

# Real-Time Biosurveillance Evaluation Methods

Evaluation Planning workshop

December 18, 2009

Hotel Subhalakshmi, Kariakkudi, India

**Nuwan Waidyanatha**

LIRNEasia, China

Email: [nuwan@lirneasia.net](mailto:nuwan@lirneasia.net)

Web: <http://www.lirneasia.net/profiles/nuwan-waidyanatha/>

Mobile: +8613888446352 (cn)

+94773710394 (lk)



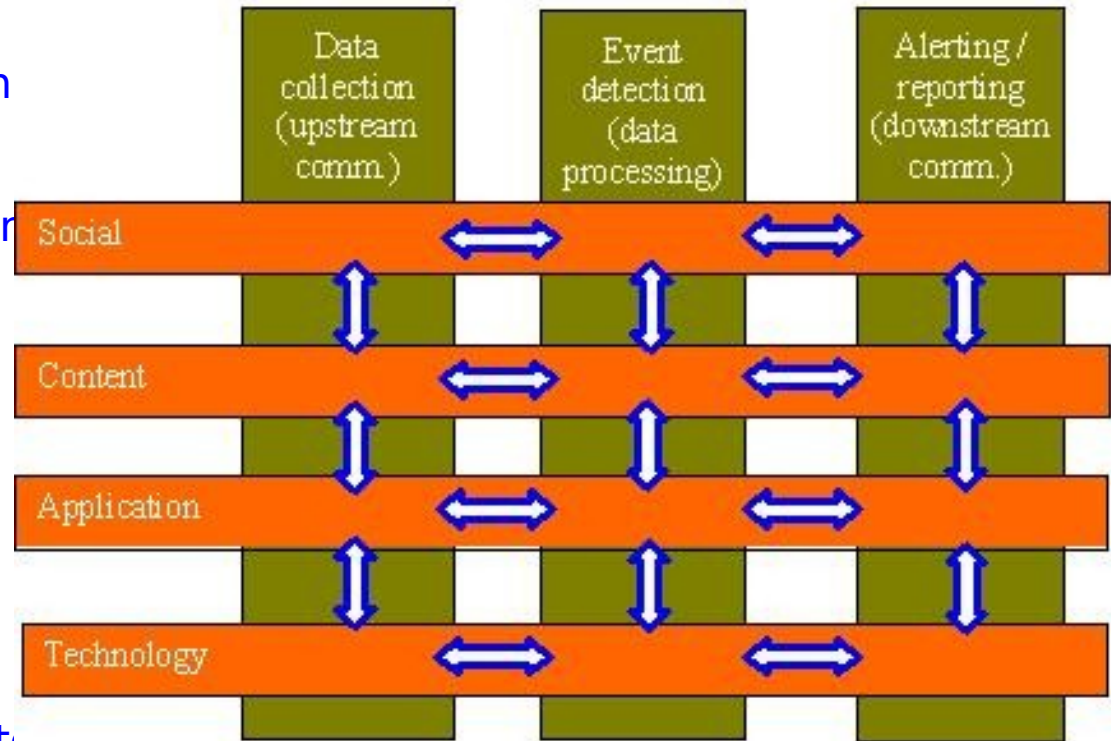
**LIRNEasia**

Learning Initiatives on Reforms for Network Economies

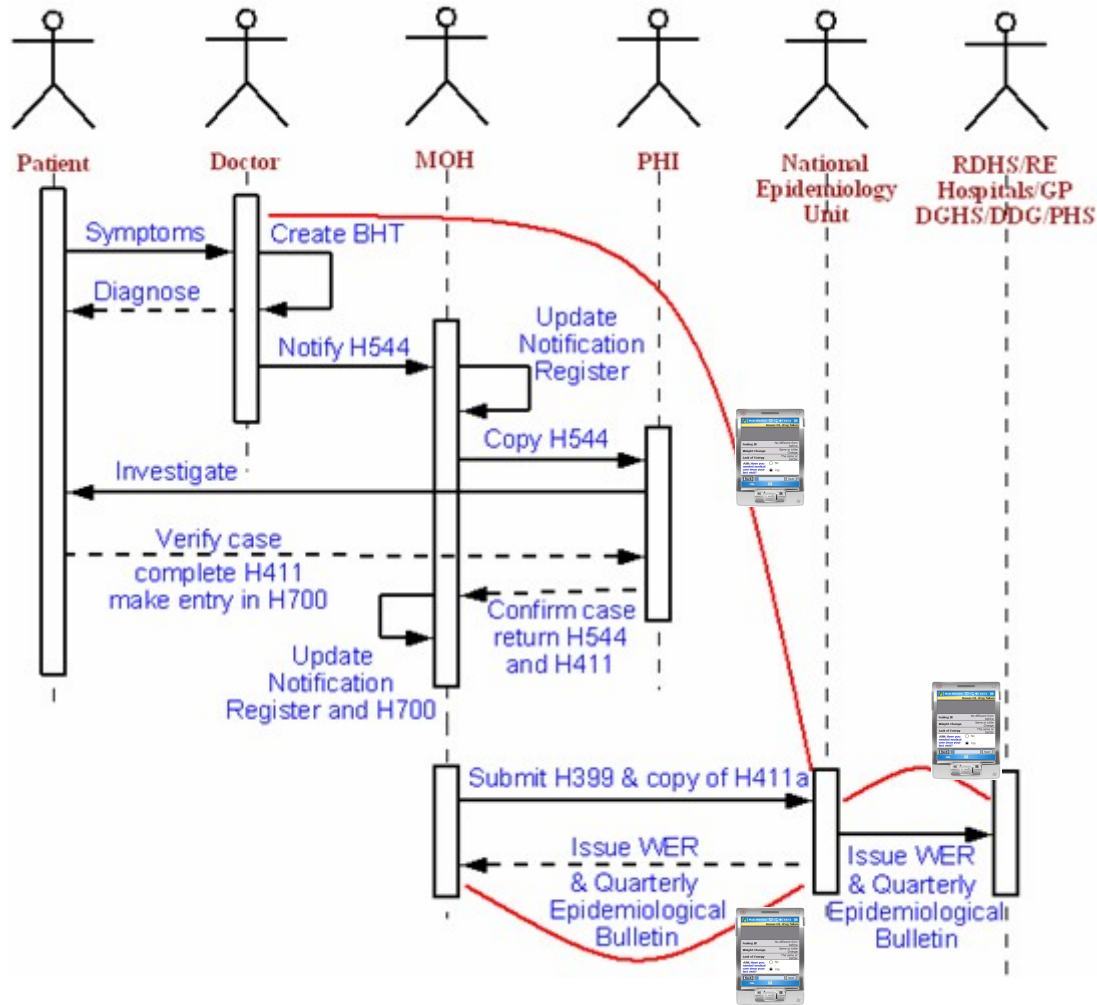
[www.lirneasia.net](http://www.lirneasia.net)

# Evaluation metric

- ❑ Three verticals - data collection, event detection and reporting
- ❑ Four layers - social, content application Technology
- ❑ Arrows showing the Interoperability between layers and verticals
- ❑ Objectively assess by calculating various indicators: costs, efficiencies, error rates, et
- ❑ Subjectively assess through interviews and simulations

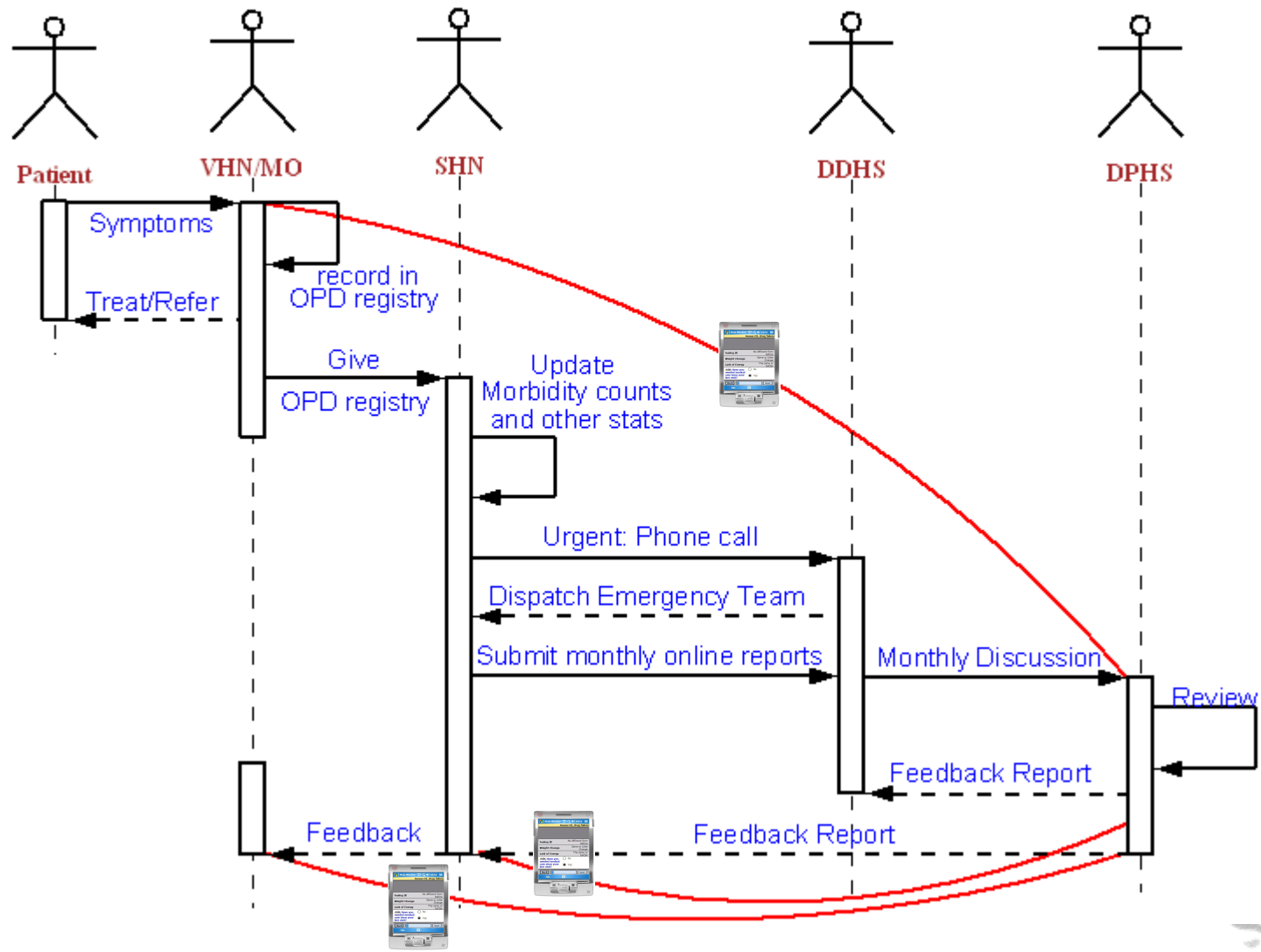


# Sri Lanka Epidemiology and RTBP overlay



- Black arrows:** current manual paper/postal system for health data collection and reporting
- Red lines:** RTBP mobile phone communication system for health data collection and reporting

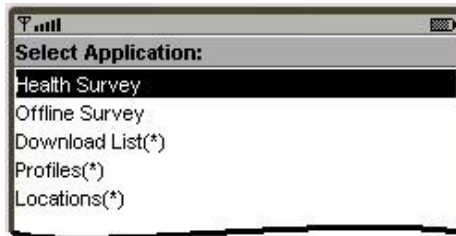
# India morbidity reporting and RTBP overlay



- Black arrows:** current manual paper/postal system for health data collection and reporting
- Red lines:** RTBP mobile phone communication system for health data collection and reporting



# m-HealthSurvey Midlet [IIT-M's RTBI]



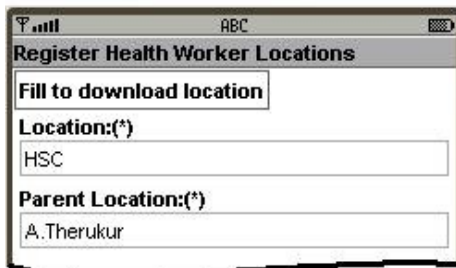
Screenshot (a) Main menu: A mobile application window titled "Select Application:" with a list of options: Health Survey (highlighted), Offline Survey, Download List(\*), Profiles(\*), and Locations(\*).

(a)



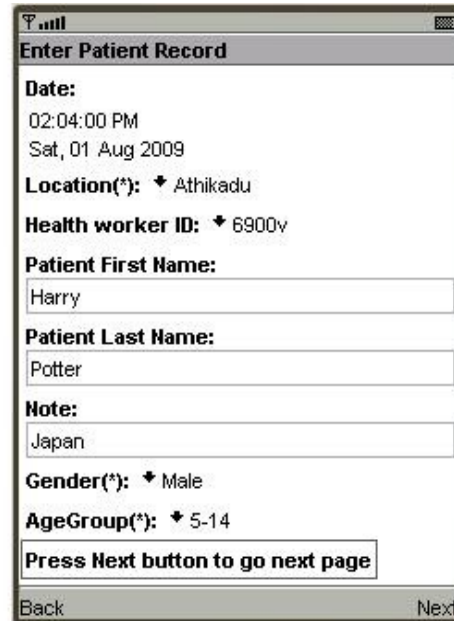
Screenshot (b) Profile registration: A mobile application window titled "Configure Healthcare worker Profile" with fields for ID: (\*), Retype ID: (\*), First Name: (\*), Last Name: (\*), Type: (\*), Phone:, and E-Mail:.

(b)



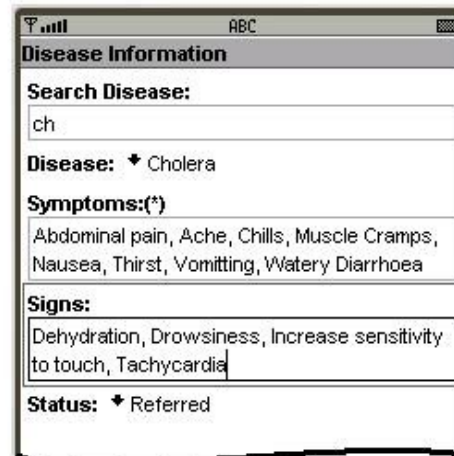
Screenshot (c) Retrieve locations: A mobile application window titled "Register Health Worker Locations" with fields for "Fill to download location", Location: (\*), and Parent Location: (\*).

(c)



Screenshot (d) Patient record screen I: A mobile application window titled "Enter Patient Record" with fields for Date:, Location: (\*), Health worker ID: (\*), Patient First Name:, Patient Last Name:, Note:, Gender: (\*), and AgeGroup: (\*). A button "Press Next button to go next page" is visible.

(d)



Screenshot (e) Patient record screen II: A mobile application window titled "Disease Information" with fields for Search Disease:, Disease: (\*), Symptoms: (\*), Signs:, and Status: (\*).

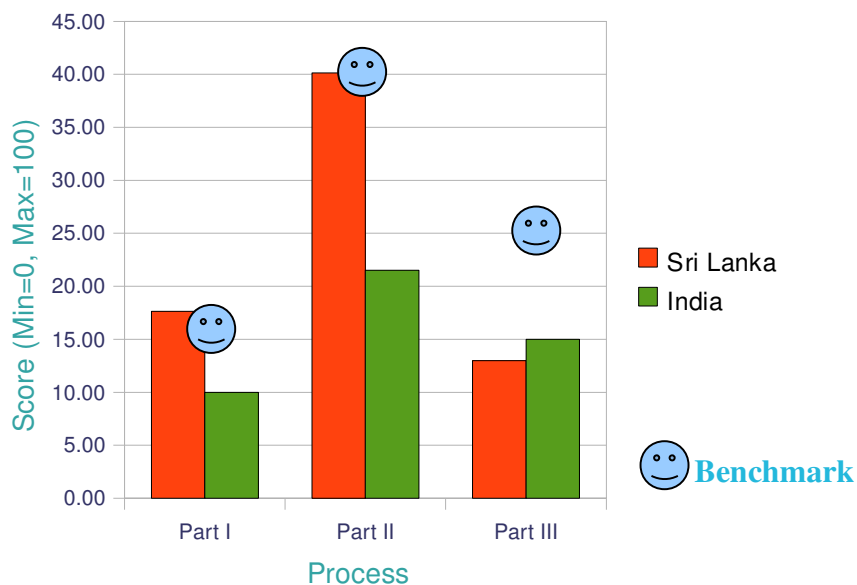
(e)

- (a) Main menu
- (b) Profile registration
- (c) Retrieve locations
- (d) Patient record screen I
- (e) Patient record screen II



# m-HealthSurvey Certification Exercise

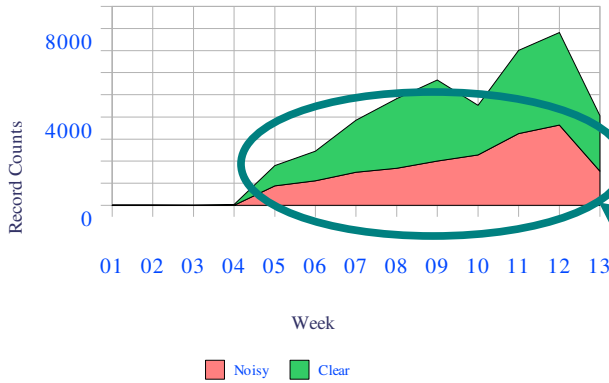
Health Workers from →	Benchmark	Sri Lanka	India
Part I - average completion time:	12.00	10.75	17.48
Part II - average completion time:	20.00	10.80	27.26
Part III - SOP absence/Presence	50.00	Absence 20.43	Presence 15.00
Age range		16 - 32	29 - 56
Certified Trainers		2 of 14	None
Certified Users		8 of 14	4 of 23
Not certified		4 of 14	19 of 23



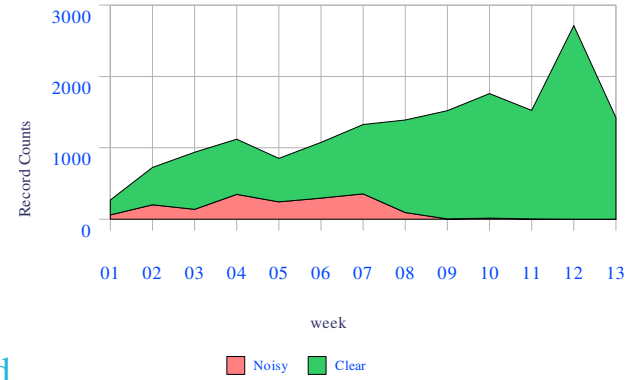
# Data collection shortcomings: noisy and off-time

Noisy and Clean data

### Sri Lanka

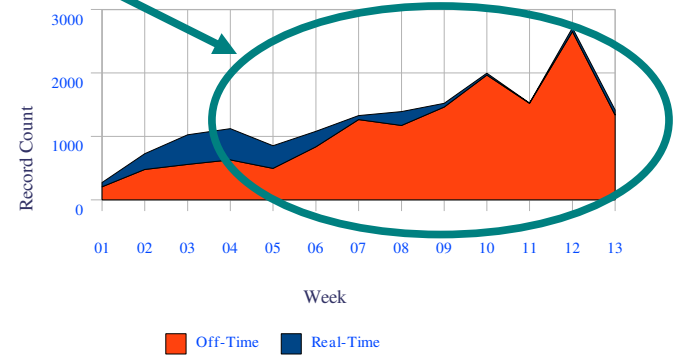
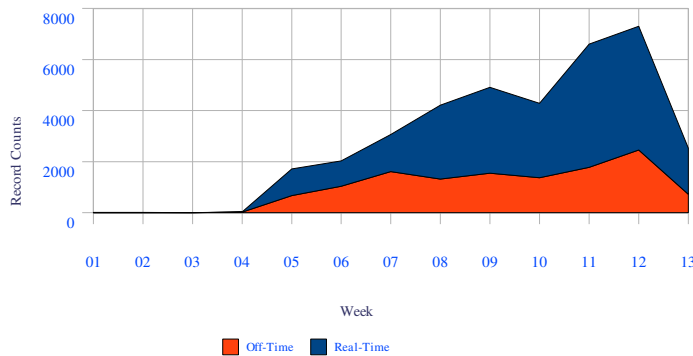


### India



Need solutions here

Real-Time and Off-Time

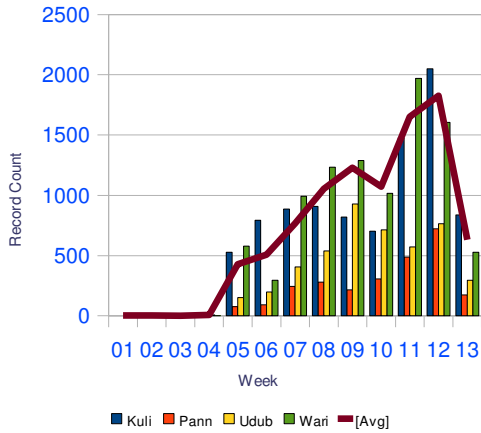


- ❑ E.61 hand held keypad inefficient for high volume data entry by medical officers
- ❑ Better to use touchscreen keyboard and hand writing recognition
- ❑ Comprehensive database of disease syndrome can reduce data errors
- ❑ Robust application with predictive text and validations for speedy data entry



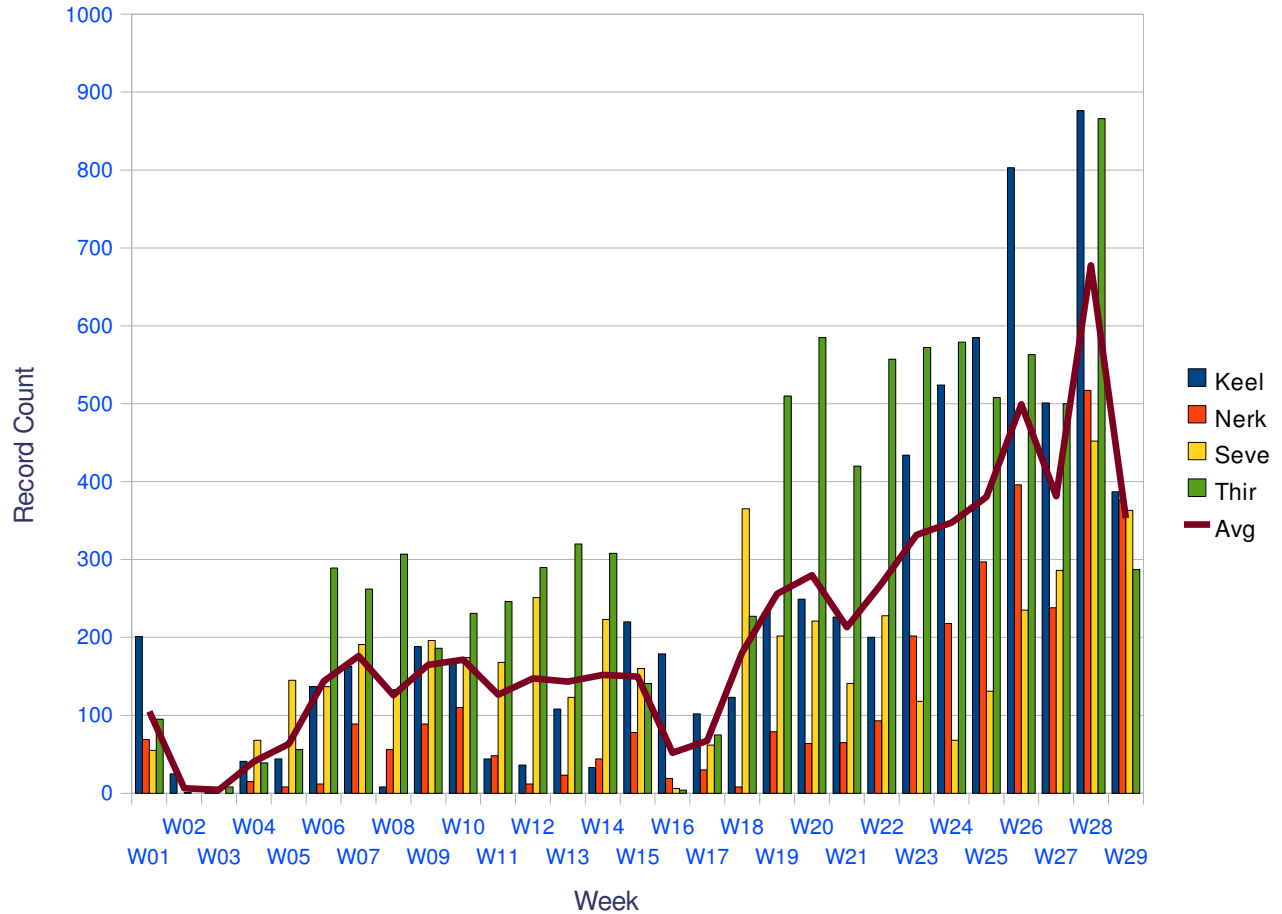
# Data submission by PHC division

## Sri Lanka



- Forgetting to write diagnosis
- Weakness in relationships
- No incentives

## India



- Still below expectation ~ 4000 records a week, why?
- Driving motivation, leadership?
- Have an incentive, reports?



# T-Cube Web Interface Utilization, Outcome, and Usability

## TCWI Assessment

The assessment is part of the pilot project - "Evaluating a real-time biosurveillance program" - carried out in Sivagangai District of Tamil Nadu, India and Kurunegala District in Sri Lanka. This particular questionnaire is designed to evaluate the usability and utilization of the T-Cube Web Interface (TCWI) and it is intended for health officials, health workers, RTBP staff only.

### Outcomes

Question 5) - 7) is to assess the effectiveness of TCWI in your work

#### 5) How many Massice Screen alerts , generated during the week, were of any significance?

Select the most appropriate answer from the list

#### 6) How many "Spatial Scan" scores over 0.9500, generated during the week, were of any significance?

Select the most appropriate answer from the list

#### 7) If you detected any potential out breaks of significant event list each case in the text box below

Mention the name of the disease, symptom area it was applicable, and the number of cases. Example: disease=dengue, location=Nerikkupai, symptoms=high fever, skin rash, vomit, count=12

« Back Continue »

#### 3) On average, how many hours do you spend each time you use TCWI?

In question 2) If your answer was "never" use TCWI during that week, then you may skip this question; else, If you did use TCWI during the week, then tell us approxinatel how many hours you spent each time you used TCWI

#### 4) What are the features you used in TCWI?

Tell us all the features you used at least one time during the week you used TCWI

- Query Analyzer (Time Series panel)
- Massive Scan (Time Series panel)
- Spatial Scan (Map panel)
- Pivot Tables
- Other:

Continue »

- ❑ Assessment is mainly for DDHS/PHC staff and Medical Officers
- ❑ On line assessment accessible through the world wide web
- ❑ To be completed once a week (or biweekly?)
- ❑ Study the required frequency of data updates, most used functions



# Calculating the ROC, AMOC, and RECALL

<i>Disease</i>	<i>Location</i>	<i>Count</i>	<i>Score</i>	<i>30. Dec. 1899</i>	<i>Health Dept Identified date</i>
Fever		3	0.98	13. Aug. 2009	
Malaria	Naramala	1	0.93	13. Aug. 2009	
.....					
Diarrhoea	Amalgama	10	0.97	22. Aug. 2009	

- ❑ Auton Lab will generate 05 - 10 disease outbreak alerts a week
- ❑ Distributed to PHC: Thir, Keel, Seva, and Nerke
- ❑ Can PHC or DDHS return verified list in 1 - 2 working days?
- ❑ Data will be used to measure Receiver Operating Characteristic, Active Monitoring Operating Characteristic, Sensitivity of T-Cube

