ATSB
The development pathway of a new product class
Mathias Mondy | VCWG | April 2021
The importance of finding tools to prevent outdoor transmission

**Mosquito feeding behavior and how it influences residual malaria transmission across Africa**

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**Abstract**

The antimalarial efficacy of the most important vector control interventions—long-lasting insecticidal nets (LLINs) and indoor residual spraying (IRS)—primarily protect against mosquitoes’ biting people when they are in bed and indoors. Mosquito bites taken outside of these times contribute to residual transmission which determines the maximum effectiveness of current malaria prevention. The likelihood mosquitoes feed outside the time of day when LLINs and IRS can protect people is poorly understood, and the proportion of bites received outdoors may be higher after prolonged vector control. A systematic review of mosquito and human behavior is used to quantify and estimate the public health impact of outdoor biting across Africa. On average 79% of bites by the major malaria vectors occur during the time when people are in bed. This estimate is substantially lower than previous predictions, with results suggesting a nearly 10% lower proportion of bites taken at the time when people are beneath LLINs since the year 2000. Across Africa, this higher outdoor transmission is predicted to result in an estimated 10.6 million additional malaria cases annually if universal LLIN and IRS coverage was achieved. Higher outdoor biting diminishes the cases of malaria averted by vector control. This reduction in LLIN effectiveness appears to be exacerbated in areas where mosquito populations are resistant to insecticides used in bed nets, but no association was found between physiological resistance and outdoor biting. Substantial spatial heterogeneity in mosquito biting behavior between communities could contribute to differences in effectiveness of malaria control across Africa.
What is ATSB?
How will it be deployed?

2-3 bait stations per eligible structure, at 1.8m high, in protected location for 6 months
The Product Development Challenges

- Proof of Concept
- Product Development
- Public Health Value Demonstration
- PQ listing and country registration
- Market Uptake
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**Building Partnerships • Creating Solutions • Saving Lives**

**Female anophelines population reduction**

**Old anopheline females**

**EIRs**

**Sporozoite rates**

Traore et al. Malaria Journal 2020

Mali
The Product Development Challenges

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Product Development

Public Health Value Demonstration

PQ listing and country registration

Market Uptake

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UK (LITE)

Israel (Westham)

IVCC/LSTM
PATH
LSHTM
Tulane University
University of Bamako
US CDC
KEMRI
Macha Research Trust
Johns Hopkins University
Institute of Molecular Biology and Biotechnology
University of Miami

Lab trials

Semi field trials

Attraction distance

Non-inferiority tests

Field trials
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Market Uptake

Open-label two-arm cluster randomized controlled (CRCT) trial design

[ATSB + high vector control coverage (ITN/IRS) versus high vector control coverage (ITN/IRS)]

38 clusters per arm

40 clusters per arm

40 clusters per arm

Mali

Kenya

Zambia

Primary outcome: incidence of malaria clinical cases (fever + positive rapid diagnostic test) measured within cohorts of children age 1-14 (5-14 in Mali). Target reduction: 30% over the time frame necessary to generate sufficient person-time (to achieve 90% power)

Secondary outcomes: time to first infection assessed among the cohort, prevalence of malaria infection among people age 12 months and older, incidence of passively reported confirmed cases among people of all ages from routine surveillance data, entomological outcomes (age structure, density, sporozoite rate, entomological inoculation rate).

Other measures: durability monitoring, insecticide resistance monitoring, social and behavioral studies (acceptability, barriers to coverage), and economic measures (cost and cost-effectiveness)
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**Determination of class and pathway**
- Prequalification Pathway
- Existing policy recommendation
- Request for Determination of Pathway: Applicants submit request to initiate engagement

**Prequalification Pathway**
- PQT assessment: Review of quality (chemistry & manufacturing), safety (exposure), entomological efficacy
- Decision to prequalify: Based on submitted dossier & inspection of production sites

**New Intervention Pathway**
- Planning phase: Initial meetings to establish requirements and milestones
- VCAG: Assess trial design, evaluate results, and advise on public health value
- Policy development: Departments develop new policy recommendations

**Outcome of evaluation process**
- Listing as prequalified product
- Issuance of new policy recommendation
- Country registration dossier submission
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**Funding**

**Technical support**

**NMCPs**

(Drive Procurement)

In place for IRS and LLIN... but need to be established for ATSB
This new product class is based on the fact that mosquitoes feed frequently on sugar. ATSBs offer a new and potentially widely applicable control method to reduce malaria transmission, including outdoors.

Modelling suggests that even a modest daily feeding/kill rate of 2-3% would translate in a substantial decrease in transmission of malaria burden (at least a minimum of 30% reduction in malaria incidence).

The development pathway of a new product class requires the mobilization of significant resources and expertise to demonstrate Public Health Value, achieve PQ-listing, country registration and market uptake.
Thank you for your attention