MESA Track:
A malaria research mapping platform

5th New Tools, New Challenges in Vector Control Work Stream meeting
15th RBM Vector Control Working Group Annual Meeting
February 3 — 5, 2020

Maria Tusell (maria.tusell@isglobal.org)

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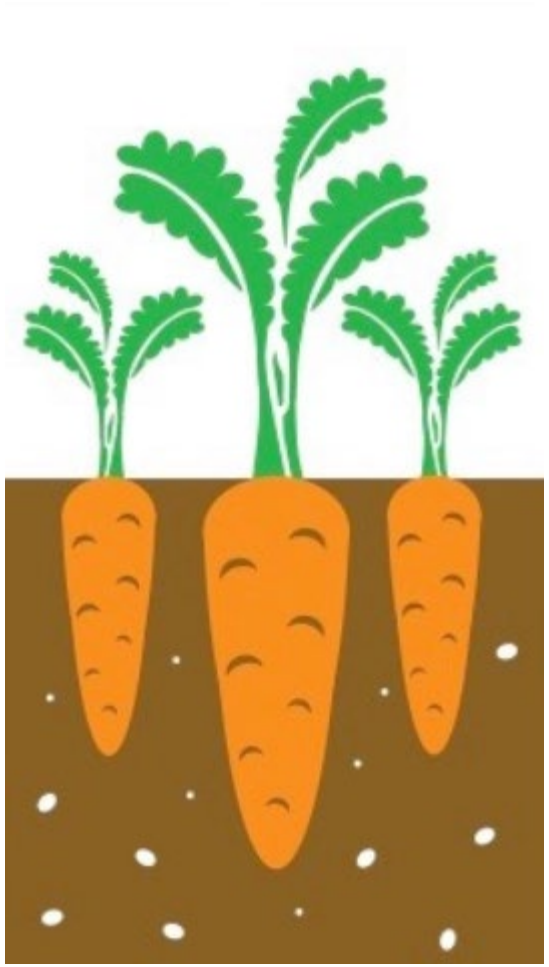
ISGlobal
Barcelona Institute for Global Health

Research: ongoing and completed



Completed research
& published results

Ongoing research

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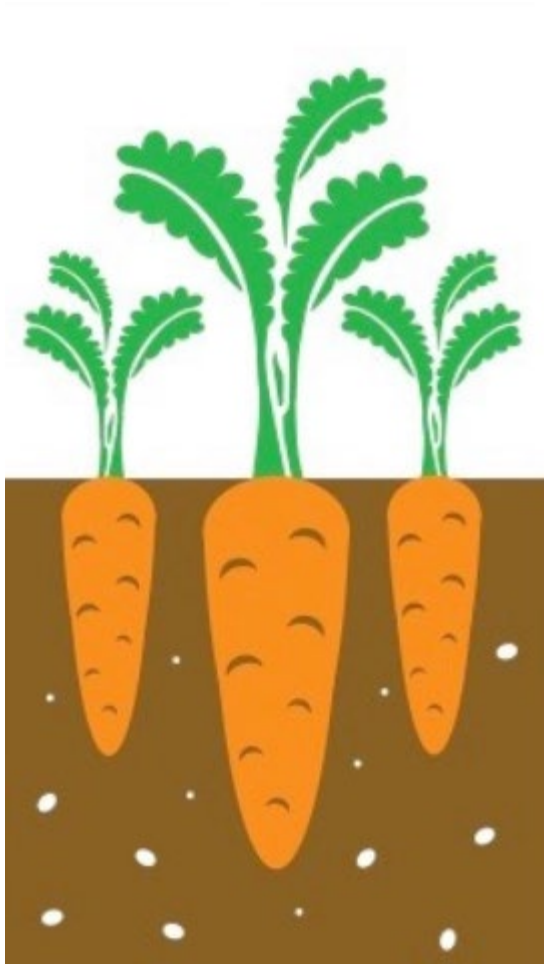
Research: ongoing and completed

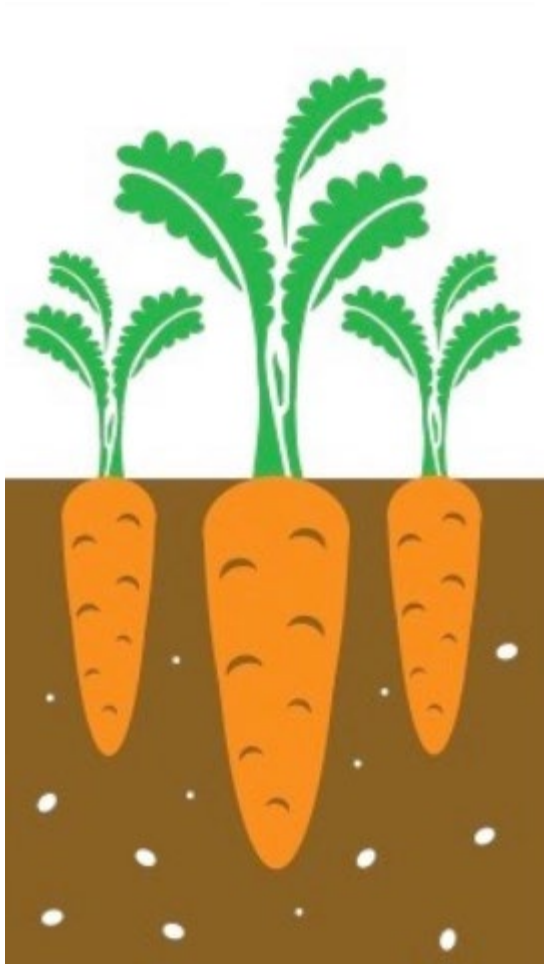


Completed research
& published results

Ongoing research

Relevant
Accessible
Visible
Shareable
“Referenceable”

Research: ongoing and completed



Completed research
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Ongoing research

Relevant
Accessible?
Visible?
Shareable?
“Referenceable”?

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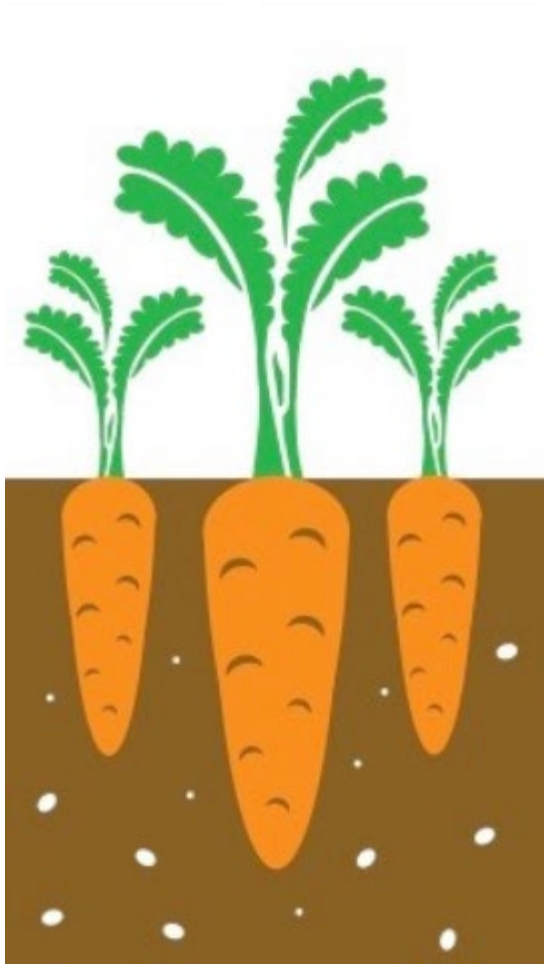
Research: ongoing and completed



Completed research
& published results

Ongoing research

Relevant
Accessible
Visible
Shareable
“Referenceable”

MESA TRACK

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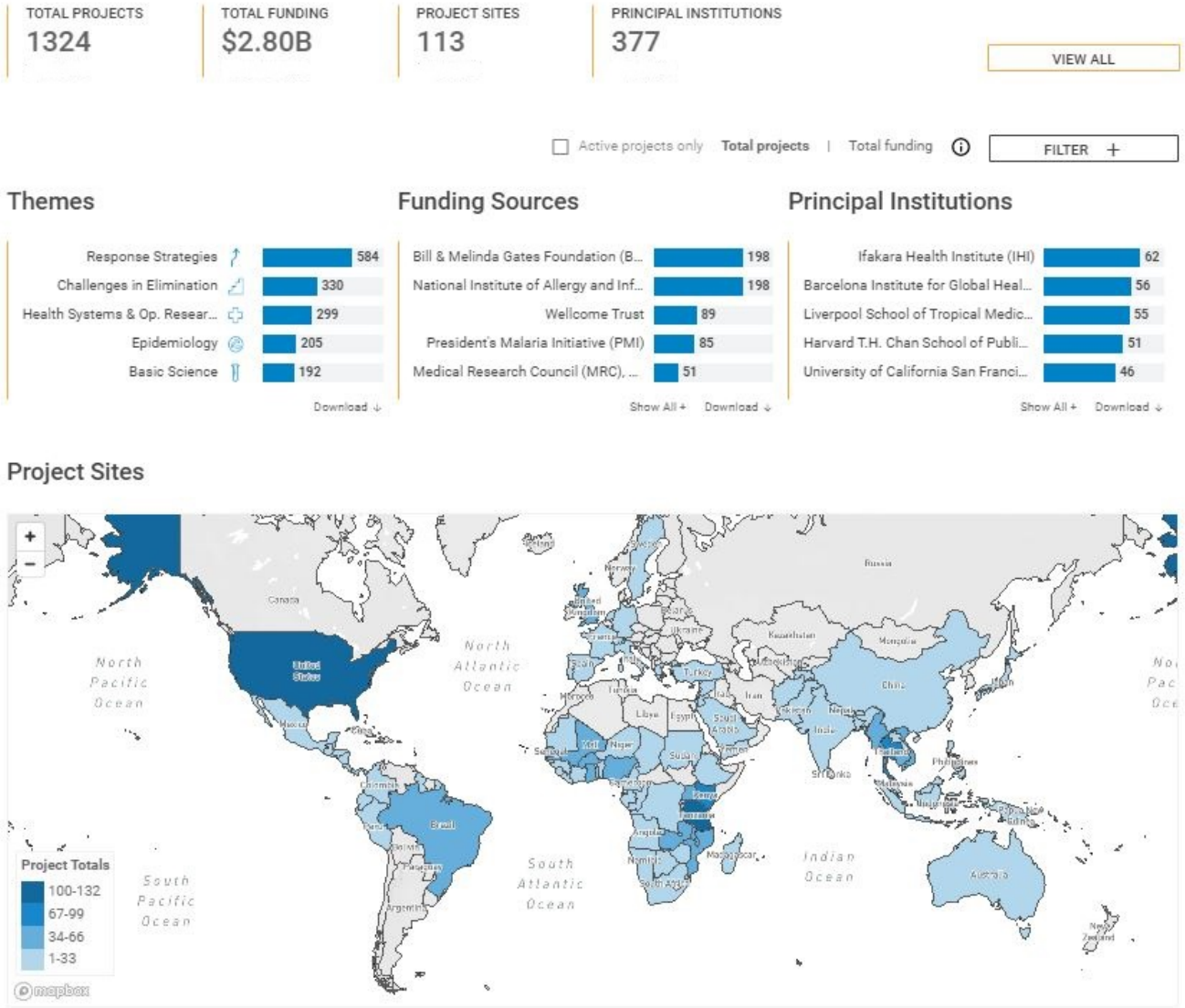
MESA Track: an open and living database of ongoing (and completed) malaria research

- Who is doing what, where, when, how
- Current and planned investments
- When new data will become available



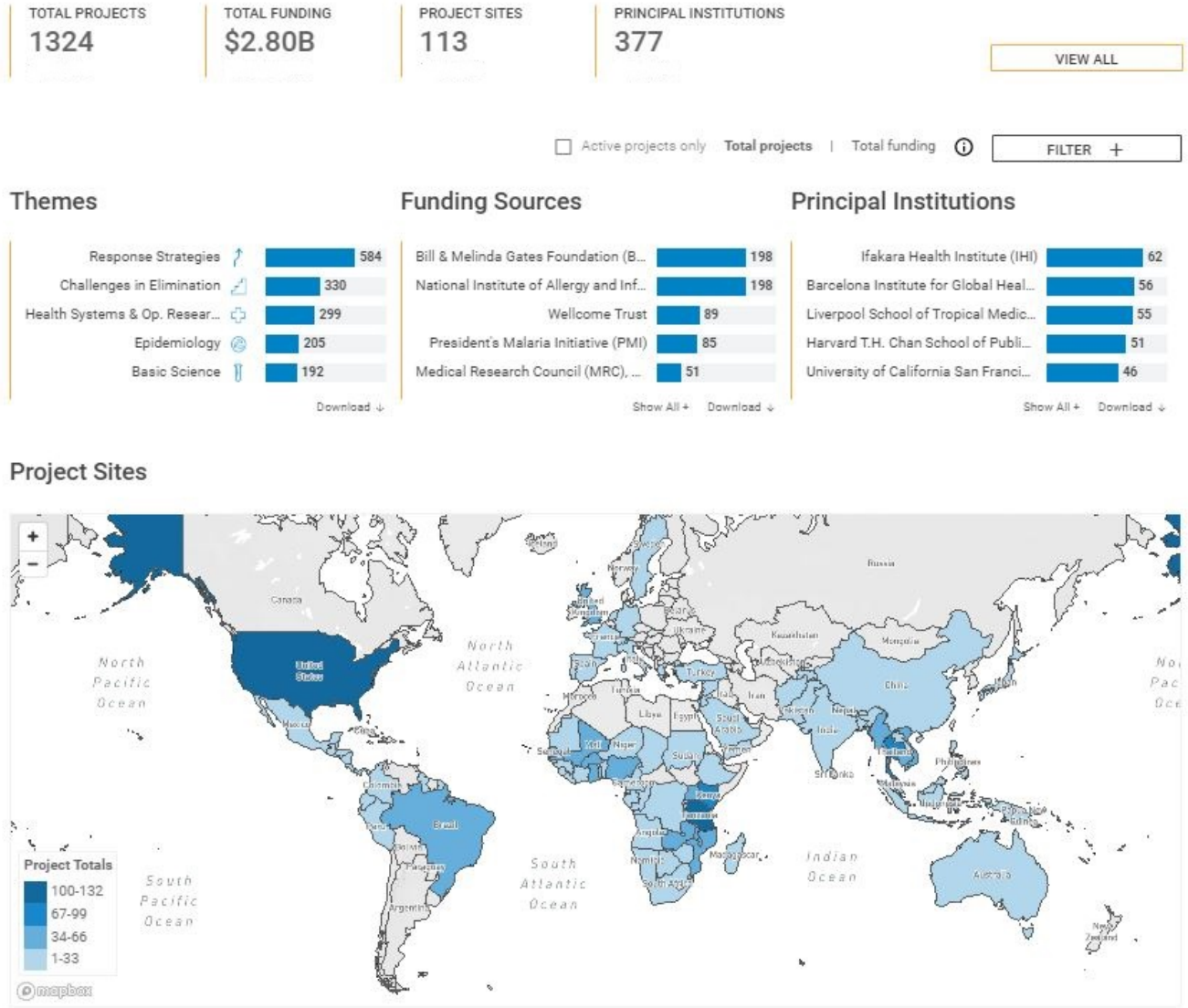
www.mesamalaria.org/mesa-track

MESA Track: an open and living database of ongoing (and completed) malaria research

- Who is doing what, where, when, how
- Current and planned investments
- When new data will become available

Evidence-based:

- Policy-making
- Implementation
- Funding



MESA Track

All Projects

TOTAL PROJECTS	TOTAL FUNDING	PROJECT SITES	PRINCIPAL INSTITUTIONS
1327	$2.73B	113	374

VIEW ALL

Active projects only | **Total projects** | Total funding | FILTER +

Themes

Download ↓

Funding Sources

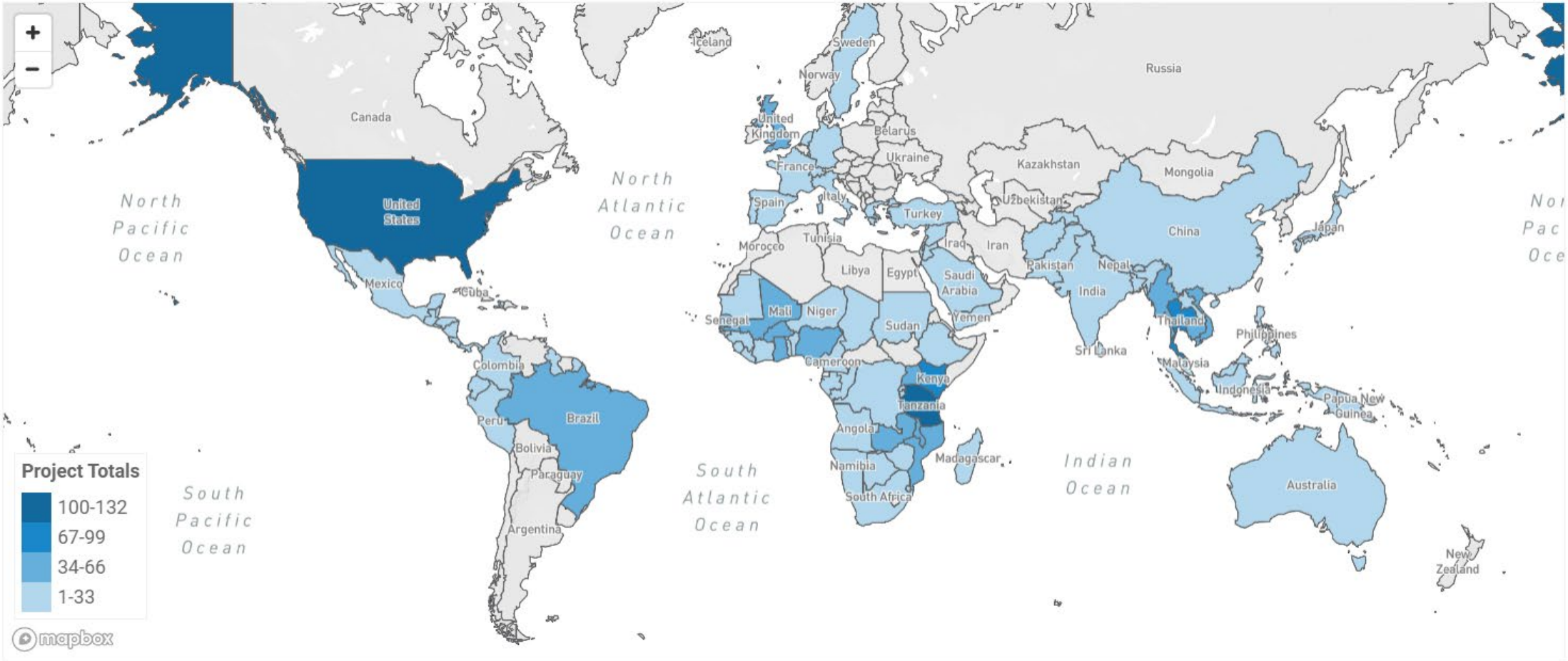
Show All + Download ↓

Principal Institutions

Show All + Download ↓

MESA Track

Project Sites



MESA Track

Search MESA Track

Search

Please enter a search term.

Themes:

All

Project Sites:

All

Project Timeline:

dd/mm/yyyy to dd/mm/yyyy

Principal Institutions:

All

Funding Sources

All

Principal Investigators:

All

Funding Amounts:

to

SEARCH

Using machine-learning and mid-infrared spectroscopy for rapid assessment of blood feeding histories and parasite infection rates in field collected malaria mosquitoes

Objectives

This project proposes to couple MIR-spectroscopy with machine-learning algorithms and to validate them for rapid assessment of blood-feeding histories and infectiousness of field-collected *Anopheles arabiensis* and *Anopheles funestus*, which dominate malaria transmission in Tanzania.

The research team will calibrate the systems to identify different vertebrate blood meals in mosquito abdomen, and *Plasmodium* sporozoite in heads and thoraces. This field validation will enable scale-up of MIR based approaches, thereby significantly improving surveillance-responses and intervention monitoring.

Principal Institution(s)

Ifakara Health Institute (IHI)

Rationale and Abstract

Effective surveillance and control of malaria-transmitting mosquitoes requires quantitative understanding of key biological attributes, namely: preferred blood –hosts of mosquitoes, proportions infected with parasites, survivorship, indoor/outdoor-biting behaviour and insecticide susceptibility. Currently, identifying mosquito blood meals and *Plasmodium* infections involves enzyme-linked immunosorbent assays (ELISA), or polymerase chain reactions (PCR), which are time-consuming, laborious and require expensive reagents. However, advances in near-infrared spectroscopy (NIR) suggest the potential for a cheaper, quicker and non-invasive alternative for predicting age and species of mosquitoes, and detecting pathogens e.g Wolbachia and Zika virus in laboratory- infected Aedes. Promisingly, mid-infrared (MIR) can provide even better accuracies since structural identities of bio-molecules are delineated at finer resolutions than in NIR bands. However, the spectroscopy-based methods have not been field-validated because entomologist lack comparative field samples of known attributes and advanced computational methods to process large spectral datasets.

Thematic Categories

- Surveillance
- Product Development
- Vector-based Strategies

Date

2019 Jul - 2022 Dec

Total Project Funding

$134,434

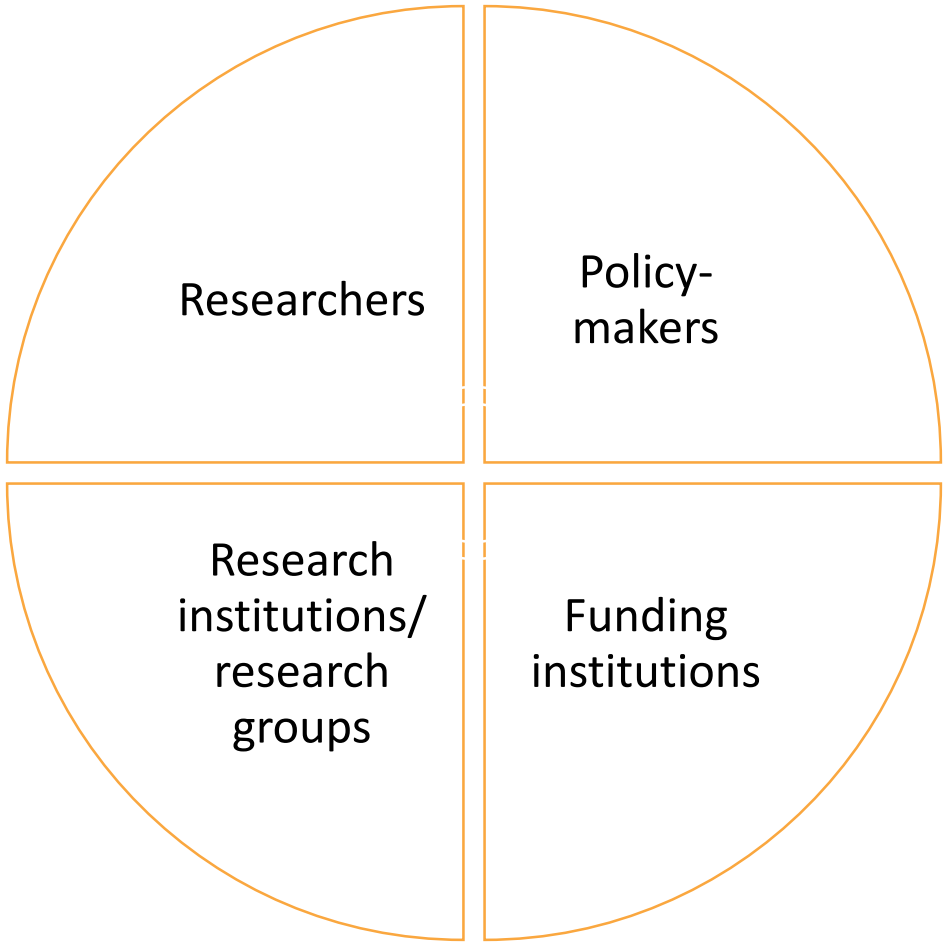
Funding Details

Wellcome Trust

Project Site

Tanzania

MESA Track can support…



MESA Track can support…

- Tool to highlight own work and impact, increase its visibility
- Identify people working in the same area
- Explore collaborations, partnerships, etc.

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MESA Track can support…

- Evidence review exercises “Deep Dives”
- Identify new questions being asked
- Foresee emerging evidence
- Plan the timing for future revisions of guidance

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Evidence review exercises “Deep Dives”

In-depth profiling of critical topics

Useful for planning for and informing policy-making processes

Tool to analyze the research landscape and identify evidence gaps

[ONGOING] Intermittent preventive treatment in infants (IPTi)

A WHO Technical Consultation to Review the Role of Drugs in Malaria Prevention for People Living in Endemic Settings took place on October 16 - 17, 2019 [ref].

23 OCT 2019

[ONGOING] Intermittent preventive treatment in pregnancy (IPTp)

A WHO Technical Consultation to Review the Role of Drugs in Malaria Prevention for People Living in Endemic Settings took place on October 16 - 17, 2019 [ref].

22 OCT 2019

[ONGOING] Novel uses of chemoprevention for malaria

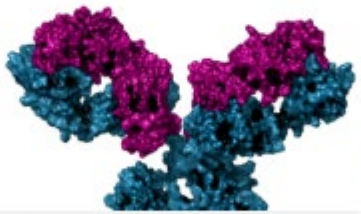
A WHO Technical Consultation to Review the Role of Drugs in Malaria Prevention for People Living in Endemic Settings took place on October 16 - 17, 2019 [ref].

22 OCT 2019

[ONGOING] Seasonal Malaria Chemoprevention (SMC)

A WHO Technical Consultation on Seasonal Malaria Prevention: Evidence for policy review will take place in October 14 - 15, 2019 [ref] with the aim of reviewing ways of optimising the implementation of the strategy and reviewing the existing guidance and constraints on its use.

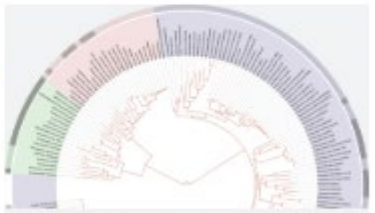
08 OCT 2019



mAbs for malaria vaccine development

A WHO consultation to discuss malaria vaccines and biologicals research and development, with the aim to review the state-of-the-art in malaria vaccine development including new developments in the field, key challenges and opportunities, was convened by WHO in July 2019 [ref].

04 OCT 2019



Genetic Epidemiology

A WHO technical consultation to discuss what genetic epidemiology of malaria parasite and Anopheline mosquitoes can tell us about malaria transmission, antimalarial drug resistance, and a possible role as a surveillance tool was convened by WHO in June 2019 [

04 OCT 2019

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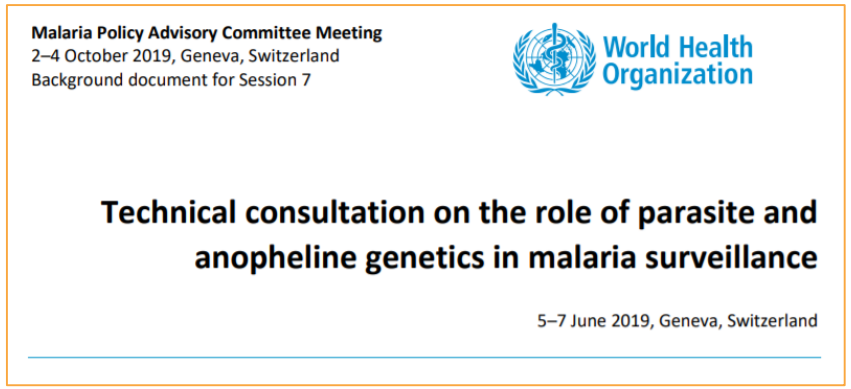
Evidence review exercises “Deep Dives”



Malaria Policy Advisory Committee Meeting
2–4 October 2019, Geneva, Switzerland
Background document for Session 7

World Health Organization

Technical consultation on the role of parasite and anopheline genetics in malaria surveillance

5–7 June 2019, Geneva, Switzerland

Evidence review exercises “Deep Dives”

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Technical consultation on the role of parasite and anopheline genetics in malaria surveillance

5–7 June 2019, Geneva, Switzerland

ID	Title	Principal Institution	Research Area: Parasite Gene Flow	Anopheline Gene Flow	Transmission Intensity	Elimination	Resistance in the parasite	Resistance in Anophelines	Applications in the field
13	Strengthening vector surveillance systems and addressing Anopheles r	PAMCA							
14	Anopheles funestus gene flow studies and rearing methods	Ifakara Health Institute							
15	Assessing the risk of mosquitoes by identifying the genetic basis of the	Ifakara Health Institute, Swedish University of Agricultural Sciences							
16	Understanding, tracking and eliminating malaria transmission in The	Institut Pasteur							
17	Genetic epidemiology regional network to support malaria eliminatior	Oxford University							
20	Plasmodium Diversity Network Africa (PDNA)	PDNA							
23	Landscape genetics in the control of Anopheles gambiae	LSTM							
24	Genomic data generation and analysis in Senegal	University Cheik Anta Diop, Senegal							
25	Genetic Approaches to Malaria Surveillance and Elimination in China	Harvard TH Chan School of Public Health							
26	Landscape Molecular Epidemiology for Malaria Elimination	Arizona State University							
29	Study of the genetic diversity of P.vivax and P. falciparum in various m	Eijkman Institute for Molecular Biology (EIMB), Indonesia							
31	Genetic polymorphism and diversity of Plasmodium vivax malaria	Harvard TH Chan School of Public Health							
32	Genotyping - parasite barcoding	Akros							
33	Pathogenesis and diagnosis (Southern Africa ICEMR)	Johns Hopkins Bloomberg School of Public Health (JHBSPH)							
34	Outbreak investigation of Plasmodium falciparum in Panama	Harvard TH Chan School of Public Health							
35	Genomic Analyses of Plasmodium vivax Responses to Antimalarial Dr	Cleveland Clinic Lerner College of Medicine, University of Maryland							
36	Malaria Cell Atlas	Wellcome Sanger Institute							
37	Applying molecular epidemiology to accelerate to zero	UCSF							
38	Genome-wide association studies to map genetic variation underlying	Wellcome Sanger Institute							
44	Geographic genetic profiling of human Plasmodium malaria	LSHTM							
45	Developing and refining methods of analysing malaria genetic data ob	LSTM							
47	A molecular strategy to trace the origins of malaria cases and map tra	UCSF							
49	Malaria Genome Project - Whole-genome scans for adaptive evolution	LSTM							
52	Genetic data as a signal of changing malaria transmission	Imperial College London							
54	Quantifying the impact of human mobility on Pf malaria burden and s	MORU							
55	Genomics for malaria elimination and eradication: using principles of	Harvard TH Chan School of Public Health							
57	Molecular tools for monitoring the impact of intensified malaria cont	Swiss TPH							
58	Impact of asymptomatic carriers in the epidemiology and control of m	Cayetano Heredia University, Peru							
60	Integrated surveillance and control programme for West Nile virus ani	University of Thessaly, Greece							
61	Mopping up and getting to zero: mapping residual malaria transmissi	Akros							
63	Genomic-based diagnostics for elimination and eradication of Plasmc	Harvard TH Chan School of Public Health							
65	Genetic Variation and Evolution of Artemisinin Resistance	Harvard TH Chan School of Public Health							
66	Enhanced Active Surveillance: Establish genetic epidemiological surve	Burnet Institute							
70	Last man standing - tracking the evolution of Plasmodium falciparum	Karolinska Institute							
71	Genetic reconnaissance to support malaria elimination in the GMS	MalariaGEN Resource Centre (University of Oxford, Wellcome Sanger Institute)							
73	Population genetics of resistance to alternative insecticides in southe	LSTM							
76	Tackling insecticide resistance in the major African malaria vector An	LSTM							
77	Characterisation of insecticide resistance in Ugandan populations of	LSTM							
78	Molecular epidemiology for malaria elimination (by the START Prograr	University of Washington							

Genetic Epidemiology

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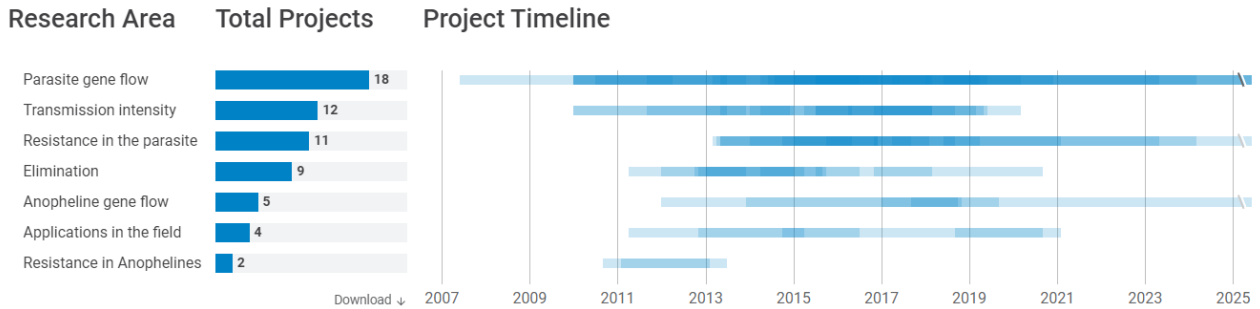
To facilitate the technical consultation’s work, MESA is compiling a landscape of recent and ongoing research in genetic epidemiology and its role in malaria surveillance. Additional information and inputs are welcome, please do not hesitate to contact us (mesa@isglobal.org) to add your research project to this ongoing Deep Dive.

TOTAL PROJECTS	TOTAL FUNDING	PROJECT SITES
42	$34.7M	53



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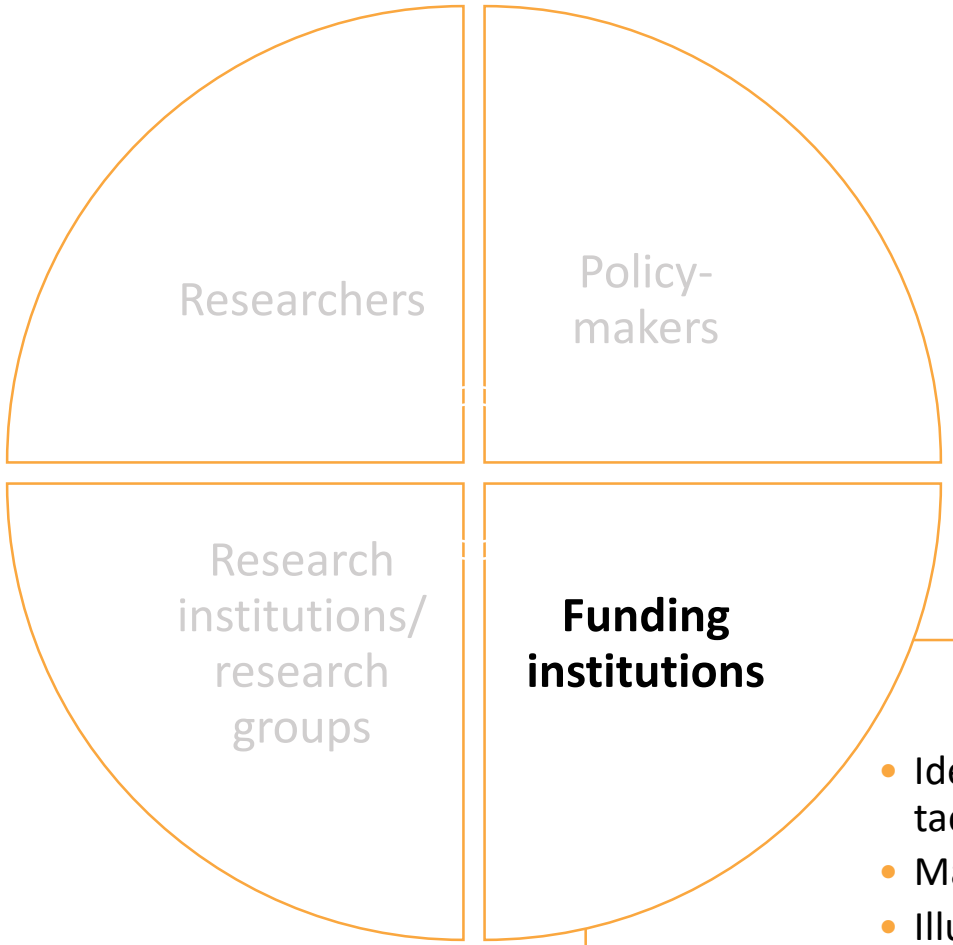

- Identify the next issues to tackle
- Make smart investments
- Illustrate funding strategies

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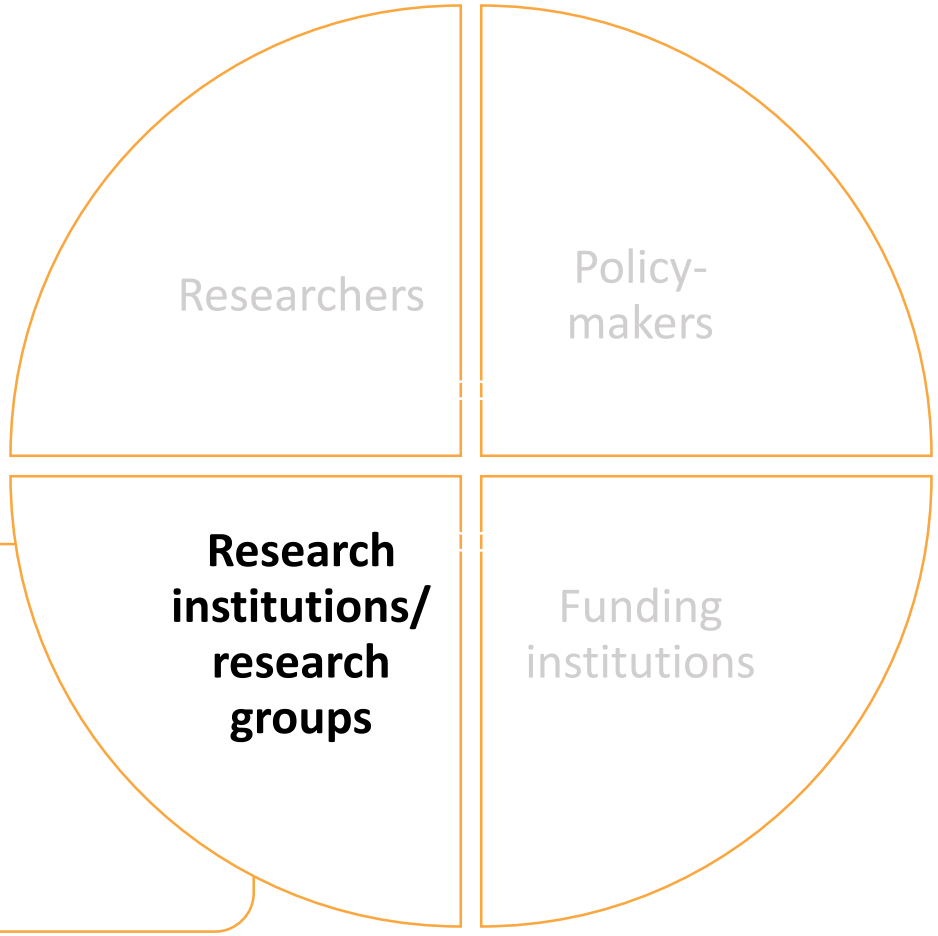
MESA Track can support…



- Increase the visibility of your work
- Illustrate your institution's research strategy
- Track your institution's work and progress

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VCWG Portfolio in MESA Track

RBM Vector Control Working Group (VCWG)

The purpose of the Vector Control Working Group (VCWG) is to align RBM partners on best practices to reach and maintain universal coverage with effective vector control interventions.

VCWG Work Streams

- IRS IRM Priorities
- LLIN Priorities
- Larval Source Management
- New Tools, New Challenges in Vector Control
- IVM, Evidence and Capacity
- VBDs and Built Environment

**This page is periodically updated to reflect the research led by the VCWG members. Inputs about new projects are welcome, please contact us at mesa@isglobal.org.*

RBM Vector Control Working Group Webpage

TOTAL PROJECTS	TOTAL FUNDING	PROJECT SITES
25	$173M	39

VIEW ALL

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VCWG Portfolio in MESA Track

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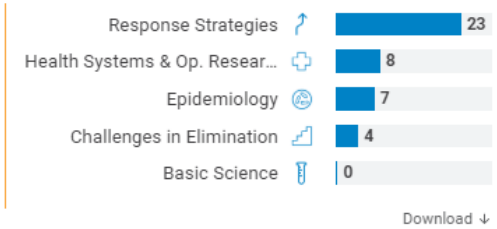
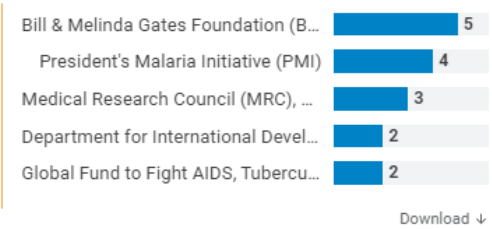
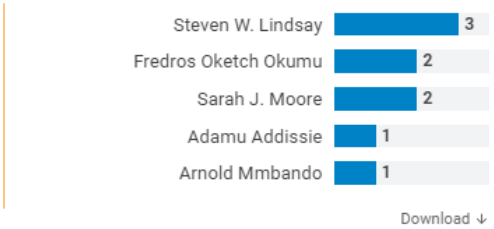
Themes



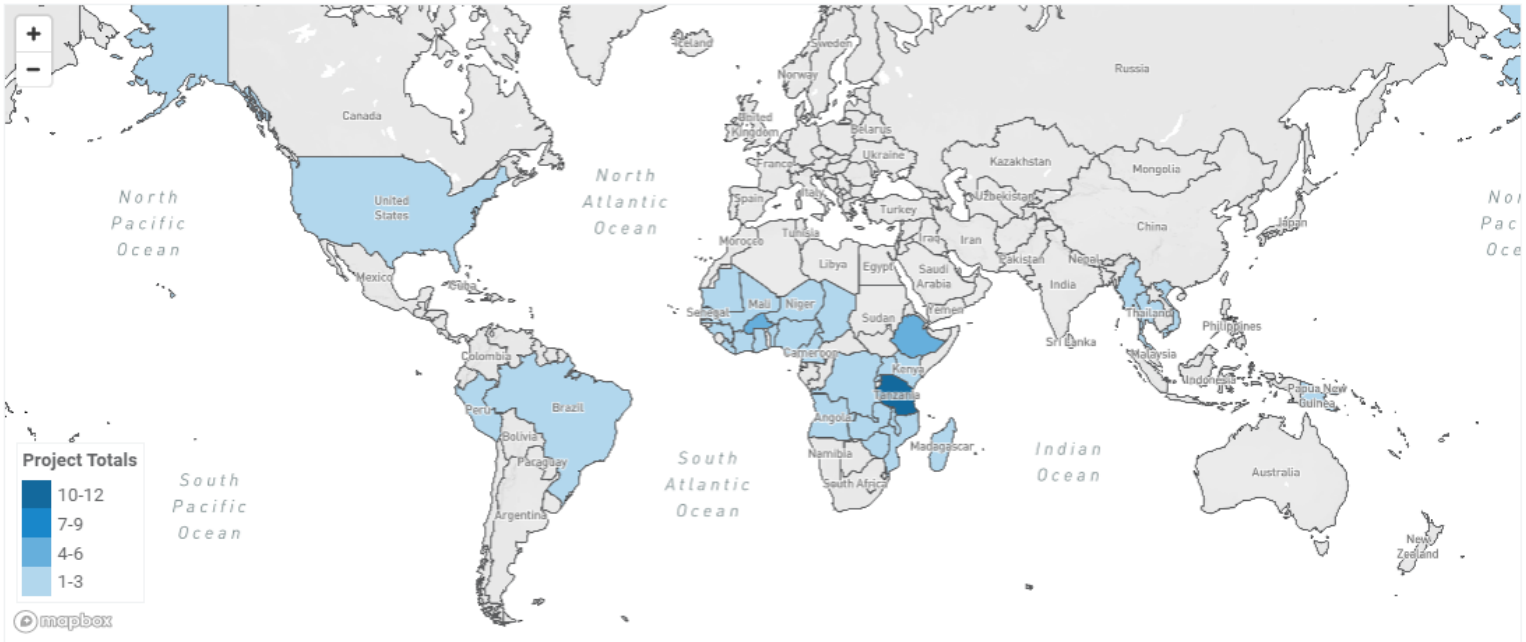
Funding Sources



Principal Investigators



Project Sites



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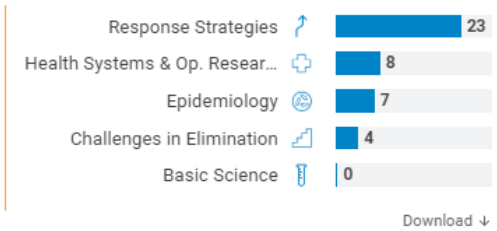
VCWG Portfolio in MESA Track

Themes



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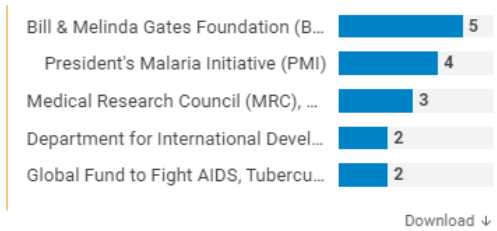

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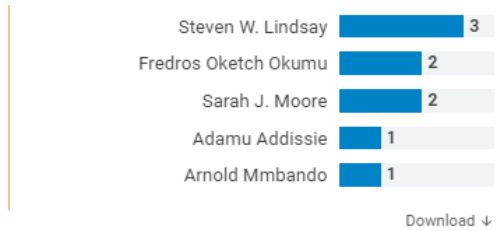
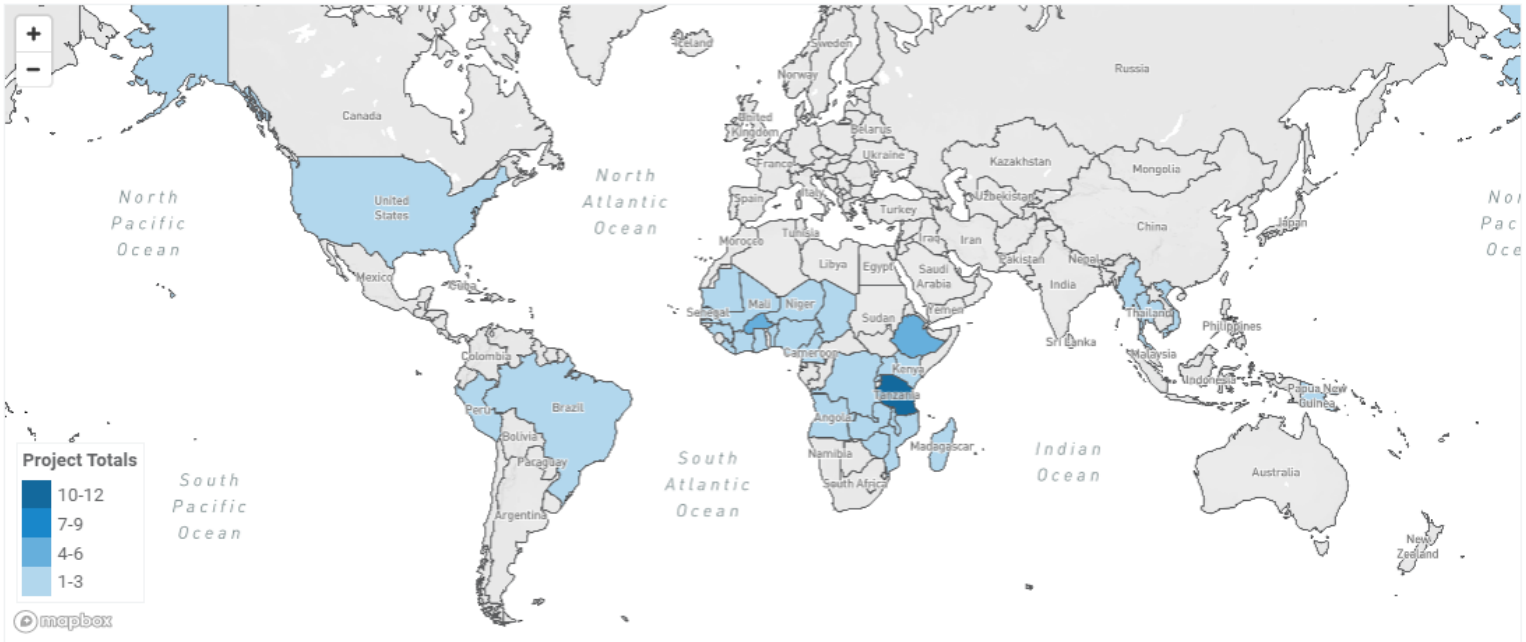


Project Sites



Work in progress

After the meeting, we aim to:

- Update with 2020 presentations
- Validate with PIs
- Send form to all participants to add additional research
- Ask for feedback

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www.mesamalaria.org/mesa-track

MESA Track is a unique platform that can help stakeholders to **recognize the challenges most in need of a response** and the potential **knowledge gaps** enabling the malaria community to respond accordingly.

Thanks for your attention!

Acknowledgements:
Kate Whitfield
Elisabet Martí

mesa@isglobal.org
www.mesamalaria.org
www.isglobal.org

The MESA Alliance is funded by:

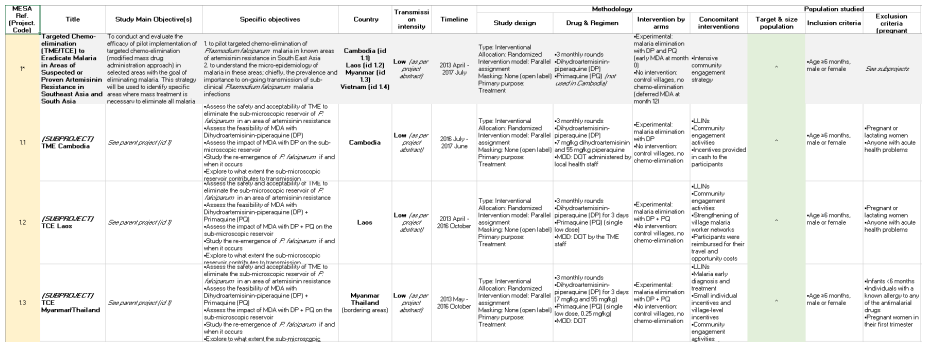
BILL & MELINDA GATES foundation

MESA Track: Methodology

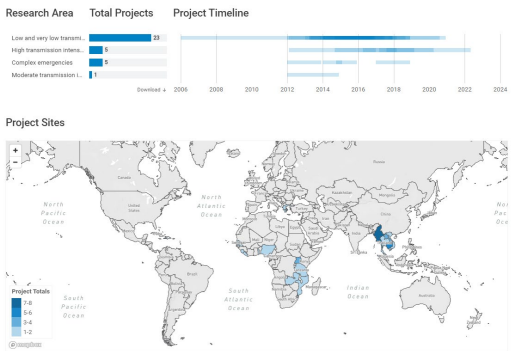
Data collection on funded and current research projects

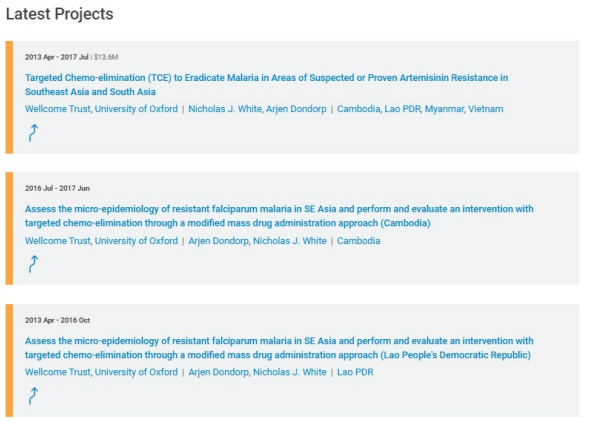
Validation and **gap-filling** with the Principal Investigators

Publication in MESA Track



MESA Ref. (Project. Code)	Title	Study Main Objective(s)	Specific objectives	Country	Transmission intensity	Timeline	Methodology				Population studied	
							Study design	Drug & Regimen	Intervention by arms	Concomitant interventions	Target & size population	Inclusion criteria	Exclusion criteria (pregnant
1*	**Targeted Chemo-elimination (TME/TCE) to Eradicate Malaria in Areas of Suspected or Proven Artemisinin Resistance in Southeast Asia and South Asia**	To conduct and evaluate the efficacy of pilot implementation of targeted chemo-elimination (modified mass drug administration approach) in selected areas with the goal of eliminating malaria. This strategy will be used to identify specific areas where mass treatment is necessary to eliminate all malaria	1. to pilot targeted chemo-elimination of *Plasmodium falciparum* malaria in known areas of artemisinin resistance in South East Asia 2. to understand the micro-epidemiology of malaria in these areas; chiefly, the prevalence and importance to on-going transmission of sub-clinical *Plasmodium falciparum* malaria infections	**Cambodia (id 1.1) Laos (id 1.2) Myanmar (id 1.3) Vietnam (id 1.4)**	**Low** *(as per project abstract)*	2013 April - 2017 July	Type: Interventional Allocation: Randomized Intervention model: Parallel assignment Masking: None (open label) Primary purpose: Treatment	•3 monthly rounds •Dihydroartemisinin-piperaquine (DP) •Primaquine (PQ) *(not used in Cambodia)*	•Experimental: malaria elimination with DP and PQ (early MDA at month 0) •No intervention: control villages, no chemo-elimination (deferred MDA at month 12)	•Intensive community engagement strategy	^	•Age ≥6 months, male or female	*See subprojects*	
1.1	*(SUBPROJECT)* **TME Cambodia**	*See parent project (id 1)*	•Assess the safety and acceptability of TME to eliminate the sub-microscopic reservoir of *P. falciparum* in an area of artemisinin resistance •Assess the feasibility of MDA with Dihydroartemisinin-piperaquine (DP) •Assess the impact of MDA with DP on the sub-microscopic reservoir •Study the re-emergence of *P. falciparum* if and when it occurs •Explore to what extent the sub-microscopic reservoir contributes to transmission	**Cambodia**	**Low** *(as per project abstract)*	2016 July - 2017 June	Type: Interventional Allocation: Randomized Intervention model: Parallel assignment Masking: None (open label) Primary purpose: Treatment	•3 monthly rounds •Dihydroartemisinin-piperaquine (DP) •7 mg/kg dihydroartemisinin and 55 mg/kg piperaquine •MDD: DOT administered by local health staff	•Experimental: malaria elimination with DP •No intervention: control villages, no chemo-elimination	•LLINs •Community engagement activities •Strengthening of village malaria worker networks •Incentives provided in cash to the participants	^	•Age ≥6 months, male or female	•Pregnant or lactating women •Anyone with acute health problems	
1.2	*(SUBPROJECT)* **TCE Laos**	*See parent project (id 1)*	•Assess the safety and acceptability of TME to eliminate the sub-microscopic reservoir of *P. falciparum* in an area of artemisinin resistance •Assess the feasibility of MDA with Dihydroartemisinin-piperaquine (DP) + Primaquine (PQ) •Assess the impact of MDA with DP + PQ on the sub-microscopic reservoir •Study the re-emergence of *P. falciparum* if and when it occurs •Explore to what extent the sub-microscopic reservoir contributes to transmission	**Laos**	**Low** *(as per project abstract)*	2013 April - 2016 October	Type: Interventional Allocation: Randomized Intervention model: Parallel assignment Masking: None (open label) Primary purpose: Treatment	•3 monthly rounds •Dihydroartemisinin-piperaquine (DP) for 3 days •Primaquine (PQ) (single low dose) •MDD: DOT by the TME staff	•Experimental: malaria elimination with DP + PQ •No intervention: control villages, no chemo-elimination	•LLINs •Community engagement activities •Strengthening of village malaria worker networks •Participants were reimbursed for their travel and opportunity costs	^	•Age ≥6 months, male or female	•Pregnant or lactating women •Anyone with acute health problems	
1.3	*(SUBPROJECT)* **TCE Myanmar/Thailand**	*See parent project (id 1)*	•Assess the safety and acceptability of TME to eliminate the sub-microscopic reservoir of *P. falciparum* in an area of artemisinin resistance •Assess the feasibility of MDA with Dihydroartemisinin-piperaquine (DP) + Primaquine (PQ) •Assess the impact of MDA with DP + PQ on the sub-microscopic reservoir •Study the re-emergence of *P. falciparum* if and when it occurs •Explore to what extent the sub-microscopic	**Myanmar Thailand** (bordering areas)	**Low** *(as per project abstract)*	2013 May - 2016 October	Type: Interventional Allocation: Randomized Intervention model: Parallel assignment Masking: None (open label) Primary purpose: Treatment	•2 monthly rounds •Dihydroartemisinin-piperaquine (DP) for 3 days (7 mg/kg and 55 mg/kg) •Primaquine (PQ) (single low dose, 0.25 mg/kg) •MDD: DOT	•Experimental: malaria elimination with DP + PQ •No intervention: control villages, no chemo-elimination	•LLINs •Malaria early diagnosis and treatment •Small individual incentives and village-level incentives •Community engagement activities	^	•Age ≥6 months, male or female	•Infants ≤6 months •Individuals with a known allergy to any of the antimalarial drugs •Pregnant women in their first trimester	





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MESA

MESA Track: Methodology

Data sources

- Research grants databases
- Research institutions websites
- Clinical trials databases
- Abstract books
- Other sources of information
- Consultation with experts in the area

Information collected

- Title
- Objectives
- Principal institution(s)
- Principal Investigator(s)
- Funding source(s)
- Abstract
- Funding amount
- Partners
- Timeframe
- Country
- Study design
- Others