MINISTRY OF HEALTH

ZANZIBAR MALARIA ELIMINATION PROGRAM

Malaria Surveillance in Zanzibar: Guidelines for District Malaria Response Team

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List of Abbreviations

ACD	Active Case Detection
ACT	Artemisinin-based Combination Therapy
ADR	Adverse Drug Reaction
AE	Adverse Event
BCC	Behavior Change Communication
DHMT	District Health Management Team
DMO	District Medical Officer
DMSO	District Malaria Surveillance Officer
DOT	Direct Observed Therapy
DRT	District Response Team
FMDA	Focal Mass Drug Administration
FSaT	Focal Screening and Treatment
HSaT	Household Screening and Treatment
IRS	Indoor Residual Spraying
ITN	Insecticide-Treated Net
LLIN	Long-Lasting Insecticide-Treated Net
LSM	Larval Source Management
MCR	Malaria Case Register
MDA	Mass Drug Administration
MEEDS	Malaria Early Epidemic Detection System
mRDT	Malaria Rapid Diagnostic Test
MSaT	Mass Screening and Treatment
OPD	Out-Patient Diagnosis
PA	Public Announcement
PHNB	Public Health Nurse grade B?
SME	Surveillance, Monitoring, and Evaluation
SOP	Standard Operating Procedure
WHO	World Health Organization
ZAMEP	Zanzibar Malaria Elimination Program

Chapter 1: Introduction

Background

Zanzibar, through an integrated vector management approach, has significantly reduced its malaria burden from 35%–40% in 1995 to less than 1.5% in 2010. Key malaria control interventions include indoor residual spraying (IRS), the use of artemisinin-based combination therapy (ACT), the distribution of long-lasting insecticide-treated nets (LLINs), and the use of malaria rapid diagnostic tests (mRDTs) in all public and private health facilities[1,2,3]. In 2010, Zanzibar recorded insecticide-treated net (ITN) ownership in 76% of households and achieved 90% IRS coverage.

Although community-level malaria prevalence in Zanzibar has been reduced to low levels (less than 1%)[1], the persistence of endemic malaria transmission in surrounding areas (Mainland Tanzania and Kenya) leaves these islands vulnerable to sudden outbreaks of malaria and re-establishment of perennial malaria transmission. Reliable and improved malaria surveillance and epidemic response capacity are required to maintain control and prevent malaria resurgence in Zanzibar.

Objective

The main objective of this guideline is to provide direction for conducting malaria surveillance and responding to abnormal increase (exceeding thresholds) of malaria cases.

Specific Objectives

The specific objectives are to provide reference and guidance to district response teams (DRTs) on:

- Detecting malaria outbreaks
- Responding to malaria outbreaks
- Ensuring availability of commodities

[1] Beer N, Ali AS, Shakely D, et al. “High effective coverage of vector control interventions in children after achieving low malaria transmission in Zanzibar, Tanzania.” Malaria Journal, 2013;12:38.

[2] Bhattarai A, Ali AS, Kachur SP, et al. “Impact of artemisinin-based combination therapy and insecticide-treated nets on malaria burden in Zanzibar.” PLOS Medicine, 2007;4:e309.

[3] Shakely D, Elfving K, Aydin-Schmidt B, et al. “The usefulness of rapid diagnostic tests in the new context of low malaria transmission in Zanzibar.” PLOS ONE, 2013;8:e72912.

Chapter 2: Surveillance, Monitoring, and Evaluation

Introduction

The program's Surveillance, Monitoring, and Evaluation (SME) unit is designed for the identification, investigation, and elimination of continued malaria transmission risk. In close collaboration with other units, the SME unit is responsible for facilitating data collection, carrying out data analysis to identify the areas of foci with local transmission of malaria, identifying trends in cases and deaths that require additional intervention (e.g., epidemics), and assessing the impact of control measures. Currently, the SME unit coordinates data collection through weekly, individual-case reporting systems and other mechanisms related to interventions, such as Active Case Detection (reactive case detection (rACD) and Proactive case detection (pACD)), LLIN distribution, and IRS. For such collection to be possible, the DRT must play an important role to coordinate, implement, and monitor the outcome. To realize the expected outcome, the DRMT team requires the necessary skills and guidance.

Objectives

The main objective of these guidelines is to guide the DRT to own, manage, and respond to anticipated malaria epidemics in a timely, consistent, and coordinated manner.

Specific Objectives

The specific objectives of these guidelines are to:

- Empower the DRT with clear roles and responsibilities, including terms of reference of each member at all levels.
- Empower the DRT at all levels, including communities, on operational case-based malaria surveillance and rapid response.
- Empower the DRT on investigation, classification, and elimination of active malaria foci.
- Empower monitoring and evaluation of control strategies.
- Document all malaria epidemics, share information with all relevant stakeholders, and educate the general public.

Team Composition and Roles of the Members

To effectively interrupt local transmission and maintain a malaria-free status, decentralization and consolidation of malaria elimination efforts must reach to the district level. For this reason, the DRT is composed of at least one member from the following cadres:

- District Medical Officer (DMO),
- District Malaria Surveillance Officer (DMSOs),
- Clinical Officer/Nurse,
- Health Officer,
- Laboratory Technician,
- Material Manager,

- Health Promotion Officer,
- Environment Health Officer,
- District Administrator and
- Meteorological Officer.

For the team implementation to be effective, each team member is assigned specific tasks, as shown in *Appendix I.*

Epidemic Threshold

According to the World Health Organization (WHO), *an epidemic threshold is the critical number or density of susceptible hosts required for an epidemic to occur. The epidemic threshold is used to confirm the emergence of an epidemic so as to step-up appropriate control measures*[4].

To define an epidemic threshold in a certain area, data have to be available for some years and the population should have been stable within this time. However, if the disease burden changed significantly within these years, the definition of a precise threshold will not be possible and an epidemic situation will be more practically defined by the rapid increase in numbers, a high case-fatality rate, and the fact that existing health services are overwhelmed.

Epidemic Threshold in Zanzibar

In Zanzibar, a threshold is considered to have two stages—namely, ***alert*** and ***alarm***—that are implemented at four different levels (i.e., district, health facility, village and *shehia*), as ***Table 1*** shows.

An ***alert threshold*** is the critical number of cases that sound an early warning, draw attention, or call for close monitoring of the trend to help understand the clear picture of transmission within 7 days.

An ***alarm threshold*** is the critical number of cases that trigger specific investigative responses, followed by actions to interrupt or intervene within 7 days.

These epidemic thresholds automatically trigger certain reactions through the Coconut Surveillance system, which sends an email or SMS message to all SME team members. Once an alert or alarm is received, the team confirms the existence of an epidemic based on the epidemic thresholds in ***Table 1.***

Table 1: Epidemic Thresholds at Different Levels in Zanzibar

	Data Type	Alert	Alarm	Action
District	Weekly reporting	Statistical method based on weekly data	Statistical method based on data	Investigate whether cases are focal and intervene
Health Facility	Weekly reporting	≥10 cases in all age groups within a week OR	If for 2 consecutive weeks, the number of cases at health facility remains ≥10 (all ages)	Investigate whether cases are focal and intervene

[4] http://www.who.int/hac/about/definitions/en/.

	Data Type	Alert	Alarm	Action
		≥5 cases under-five years of age	OR ≥5 cases under-fives	
Shehia	Malaria case notification and household follow-up	≥10 cases in all age groups within a week OR ≥5 cases under-fives	10 or more cases (all ages) for 2 consecutive weeks OR ≥5 cases under-fives	Investigate and consider *shehia*-wide response (MSaT)
Village	Malaria case notification and household follow-up	≥5 cases all in age groups within a week	5 or more cases (all ages) for 2 consecutive weeks	Investigate and consider village-wide response (FSaT)

Note: Mass Screening and Treatment (MSaT); Focal Screening and Treatment (FSaT); "week" refers to the past 7 days since the malaria case was reported at the health facility.

Malaria Epidemic Rapid Response

In Zanzibar, if a village or *shehia* has exceeded the defined malaria epidemic cutoff within the past 7 days (see ***Table 1***), a respective District Response Team needs to initiate a rapid response to minimize malaria morbidity and mortality in the affected community. ***Table 2*** describes the type of responses initiated in response to a malaria epidemic. The response is composed of three main steps:

- Step 1: Epidemiological and entomological investigation
- Step 2: Outbreak mitigation
- Step 3: Outbreak evaluation

Table 2: Type of Response and Their Respective Interventions/Activities to Be Conducted

Type of Response	Case-Based Response (Malaria Case Notification (MCN))	Event-Based Response (Hotspot/Cluster)	Event-Based Response (Epidemic)
Scope	Household follow-up of all detected and notified cases	Response in defined geographic areas experiencing a temporal spatial clustering of cases	Response in areas where malaria epidemics (outbreaks) occur
Criteria for response	All notified malaria cases	• Malaria hotspot • Cluster of malaria cases: at least five index cases reported in a village/sub-*shehia* within a period of 7 days	Epidemic thresholds exceeded (at district/health facility level)

Geographic area	Index case households	Village/sub-*shehia*	Depends on the extent of the malaria outbreak (shehia, district, or zone)
Response activities	Household-testing Behavior Change Communication (BCC) leaflet LLIN coupon Locating breeding sites	• FSaT • BCC • LLIN distribution • Larval Source Management (LSM) • Focal IRS	MSaT BCC LLIN LSM IRS

Step 1: Epidemiological and Entomological Investigation

In Zanzibar, the District Health Management Team (DHMT), in close collaboration with the Zanzibar Malaria Elimination Programme (ZAMEP), is responsible for the investigation and implementation of a rapid response to malaria outbreaks. Each outbreak investigation consists of two parts:

- Investigations at health facilities, implementation of ACD, and other interventions in the affected community conducted through the DRT
- Outbreak mitigation and evaluation through the national/zonal level

Objectives of an outbreak investigation

- To confirm the existence of the outbreak based on health facility reports
- To understand the nature and source of the outbreak
- To take necessary action to interrupt an ongoing outbreak

Steps of an outbreak investigation and implementation

The DHMT will perform the following steps in conjunction with the national team:

1. (a) Epidemiological investigation: Review records reported in the specified period at the health facility out-patient diagnosis (OPD register, Malaria Case Register [MCR], Malaria Early Epidemic Detection System [MEEDS] booklet, laboratory register, and dispense register) for accuracy, consistency, and completeness.

   (b) Entomological investigation:

   i. Collect mosquitos from 10 households (randomly select one room per household).

   ii. Locate breeding sites and larvae (refer to the Chapter 3).

   iii. Assess LLIN coverage and use.

   iv. Assess IRS, where applicable.

   v. Assess human social practices related to malaria transmission.

2. Verify the diagnosis; review that the laboratory's standard operating procedures (SOPs) have been followed during the testing (microscopy and malaria rapid diagnostic text [mRDT]).
3. Perform data analysis to orient the data in terms of time, place, and person. This detailed analysis, which determines who is at risk of becoming ill, will be conducted based on the history of travel and location of the index case. For instance, if an index case has a history of travel, then there is no need to screen the whole village/*shehia*.
4. Assess and mobilize the local response capacity in terms of the following:
    - What number and type of staff are available locally?
    - What drugs/medical supplies/guidelines are available to treat the cases?
    - Have any health education events community meetings been conducted?
    - Have any resource gaps been addressed? As needs arise, offer laboratory support, provide environmental support, distribute public information, address specific disease-control needs in terms of personnel, drugs, equipment, transport, and communication.
5. Execute implementation measures based on the findings according to thematic area.
6. Prepare and submit a summary field report. (For more details, refer to *Appendix III*.)
7. Prepare a written report and disseminate the findings (should be submitted within 7 days).
8. Intensify surveillance—maintain contact with the district/*shehia* for daily updates (e.g., cases, deaths, number admitted, number discharged, areas affected) until the end of the epidemic.

Responsibilities of the District Response Team

Overall, under the supervision of the DMO, the responsibilities of the DRT will be conducted at three levels—community, household, and facility—as stipulated below:

a) Community level

1. Brief the *shehia* leadership on the situation and purpose.
2. Plan and mobilize a community sensitization meeting.
3. Execute interventions.
4. Develop a report based on the above activities. (For more details, see *Appendix III*.)

b) Household level

Visit houses that reported malaria cases in the past 7 days, and perform the following:

1. Promote all malaria intervention, including filling out a household investigation form.

2. Determine whether any of the reported cases advanced to severe malaria (either severe anemia or other severe manifestation) or resulted in mortality. Any persons with severe malaria should be transported for hospitalization.
3. Establish whether ACT (or alternative drugs) was administered according to guidelines, and ensure compliance.
4. Inquire about the use of ITN/LLIN for the cases and all household members (if the usage is no less than household members were advised to use).
5. Perform mRDT on all household members *(regardless of history of fever),* and record all results. Determine slide positivity among tested persons (perform data analysis and report results to the community within 3 days of initiating the investigation).
6. Use ACT (or alternative drug, as indicated by ZAMEP) to treat all confirmed cases.
7. Perform mRDT in all current fever cases and in all cases with a history of fever in the past 48 hours in households nearby. If any neighbors exhibit a positive result, repeat procedure 1-7 as stipulated above. Determine slide positivity among tested persons (perform data analysis and report results to the community within 3 days of initiating the investigation).
8. Use ACT to treat all mRDT-confirmed cases. Note that the above steps have to be taken for each followed-up case.

c) Facility level

1. Analyze the trend of malaria cases in OPD and eventually lab registers. → Responsible: SM&E and DHMT representatives.
2. Determine the stock situations of anti-malarials (ACT and Quinine) and mRDT. → Responsible: Treatment and diagnosis representatives.
3. In case of abnormalities, conduct an outbreak investigation as stipulated in the outbreak investigation and implementation section above.

Specific Responsibilities of DRT Members

Responsibilities of the District Medical Officer

The DRT—led by the DMO, in close collaboration with the DMSO—will visit the health facility and perform preliminary investigations, according to the provided SOPs (see the Malaria Surveillance field manual, Section 2, page 10). Note that the outbreak investigation needs to be initiated within 24 hours of the notification, as follows:

1. Review and verify the MCR and check for complete and accurate compilation. In particular:
    - Ensure that each reported case has been entered into the register. Are the reception book/OPD register, laboratory register, dispense register, MEEDS booklet, and MCR tallying?
    - If those items aren't tallying, the DMSO needs to complete the MCR with the confirmed cases and remind the health worker to fill in the data regularly.
2. Use the MCR register to fill out the tabulation for malaria case location sheet and perform the following:

- Define and chart the age-group frequency distribution.
- Plot the geographic distribution of all confirmed malaria cases in the period considered.
- Summarize the travel history of all confirmed malaria cases.
- Plot the date of the test performed on all confirmed malaria cases into a chart.

3. Determine the stock availability of anti-malarials (ACT and Artesunate injection), LLIN, and mRDT/microscopy, if applicable.
4. Determine the quality of tested mRDTs/blood slides. Determine whether each case received ACTs at a clinic according to the guidelines.
5. Prepare a brief report based on the findings obtained from step 1-4 above:

Responsibilities of the District Entomologist

1. The DRT members, in collaboration with ZAMEP entomologist, will conduct a basic entomology assessment, as indicated in Chapter 5.
2. Identify and lead vector control interventions.
3. Prepare detailed entomological findings that will be made available no later than 7 days after the bacis entomology assessment.

Responsibilities of the District Health Promotion Officer

1. In collaboration with other DRT members, guided by ZAMEP and BCC officers, the District Health Promotion Officer will assess the use of vector control protective tools, as stipulated in Chapter 6.
2. Increase health-seeking behaviors.
3. Promote the usage of recommended malaria-prevention measures.
4. Mobilize and sensitize the community to minimize temporary mosquito-breeding sites.
5. Assess and observe human social practices on malaria transmission.

Step 2: Outbreak Mitigation

Based on the information of the technical team, ZAMEP will select a proper intervention strategy. The first important step is to inform the population about the current malaria situation. This should be the responsibility of a person at the national level who is precisely informed about the situation and has media skills and good knowledge about malaria. ZAMEP will conduct the outbreak mitigation at three levels (i.e., health facility, household, and community).

a) Health facility level

1. Provide extra stock of mRDT and anti-malarials. → Responsible: DHMT.
2. Treat all febrile cases with ACT. → Responsible: Health facility staff.
3. If the facility did not recognize the abnormality until ZAMEP remedied the situation, then training in basic data evaluation (SME) should be provided. → Responsible: ZAMEP.

b) Household level

1. Ensure that all previously reported cases have initiated and completed ACT treatment. If not, provide ACTs. → Responsible: Treatment and diagnostic representatives.
2. Ensure that all newly detected cases (those with a reported history of fever in index case's household and in nearby households are tested for malaria) are tested for malaria and if found positive, they should be treated. → Responsible: Treatment and diagnostic representatives.
3. Ensure that residents of visited households use their existing ITN/LLINs (if a household does not have enough nets, then provide some). → Responsible: Entomology representative.

c) Community level

1. Communicate to the community exactly what steps will be taken to control the epidemic. → Responsible: DHMT and ZAMEP representatives and community leader.
2. Alert the community of the need to immediately seek attention in case of fever. → Responsible: DHMT and community leader.
3. Alert the community of the need to use their existing ITN/LLINs. → Responsible: DHMT and community leader.
4. Mobilize the community to participate in upcoming malaria-control activities. → Responsible: DHMT and ZAMEP representatives and community leader.
5. Apply Information, education and communication/Behaviour change communication (IEC/BCC) interventions. → Responsible: ZAMEP representatives.
6. Conduct larviciding (if applicable). → Responsible: Entomology representatives.
7. Conduct focal IRS (if applicable). → Responsible: Entomology representatives.

Step 3: Outbreak Evaluation

After the occurrence of a malaria outbreak, possible reasons and the success of the conducted intervention to prevent future epidemics and to improve strategic planning.

To evaluate the causes of an outbreak, entomological investigations. These activities will include the following procedures:

1. **Resistance monitoring status.** Collect adult mosquitoes or first-generation mosquitoes from the larva-rearing process and test them with the susceptibility assay against insecticides currently in use, which include *Lambda-cyhalothrin* for IRS, *deltamethrin* for treated and conventional nets, and *permethrin* for LLINs.
2. **Bioassay test.** Collect samples of conventional nets, ITNs, and LLINs from the community. This test will indicate a gradual decrease in toxicity of insecticide employed for the treatment of nets and IRS.

3. **Larvae searches.** Conduct the dipping method to sample larvae of *Anopheles* mosquitoes from surrounding water habitats. The collected larvae will be reared to adulthood in the insectary, where species identification will occur. All potential *Anopheles* mosquito-breeding habitats will be mapped. The findings will be correlated with the adult sampling outcome.

The national entomological representative is responsible for conducting these activities with his or her team. To evaluate the success of the outbreak intervention, ZAMEP decided to collect and analyse the following outcome indicators[5]:

a. **Percentage of patients developing severe disease.** The number of cases of severe malaria—more specifically, "cerebral malaria."
b. **Flattening of falling epidemic curve**. Measuring whether the epidemic has been identified early and whether conducted interventions were successful.
c. **Case fatality rate.** This is the proportion of deaths within a designated population of "cases" over the course of the disease.

Preparedness for Epidemic Response

ZAMEP developed a preparedness checklist for early detection, control, and prevention of epidemics, aiming to review the national health goals, policies, and strategies on epidemics; to assess the institutional framework and capacity for epidemic preparedness and response; and finally to assess the design and implementation of an early warning system for forecasting and preventing epidemics. For more details, see *Appendix II.*

Chapter 3: Case Management

The Focal Mass Drug Administration (FMDA) is considered to be among the major interventions that can interrupt malaria transmission in targeted populations. To halt ongoing cases and asymptomatic cases in hotspot areas, FMDA is considered a good approach that can rapidly reduce the prevalence of malaria incidences in a short period; however, other interventions—especially those that reduce vectorial capacity, including IRS and LLINS—need to be deployed to maintain the gains.

Focal Mass Drug Administration

FMDA involves the administration of a full dose of anti-malarial treatment, irrespective of the knowledge of symptoms or presence of infection, to an entire population in a small-defined geographical area or hotspot, except those where the medicine is contra-indicated. Mass Drug Administration (MDA) is conducted in a coordinated manner so that the whole at-risk population takes the drug at approximately the same time, often at repeated intervals. The objective of MDA is to halt transmission and rapidly reduce malaria morbidity or mortality, or to prevent relapses and halt malaria transmission. To have the desired impact, MDA must achieve high coverage of the targeted group or population, which in turn demands a high level of community participation and engagement.

[5] World Health Organization. Field guide for malaria epidemic assessment and reporting, 2004

To ensure that this activity is successfully implemented, the following requirements should be in place:

1. Medicine for Treatment (ACTs) and Primaquine

The medicines must be of proven efficacy in the implementation area and preferably have a long half-life. WHO recommends that a medicine different from that used for first line treatment be used for MDA.

A low single dose of 0.25mg/kg body weight of Primaquine is recommended for the clearance of matured gametocytes malaria transmission by treating the index and blocking of transmission.

2. Community Awareness

Among community members from the affected geographically defined areas, public education on the usage of medicines is essential to ensure full medication-consumption compliance.

3. Safety Monitoring

Safety monitoring, an integral part of MDA, needs to occur so that patients who experience an adverse event (AE) are properly managed to avoid any serious implications. To achieve this, any detected case of adverse drug reaction (ADR) should be referred to the nearest hospital for proper management.

Method for Implementation

- Conduct a planning meeting with the DRT to discuss the modality of the exercise, the mobilization process, and the actual implementation.
- Conduct a BCC mass campaign in the entire community to create awareness among the people about malaria situation in their community.
- Distribute LLINs to all eligible community members.
- Perform FMDA using ACTs and Primaquine.

Preparation for Implementation

(a) Increasing Awareness

BCC members from the DRT should organize FMDA in their respective *shehia*/area before the exercise. The messages will target the community in hotspot areas in an effort to understand the malaria situation in those localities, get prepared for FMDA, and undergo net distribution. Community members should be fully involved during the implementation of the activity.

(b) Logistics Supply

Logistics materials include mRDT, anti-malarials, LLINs, and register books to be handed out to eligible community members during FMDA and LLIN distribution. Quantify the commodities estimated based on the population of the *shehia*.

(c) Human Resources

Complete orientation training for the DRT on FMDA and how to dispense the proper dosage of anti-malarials by age and medicine categories.

Implementation

The ZAMEP national team, the DRT, and community members will join in the activities in their respective *shehia* for the field work. A local community member will accompany the DRT to facilitate the identification of households and household members.

One member, attached with a clinician, will fill the register book. Household members were required to take the anti-malarial drug under Direct Observed Therapy (DOT) and asked to ensure that the remaining doses be taken over the following days without missing or skipping the dose.

Exclusion Criteria for MDA

The MDA should exclude the following community member groups:

- Pregnant women in the first trimester (first 3 months of pregnancy)
- Very ill patients who cannot swallow the tablets

Monitoring/Evaluation of the Activity

MDA Findings (Results)

Count the people from the respective *shehia*/area using the register book (see *Appendix IV*), then fill in ***Tables 3 and 4.***

Table 3: Households Visited Through FMDA

Shehia	Household Targeted	Household Visited	Results in %

Table 4: Household Members Administered with Anti-Malarial Through FMDA

Shehia	Household Members Targeted	Household Members Dispensed with Anti-Malarial	Results in %

Write a report about the activity and how the exercise proceeded, then send it to ZAMEP. Table 3 and 4 should be part of the report to be submitted within 7 days after the response activities.

Post-FMDA Survey

Two weeks after the completion of the FMDA, conduct the post-FMDA survey, as demonstrated below:

- **What do you need during post-FMDA?**

– Human resources
– Transportation
– Post-FMDA register books, as shown in *Appendix VI*

- **Activity: Post-FMDA Survey**

Report prepared by:

……

Title in the Response Team

District Response ……..(Name of District)

Date Report Prepared……

Section 1: Brief description of how activity was conducted

A post-FMDA survey was conducted, including an introduction, the purpose of FMDA, the number of people who took part in the interviews, and responsibilities.

The post-FMDA survey was carried out to achieve the following:

- Estimate the completion of three doses of ACT distributed during FMDA
- Understand the reasons for not completing FMDA doses
- Investigate the side effects following FMDA
- Investigate the willingness to participate in FMDA in the future

Section 2: The number of people taking part in the activity and the number of days taken to complete activity

Shehia	Dates Activity Undertaken	Number of Technicians	Number of Days to Complete Activity

Shehia	Target Households	Number of Households Visited	Slept Under LLIN	ACT Doses Taken				
				Completion	Incomplete	Not Taken	Side Effect	Participation in the Future

Section 3: Treatment adherence

Reasons for not completing the doses

- Side effects (e.g., abdominal pain, headache, vomiting, dizziness, body malaise)
- Children were not given the drugs by their guardians and parents

- Too many activities or busy

Reasons for not taking the drugs at all

- Refused
- Not enough nets received
- Chronic diseases (e.g., hypertension)
- Fear of side effects
- Fear of abortion
- Didn't like
- Not sick
- No enough information received because not present during distribution

Reasons for not using LLINs

- No mosquitoes
- Nets insufficient/old
- Climatic conditions

Section 4: What went well?

- Good community cooperation occurred.
- To a large extent, the list of households was correct in the field.
- The tool was simple and clear.

Section 5: Challenges experienced

- Exercise was finished, but time was insufficient.
- Up-and-down movements looking for households exhausted the interviewer.
- Some people were not identified.
- Lack of information prior to post-FMDA sparked questions from community members.

Section 6: Lessons learned/how can we improve activity in the future

- LLIN distributions can increase MDA compliance if both activities take place at the same time.
- Number of nets given could affect MDA if the community is not aware of the distribution system in advance (formula used in distribution), though care is needed when delivering the message.
- Apart from DOT, we can never be sure whether the dosages have been completed.
- Some who initially refused medication promised to take the drugs after realizing that no reactions occurred to their neighbors, who took the dosage earlier.

Section 7: Recommendations

- If possible, single-dose treatment should be available in the future.

- This kind of exercise needs at least 2 days.
- Interviewees should have information prior to survey.

Chapter 4: Diagnostics

The DRT should conduct ACD at the community and household levels considered to be at high risk. The aim is to detect the malaria parasite in targeted populations and treat malaria cases according to treatment guidelines to halt malaria transmission in an embattled society.

Malaria diagnosis is accomplished through non-microscopic testing (i.e., mRDT) due to its quick results and user-friendly features for many health workers. However, its sensitivity and specificity should be monitored at all times using more sensitive and reliable methods.

Types of Screening

- **MSaT** is the screening of a whole population within a *shehia*. It is offered to all, irrespective of individuals' risk status (e.g., without considering age groups, gender, and so on). Once a malaria case is confirmed, treatment should be provided by the assigned medical personnel.
- **FSaT** screening is performed on a focal group within a population, such as a village within a *shehia*, a certain age group, a gender, an occupation, and so on. Confirmed malaria cases should be treated by the assigned medical personnel.

The decision of screening with the MSaT or FSaT approach will be guided by the analysis of epidemiological investigation. (See ***Table 1.)***

Steps to Be Considered During MSaT or FSaT Interventions

- Mobilize health materials, including mRDT kits, which will depend on the population of a specific *shehia*/village. (Refer to the preparedness checklist in *Appendix II*.)
- Liaise with community leaders to determine the number and locations of testing posts, which will depend on the target population, the number of laboratory technicians available, and the extent of the geographical area.
- Organize a team of two or more health professionals (e.g., laboratory technician, Public Health Nursing group B (PHNB), clinicians) and community representatives per test post. (Refer to the preparedness checklist in *Appendix II.)*
- Prepare and submit a summary report to the DMO, the District Authority, the *shehia*, and ZAMEP.

Materials Required

- mRDT kits and mRDT SOPs, anti-malarial drugs, booklet/register books, safety box, slide box, glass slide, cotton, lancets, pen, pencil, sharpener, and erasers.
- These requirements will be organized 1 day before field day.

The teams should include the following in their summary reports:

- Number of mRDT tested >5 years
- Number of mRDT tested <5 years
- Number of positives >5 years
- Number of positives >5 years

Dissemination of report

- National level
- District authority
- *Shehia* level

Chapter 5: Larvae Source Management (LSM)

Introduction

Mosquitoes have a wide range of habitats in grasslands and open woodland areas, usually in warmer water areas exposed to the sun. In the spring, small numbers of mosquito larvae are usually located in shallow, permanent, and semi-permanent ponds; irrigated areas; and weedy roadside ditches. However, as populations build during the summer, larvae may be found in temporary water bodies, including artificial containers, water-filled hoof prints near livestock watering sites, bird baths, used tires, and foul water in corals and around feedlots.

Larva Sampling of Malaria Vectors/Larviciding[6,7]

Locating the Sites

To be effective, anti-larval measures must be targeted at the most productive breeding sites of the local vector species. This normally requires local studies to identify those sites because there is great variation not only among species but also among locations for a given species. Many important malaria vectors—notably *Anopheles gambiae s.l.*—breed in a wide range of aquatic habitats.

These habitats range from small, temporary bodies of water to the margins of semi-permanent and permanent streams and ponds. Maintaining complete coverage of the small and temporary sites, including those scattered around the margins of larger water bodies, is important but difficult. This is because the smaller sites are often numerous, scattered, and shifting—that is, they can be new and at slightly different locations every week, as old breeding sites dry out or are washed away, and new breeding sites are created elsewhere.

Because new breeding sites are always appearing, and eggs laid in new sites may reach adulthood in 7–10 days, it is typically necessary to repeat larviciding operations at weekly intervals, regardless of the residual characteristics of the product used. This is not usually the case in places where the majority of the breeding sites are permanent (e.g., cement-lined pits, brick pits).

Monitoring for Mosquito Larvae

1. Performing a Dip

- When searching for mosquito larvae, it is important not to disturb larvae on the water surface. Mosquito larvae will quickly swim to the bottom of the water body or hide under vegetation or other debris if disturbed.
- When approaching a body of water, move slowly and carefully. Vibrations from your footsteps might disturb the vegetation, or your body might cast a shadow over the water, causing the larvae to dive to the bottom.
- Mosquito larvae of the malaria vectors are typically located on the surface of the water and next to vegetation or surface debris. In larger bodies of water, they are found along the edges of shallower areas, with vegetation

[6] World Health Organization, “Malaria entomology and vector control,” Learner’s Guide. Trial Edition, WHO/CDS/CPE/SMT/2002.18 Rev.1 Part I, 2003.

[7] World Health Organization, “The role of larviciding for malaria elimination,” 2010.

such as grasses and sedges present. Mosquito larvae are not typically located in the more open deeper water areas, where there is excessive wind and wave action.

- Dipping should be concentrated in areas containing vegetation or floating debris.
- If there is a strong wind, dipping should be done on the downwind side of the water body where the larvae and pupae may be concentrated.

2. Large Area

Anopheles mosquitoes have a long flight range in open country; females can fly up to 1–1.5 km. For this reason, breeding must be prevented within a diameter of up to 3 km, or within an area of potentially more than 9 km^2, to protect a small community inside that zone. In larger communities, the whole area of the settlement, plus a buffer region between the community and breeding sites, must be covered.

Dipping Techniques[8]

Complete Submersion and Simple Scoop Method

- A "dip" is accomplished by quickly scooping a dipper full of water. Mosquito larvae are easily frightened and will try to avoid the dipper if the dip is taken too slowly. Therefore, it is important that a dip be performed quickly.
- Quickly plunge the dipper below the surface of the water, then bring back a "scoop full" of water. Avoid over-filling, as the larvae may be lost in the overflow.
- This is the most common method of performing a dip.

Partial Submersion and Flow-In Method

- Use this method when you need to test for larvae at the edges of vegetation in shallow water.
- Push the dipper, tilted at approximately 45º, down into the mud, adjacent to clumps of grasses or sedges. This method causes the water around the vegetation to flow into the dipper, carrying the larvae with the flow. There is no need to move the dipper. Make sure to pull the dipper up before it is full.

Scraping Method

- This method is for collecting larvae that are hiding under floating or other vegetation, such as cattails.
- Dip from the water toward the vegetation, then use the dipper to scrape against the base or underside of the vegetation to dislodge the larvae.
- This method can be more effective if the bottom of the dipper is screened.
- Dipping for mosquito larvae is not effective if it is raining.

Once *Anopheles* mosquito larvae have been discovered in a water body, the water body needs to be treated (see ***Table 5***) every 2–3 weeks using a biological control

[8] World Health Organization, "Manual on practical entomology in malaria, part II: methods and techniques," 1975.

agent (*Bacillus thuringiensis, methoprine*, or *israeliensis*) for at least six rounds. Please note that the treatment is not required when average larvae density is below 5 per 10 dips during monitoring.

Larvae monitoring should be conducted 1 day before the next treatment is performed, whereby the findings should suggest continuation or discontinuation of water body treatment.

If the water body is small, larvicide can be applied by hand using a pail and a scoop or by small handheld grass seed. If the water body is too large to be treated by hand, the implementer should walk around the water body and apply the larvicide every 2 meters.

When to Treat

Table 5 gives an estimate of larval density and can be used as a guide for treating or not treating a water body. The counts are based on taking 10 dips around and close to the vegetation edge of the water body. At each dip, the mosquito larvae are counted.

Table 5: Estimate of Larval Density in a Water Body

Density	Low	Medium	High
Number of larvae in 10 dips	1–4	5–60	>60
Treatment required	No	Yes	Yes

Larviciding Indicators

- It is not enough to show that larvae are killed or excluded from sites that are known and treated. Rather, the critical test is to show whether adult mosquito densities (and ideally, malaria incidence) have been reduced in the target community.
- New breeding sites are always appearing, and eggs laid in new sites may reach adulthood in just 7–10 days. It is normally necessary to repeat larviciding operations at weekly intervals, regardless of the residual characteristics of the product used. This is not usually the case in places where the majority of the breeding sites are permanent (e.g., cement-lined pits, brick pits).

Mosquito Larvae Monitoring Form

MAP ID 3: .....

DATE: .....

LOCATION: .....

SIZE: .....

TYPE: .....

VEGETATION: .....

PREDATORS: .....

NO. OF DIPS: .....

QUANTITY/DIP: .....

DATE	INSTAR 1st	INSTAR 2nd	INSTAR 3rd	INSTAR 4th	PUPAE (Yes/No)	TOTAL

APPLICATION INFORMATION:.....

PRODUCT:.....

RATE/AMOUNT: .....

APPLICATION METHOD: .....

WEATHER: .....

APPLICATOR:.....

Chapter 6: Comprehensive Behavior Change Communication

Introduction

During a malaria epidemic response, a communication package—including information about community sensitization to screening for malaria parasites by using mRDT and microscopy, ACT use, the importance of community involvement in IRS operations while continuously using LLINs, and the improvement of environmental sanitation—will be continuously disseminated to the population.

The aim of BCC intervention is to increase community awareness about the uptake of proposed malaria control interventions during and after an epidemic response as an effort to combat malaria transmission within a certain locality.

In conjunction with national, district, and health promotion units, the following activities will be conducted:

1. Meetings with local villagers

   a) Inform local villagers about the current malaria situation, and discuss the causes of the situation in their locality.

   b) Arrange with local villagers to engage in planned interventions.

   c) Encourage community participation through local leaders on selected interventions such as the distribution of IEC materials, ACD activities, and so on.

2. Channels of communication

These include the use of community mobilizers to improve interpersonal communication. The following methods will be used:

   a) Interpersonal communication

   b) Sound crier (Upatu)

   c) Radio/TV programs: Liaise with national team

   d) Public announcement (PA)

   e) Speech from religious leaders

Proposed Messages for Response Interventions

During the implementation of the above activities, the following messages should be conveyed:

1. Adherence to recommended anti-malarials: The message should sensitize community members on the importance of using timely and complete doses of recommended ACT plus Primaquine. During FMDA, the messages will emphasize the importance of using DOT.

2. IRS: The messages should insist that community members fully participate during the IRS operation. The national team will conduct the IRS operation primarily in the active malaria foci. For more details, see *Appendix V*. Please note that, should the IRS operation be conducted as a response intervention, the DRT needs to contact ZAMEP for further arrangements.

3. Continuous LLIN usage: The message should emphasize personal protection. People should sleep under bed nets. The assessment of LLIN ownership will be done with the aim to identify the LLIN gap based on the number of sleeping spaces in each household to inform top-up net distribution. To ensure that we provide good protection to the community, the team should make sure that each sleeping space is covered by LLINs (universal coverage). ***Table 6*** shows an example.

Table 6: LLIN Coverage Example

Household No.	No. of sleeping spaces*	No. of LLINs available	Number of LLINs needed	Remark
1	5	2	3	
2	2	0	2	
3	6	2	4	
Total				

*Note: Sleeping space is a place where someone is sleeping either in a bed, on a mat, or on the floor.

Assessment of BCC Interventions

To understand the outcome/effectiveness of BCC-implemented activities, the team shall conduct a special BCC assessment, using a designed tool, to capture the required information regarding the progress of BCC activities in the affected area.

Appendices

Appendix I: Responsibilities of the District Malaria Response Team

Position	Responsibilities	Number
DMO	• Undertake management and administration role • Maintain updated flow of information to all levels of communication (district and community) • Mobilize resources (personnel, materials and supplies, data collection tools, logistics and transport)	1
District Management Representative	• Assist the DMO in undertaking management and administration role • Communicate with the District Commissioner • Mobilize community leaders/*shehia*s	1
District Malaria Surveillance Officer (DMSO)	• Technically assist the DMO to run the team • Perform monitoring and reporting (report of response activities) • Prepare and submit event reports	1
Assistant DMSO	• Assist the DMSO in performing the above roles	1
District Surveillance Officer (DSO)	• Work closely with the DMSO	1
District Pharmacist (DP)	• Ensure the availability of health commodities	1
Clinical Officer/Nurse	• Communicate with the health facility at the community level • Verify checklist for pre- and post-field activities • Conduct malaria testing and treatment according to SOPs • Prepare and submit a summary report to the DMO and *shehia*/community	1
Environmental Health Officer	• Identify and map mosquito breeding sites • Performing larviciding according to SOP in close collaboration with the community • Monitor mosquito larvae (i.e., performing a dip) • Prepare and submit a report to the DMO and *shehia*/community	1
District Lab Technician	• Mobilize diagnostic kits • Collect and submit all positive mRDT devices to the national level	1

Position	Responsibilities	Number
	• Mobilize/train the testing team • Liaise with national-level diagnostics team • Supervise quality assurance of mRDT testing	
Health Promotion Officer	• Lead community sensitization • Work with *shehia* health committee/custodian *shehia* committee • Promote selected malaria control interventions • Organize distribution of LLINs (with *shehia* health committee/custodian *shehia* committee) when needed • Monitor health-promotion activities in areas where response activities have been carried out • Liaise with ZAMEP BCC team for further guidance and support	2
***Shehia*/Community Leader**	• Help in sensitization of the community • Participate in the agreed-upon control intervention • Host the DRT	1
Meteorological Officer	• Provide updates on the weather forecast	1

Appendix II: Preparedness Checklist

Name of District		
Desk Reviewer/Interviewer		Date
POLICIES – NATIONAL		

1. Is there a national/local health policy document? …… Y/N

   If YES,

   What is the date on the document, and which period does it cover?

   .....

   Does it cover the prevention and control of epidemics including malaria?.....Y/N

   If YES,

   State the national/local policy on the prevention and control of malaria epidemics:

   .....

   .....

   .....

   .....

2. Is there an inventory of diseases of epidemic potential in the country? Y/N

   If YES,

   State which ones and their epidemic thresholds:

   .....

   .....

   .....

   .....

Appendix III: Summary Report for the Active Case Detection

District	*Shehia*	Village	Total Population Examined			Total Population Expected	Total Positive	Proportion Tested Positive (%)
			Day 1	Day 2	Day 3			

Appendix IV: Register Book for MDA

Date: _____ District:_____

***Shehia*: _____ Village: _____**

Name of Staff:_____ Name of Head of Household:_____ No. of Houshold Members:_____

Resident Basic Information					Suitability for MDA				
No.	**Name (First and Last)**	**Present for MDA? (Y/N)**	**Age (years)**	**Sex (M/F)**	**In First Trimester of Pregnancy? (Y/N)**	**Agree to Treatment? (Y/N)**	**Dosage (number of tablets given)**		**If refused MDA, give reason**
							ACT	**PQ**	
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									

Appendix V: Indoor Residual Spraying Leaflet

ZOEZI LA UPIGAJI DAWA MAJUMBANI LITAANZA RASMI MWEZI MARCH 2016 KATIKA WILAYA ZOTE ZA UNGUJA NA PEMBA.

NINI WAJIBU WA MWANANCHI KATIKA KUFANIKISHA ZOEZI HILI:

- KUTOA MASHIRIKIANO YA HALI YA JUU WAKATI ZOEZI HILI LIKIENDELEA KAMA KUMRUHUSU MPIGA DAWA KUINGIA NDANI YA NYUMBA
- KUCHANGIA MAJI PALE YATAKAPOHITAJIKA N.K.
- KUHIFADHI VIZURI AINA ZOTE ZA VYAKULA, VYOMBO, NGUO, MAJI YA KUNYWA NA MIFUGO KAMA KUKU ILI VISIPATE DAWA
- HAKIKISHA KUTA ZA NDANI YA NYUMBA ZINAFIKIKA ILI ZIWEZE KUPIGWA DAWA

MAMBO MENGINE MUHIMU YA KUZINGATIA:

- ENDELEA KUTUMIA CHANDARUA KILICHOTIWA DAWA NA RUDIA KUTIA DAWA KILA BAADA YA

ZOEZI LA UPIGAJI DAWA MAJUMBANI LITAANZA RASMI MWEZI

MARCH 2016 KATIKA WILAYA ZOTE ZA UNGUJA NA PEMBA

NINI WAJIBU WA MWANANCHI KATIKA KUFANIKISHA ZOEZI HILI:

- KUTOA MASHIRIKIANO YA HALI YA JUU WAKATI ZOEZI HILI LIKIENDELEA KAMA KUMRUHUSU MPIGA DAWA KUINGIA NDANI YA NYUMBA
- KUCHANGIA MJI PALE YATAKAPOHITAJIKA N.K.
- KUHIFADHI VIZURI AINA ZOTE ZA VYAKULA, VYOMBO, NGUO, MAJI YA KUNYWA NA MIFUGO KAMA KUKU ILI VISIPATE DAWA
- HAKIKISHA KUTA ZA NDANI YA NYUMBA ZINAFIKIKA ILI ZIWEZE KUPIGWA DAWA

MAMBO MENGINE MUHIMU YA KUZINGATIA:

MIEZI SITA. *(KWA VILE VYANDARUA VISIVYOKUWA NA DAWA YA MUDA MREFU).*

- ONDOSHA MAZALIO YA MBU KWA KUWEKA MAZINGIRA SAFI
- FUKIA VIDUDU VYOTE VITAVYOKUFA KWA DAWA MFANO MENDE, NZI, MBU, N.K. NA KUVICHOMA KWA HIFADHI YA MIFUGO YAKO.
- ZOEZI LA UPIGAJI DAWA LITAFANYIKA KATIKA NYUMBA WANAZOISHI/WANAZOLALA WATU TU.

DAWA HII NI SALAMA KWA BINAADAMU NA MAZINGIRA YAKE NA INADUMU KWA KIPINDI CHA MIEZI SITA HADI MINANE

NDUGU MWANANCHI

KAMA KUNA TATIZO LOLOTE AU TAARIFA ZA **ZIADA** ZA KITAALAMU ZINAHITAJIKA WASILIANA NA KIONGOZI AU MSIMAMIZI WA WAPIGA DAWA KATIKA WILAYA YAKO.

July 2014

- ENDELEA KUTUMIA CHANDARUA KILICHOTIWA DAWA NA RUDIA KUTIA DAWA KILA BAADA YA MIEZI SITA. *(KWA VILE VYANDARUA VISIVYOKUWA NA DAWA YA MUDA MREFU).*
- ONDOSHA MAZALIO YA MBU KWA KUWEKA MAZINGIRA SAFI
- FUKIA VIDUDU VYOTE VITAVYOKUFA KWA DAWA MFANO MENDE, NZI, MBU, N.K. NA KUVICHOMA KWA HIFADHI YA MIFUGO YAKO.
- ZOEZI LA UPIGAJI DAWA LITAFANYIKA KATIKA NYUMBA WANAZOISHI/WANAZOLALA WATU TU.

DAWA HII NI SALAMA KWA BINAADAMU NA MAZINGIRA YAKE NA INADUMU KWA KIPINDI CHA MIEZI SITA HADI MINANE

NDUGU MWANANCHI

KAMA KUNA TATIZO LOLOTE AU TAARIFA ZA **ZIADA** ZA KITAALAMU ZINAHITAJIKA WASILIANA NA KIONGOZI AU MSIMAMIZI WA WAPIGA DAWA KATIKA WILAYA YAKO.

July 2014

Appendix VI: Post-FMDA Register Book

Date: _____ District: _____*Shehia*: _____Village: _____

Name of Interviewer:_____ Name of Head of Household:_____ No of Household Members:_____

Resident Basic Information					Net Use Last Night				Participation During MDA*				
No.	Name (First and Last)	Present during survey? (Y/N)	Age (years)	Sex (M/F)	Did you sleep under a net last night? (Y/N)	If NO, provide reason for not sleeping under net last night.	How many tablets did you take on DAY 1?	How many tablets did you take on DAY 2?	How many tablets did you take on DAY 3?	If any dose or all doses not taken: Provide a reason for not completing dose.	If any dose or all doses not taken: Did you get a reminder to complete all doses? (Y/N)	If one or more doses taken: did you experience any side effects after taking MDA treatment? (If yes, specify side effects.)	Would you participate in MDA in the future? (Y/N)
01													
02													
03													
04													
05													
06													
07													

Resident Basic Information					Net Use Last Night				Participation During MDA*				
No.	Name (First and Last)	Present during survey? (Y/N)	Age (years)	Sex (M/F)	Did you sleep under a net last night? (Y/N)	If NO, provide reason for not sleeping under net last night.	How many tablets did you take on DAY 1?	How many tablets did you take on DAY 2?	How many tablets did you take on DAY 3?	If any dose or all doses not taken:		If one or more doses taken: did you experience any side effects after taking MDA treatment? (If yes, specify side effects.)	Would you participate in MDA in the future? (Y/N)
										Provide a reason for not completing dose.	Did you get a reminder to complete all doses? (Y/N)		
08													
09													
10													

*Parents or guardians to respond on behalf of children.
If household has more than 10 members, use a second form.