Reactive IRS

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Definitions

Vector control can typically be divided into:

**Universal coverage** – Where everyone is covered regardless of risk. Often in high endemic areas.

**Focal coverage** – Where the disease is located spatially or temporally and targeting this area will achieve programme aims.

IRS history

Year

Incidence (per 10,000)

VL Incidence

Independent Survey of VL incidence

Deb et al., 2018 Gates Open Research
India currently

If a village has a case of VL it is then it is included in the micro plan for IRS for the next 3 years.

This is focal in nature. Synchronizing IRS to case data as per NVDCP guidelines.

For VL IRS takes the entire village as the unit for IRS.
**Response**

**CI staff, health promotion staff, community members**
- prioritise areas for targeting resources
- verify source locations
- reactive case detection – *test+treat*, family and neighbours/special or mass survey
- reactive case detection in area of initial case and case mapping at household level
- forward all active case notifications for electronic data entry and automated outbreak ID (safety net)
- **targeted vector control and surveillance**
- in case of *epidemic*, personal protection measures
- community mobilization
- information, education and communication activities in effected communities
- behaviour change communication

**Case detection – location and response**

- **Person visits health facility**
  - Test
  - **Fever/history of fever**
  - **Travel history**

- **Test**
  - **Positive**
  - **Negative**

- **Positive**
  - **Treat**
  - **Notify case**

- **Notify case**
  - **CI collect forms**
  - Determine possible source locations

- **Hardcopy location for follow up by local team**
  - **Identify Location**

- **Passive case data entry**
  - **Automated outbreak & epidemic ID (safety net) and communication**

**Coleman et al 2008 Mal J.; Coleman et al 2008 Mal J.**
Outbreak detection

- **Does every case trigger a response?**
  - Thresholds can be set based on historical data (e.g., >1:1000)
  - Outbreaks trigger using a set level.
  - Trigger by area, village, block, district
  - Trigger by health facility
Need to know the distance from an index case that disease risk decreases.

WHO guidelines recommends ACD at 50m or 100 households from an index case. Based upon work in Bangladesh at high prevalence in 2004.

Urine-based ELISAs and finger-prick blood samples for detection of recent active transmission to assess the scale for reactive spraying

• Collect conventional rK39 antibody detection RDTS from finger-prick blood collection
• Send urine samples to central laboratory for Antigen detection
• Clinical symptoms

20% of samples to be taken from each:
1. Household members, 2. Near neighbours – next 5 houses
3. Between 20m-50m, 4. Between 50m-100m, 5. 100m-500m
What is the Ideal Diagnostic?

**DIRECT METHODS**
- (Microscopy) Culture
- Genome detection
- Antigen detection

**INDIRECT METHODS**
- Serology IgM
- Serology IgG

**Time to Result:**
- Days
- Hours
- Hours/Minutes

Confidence

Ease of use

Adapted with permission from J. Cardosa & R Peeling
Antigen detection: Urinary detection test
Same low mw carbohydrate as detected by the Katex test – modified to ELISA format. Currently under evaluation for detecting symptomatic and asymptomatic cases in Bangladesh.

Modified to a ELISA format where urine does not need to be boiled and results can be quantitative.
A retrospective study in Bangladesh showed 95% sensitivity from 107 confirmed patients. Specificity of 100% in healthy endemic control

Evaluation in Bangladesh – clinical recruitment has just ended. In VL, PKDL and asymptomatic suspects

Currently a laboratory based test
Targeted vector control
Delivery of interventions

- **Currently**
  - Twice a year spray operators hired and deliver focal IRS.

- **Reactive requires an ability to implement throughout the year on demand**
  - Community spray teams
  - District response teams
Insecticide concentration (mg aif/m²) vs. Sampling Point
Where are we now

• **Linked to ongoing activities in sentinel sites**
  • Sand fly abundance
  • Insecticide resistance data
  • Historical case data
  • Vector control data
  • Aggregated and supported in DDMS+
  • IRS QA

• **Developing laboratory facilities to support the work**
  • RMRI and AIMS
  • Antigen test set up
  • Ethics in process