LSTM

LIVERPOOL SCHOOL
OF TROPICAL MEDICINE

Reactive IRS

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Definitions

Vector control can typically 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.

Reactive coverage – Where response to a trigger, often case load, results in an action. Normally in elimination, post elimination settings.
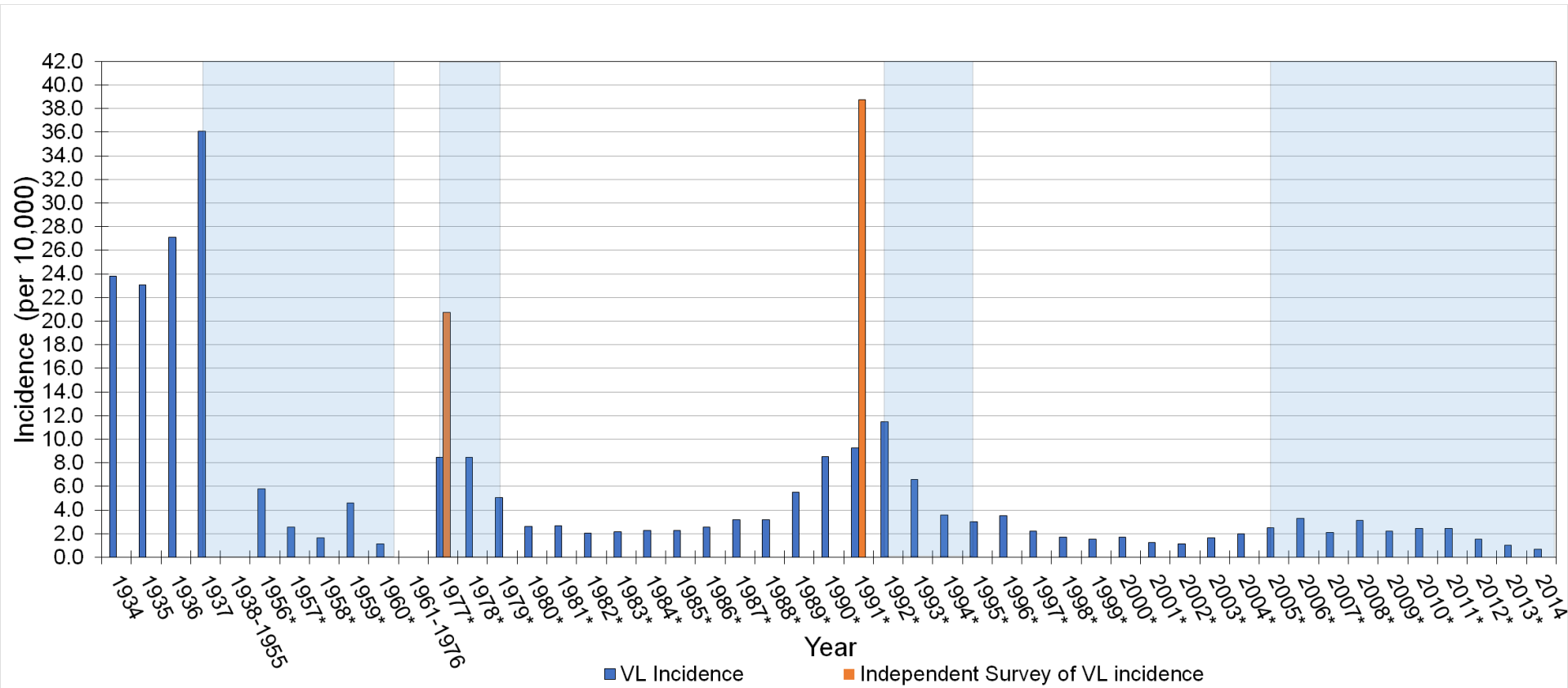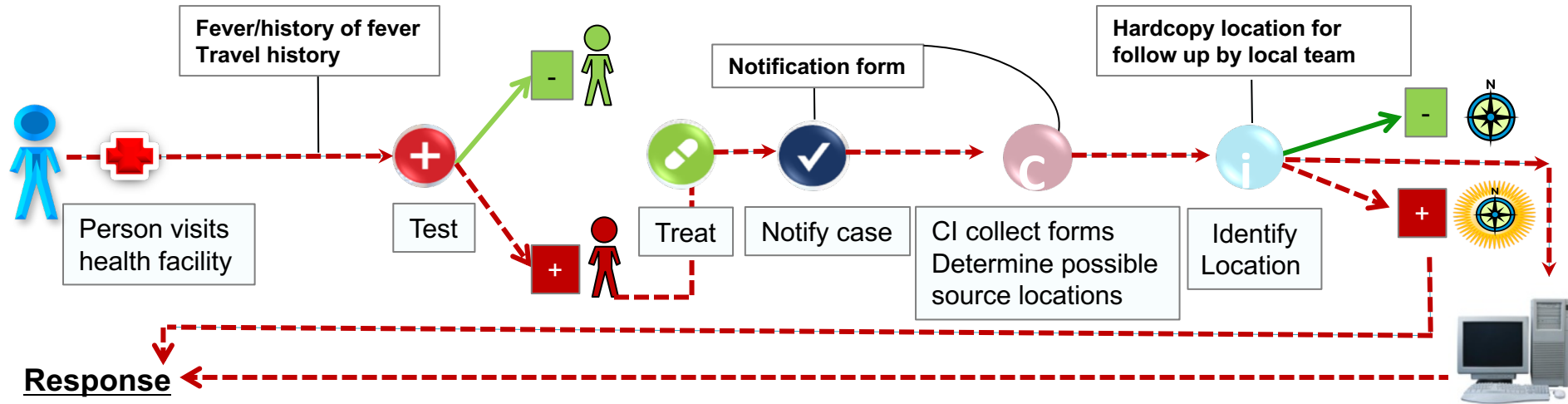
India currently

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.

Reactive IRS

Case detection – location and response

**Fever/history of fever
Travel history**

Notification form

**Hardcopy location for
follow up by local team**

Person visits
health facility

Test

Treat

Notify case

CI collect forms
Determine possible
source locations

Identify
Location

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

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

Coleman et al 2008 Mal J.; Coleman et al 2008 Mal J.

- **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

Reactive IRS – Where?
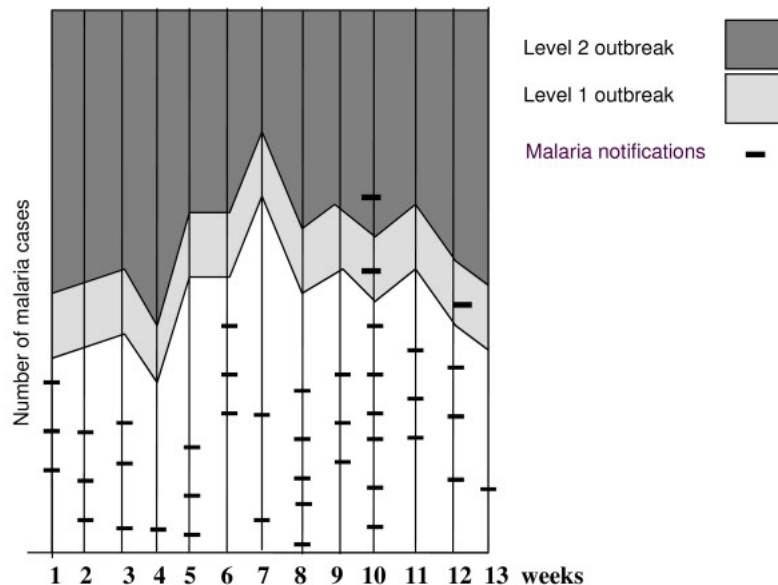
Need to know the distance from an index case that disease risk decreases.

WHO guidelines recommends ACD at 50m or 100 households from an index case. Based upon work in Bangladesh at high prevalence in 2004.
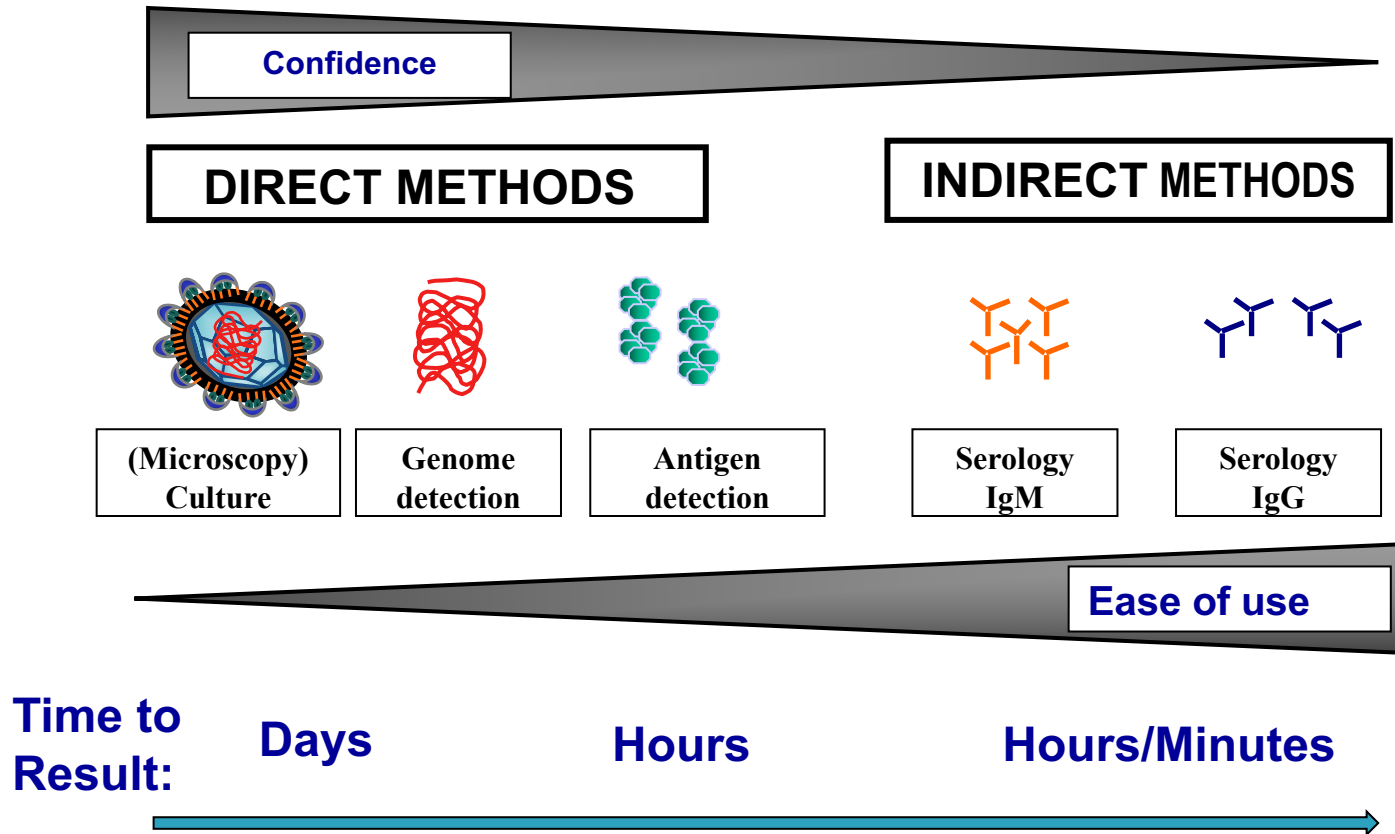
Urine-based ELISAs and finger-prick blood samples for detection of recent active transmission to assess the scale for reactive spraying
- Collect conventional rK39 antibody detection RDTS from finger-prick blood collection
- Send urine samples to central laboratory for Antigen detection
- Clinical symptoms

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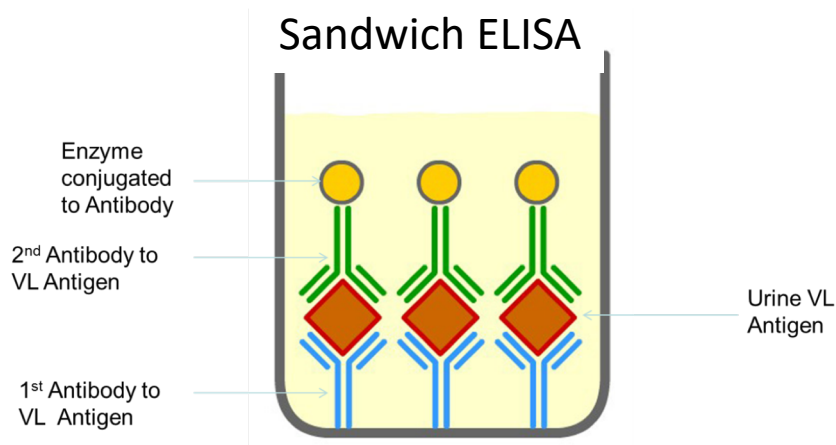3. Between 20m-50m, 4.   Between 50m-100m, 5.   100m-500m

What is the Ideal Diagnostic?

Confidence

DIRECT METHODS			INDIRECT METHODS	
(Microscopy) Culture	Genome detection	Antigen detection	Serology IgM	Serology IgG

Ease of use

Time to Result:

Days   **Hours**   **Hours/Minutes**

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.

Sandwich ELISA

Enzyme conjugated to Antibody

2nd Antibody to VL Antigen

1st Antibody to VL Antigen

Urine VL Antigen

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

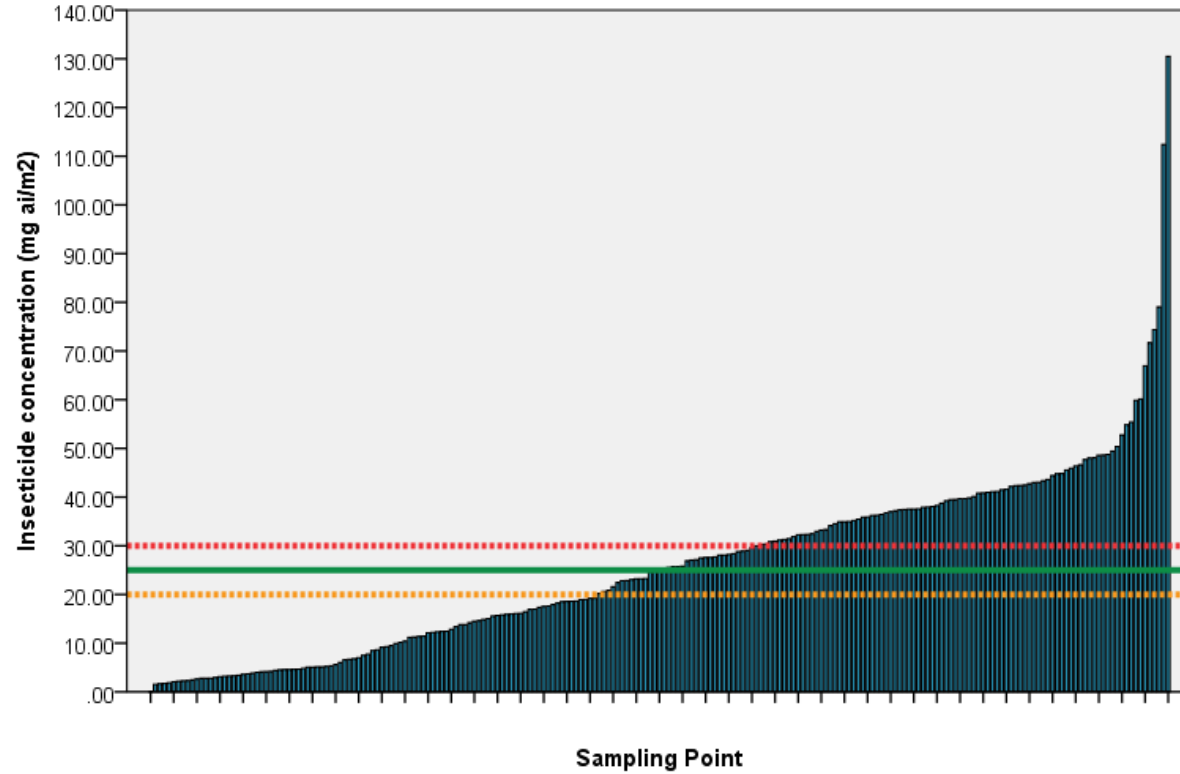Currently a laboratory based test
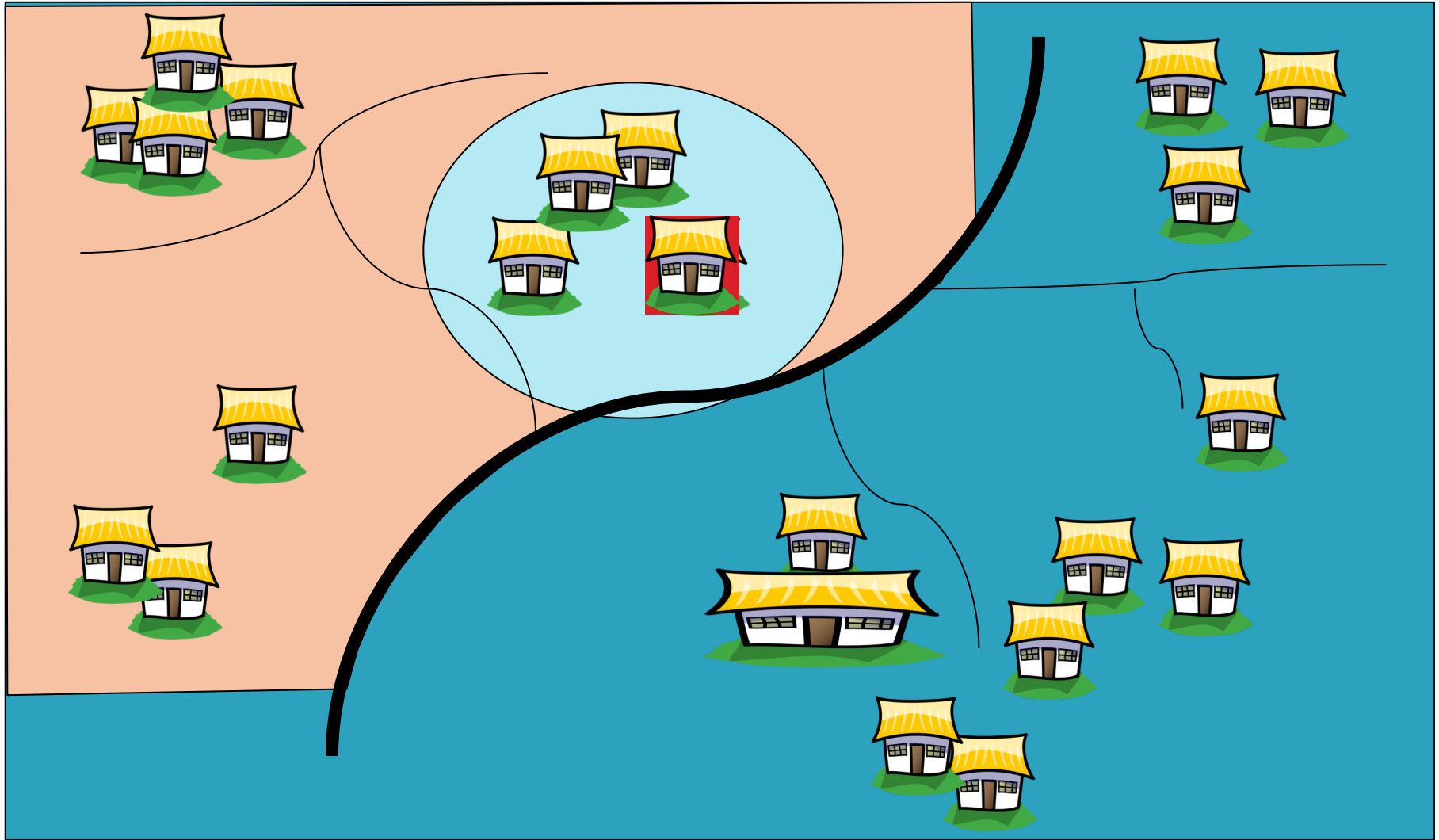
- **Currently**
  - Twice a year spray operators hired and deliver focal IRS.

- **Reactive requires an ability to implement throughout the year on demand**
  - Community spray teams
  - District response teams

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