



Improving and validating methods to strengthen the evidence base for innovative vector control tools

Symposium 14

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Validation of Methods for Vector Control

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Overview of I2I Work Packages

- Developing the ‘**Raising the Floor for ITNs**’ initiative, including physical durability and Post-Market data collection
- Achievable goals around data quality and availability
- **Method validation** and data interpretation are key to understanding new products
- Developing the **Collaborative Registration Procedure (CRP)** for VC with WHO and AU partners
- **Professional placement programme** to place African researchers with VC product developers

Overarching Activity Areas

1. Lifecycle Management of Vector Control Products
2. Method Validation
3. Country Registration
4. Product Development Fellowship Programme

New grant builds on progress in the previous efforts and works to catalyse solutions to long-standing issues

What we mean by Methods Validation

Multi-phase, multi-site experimental procedure to:

- Understand performance
- Define and measure analytical error to show quality, reliability, and consistency of results
- Demonstrate suitability for intended purpose and results are reliable

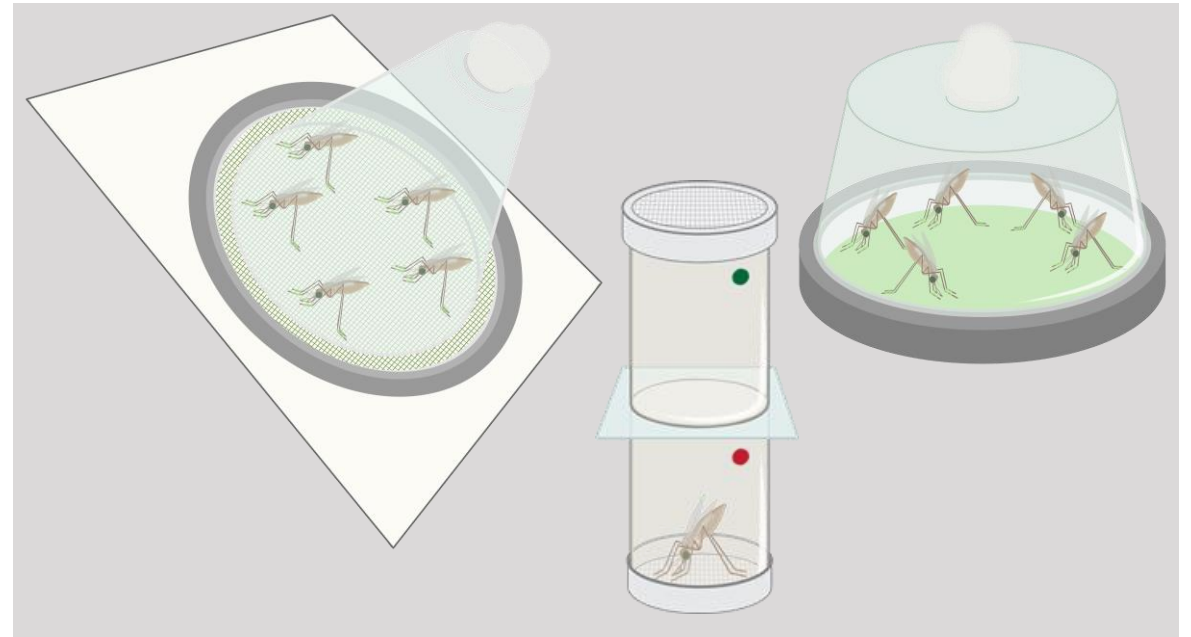
Results in a Method Claim



Any method which measures a quantitative endpoint can be experimentally validated

Benefits of validating methods

1. To ensure a method is appropriate for intended use
2. To characterise the method to ensure we understand what it is telling us, and what it's not
3. To allow comparison between different methods designed to measure the same endpoint
4. To identify sources of variability so that they can be minimised
5. To allow comparison and interpretation of data between studies and across time



Focus in i2i to date has been on standard and adapted laboratory bioassays

Method Validation WP

- Establish a standardised process for method validation, lead proof of principle, and then disseminate and socialise
 - Methods Validation Framework
 - Consensus SOPs
 - Standardisation or characterisation of inputs
- Coordination of multi-site validation of methods
 - Method claims
 - Interpretation guidance
 - Online tools for data analysis and interpretation
- Underpinning research to better understand methods
 - Identifying and minimising sources of variability
 - Optimising new and existing bioassays
- Prioritisation led by Methods Landscaping, in consultation with stakeholders

- Durability monitoring of ITNs
- New methods to evaluate new vector control tools
- Application technology to improve IRS evaluation
- Characterisation of resistant and susceptible mosquito colonies
- Understanding and standardising wash methods for ITNs
- Quantifying and characterising surface-available insecticide on ITNs
- Reviewing resistance monitoring methods, considering new MoA

Variability in results (Noise)

'Noise': Variation caused by factors other than test item

More variability means more samples needed to detect smaller differences

I2I are quantifying the precision of standard bioassays and identifying sources of noise

I2I are generating guidance on interpreting data given a known level of noise



By measuring noise in an assay you can identify sources and better interpret data

Characterising or standardising inputs

To minimise variability (noise) all elements should be standardised as far as possible

Where this is not possible, characterise inputs and use the information to interpret data

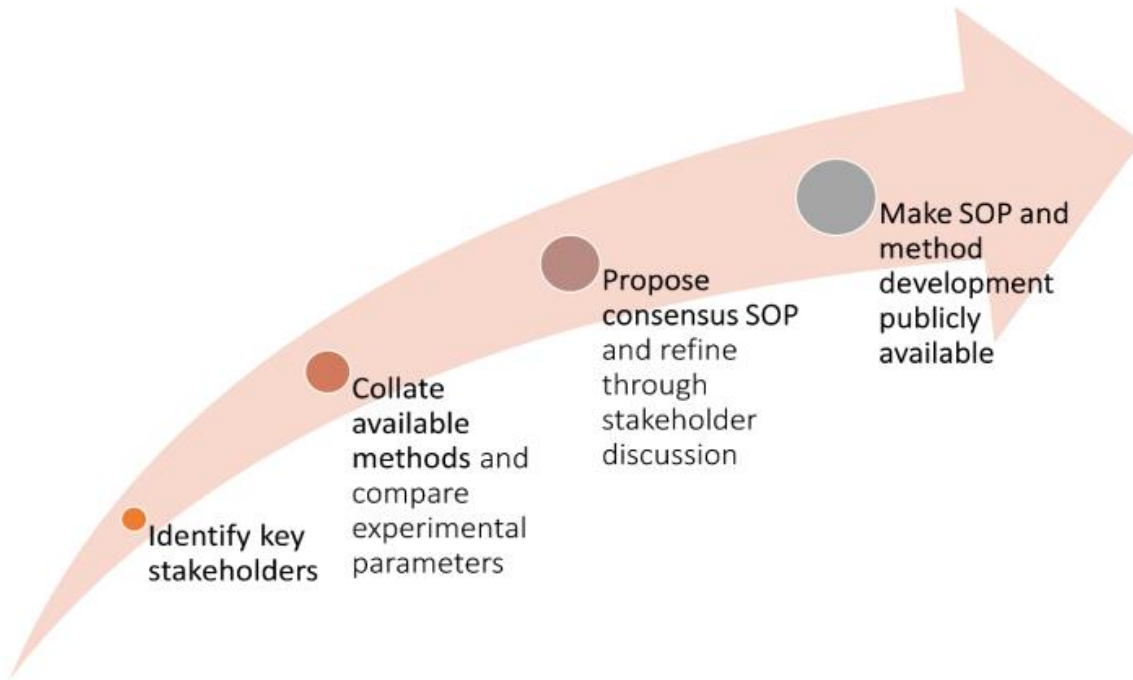
Pyrethroid Resistant Mosquito Strain: Tiassalé 13	
Species: <i>An. gambiae s.l.</i>	
% Mortality (24 h) in WHO tube bioassay with alpha cypermethrin (0.03%)	54% (n = 94)
% Mortality (24 h) in WHO tube bioassay with alpha cypermethrin (0.03%) + PBO (4%)	92% (n = 96)
% Mortality (72 h) in WHO bottle bioassay with chlorfenapyr (100 ug/bottle)	100% (n = 97)
% Mortality (24 h) in cone test with new pyrethroid-only ITN (Interceptor)	70% (n = 106)
Pyrethroid susceptible mosquito strain: Kisumu	
Species: <i>An. gambiae s.l.</i>	
% Mortality (24 h) in WHO tube bioassay with alpha cypermethrin (0.03%)	100% (n = 90)
% Mortality (24 h) in cone test with new pyrethroid-only ITN (Interceptor)	95% (n = 103)
NB. All results Abbot's corrected where control mortality was between 5 and 20%	

Lees et al, 2022. Strain Characterisation for Measuring Bioefficacy of ITNs Treated with Two Active Ingredients (Dual-AI ITNs): Developing a Robust Protocol by Building Consensus



Consensus SOPs

Aim: bring users together to compare SOPs and agree on a single version which all can adopt to generate more standardised data for easier comparison between studies



Article

Developing Consensus Standard Operating Procedures (SOPs) to Evaluate New Types of Insecticide-Treated Nets

Natalie Lissenden ^{1,2,*}, Jennifer S. Armistead ³, Katherine Gleave ¹, Seth R. Irish ⁴, Jackline L. Martin ⁵, Louisa A. Messenger ⁴, Sarah J. Moore ^{6,7,8,9}, Corine Ngufor ^{10,11}, Natacha Protopopoff ¹⁰, Richard Oxborough ¹², Angus Spiers ² and Rosemary S. Lees ^{1,2}

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Process can be applied to any SOP where versions are in use by multiple users



Thank you