Entomological Surveillance – Indicators for LNs

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- Relevance of entomological surveillance
- Why we need to incorporate entomological impact indicators?
- Surveillance approach

Vector control should guide by:

- Apply methods that are cost-effective (cost & impact under programme settings)
- Must have systems to deliver such tools/interventions
 - Technical capacity to plan & implement
 - Human
 - Physical infrastructures
- M&E from planning to impact assessment

Which Tools for Vector Control?

- In epidemiological terms a good tool
 - Must be able to reduce transmission to the lowest level i.e. impact on vectorial capacity

An important vector will make sure that:

- It bites humans frequently if had a choice (HBI)
- Lives longer increasing it's chance to transmit (Parous rates, ovarian dilatations)
- It is susceptible to the parasites sporogony
- Ability to reproduce in large numbers density

Based on these assumptions

Expect that LNs impact on:

- Biting rates
- Survivorship
- Sporogony
- ② Densities



> Vector
Exposure to
control
intervention



Heterogeneity of vector population biting behavior

Let us look at these factors in detail

Biting rates – a²

- Indoors/outdoors
- Biting humans or other sources
- Biting peaks indoors/outdoors

Survivorship – n⁸

- Parous rates dissections to determine whether laid eggs before or not
- Age grading number of ovarian coils X times laid eggs

Density – m

- Numbers/person/night
- Numbers/sleeping room/night

• Sporogony – n⁸

- Proportion with sporozoites salivary dissections, PCR/ELISA
- Entomological Innoculation Rate (EIR) numbers/person/night x sporozoite rate

Where do you draw the line ...

- In an ideal world ... collect all indicators process to impact – including entomological – biting, resting, densities, survivorship etc.
- But given the reality let program concentrate on impact/coverage
 - Coverage indicators
 - Entomological impact indicators

Goal of Entomological Surveillance

Tool to sustained efficacy of vector control measures and provide basis for measuring their effectiveness

- Guide planning, implementation and evaluation
- No universal surveillance system
- Tailored according to malaria risk and resources available

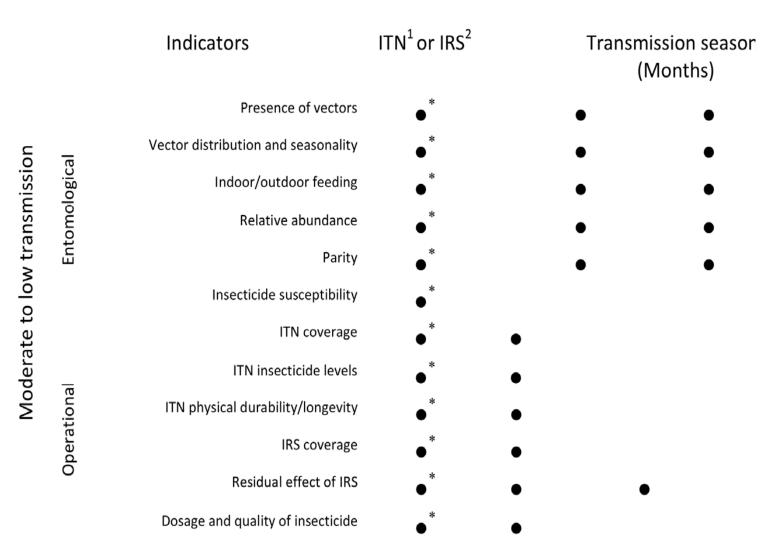
Entomological Surveillance will aim to:

- Identify the vector population
- Guide optimal time and place to implement VC
- Detect behavior changes that would limit the efficacy of VC
- Monitor the entomological impact of VC
- Detect development of insecticide resistance and modes of action

Indicators

- Presence of malaria vectors and species
- Vector spatial and seasonal distribution
- Vector relative abundance
 Vector relative abundance
- Outdoor/indoor feeding behaviour
- Parous rates
- Insecticide susceptibility

Timing of Collection



Surveillance approach

- Sentinel surveillance
- Baseline before intervention is implemented
- Indicators change from baseline
 - Data link to ongoing cases surveillance
 - Further investigation
 - Example: insecticide resistance is emerging
 - LNs physical and chemical barrier

Example:

- Impact of resistance on applied control tools (LNs):
- Depend on: mechanism conferring resistance
- Behavioral resistance
- LNs act at the same time as a physical and chemical barrier.

Experimental Hut Traps

Assess operational consequences of IR

Efficacy of LNs:

- Deterrence
- Blood feeding inhibition
- Induced exophily
- Mortality



Conclusions

Cost-effective

- It is always important to institute a M&E system when implementing vector control
- Stick to indicators that can be achieved by the control programme