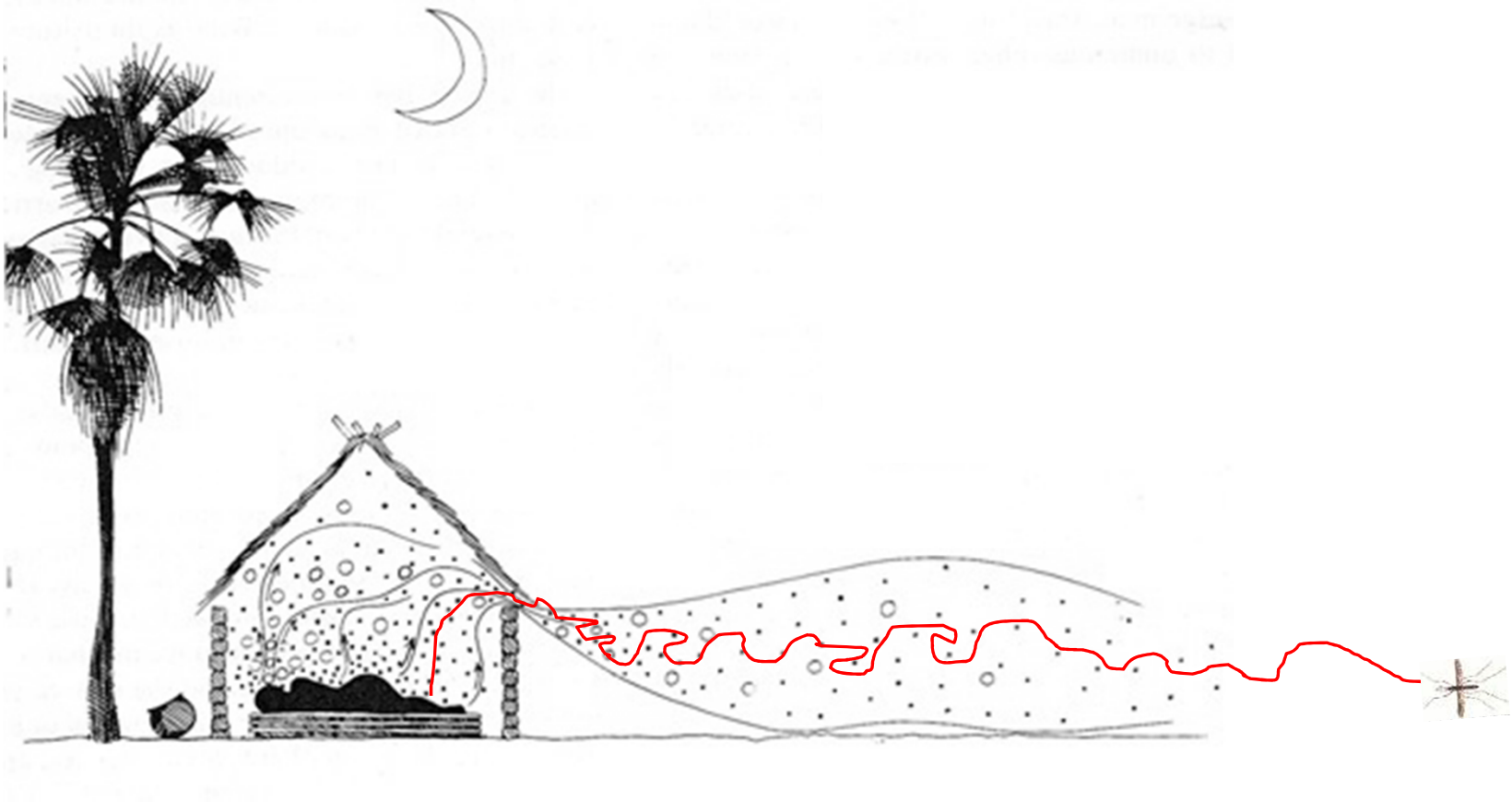
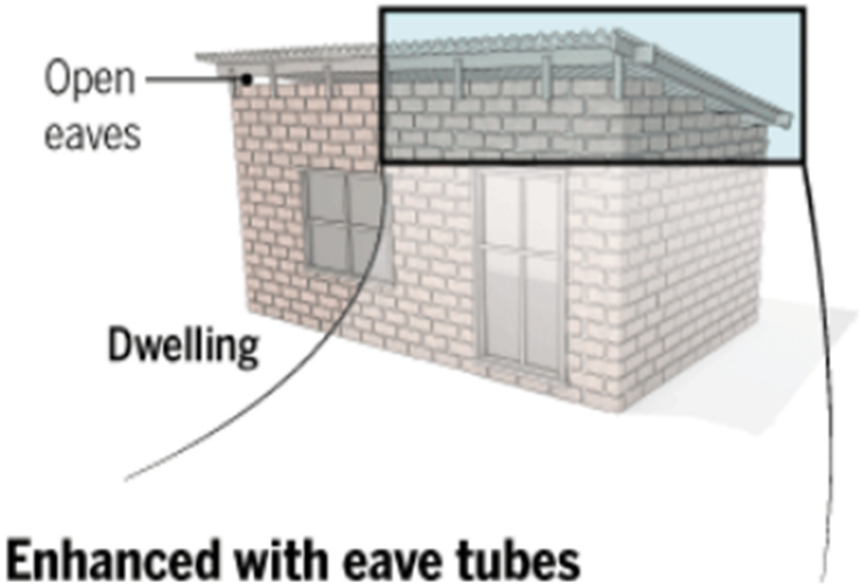
# Progress on a Randomised Controlled Trial for evaluation of Eave Tubes

*Matt Thomas*

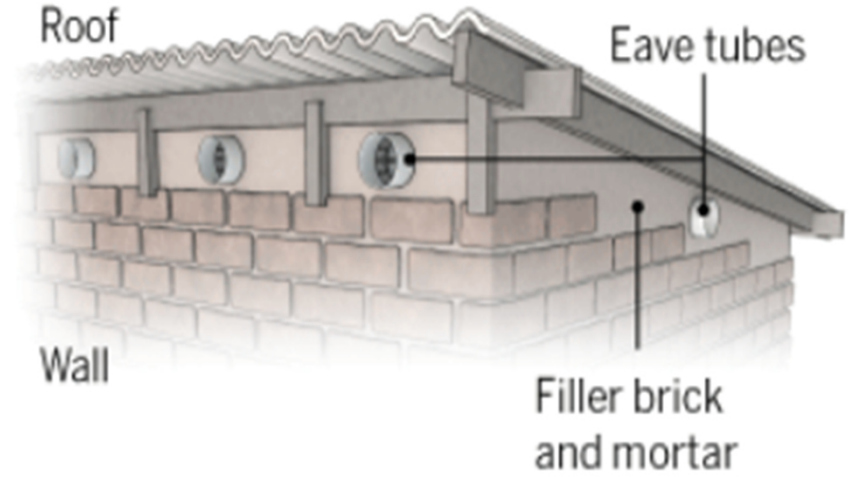
*Penn State University*

# Eaves are the main entry point for anophelines

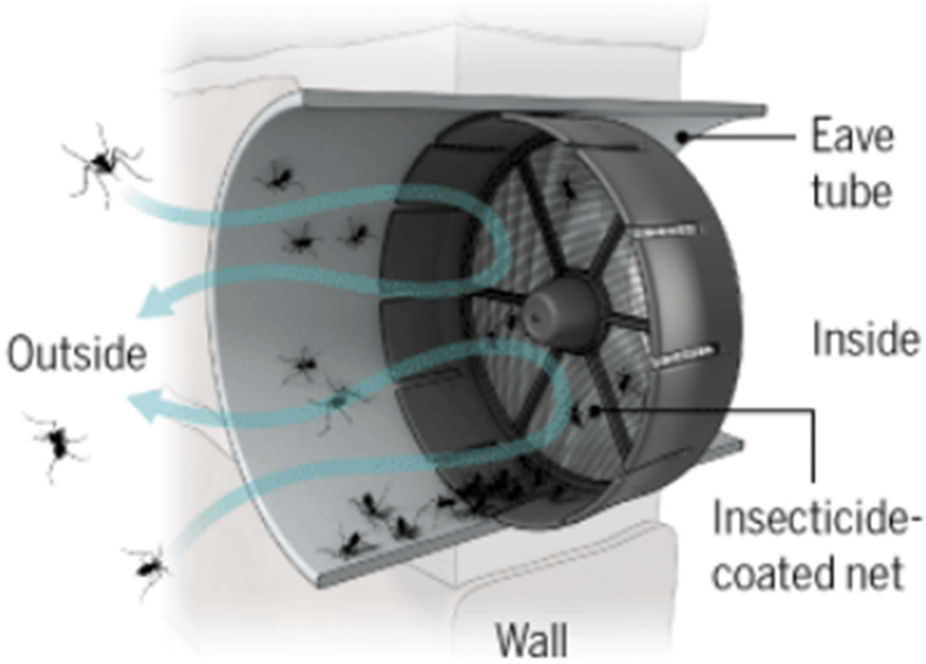


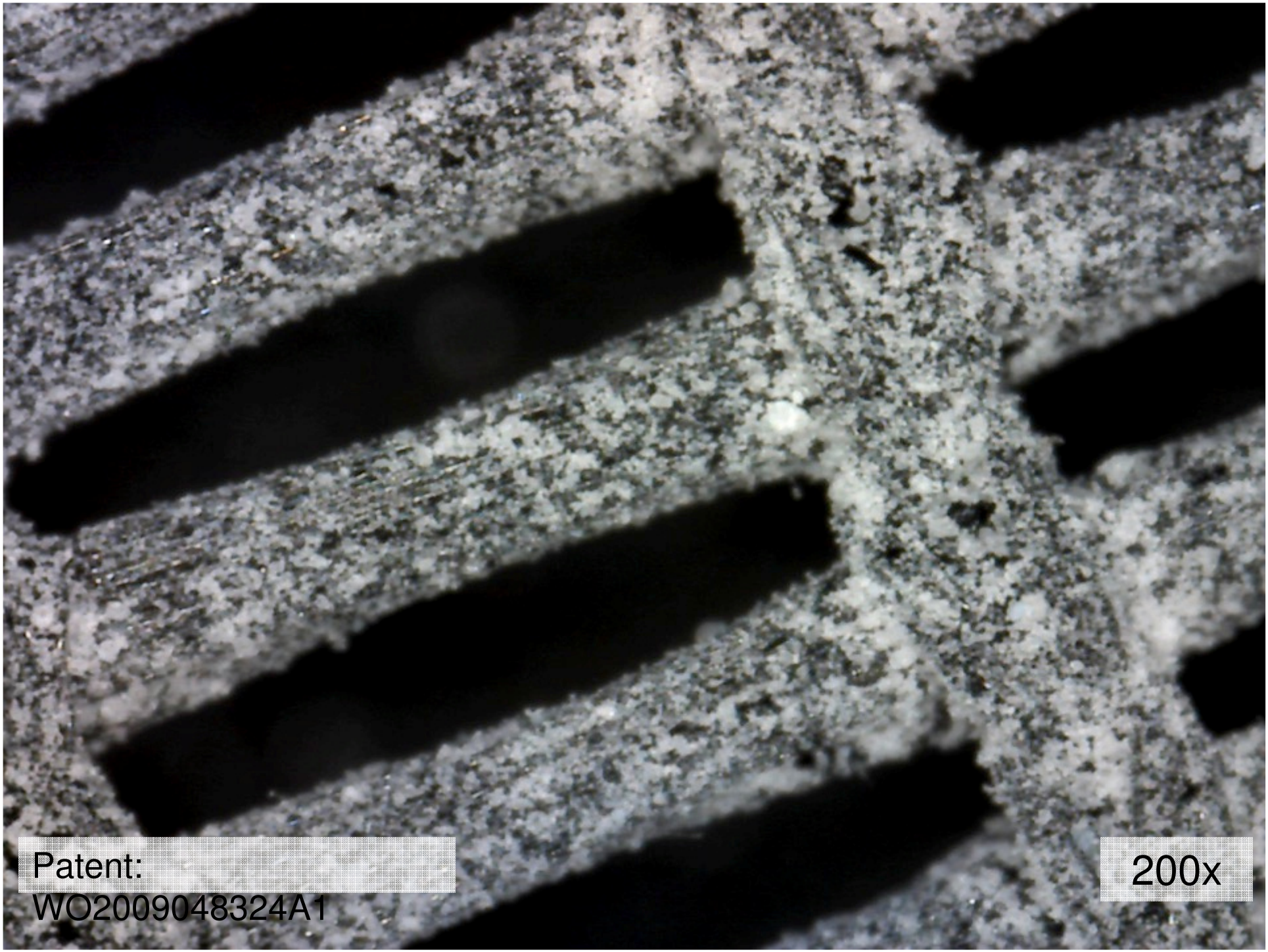



**Enhanced with eave tubes**




**Eave tube**




Patent:
WO2009048324A1
200x

Sternberg *et al. Malar J (2016) 15:447*
DOI 10.1186/s12936-016-1499-8

Malaria Journal

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# Eave tubes for malaria control in Africa: initial development and semi-field evaluations in Tanzania

Eleanore D. Sternberg[1*†], Kija R. Ng'habi[2†], Issa N. Lyimo[2], Stella T. Kessy[2], Marit Farenhorst[3], Matthew B. Thomas[1], Bart G. J. Knols[3] and Ladslaus L. Mnyone[2]

Malaria Journal

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# Eave tubes for malaria control in Africa: a modelling assessment of potential impact on transmission

Jessica L. Waite[1*], Penelope A. Lynch[2] and Matthew B. Thomas[1]

Malaria Journal

COMMENTARY Open Access

# Eave tubes for malaria control in Africa: an introduction

Bart G. J. Knols[1*], Marit Farenhorst[1], Rob Andriessen[1], Janneke Snetselaar[1], Remco A. Suer[1], Anne J. Osinga[1], Johan M. H. Knols[1], Johan Deschietere[2], Kija R. Ng'habi[3], Issa N. Lyimo[3], Stella T. Kessy[3], Valeriana S. Mayagaya[3], Sergej Sperling[4], Michael Cordel[4], Eleanore D. Sternberg[5], Patrick Hartmann[2], Ladslaus L. Mnyone[3], Andreas Rose[4] and Matthew B. Thomas[5]

PNAS

# Electrostatic coating insecticides and brea in mosquitoes

**Rob Andriessen[a,1], Janneke Snetselaar[a,1], Ren Ladslaus L. Mnyone[c], Basil D. Brooke[d,e], Hilar**

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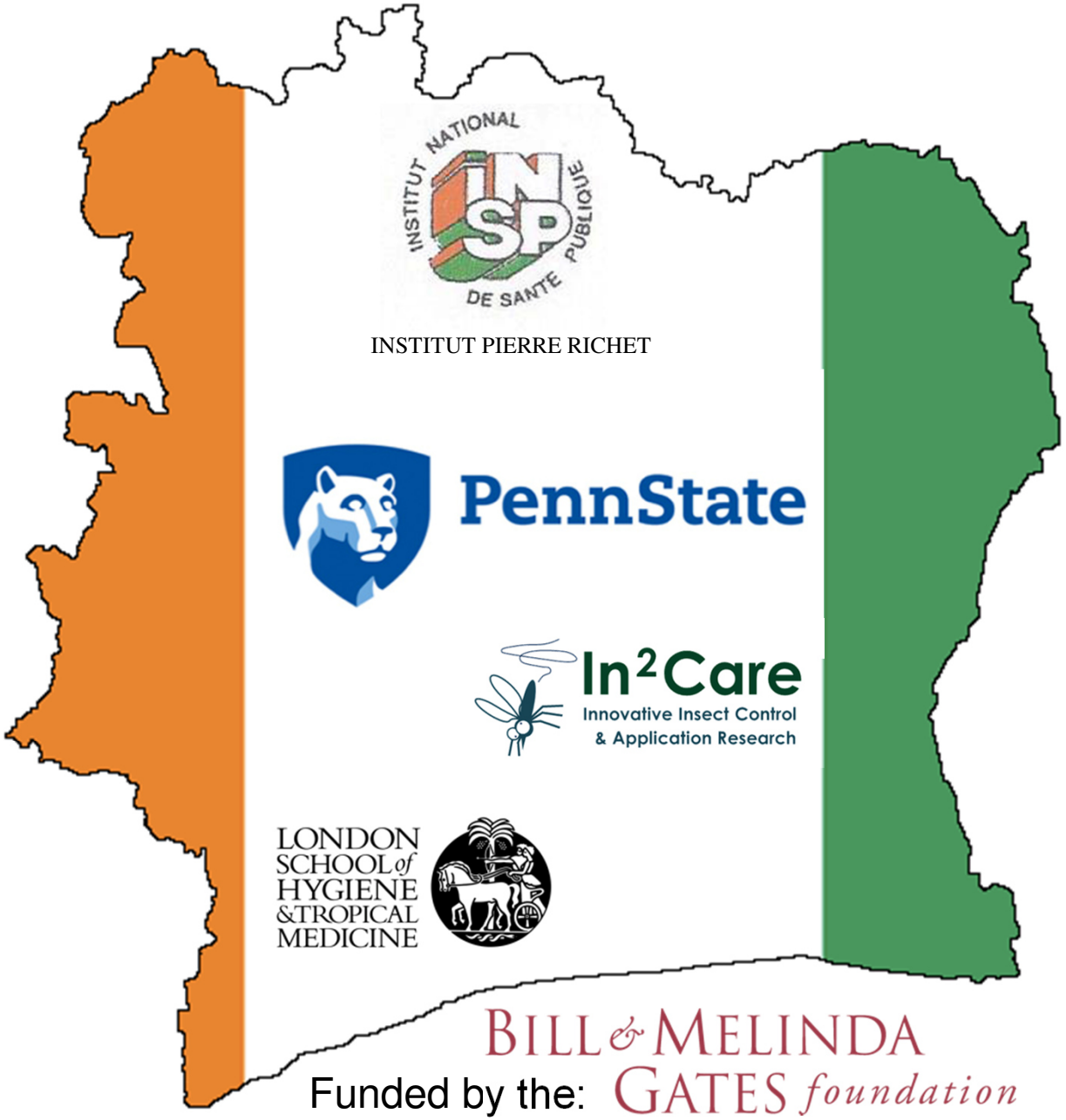
# Eave Tubes: From Concept to Implementation

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EAVE TUBE

**Two armed randomized controlled trial (2016 – 2018):**

- 20 villages will receive new LLINs + eave tubes and house screening.
- 20 villages will only receive new LLINs.

**Outcomes:**

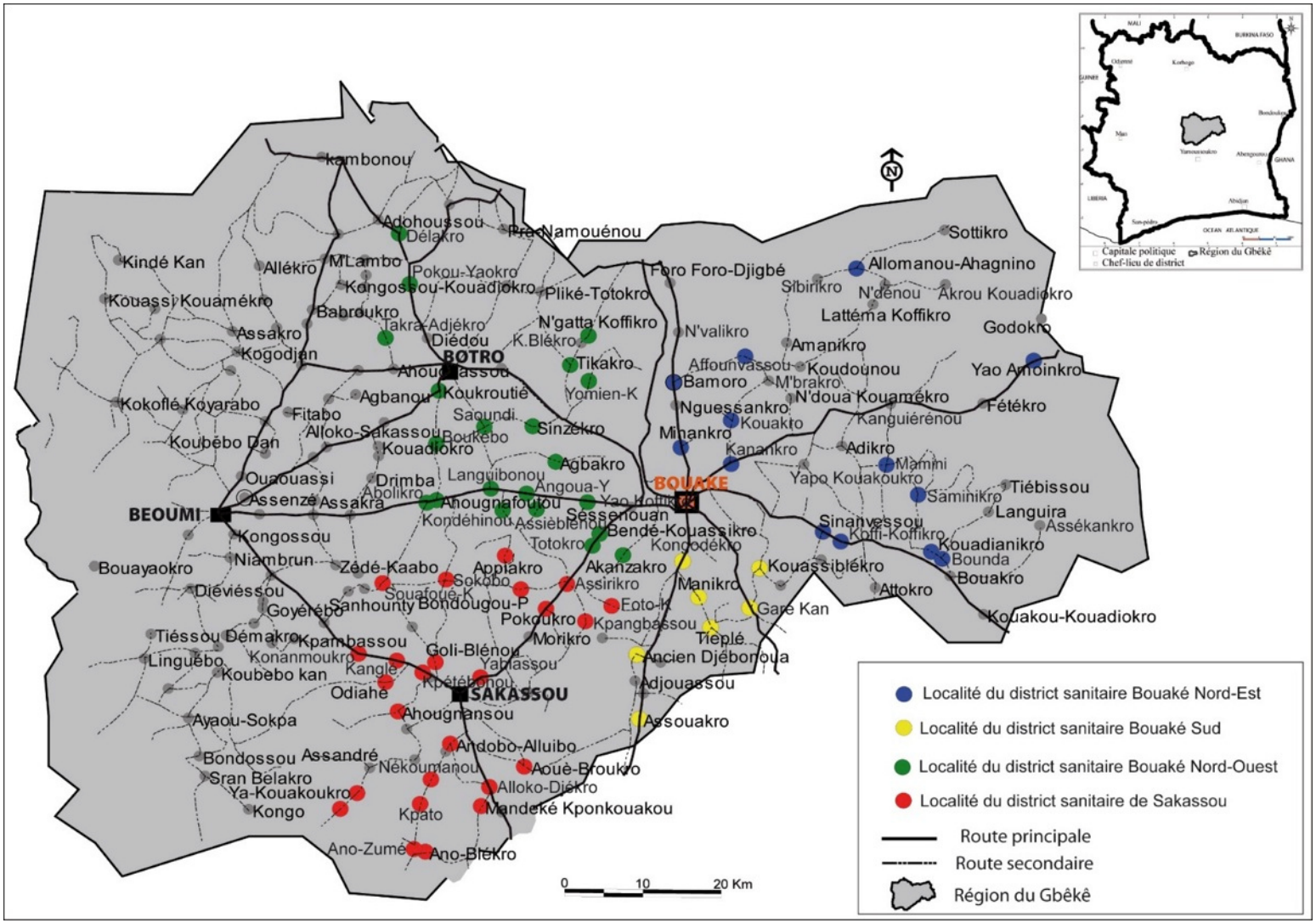
- Epidemiology
- Entomology
- Physical environment
- Social science
- Economic analysis.

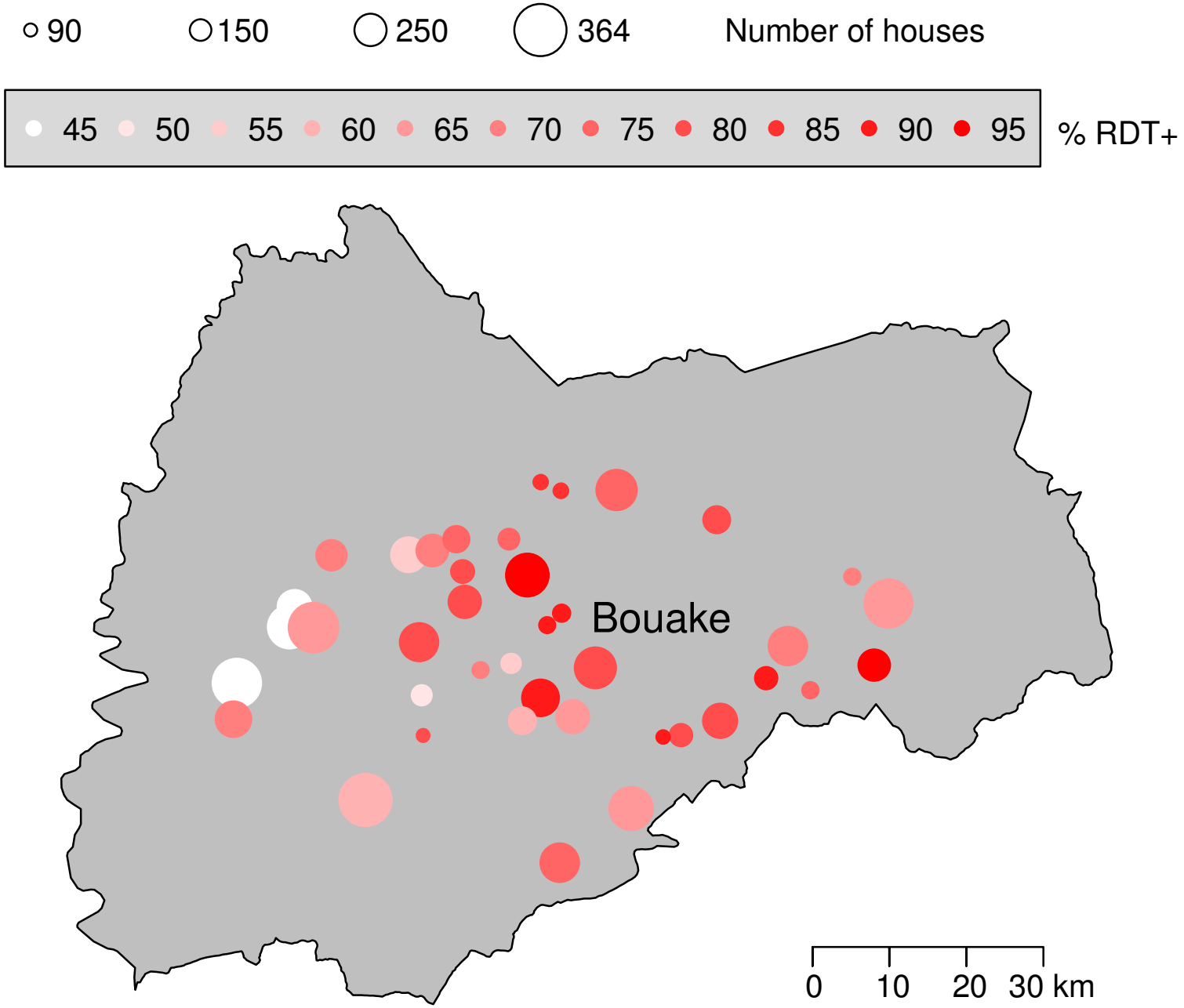
EAVE TUBE

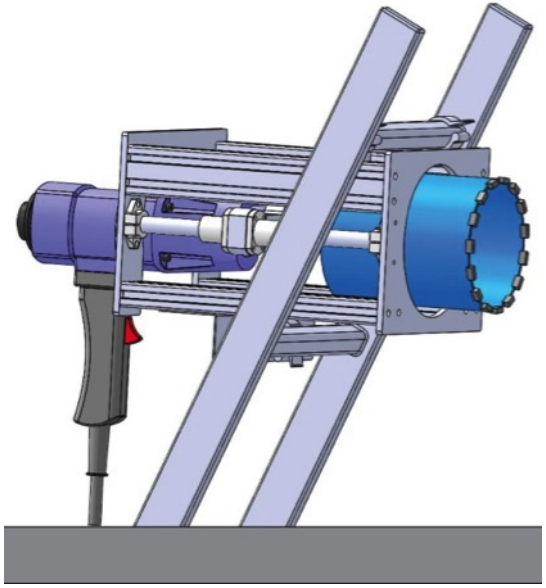
## Epidemiology

- Active infection detection in cohorts of 50 children from each village.
- Initial parasite clearance at start of trial and monitor time to first infection (blood smears and PCR). Repeated beginning year 2.
- Ongoing infection incidence (monthly or 2-weekly blood smears and PCR).
- Febrile children checked with RDT and positives referred to CHWs

# Study region in central Côte d'Ivoire:

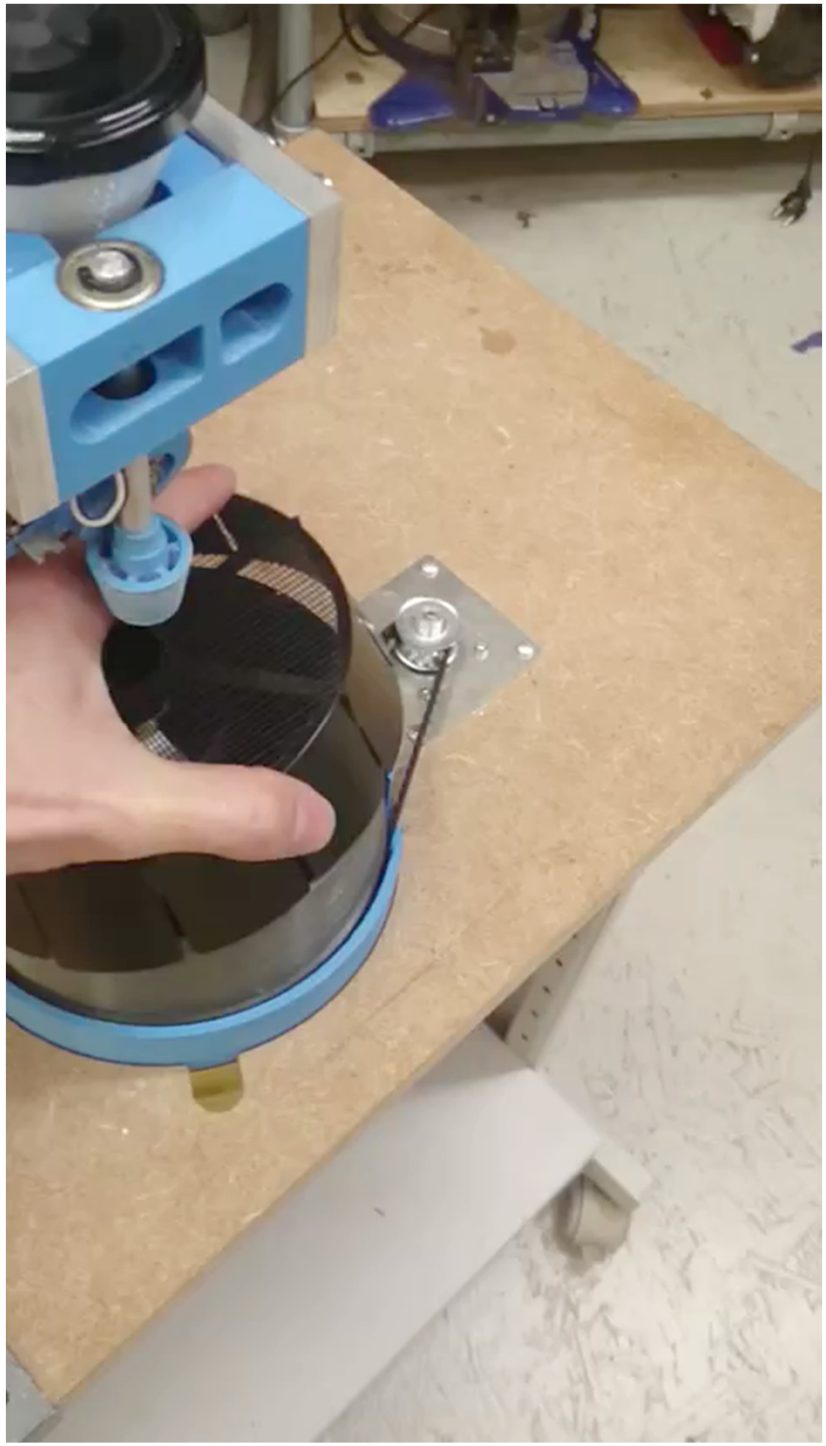


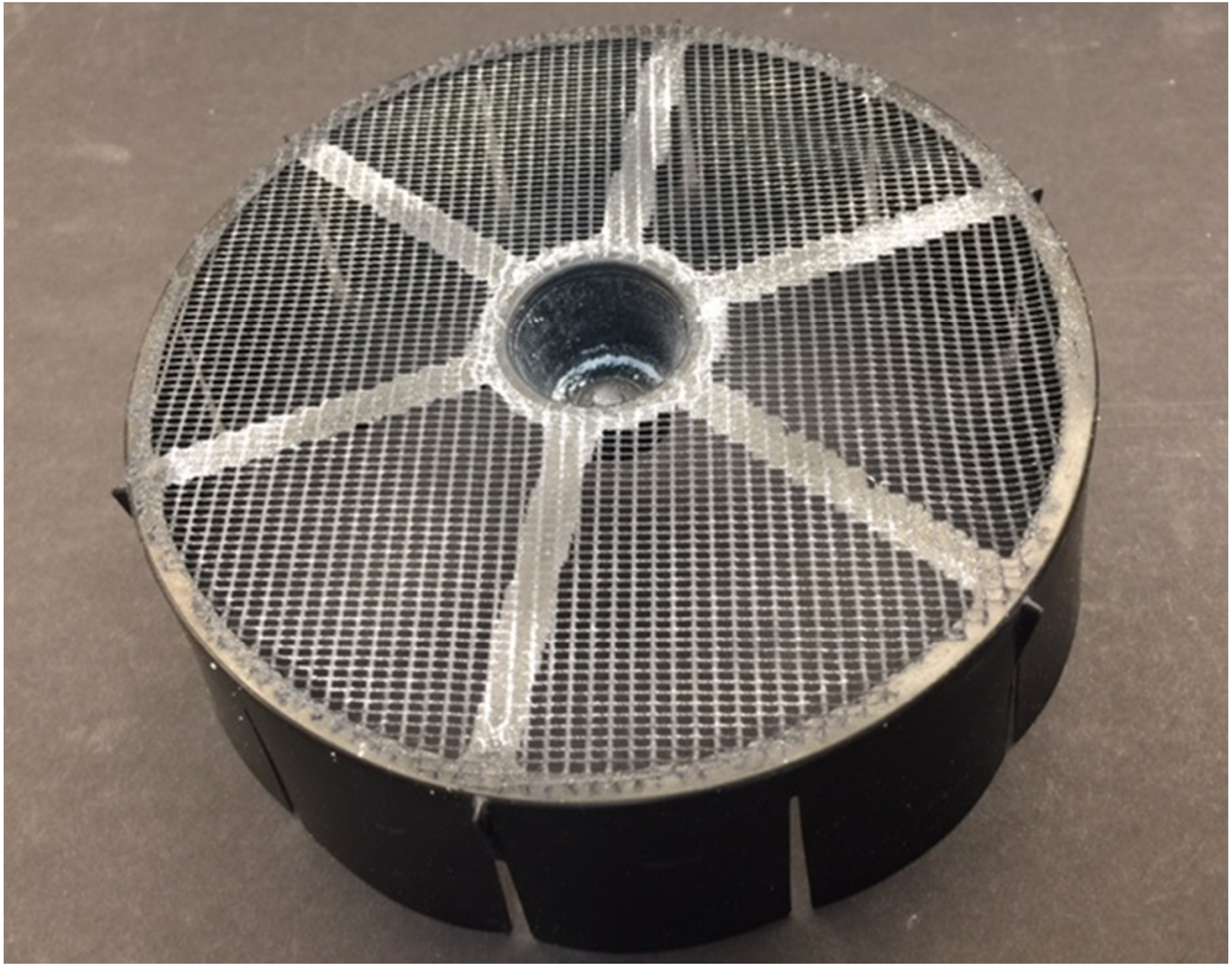

90
150
250
364
Number of houses
45
50
55
60
65
70
75
80
85
90
95
% RDT+
Bouake
0
10
20
30 km




+226 66 58

| Village Code | Total number of houses | Number of houses consent | % Consent |
|---|---|---|---|
| AFOT | 299 | 238 | 80 |
| AKAN | 287 | 277 | 97 |
| APPI | 112 | 89 | 79 |
| ASDR | 157 | 135 | 86 |
| AYAS | 364 | 342 | 94 |
| FOTO | 231 | 166 | 72 |
| GBEH | 160 | 123 | 77 |
| GOLI | 346 | 140 | 40 |
| KOUA | 282 | 250 | 89 |
| LANG | 226 | 157 | 69 |
| MBRE | 95 | 83 | 87 |
| MAMI | 113 | 90 | 80 |
| NANG | 136 | 117 | 86 |
| PIBO | 220 | 107 | 49 |
| SAMI | 335 | 249 | 74 |
| SADI | 183 | 143 | 78 |
| SESS | 120 | 107 | 89 |
| SINA | 269 | 220 | 82 |
| SINZ | 146 | 90 | 62 |
| SOKO | 141 | 104 | 74 |



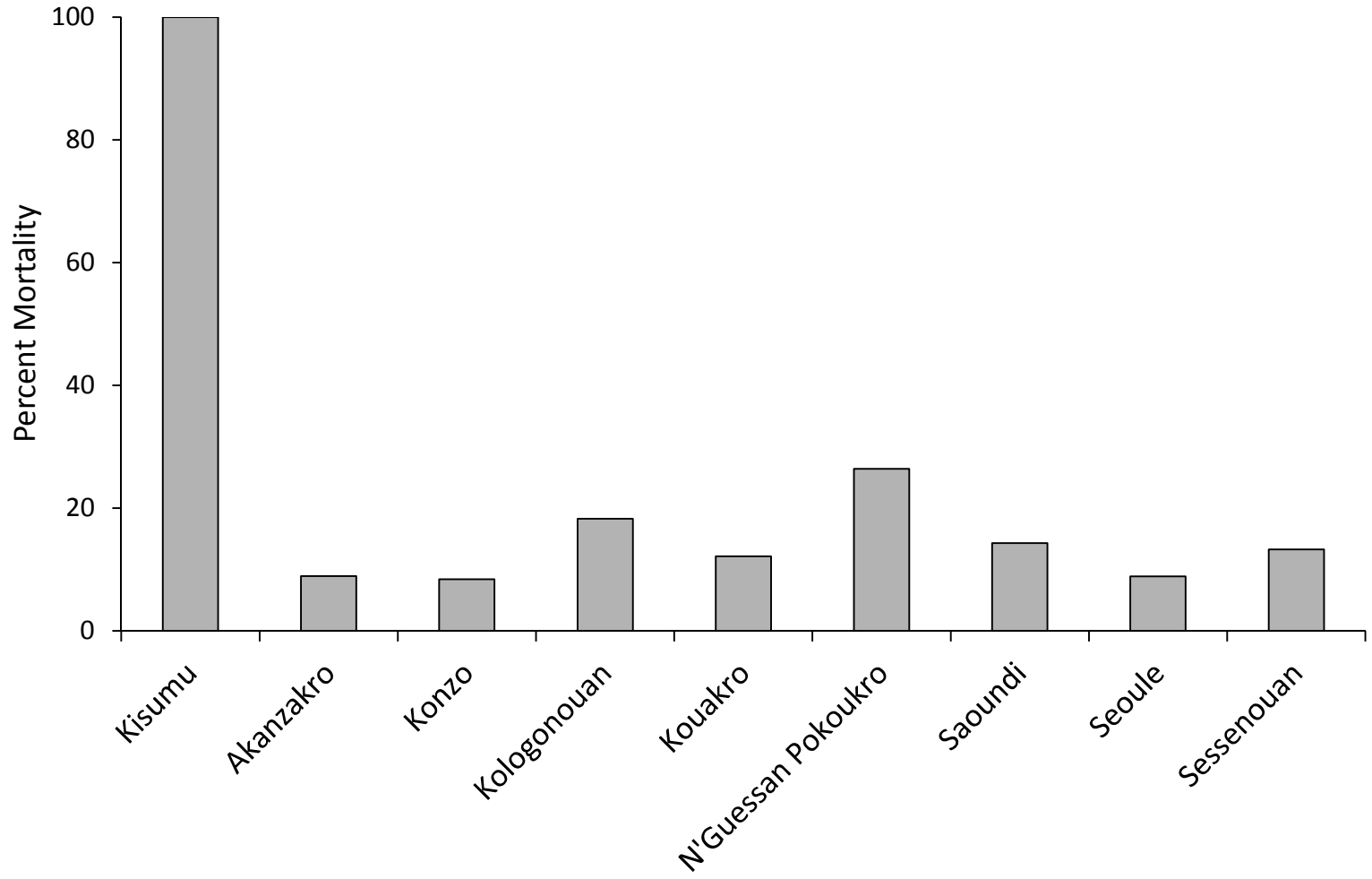


# Resistance ratio of local populations from 8 villages to deltamethrin using CDC bottle assays

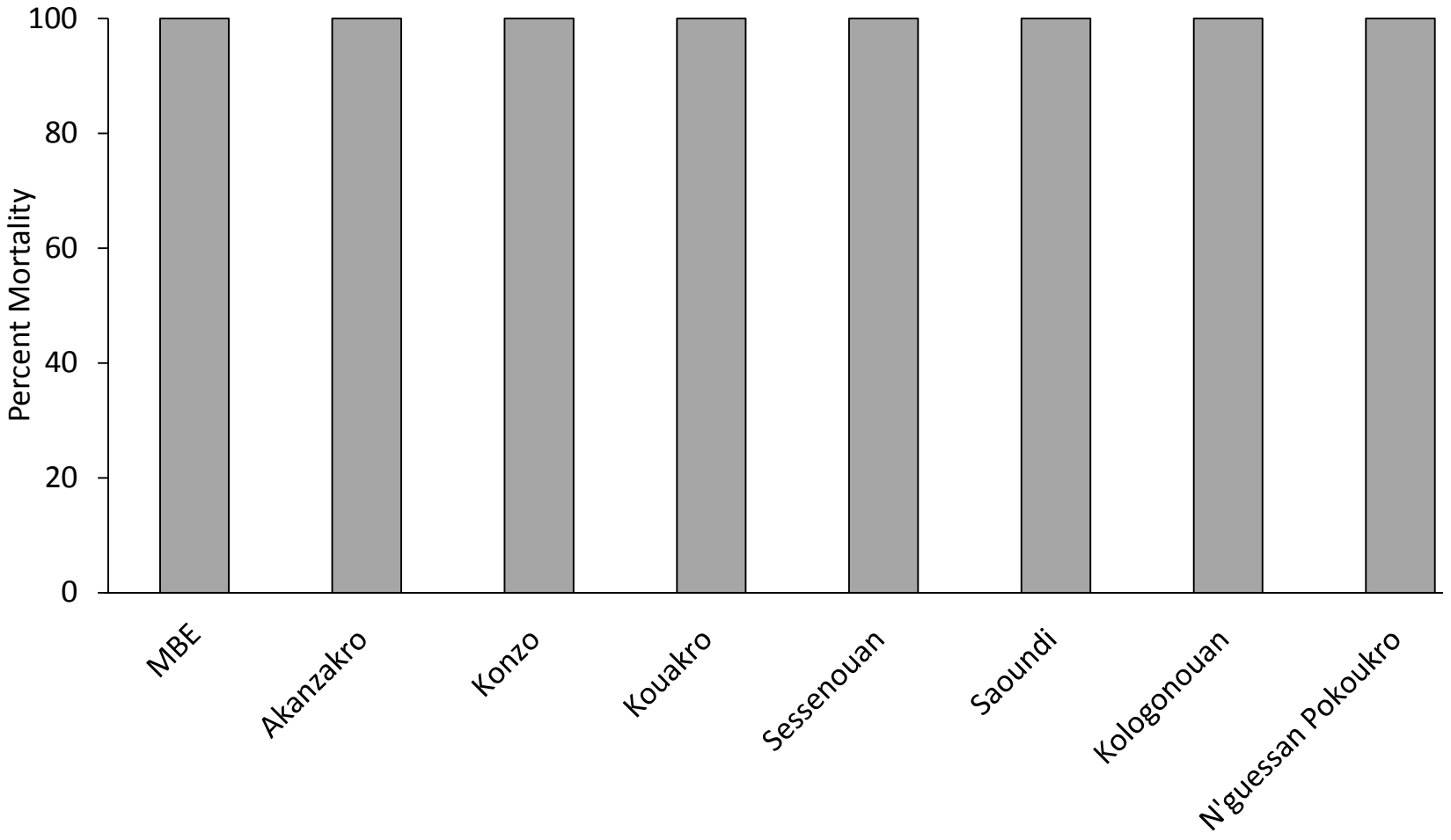
| Strain | Slope (SE) | LD 50 (95% CI) | RR50 (95% CI) |
|---|---|---|---|
| Kisumu | 1.3 (0.18) | 0.01 (0.009-0.02) | - |
| Akanzakro | 1.7 (0.18) | 27.2 (20.3-35.2) | 1873 (2424-1447) |
| Kologonouan | 1.5 (0.15) | 21.9 (15.8-28.5) | 1504 (1117-2028) |
| Konzo | 1.6 (0.13) | 23.5 (19.1-28.3) | 1617 (1221-2141) |
| Kouakro | 1.7 (0.17) | 22.4 (17.4-28.0) | 1542 (1162-2046) |
| N'G. Pokoukro | 2.1 (0.25) | 33.7 (25.7-43.2) | 2314 (1768-3027) |
| Saoundi | 1.7 (0.12) | 35.0 (28.9-41.9) | 2405 (1875-3086) |
| Seoule | 1.8 (0.14) | 21.0 (17.2-25.0) | 1441 (1067-1946) |
| Sessenouan | 1.4 (0.13) | 27.4 (20.8-34.8) | 1883 (1446-2452) |

*LD50s are expressed in µg/mL*

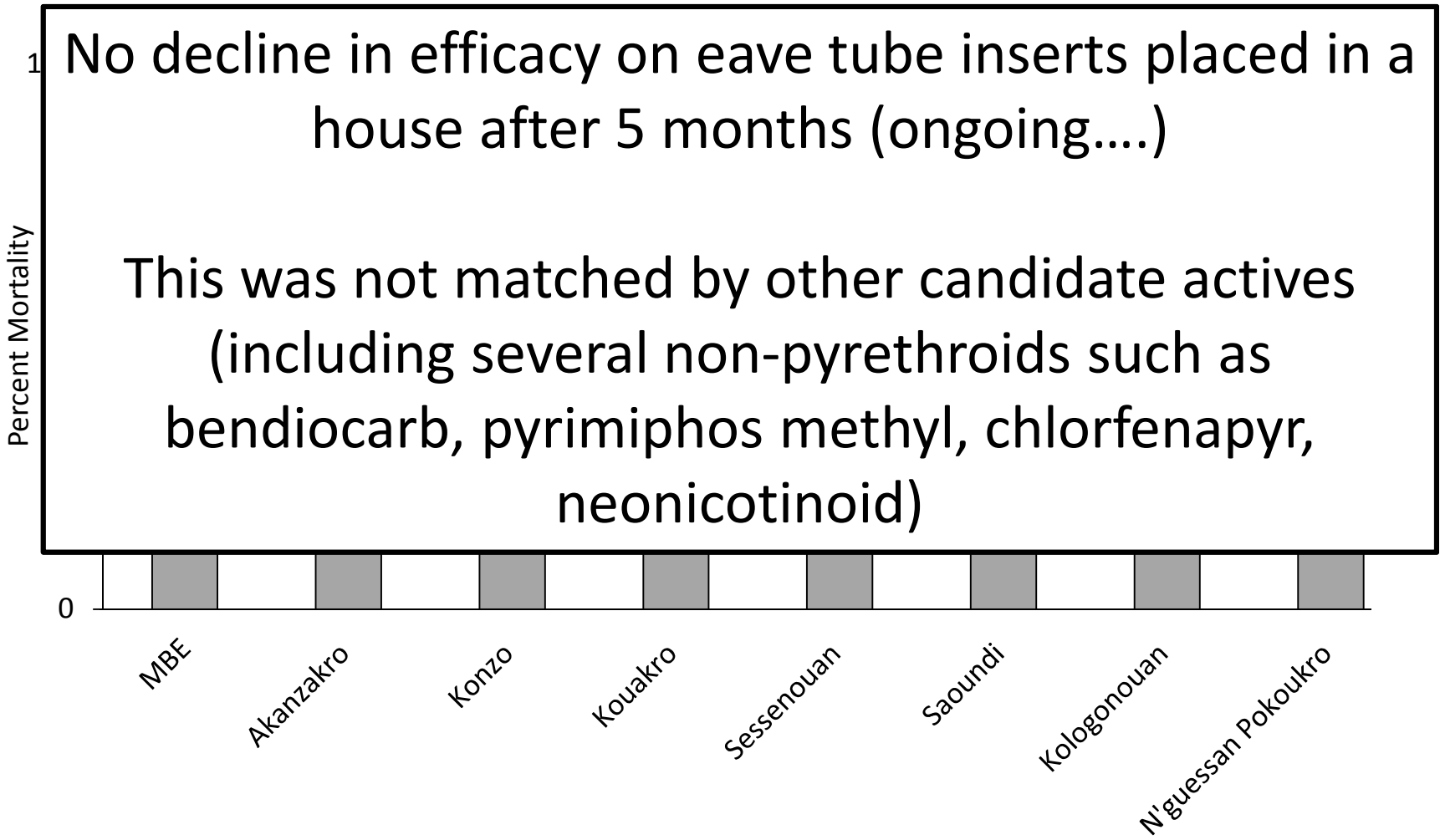
# Percentage mortality of pyrethroid susceptible and resistant *Anopheles gambiae* on PermaNet 2.0 LLIN in WHO cone bioassays



# Percentage mortality of pyrethroid resistant *Anopheles gambiae* on Eave Tube inserts treated with 10% Beta Cyfluthrin (Tempo 10 WP)



Percentage mortality of pyrethroid resistant *Anopheles gambiae* on Eave Tube inserts treated with 10% Beta Cyfluthrin (Tempo 10 WP)



EAVE TUBE

- Installations completed in 20 villages
- Treatment of inserts and distribution of LLINs in next couple of weeks
- Monitoring then begins (detailed SOPs prepared for all activities, checked by QA monitor)
- Trial Steering Committee (approved study protocol, oversee progress, independent statistical analysis and advice on SAEs)
- Various additional entomological expts to help interpret RCT (including household level trial)