Coconut Surveillance

> Malaria kills more than 400,000 people every year. However, malaria is curable and preventable. The World Health Organization (WHO) has a bold vision of a world free of malaria. Coconut Surveillance can help to realize this vision.

Overview

Coconut Surveillance is open source software designed by malaria experts specifically for malaria control and elimination. The software guides health care workers through a case follow-up and active case detection protocol that aims to limit onward transmission and contain outbreaks. Program supervisors use Coconut Surveillance to monitor new cases and track case management in real time. In addition to maps, charts, and tables with aggregated and case-level analysis, the software has built-in epidemic threshold detection and issue tracking to ensure the appropriate individuals take programmatic action in a timely manner. Since 2012, Coconut Surveillance has helped malaria surveillance officers in Zanzibar respond to more than 9,500 reported cases of malaria, complete nearly 10,500 household visits, test more than 40,000 household members, and identify and treat more than 2,100 previously unknown cases, many of them asymptomatic.

How Coconut Surveillance Works

Coconut Surveillance supports passive and active case detection, epidemic detection, mobile decision support, and high-resolution targeting of preventive interventions.

Passive case detection occurs when a new diagnosis is made at a clinic. A clinician enters basic information about the case using a simple Short Message Service (SMS) mobile phone messaging system. This creates a record in the system and triggers a follow-up response. A nearby field worker—such as a surveillance officer or village health worker—receives notification of the new case via SMS, which triggers active case detection at the household level. The field worker uses Coconut Surveillance on an Android smartphone or tablet to retrieve the latest case data. The field worker collects detailed case-level data from the health facility, the patient's household, and the members of the patient's household and enters the information into Coconut Surveillance. While visiting a patient's home, the field worker tests household members and neighbors for malaria; the field worker also uses the software to record the GPS location of each case household, information on net ownership and net use, and detailed travel itinerary. As soon as internet connectivity is available, all of the collected data are synchronized via a secure connection with a remote database where data are monitored and analyzed in real time.

Coconut Surveillance has been used for more than 3 years in Zanzibar, where the software is often referred to as the malaria case notification system. Twenty district malaria surveillance officers equipped with inexpensive Android tablets and motorbikes are keeping malaria prevalence at <1%—a steady and sustained decrease from more than 35% just 15 years ago.

Coconut Surveillance has become an essential tool for the Zanzibar Malaria Elimination Program.

Coconut Surveillance

Coconut Surveillance Key Features

Multiple modes. Supports passive case detection (new cases reported at clinics), active case detection at the household level, and reactive case detection (mass/focal screening and treatment).

Mobile decision support. Uses bi-directional data synchronization, which makes it possible to guide field workers based on current response protocols and risk stratification, collaborate on case response, transfer cases, and keep software updated.

Detailed case data. Collects detailed case-level data from facilities, households, and individual household members; supports WHO definitions for case travel history to track malaria importation.

Geo-located data. Displays maps of case data in real time and over time, enabling managers to identify transmission hotspots to target response interventions precisely.

Follow-up monitoring. Enables supervisor to monitor response time and completeness as cases progress through the follow-up protocol; analyzes overall efficiency of field workers to help allocate resources effectively.

Automated alerts. Uses SMS and e-mail to alert the appropriate health worker, manager, or IT person immediately when new cases are reported, when epidemic thresholds are exceeded, or when errors are detected.

Advanced analytics. Includes advanced built-in reports, most that drill down to case detail, designed by malaria experts; generates routine reports automatically and distributes them to designated users via SMS and e-mail; enables users to export case data for analysis in other tools.
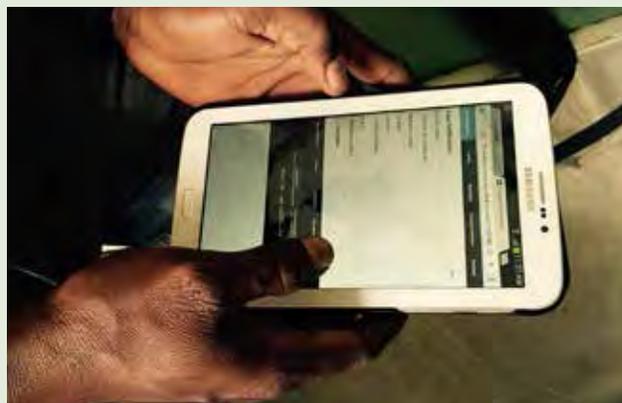
Secure and private. Stores data in encrypted form and encrypts data before transmission; allows only authorized users of the mobile application to access personally identifiable data; conceals all personally identifiable data in exported files.

Open source. Published under the Apache License, Version 2.0; there are no licensing fees. All software source code is maintained in public code repositories on www.github.com.

Minimum hardware. Runs on commonly available Android mobile devices, including smartphones and tablets.

Offline and online. Allows users to create, access, and update case records offline and synchronize data over mobile phone networks and Wi-Fi hotspots whenever a connection is available.

Cloud or local. Synchronizes with a shared cloud database or a privately hosted database.