HIGH UNDETECTED INFECTIONS	• AI-BASED AUTOMATED MICROSCOPIC DIAGNOSIS • AI-BASED SMART NOSE TO DETECT MOLECULES EMITTED BY PARASITES THROUGH SKINS TO ATTRACT MOSQUITOES
ANTI-RELAPSE DRUGS	• SINGLE DOSE OF ANTIRELAPSE RADICAL CURE
OUTDOOR AND EARLY BITERS	• VACCINE • LARVA SOURCE REDUCTION

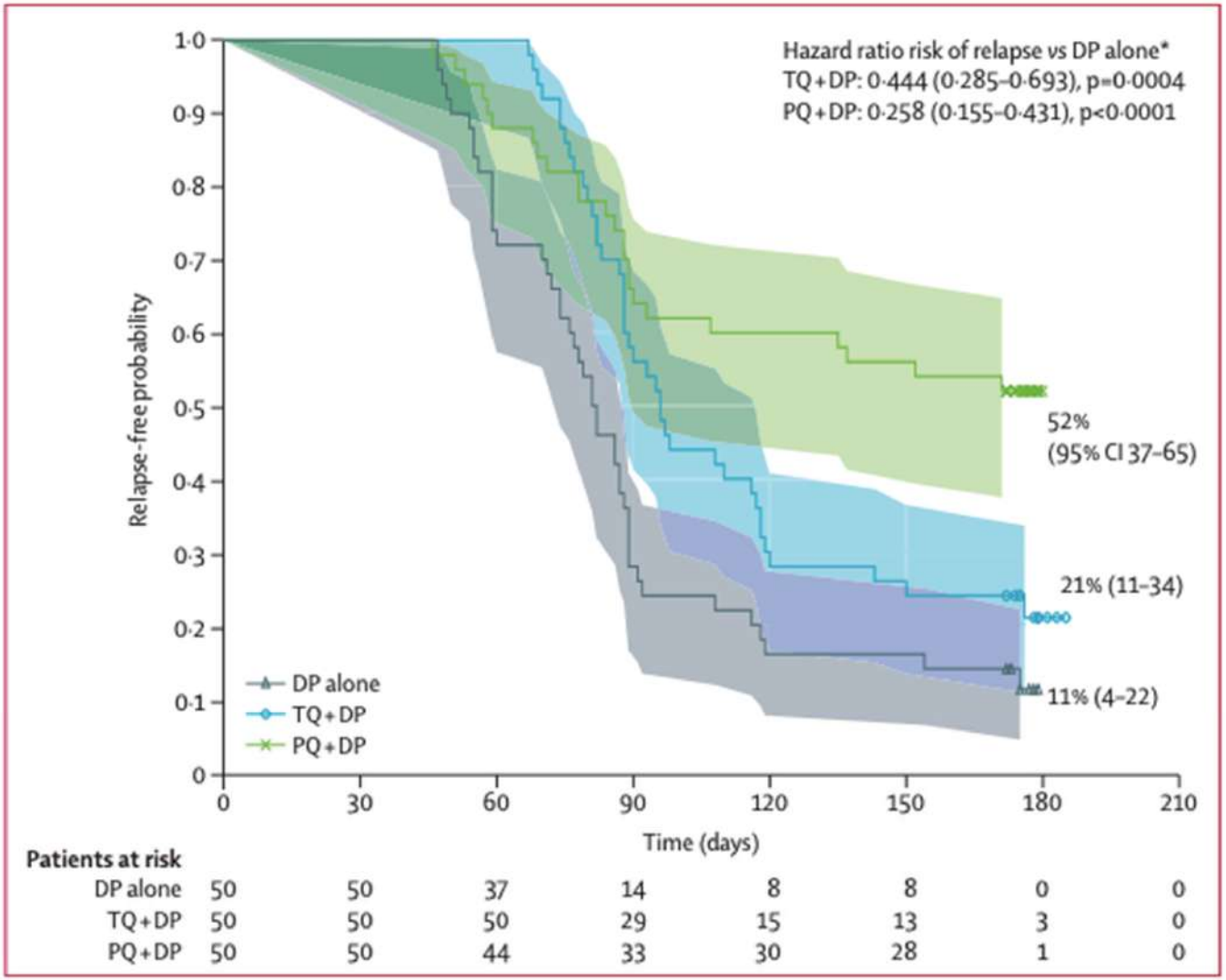


***Figure 2*: Kaplan-Meier survival curves for 6-month relapse-free efficacy for the microbiological intention-to-treat population**

Sutanto I, Soebandrio A, Ekawati LL, et al. Tafenoquine co-administered with dihydroartemisinin-piperaquine for the radical cure of Plasmodium vivax malaria (INSPECTOR): a randomised, placebo-controlled, efficacy and safety study. Lancet Infect Dis. 2023 Oct;23(10):1153-1163.

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IDSPZV1

Study Vaccine and Design

Inclusion: healthy malaria-naïve soldiers age 18-55 years old
Randomization to the two main groups is 1:1 and open label
Randomization to vaccine or placebo is 2:1 and double blind.

Two arms of vaccines / normal saline placebo

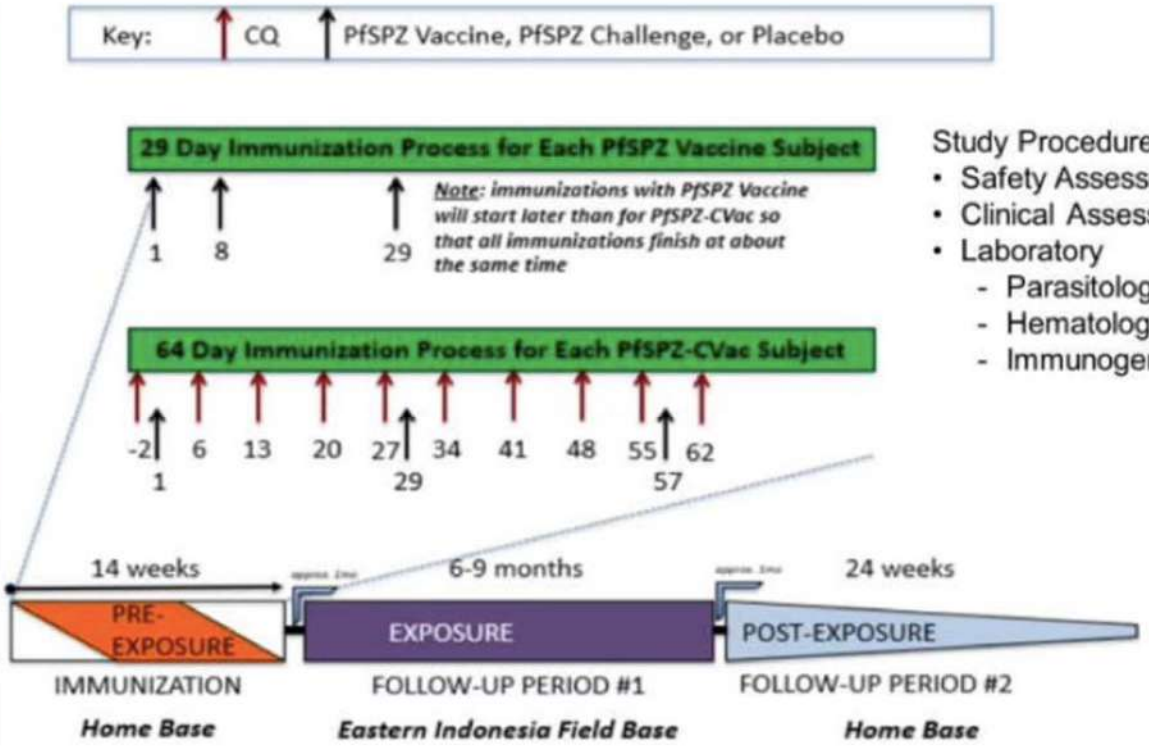
PfSPZ Vac/Placebo
n = 172 randomized

Radiation attenuated

PfSPZ-CVac/Placebo
n = 173 randomized

Chemo-attenuated (blood stage prophylaxis /chloroquine)

Study schema for immunizations with PfSPZ Vaccine and PfSPZ-CVac.



Study Procedures:
- Safety Assessment
- Clinical Assessment
- Laboratory
  - Parasitology
  - Hematology
  - Immunogenicity

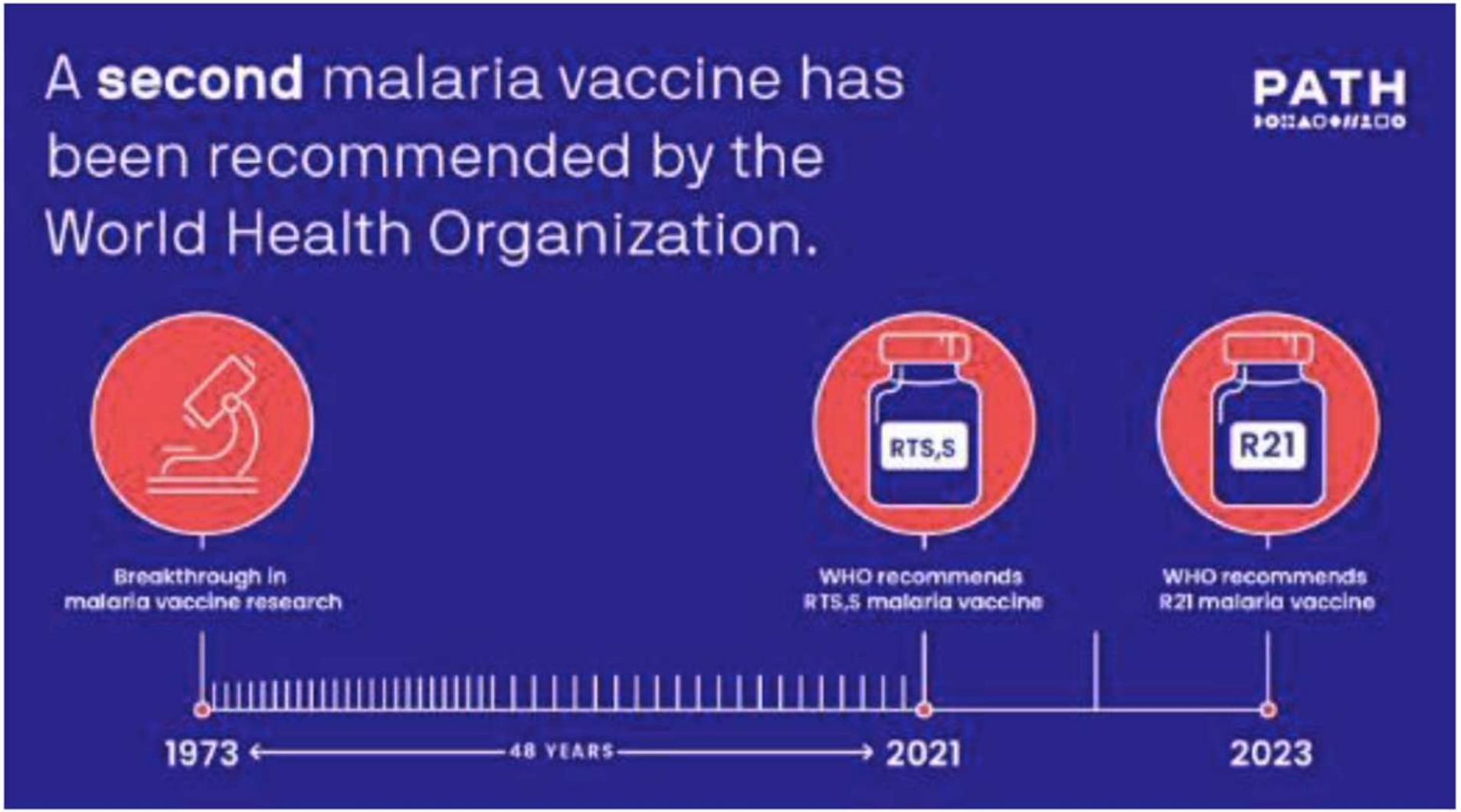
Vaccine Efficacy (VE)

1st Pf Clinical Malaria (CM)

	1st CM 24 weeks	P value	1st CM 43.5 weeks	P value
PfSPZ Vaccine	VE = 56%	0.0010	45%	0.0038
PfSPZ-CVac	VE = 50%	0.0044	38%	0.0181

1st Pf Infection (almost the same, as only two asymptomatic Pf infections)

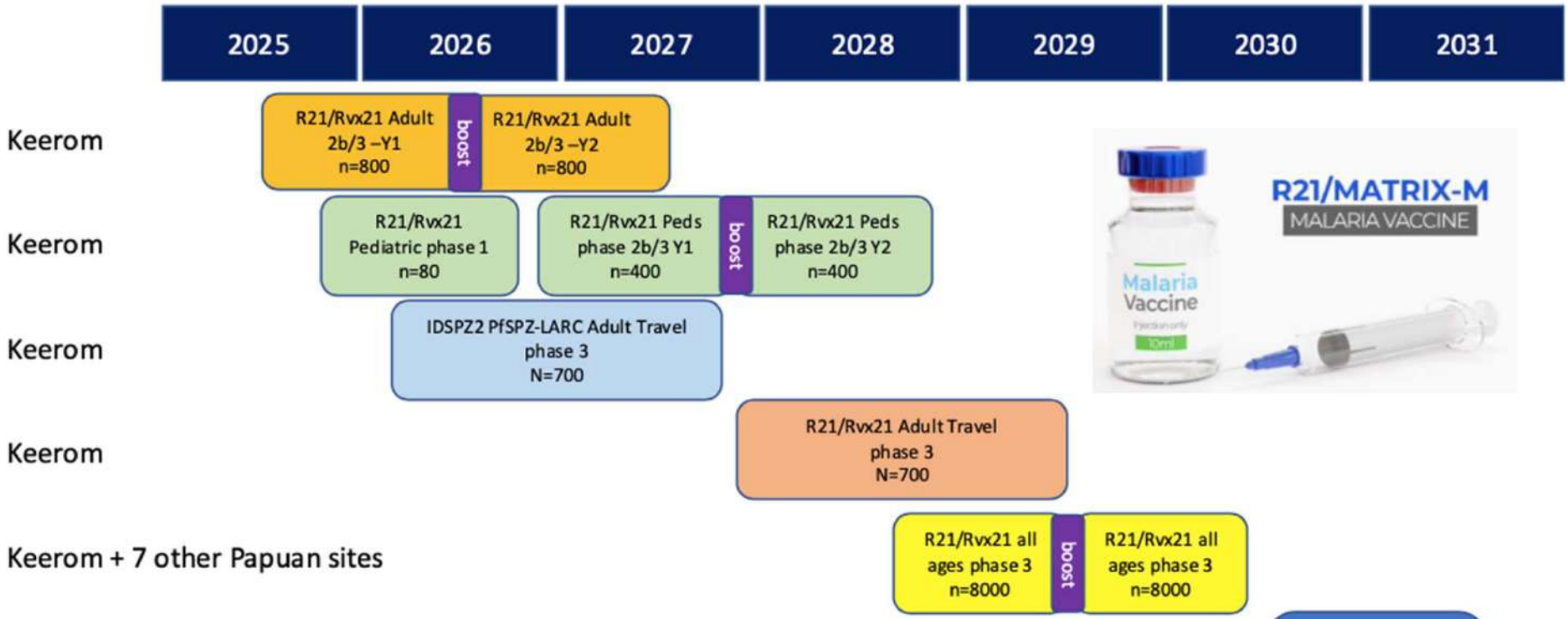
	1st Infection 24 weeks	P value	1st infection 43.5 weeks	P value
PfSPZ Vaccine	VE = 54%	0.0015	46%	0.0029
PfSPZ-CVac	VE = 50%	0.0043	39%	0.0133



As of October 2023, **WHO recommends the programmatic use of malaria vaccines for the prevention of** *P. falciparum* **malaria in children living in malaria endemic areas, prioritizing areas of moderate and high transmission.** This applies to both RTS,S/AS01 and R21/Matrix-M vaccines.

The first malaria vaccine, RTS,S, was recommended by WHO to prevent malaria in children in October 2021. The vaccine has reached nearly 2 million children in Ghana, Kenya and Malawi through the Malaria Vaccine Implementation Programme, MVIP, since 2019.

Vision of OUCRU/FKUI Malaria Vaccine Trials in Papua – Roadmap to Malaria Vaccines for Indonesia

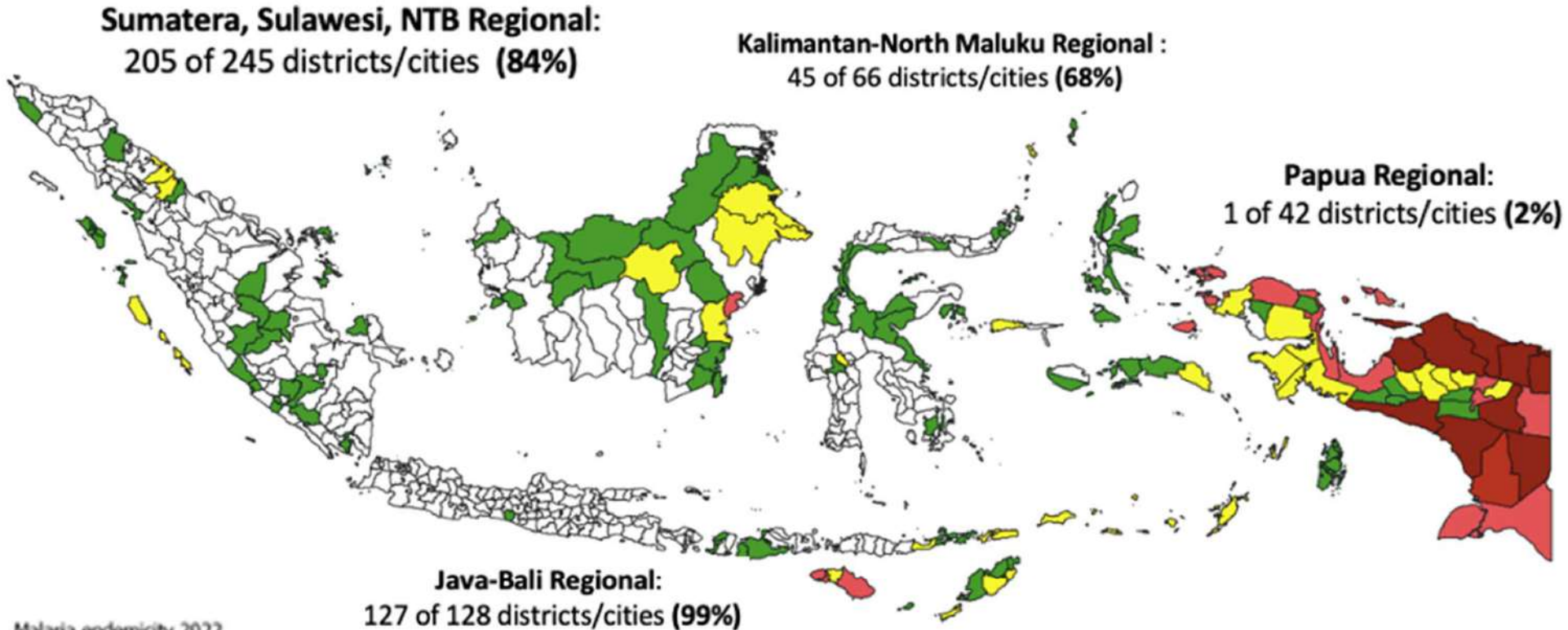


Target prevention : *P. falciparum, P. vivax*

Target demography : *adults, children, travelers*

BPOM review & registration

Eliminating malaria in Papua: How?
"*ambition or delusion*?"



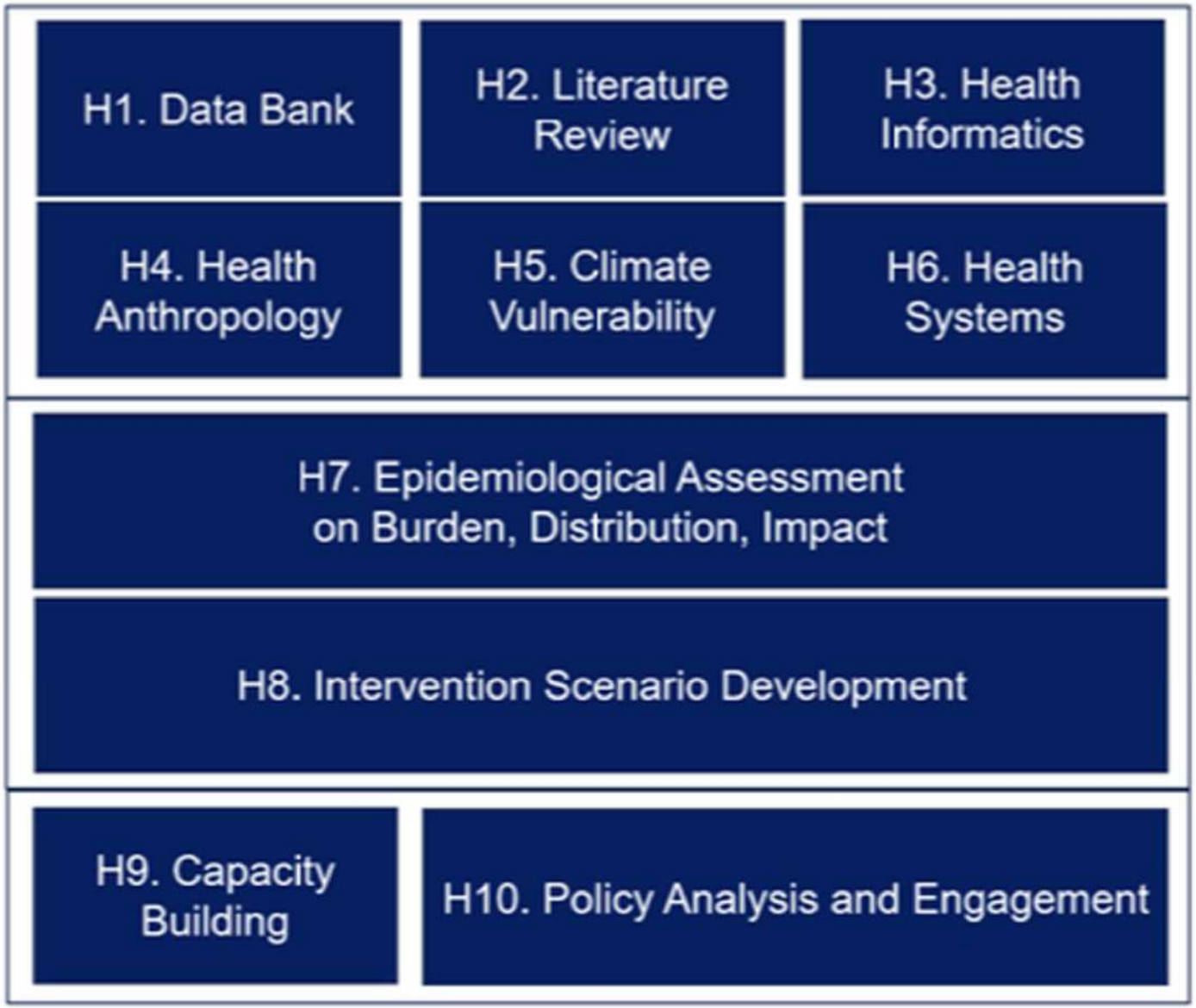
Three challenges: preventing re-introduction, pushing to elimination, and reducing high burden

SHIELD PAPUA - Strengthening Health Initiatives for Eliminating Infectious Diseases in Papua

- *"systematically create a robust framework for generating real evidences, assessing impact and supporting better-informed decision making"*

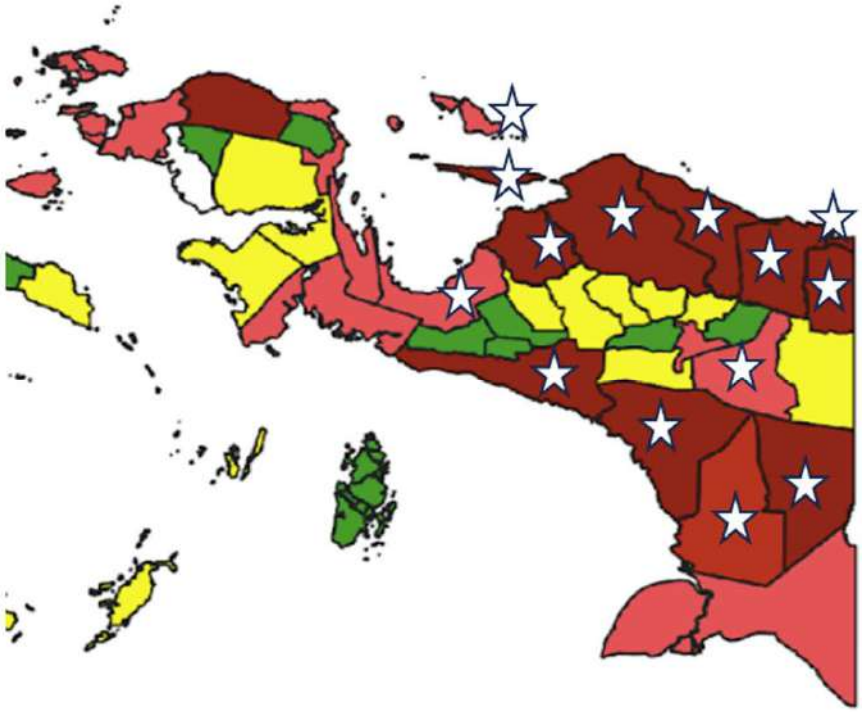
Funders:

- Australian DFAT via University of Melbourne
- MOH via UNICEF;
- Asia Pacific Leaders Malaria Alliance



EPID SITE: PAPUA PUBLIC HEALTH LABORATORY

H3. HEALTH INFORMATICS
OUCRU SUPPORTS ACCELERATION AT 14 HIGH ENDEMIC DISTRICTS



Data-capturing tool
To develop a data-capturing tool for collecting malaria epidemiological and intervention data.

Database and dashboard
To develop a secure database and real-time dashboard summarizing and reporting indicators and analytics collected.

Data-driven recommendation
To perform epidemiological analysis, interpretation, and data-driven recommendations on the interventions in malaria elimination acceleration activities.

Dissemination and trainings
To provide report and develop a manuscript draft of the findings from this evaluation to be ready for publication on international journal, and conduct capacity-strengthening trainings.

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untuk setiap anak

PAPUA
KARYA SWADAYA

PAPUA TENGAH
BANGKITLAH NEGERIKU

PAPUA PEGUNUNGAN

PAPUA SELATAN
BERKARYA BERSAMA HATI

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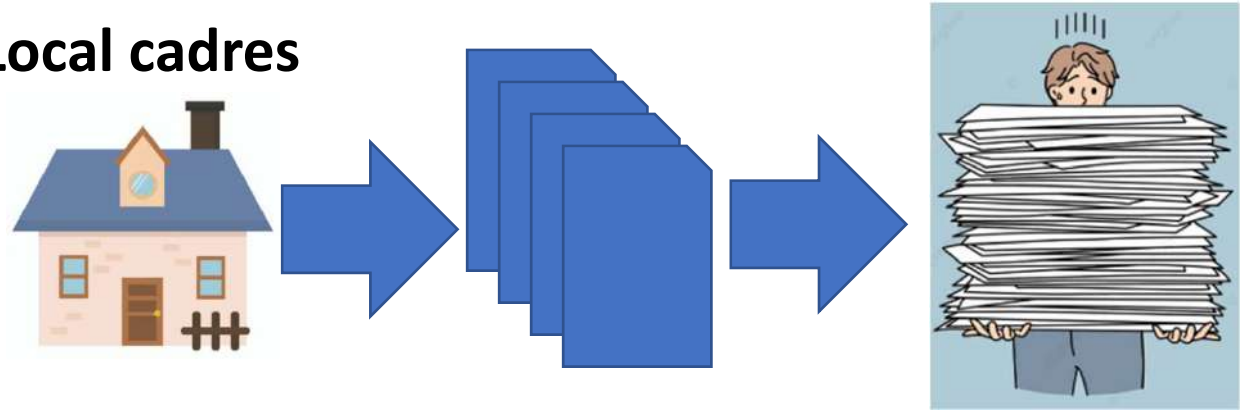
REAL TIME LOCAL RISK PROFILING & MONITORING

Local cadres



50-70 houses/month

Traditional

Households	Members of household	Individual Risk
Environmental Risk	Breeding habitats	

REAL TIME LOCAL RISK PROFILING & MONITORING

Local cadres

50-70 houses/month/cadre

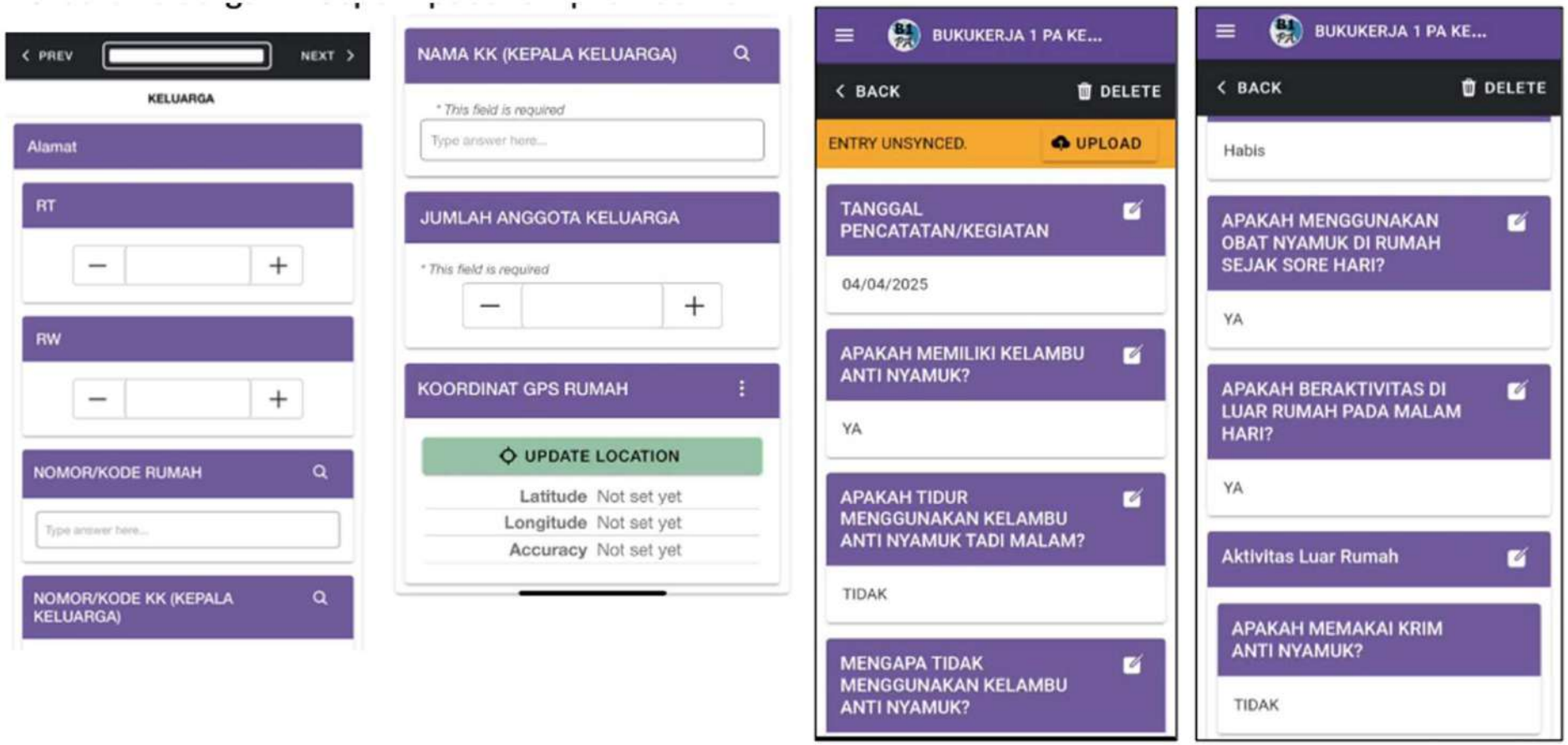
Traditional

Digitalization

Local cadres

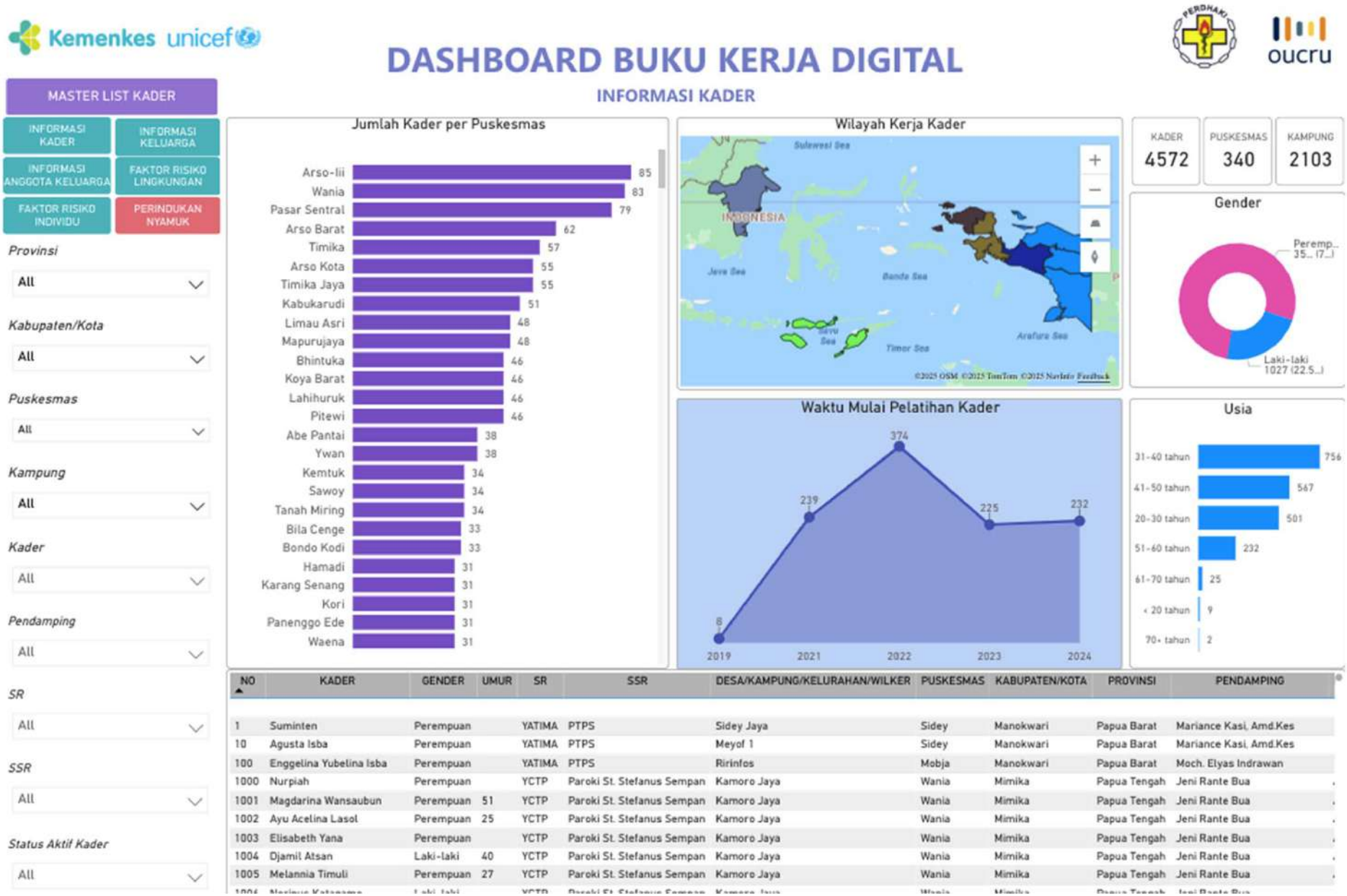
50-70 houses/month/cadre

REAL TIME LOCAL RISK PROFILING & MONITORING



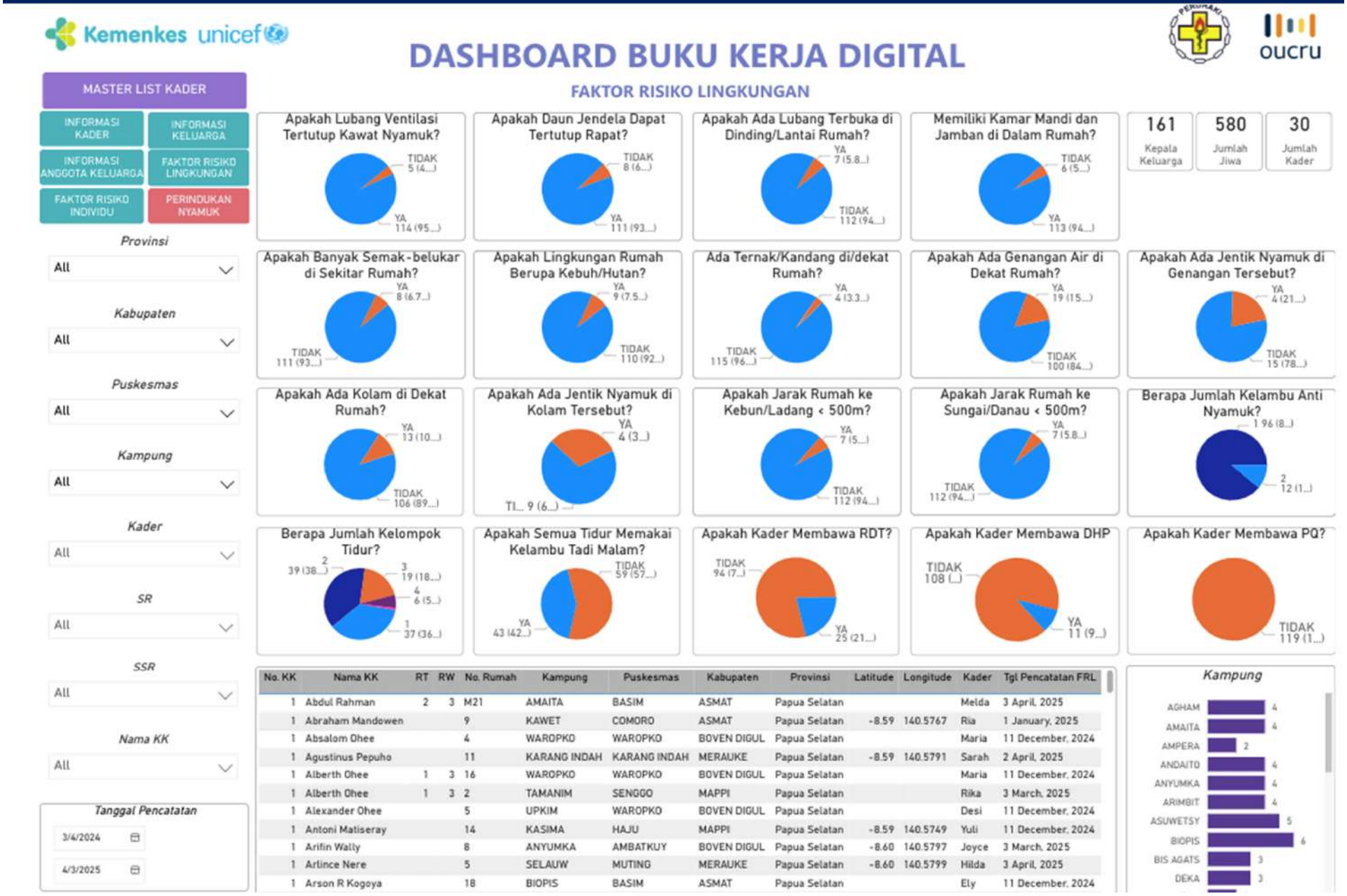
One cadre can collect 50-70 data points per month. Over 3 months, this will accumulate to 150-210 data points.
With 4,500 cadres, at least 675,000 to 975,000 data points will be collected every 3 months.

REAL TIME LOCAL RISK PROFILING & MONITORING



NO	KADER	GENDER	UMUR	SR	SSR	DESA/KAMPUNG/KELURAHAN/WILKER	PUSKESMAS	KABUPATEN/KOTA	PROVINSI	PENDAMPING
1	Suminten	Perempuan		YATIMA	PTPS	Sidey Jaya	Sidey	Manokwari	Papua Barat	Mariance Kasi, Amd.Kes
10	Agusta Isba	Perempuan		YATIMA	PTPS	Meyof 1	Sidey	Manokwari	Papua Barat	Mariance Kasi, Amd.Kes
100	Enggelina Yubelina Isba	Perempuan		YATIMA	PTPS	Ririnfos	Mobja	Manokwari	Papua Barat	Moch. Elyas Indrawan
1000	Nurpiah	Perempuan		YCTP	Paroki St. Stefanus Sempan	Kamoro Jaya	Wania	Mimika	Papua Tengah	Jeni Rante Bua
1001	Magdarina Wansaubun	Perempuan	51	YCTP	Paroki St. Stefanus Sempan	Kamoro Jaya	Wania	Mimika	Papua Tengah	Jeni Rante Bua
1002	Ayu Acelina Lasol	Perempuan	25	YCTP	Paroki St. Stefanus Sempan	Kamoro Jaya	Wania	Mimika	Papua Tengah	Jeni Rante Bua
1003	Elisabeth Yana	Perempuan		YCTP	Paroki St. Stefanus Sempan	Kamoro Jaya	Wania	Mimika	Papua Tengah	Jeni Rante Bua
1004	Djamil Atsan	Laki-laki	40	YCTP	Paroki St. Stefanus Sempan	Kamoro Jaya	Wania	Mimika	Papua Tengah	Jeni Rante Bua
1005	Melannia Timuli	Perempuan	27	YCTP	Paroki St. Stefanus Sempan	Kamoro Jaya	Wania	Mimika	Papua Tengah	Jeni Rante Bua

REAL TIME LOCAL RISK PROFILING & MONITORING



No. KK	Nama KK	RT	RW	No. Rumah	Kampung	Puskesmas	Kabupaten	Provinsi	Latitude	Longitude	Kader	Tgl Pencatatan FRL
1	Abdul Rahman	2	3	M21	AMAITA	BASIM	ASMAT	Papua Selatan			Melda	3 April, 2025
1	Abraham Mandowen			9	KAWET	COMORO	ASMAT	Papua Selatan	-8.59	140.5767	Ria	1 January, 2025
1	Absalom Ohee			4	WAROPKO	WAROPKO	BOVEN DIGUL	Papua Selatan			Maria	11 December, 2024
1	Agustinus Pepuho			11	KARANG INDAH	KARANG INDAH	MERAUKE	Papua Selatan	-8.59	140.5791	Sarah	2 April, 2025
1	Alberth Ohee	1	3	16	WAROPKO	WAROPKO	BOVEN DIGUL	Papua Selatan			Maria	11 December, 2024
1	Alberth Ohee	1	3	2	TAMANIM	SENGGO	MAPPI	Papua Selatan			Rika	3 March, 2025
1	Alexander Ohee			5	UPKIM	WAROPKO	BOVEN DIGUL	Papua Selatan			Desi	11 December, 2024
1	Antoni Matiseray			14	KASIMA	HAJU	MAPPI	Papua Selatan	-8.59	140.5749	Yuli	11 December, 2024
1	Arifin Wally			8	ANYUMKA	AMBATKUY	BOVEN DIGUL	Papua Selatan	-8.60	140.5797	Joyce	3 March, 2025
1	Arlince Nere			5	SELAUW	MUTING	MERAUKE	Papua Selatan	-8.60	140.5799	Hilda	3 April, 2025
1	Arson R Kogoya			18	BIOPIS	BASIM	ASMAT	Papua Selatan			Ely	11 December, 2024

REAL TIME LOCAL RISK PROFILING & MONITORING

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INFORMASI PERINDUKAN NYAMUK

PERDHAKI oucru

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INFORMASI KADER | INFORMASI KELUARGA | INFORMASI ANGGOTA KELUARGA | FAKTOR RISIKO LINGKUNGAN | FAKTOR RISIKO INDIVIDU | PERINDUKAN NYAMUK

Provinsi: All

Kabupaten/Kota: All

Puskesmas: All

Kampung: All

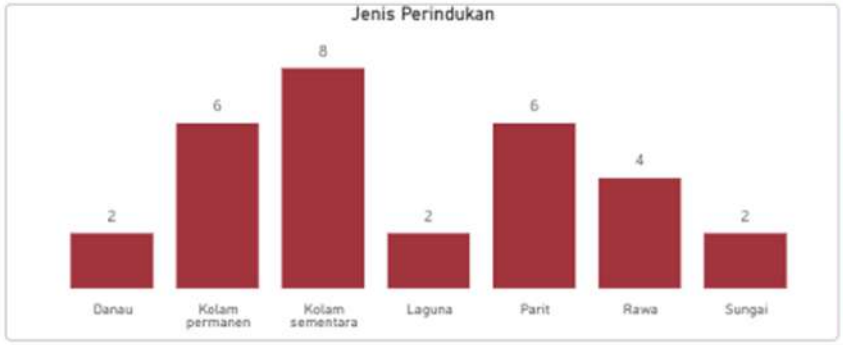
Kader: All

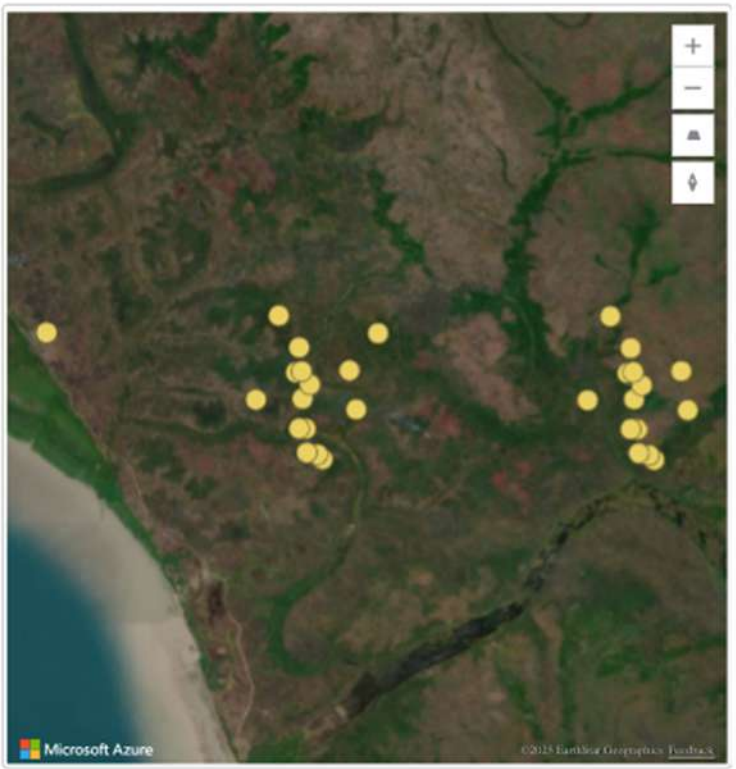
Keberadaan Jentik: All

Tanggal Pencatatan: 9/20/2024 – 3/1/2025

30	26
Lokasi	Terdapat Jentik

OVERLAY PERINDUKAN RUMAH PENDUDUK DAN





Nama tempat	Jenis perindukan	Jarak dari permukiman	Luas perindukan	Kedalaman	Jernih atau keruh?	Apakah ada tumbuhan?	Apakah ada sampah?	Api
Belakang gudang kayu	Kolam permanen	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Jernih	Tidak	Tidak	Ya
Belakang kios	Kolam sementara	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Ya	Ya	Ya
Belakang rumah pak Budiman	Kolam sementara	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Ya	Ya	Ya
Danau dekat kebun	Danau	Lebih dari 100 Meter	Lebih dari 5 Meter Persegi	Lebih dari 1 Meter	Keruh	Ya	Ya	Ya
Dekat Jembatan Dua	Rawa	Lebih dari 100 Meter	Lebih dari 5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Ya	Tidak	Ya
Depan rumah Pak Hely	Kolam permanen	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Jernih	Tidak	Tidak	Ya
Depan toko sembako	Parit	Kurang sama dengan 100 Meter	Lebih dari 5 Meter Persegi	Kurang sama dengan 1 Meter	Jernih	Tidak	Tidak	Tid
Gudang	Parit	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Tidak	Ya	Tid
Gudang kayu	Kolam sementara	Kurang sama dengan 100 Meter	Kurang dari 1 Meter Persegi	Kurang sama dengan 1 Meter	Jernih	Tidak	Ya	Ya
Jalan Buntu	Kolam sementara	Kurang sama dengan 100 Meter	Kurang dari 1 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Tidak	Ya	Ya
Jalan desa RT5	Parit	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Tidak	Ya	Ya

REAL TIME LOCAL RISK PROFILING & MONITORING

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DASHBOARD BUKU KERJA DIGITAL

OVERLAY PERINDUKAN NYAMUK, RUMAH PENDUDUKAN dan KASUS POSITIF

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Kader: All

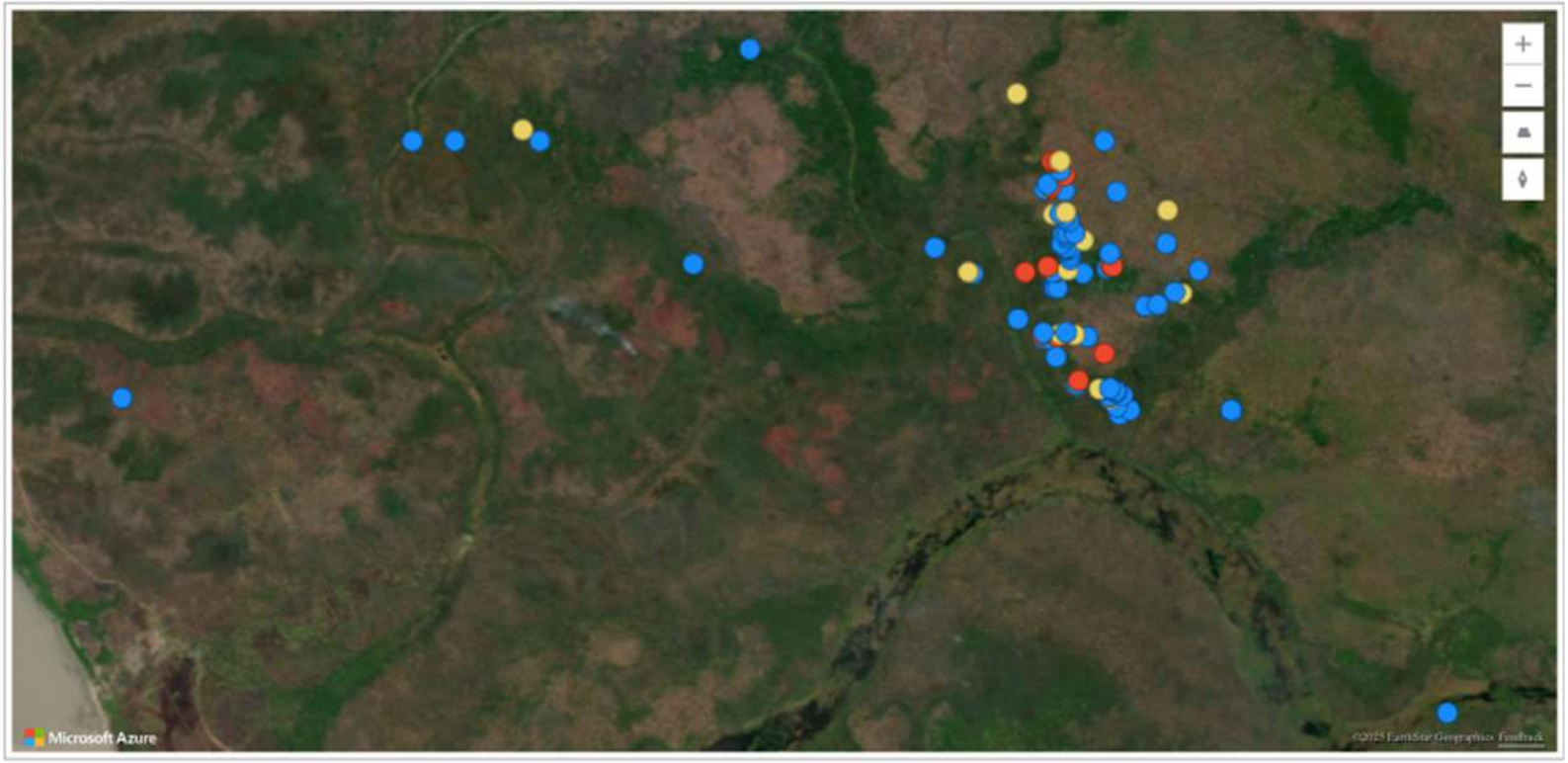
Keberadaan Jentik: All

Parasit: All

30 Lokasi

26 Terdapat Jentik

OVERLAY PERINDUKAN RUMAH PENDUDUK DAN



Nama tempat	Jenis perindukan	Jarak dari permukiman	Luas perindukan	Kedalaman	Jernih atau keruh?	Apakah ada tumbuhan?	Apakah ada sampah?	Api
Belakang gudang kayu	Kolam permanen	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Jernih	Tidak	Tidak	Ya
Belakang kios	Kolam sementara	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Ya	Ya	Ya
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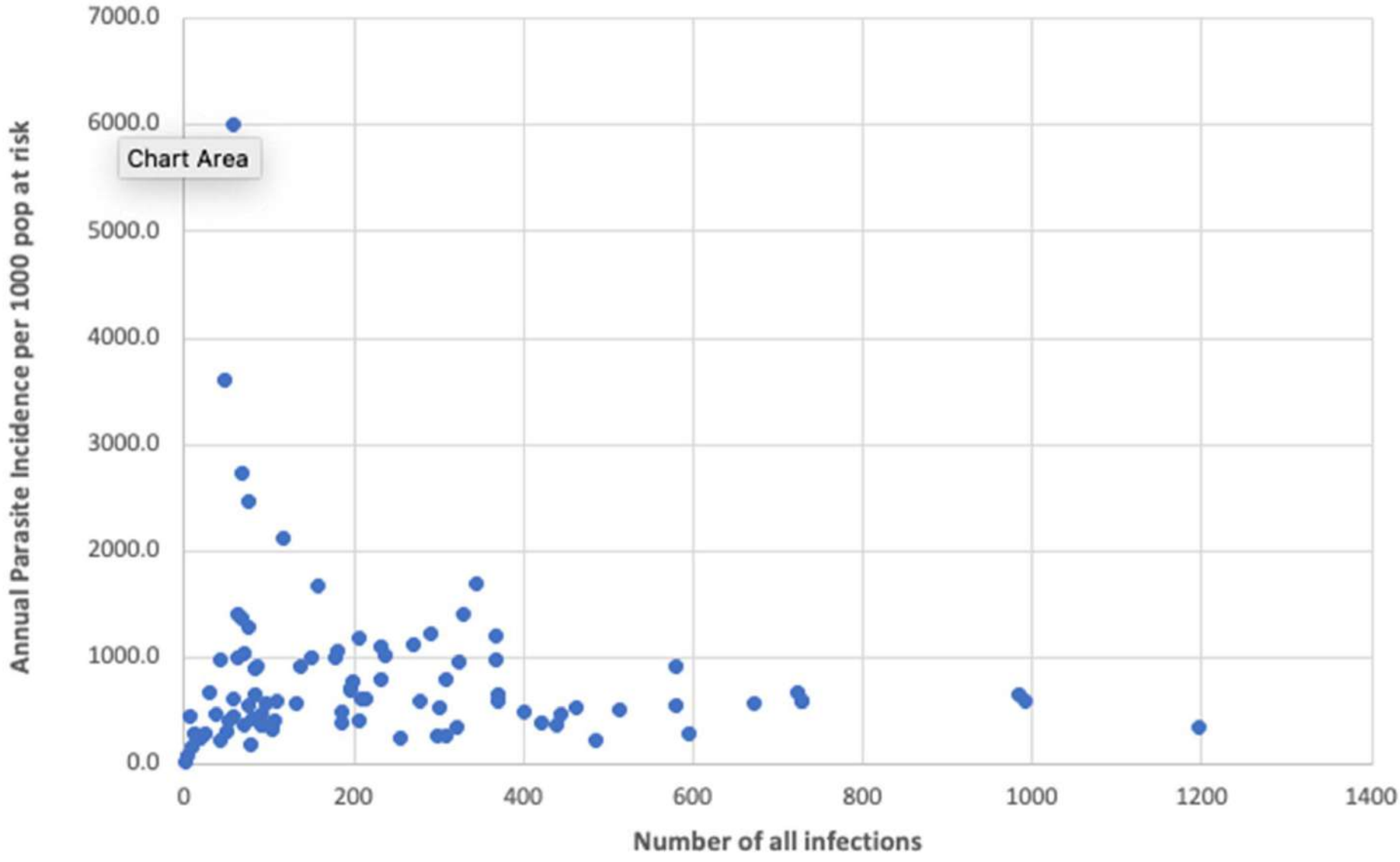
Danau dekat kebun	Danau	Lebih dari 100 Meter	Lebih dari 5 Meter Persegi	Lebih dari 1 Meter	Keruh	Ya	Ya	Ya
Dekat Jembatan Dua	Rawa	Lebih dari 100 Meter	Lebih dari 5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Ya	Tidak	Ya
Depan rumah Pak Hely	Kolam permanen	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Jernih	Tidak	Tidak	Ya
Depan toko sembako	Parit	Kurang sama dengan 100 Meter	Lebih dari 5 Meter Persegi	Kurang sama dengan 1 Meter	Jernih	Tidak	Tidak	Tid
Gudang	Parit	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Tidak	Ya	Tid
Gudang kayu	Kolam sementara	Kurang sama dengan 100 Meter	Kurang dari 1 Meter Persegi	Kurang sama dengan 1 Meter	Jernih	Tidak	Ya	Ya
Jalan Buntu	Kolam sementara	Kurang sama dengan 100 Meter	Kurang dari 1 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Tidak	Ya	Ya
Jalan desa RT5	Parit	Kurang sama dengan 100 Meter	1-5 Meter Persegi	Kurang sama dengan 1 Meter	Keruh	Tidak	Ya	Ya

H4. INTERVENTION SCENARIO DEVELOPMENT

A VILLAGE IN KEEROM

REPEATED ATTACKS



H9. CAPACITY BUILDING

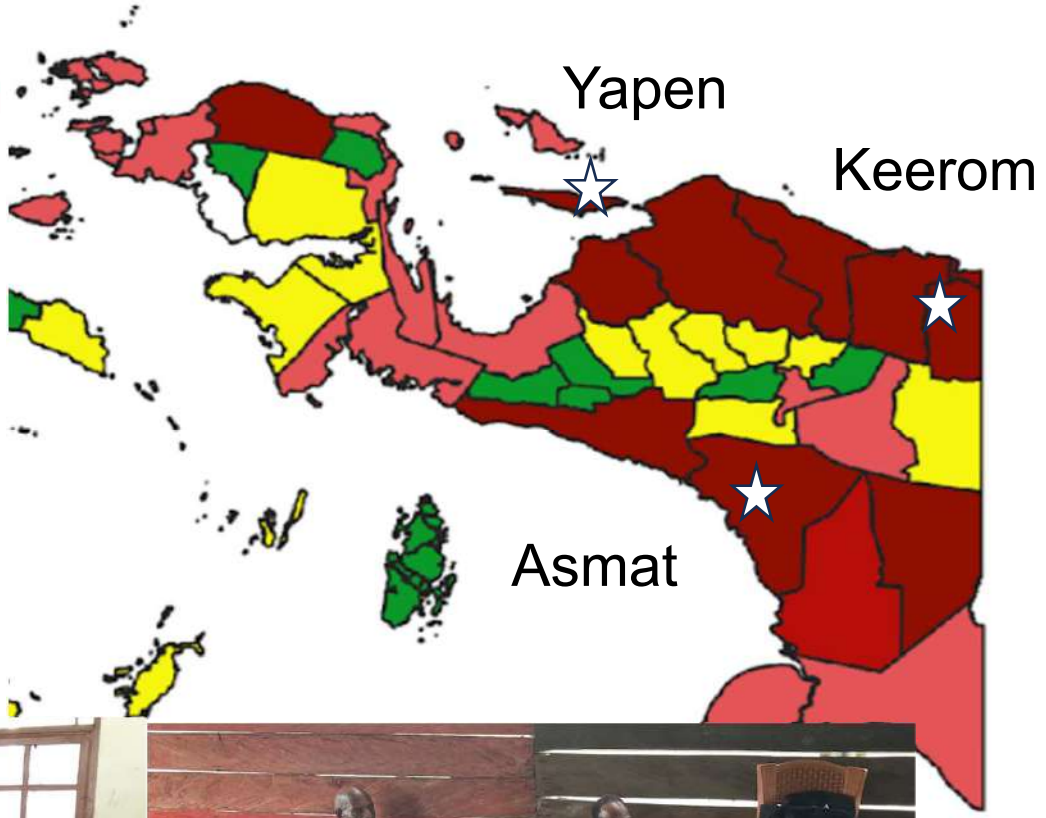
SPATIAL EPIDEMIOLOGY

- 3-day training in October 2024 (Jakarta)
- 25 participants:
  - National Malaria Control Program
  - National Vector Control Program
  - National Disease Surveillance Program,
  - Provincial Malaria Managers (Papua, Sumatra)
- 6 trainers: MORU+OUCRU
- Funding: APMEN

Modules

- Spatial Epidemiology
- Case map visualization
- Cluster detection analysis
- Hot spot analysis
- Ecological analysis

H4. ANTHROPOLOGY - INDIGENOUS PAPUANS



QUOTES FROM KEEROM

"We're used to malaria. We've always known what to do about it. Since we were kids, we were taught that if we start shivering, have a headache, and a fever, we just go to the forest, find leaves, and rub them on our bodies."

"*People say malaria kills. I've never seen anyone die from malaria. What I've seen is people dying from cysts, tumors, cancer*"

"*Malaria is like spinach… eaten every day*."

Local: Daun gatal

Latin: *Laportea ducumana*