

# A Short Message Service Based (SMS) method for communicating malaria epidemic detection and surveillance information in Oromia

## Region, Ethiopia



Ethiopia Epidemic Detection Project, Tulane University, Addis Continental Institute of Public Health, Apposit Technologies LLC, Oromia Regional Board of Health, Federal Ministry of Health – Ethiopia, USAID/PMI/E



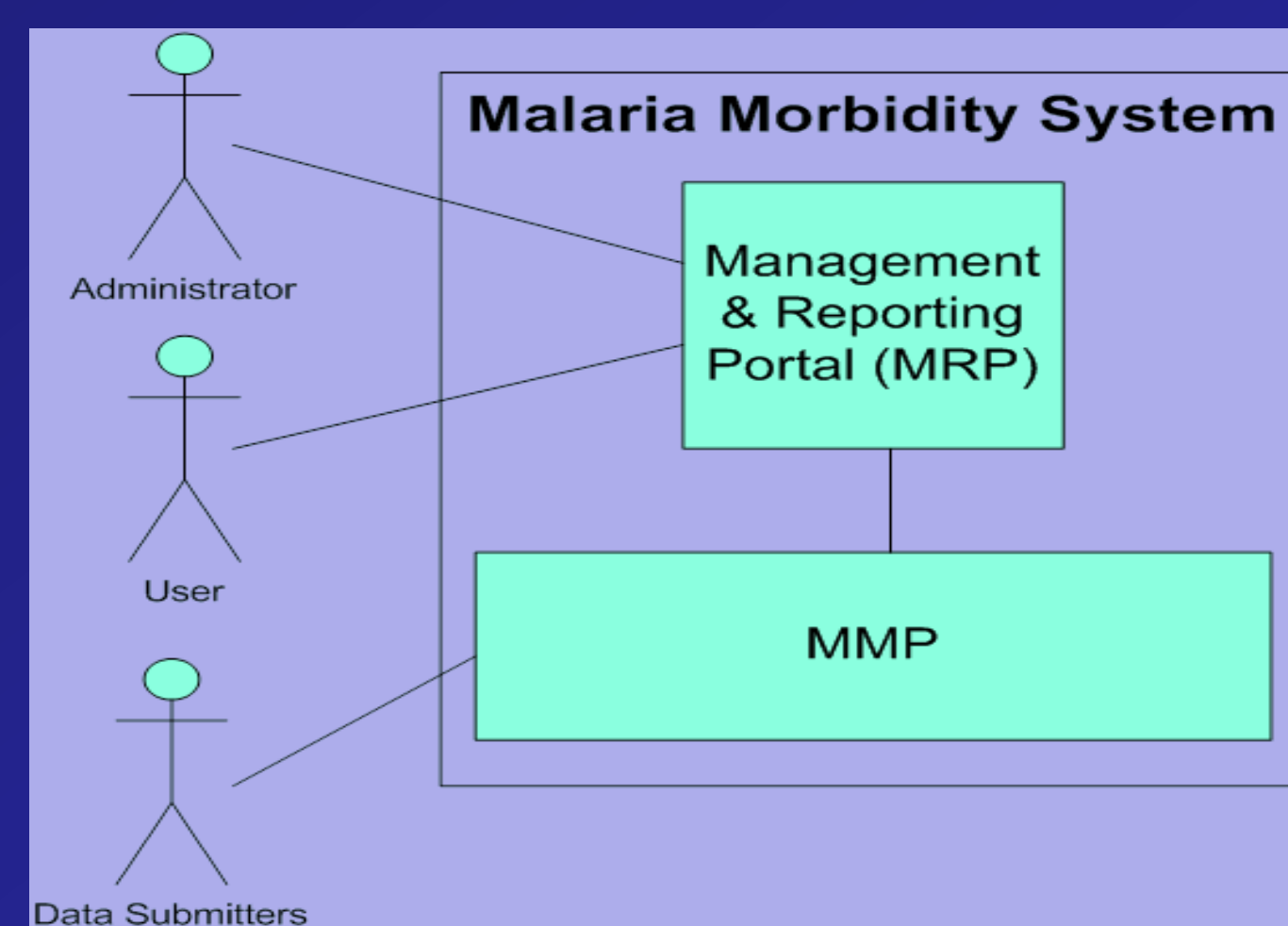
### Background

- Ethiopia is at a high risk of epidemic outbreaks of malaria due to climate and topography
- As such epidemic early detection and response form an important component of the national malaria control strategy.
- Epidemic Response for malaria has been shown to be more effective when it can be mounted rapidly enough to ensure effective coverage early on during epidemic onset.
- Epidemic Detection sites have been established with President's Malaria Initiative Funding in the Oromia Region to provide surveillance and epidemic detection capabilities and testing grounds for new surveillance strategies in the Region.
- The Sites consist of primary health care units (PHCUs) – Health centers and Health Posts (10 Sites in Oromia)

### Methods

- A Short Message Service Based system for data communication was developed by Apposit Technologies LLC. In collaboration with Addis Continental Institute of Public Health and Tulane University School of Public Health and Tropical Medicine
- The System has two main components (schematically illustrated in figure 1):
  - WMD SMS Service** – This service allows users to send in weekly summary reports on key malaria indicators from health facilities around the country. (See Figure 2)
  - Management and Reporting Portal** – This browser based portal will provide access to reports to users, and will allow administrators to manage system components.

Figure 1. Malaria Epidemic Monitoring and Morbidity System Schematic



- Information on each facility is included and data submissions are weekly and facility specific. Table 1 lists data stored specific to each facility

Acknowledgements: J. Yukich<sup>1</sup>, H. Nauhasseny<sup>2</sup>, A. Abate<sup>3</sup>, Y. Berhane<sup>2</sup>, J. Keating<sup>1</sup>

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Table 1. List of Health Facility Attributes

Field	Description
ID	A system generated, unique sequential identifier
Name	Name of the health facility
Type	Type of health facility (e.g. HP, HC)
Kebele	Kebele in which health facility is found
Wereda	Name of wereda in which health facility is found
Zone	Zone in which health facility is found
Region	Region in Ethiopia in which health facility is found
Longitude	Longitudinal location coordinate
Latitude	Latitudinal location coordinate
Altitude	Altitude of health facility
Relationships	List of health facilities to which health facility is related with the nature of the relationship (parent, child). A HP can only be associated with one HC at one time. It is possible that the HC to which a HP is associated can change.
Assigned Account	Accounts that have been assigned to health facility
Threshold Data	A matrix of data consisting of the week number and threshold quintiles.

- A Threshold matrix is incorporated to provide automatic notification by SMS to the district and other levels when facilities exceed weekly threshold values for epidemic detection.

To use this services a user sends an SMS the following format: (See Figure 2)

[wmd] [date] [user id] [facility id] [type] [patients] [tested] [Pf+] [Pv+] [mixed]

Where:

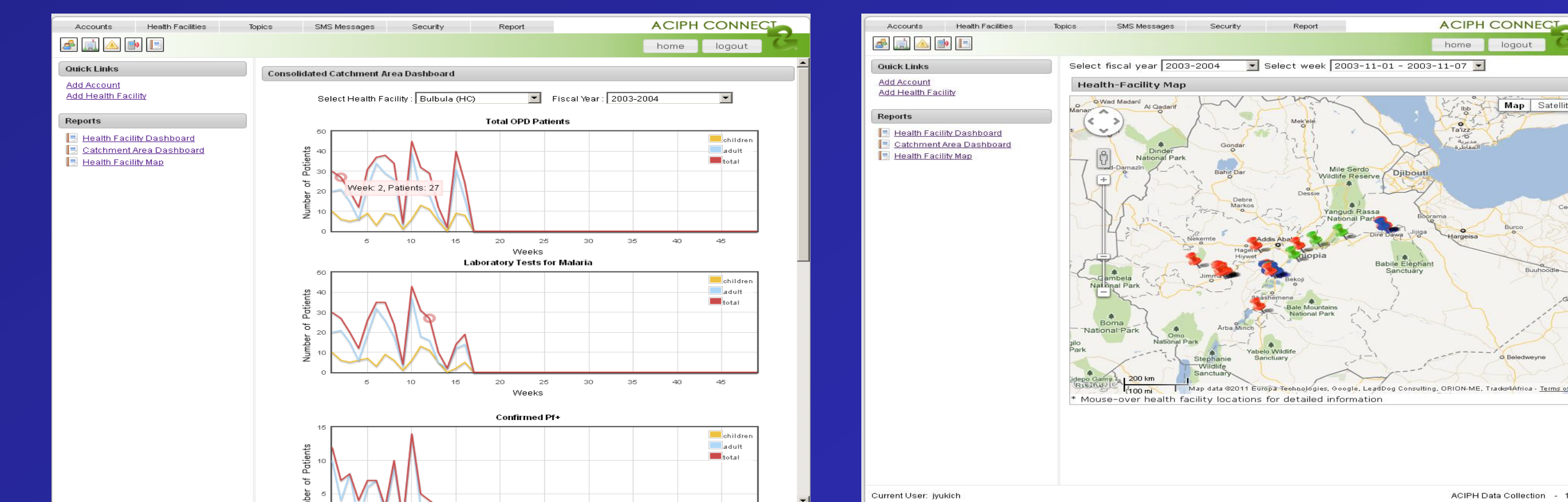
- Wmd = sms keyword
- Date = report date (DD/MM)
- User id = data submitter unique id number
- Facility id = health facility ID
- Type = adult (a) or child (c)
- Patients = total number of patients seen
- Tested = total number of patients tested
- Pf+ = total number of positive tests for Pf
- Pv+ = total number of positive tests for Pv
- Mixed = total number of mixed cases

Figure 2. Example Case report Using SMS system



- Additionally reports can be produced weekly for each facility or aggregated by PHCU. Data is automatically mapped in the current week using a Google maps interface or alternatively is displayed in times series report format. (Shown in Figure 3)
- Data is received by a central server, compared on a small number of quality and consistency checks then immediately posted to a web accessible domain where users may access and visualize data.
- Training and Roll out has been completed in five primary Health Care units and is planned at five more in the upcoming months.

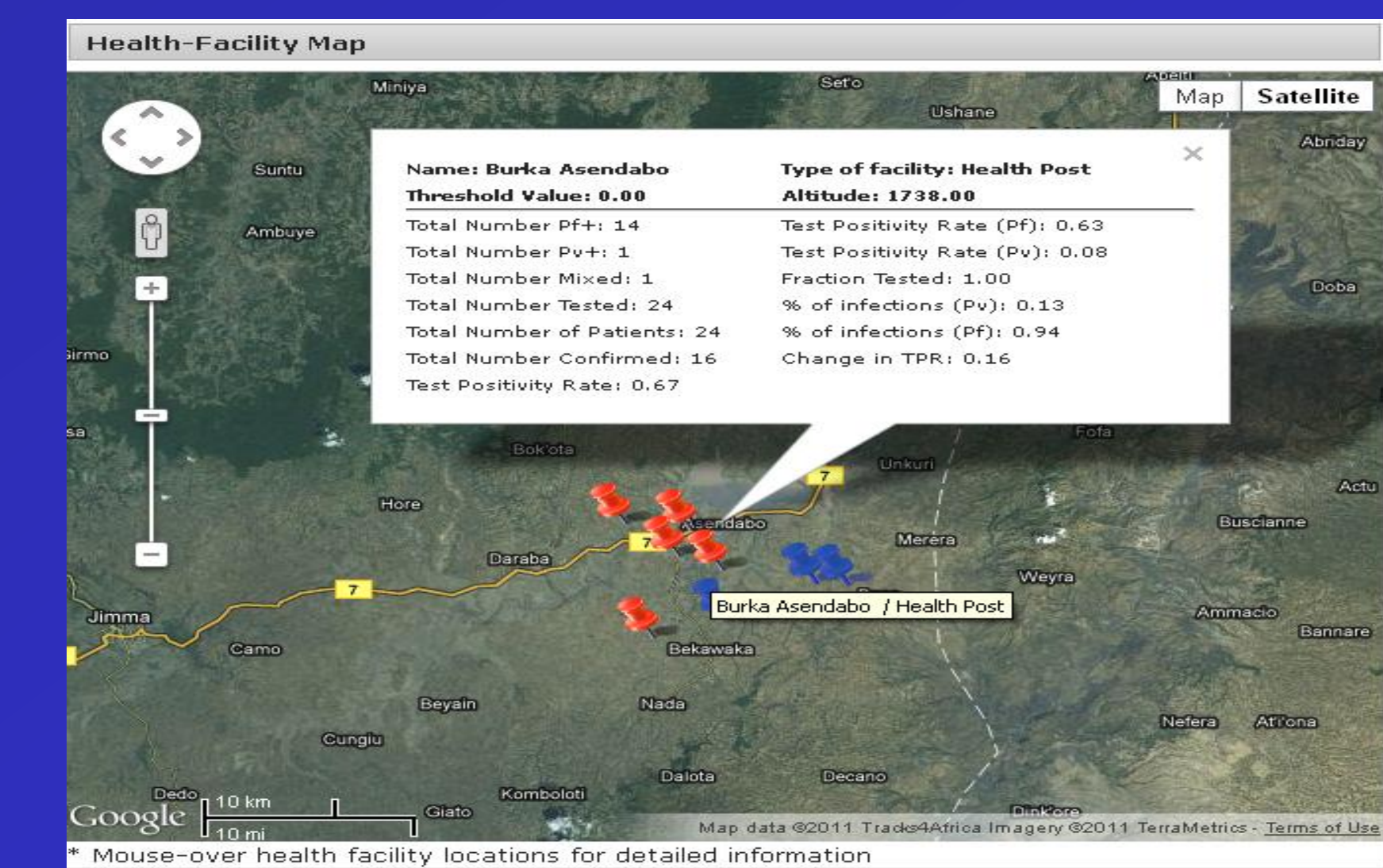
Figure 3. Catchment Area Report and Mapped Data



### Results

- SMS training and rollout was completed and reporting initiated in FY 2011 for all primary sites.
- Data transmission is rapid But reporting is not 100% complete
- Continued training may be necessary
- Data Quality Comparison to Reported data from Individual Patient Logs and HEW supervision indicates that reported case counts and patient counts are accurate when compared to the Individually recorded data.

Figure 4. Health Facility Level information from Burka Asendabo Health Post indicating high levels of malaria transmission in the area.



### Conclusions, Limitations and Next Steps

- SMS systems can rapidly connect data from the community level to all levels of the health system in Ethiopia
- Maintaining accuracy of data requires not only supervision but also maintenance of stocks of drugs and tests
- Expansion of the system to all sites 10 PHCUs
- Expansion of the Scope of the system to include stock reporting
- Incorporation of Toll Free Reporting and a more refined incentivization strategy may improve reporting completeness