Resilience Against Future Threats through vector control
A research programme consortium
www.lshtm.ac.uk/raft
About RAFT

• Research consortium to address urgent and emerging challenges in mosquito-borne disease control

• Focus: malaria and arboviruses in sub-Saharan Africa and southeast Asia

• 6-year programme: 2020-2026

• Funded by the UK government

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RAFT Partners & Countries

Addressing insecticide resistance and emerging mosquito-borne disease threats

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Problem statement

Insecticide resistance & malaria

- LLINs have been responsible for 2/3 reduction of malaria since 2000
- This is now under threat in Africa
- Future net-buying decisions will be more complicated
- Sub-national stratification needs to take account of differences in insecticide-resistance of local mosquitoes

A rapidly changing world

- The effects of anthropogenic change on our environment are changing VBD risks
- To manage these risks, we need to document, monitor and plan for them (mitigation measures, action plans etc)
- This will require awareness-raising and engagement with sectors outside vector control

Vectors that thrive in urban environments

- Aedes-borne arboviruses – limited data and technical capacity in Africa, historically overshadowed by malaria
- Anopheles stephensi – a newly invasive malaria vector in Africa (already found in Djibouti, Ethiopia, Sudan & Nigeria)

Addressing insecticide resistance and emerging mosquito-borne disease threats

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Our goals

Obj. 1

To manage insecticide resistance by ensuring the targeted deployment of most effective and cost-effective malaria vector control interventions in African countries

Obj. 2

To enhance strategic preparedness for emerging and future mosquito-borne threats in SSA and SEA, through increased awareness, technical understanding and operational planning amongst vector control programmes and donors

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Some of RAFT’s outputs – 1

- **Evidence for LLIN product choice:** To identify the “locally most effective and cost-effective LLIN”, taking into account the specific insecticide resistance mechanisms in the target locality. [Background: new LLINs with new AIs and complex geographic variation in resistance, several species, each with diverse genes]

- **Environmental change on mosquito-borne diseases:**
  - Reviews: to improve knowledge on VBD threats amongst researchers, policymakers and implementers
  - Field research on land-use/land cover (LULC) and VBD

- **South-South networking:** Between African, Asian and Latin American country experts to strengthen national capacity in awareness and preparedness for arboviruses

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LLIN product choice

- **Experimental huts**
  To compare how resistance affects vector bionomics

- **Genetic analysis**
  To measure how each resistance gene affects vector (a) longevity and (b) feeding success

- **Mathematical modelling**
  To predict the impact of each LLIN on malaria transmission, given local resistance

- **Economic analysis**
  To identify the most cost-effective LLINs to counter insecticide resistance in a given target area

Addressing insecticide resistance and emerging mosquito-borne disease threats

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Some of RAFT’s outputs – 2

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Emerging mosquito-borne disease threats

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Some of RAFT’s outputs – 3

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- **Environmental change on mosquito-borne diseases:**
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- **South-South networking:** Between African, Asian and Latin American country experts to strengthen national capacity in awareness and preparedness for arboviruses
Strengthening the ability of control programmes to anticipate emerging threats and prepare response plans

Exchange visits

Case studies

Self-assessment workshops

Discussion forums?

Cohort 1
Thailand, Nov 2022
- Burkina Faso
- Cote d'Ivoire
- Nigeria
- Tanzania
- Uganda

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New and emerging threats

- **Rice and malaria in Africa**: An avoidable trade-off
- **Urbanisation (etc) and malaria vector longevity**
- **An. stephensi in Africa**: What can RAFT contribute?
### How we will achieve this

| New research | Experimental hut trials to evaluate how different insecticidal nets perform according to local resistance (vector genomics)  
|              | Field studies to characterize *Aedes* bionomics  
|              | New eDNA surveillance tool for rapid assessment surveys of *An. stephensi* |
| Decision-making frameworks | Co-designed with NMCPs (and global net-buying agencies) to identify the most cost-effective LLINs against mosquitoes with insecticide resistance |
| Provide accessible state-of-knowledge evidence reviews | To improve awareness and knowledge on changing mosquito-borne disease threats amongst researchers, policymakers and implementers |
| South-south exchange | Between African and Asian country experts to strengthen national capacity in preparedness and control of arboviruses |
| Country case studies | National action plans, self-assessment workshops |
Thank you for more information, visit www.lshtm.ac.uk/raft