



## MOTHER-MUAC

TEACHING MOTHERS TO SCREEN  
FOR MALNUTRITION



**GUIDELINES  
FOR TRAINING  
OF TRAINERS**



CARING TOGETHER

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## BACKGROUND

*Putting mothers at the center of malnutrition screening strategies acknowledges that they are in the best position to detect the earliest signs of malnutrition and leverages the fact that mothers want to participate as fully as possible in promoting the health of their children.*

This is why, in 2011, ALIMA began exploring the feasibility of training mothers to screen their own children for malnutrition by teaching them how to use color-coded Mid-Upper Arm Circumference (MUAC) tapes and check for edema. ALIMA was also responding to two persistent problems found in even the best-functioning treatment programs: late presentation of severely malnourished children and coverage rates often below 50%.

MUAC offers many advantages. Compared to other commonly used anthropometric indicators such as weight-for-height Z score, it is simple to understand and use. Furthermore, MUAC better identifies children at highest risk of death from common childhood illness [1]. Regular screening in the community has been shown to improve early diagnosis while decreasing risk of medical complication or death. [2, 3]

Current recommendations call for community health workers (CHW) to screen children in their catchment area [4], without any mention of frequency. Early detection of wasting or nutritional edema requires repeated screens, sometimes at weekly intervals, with particular focus during the months when most malnutrition occurs - typically the rainy season. CHWs are usually asked to screen once per month, but often have

multiple competing responsibilities. Family members are best placed to regularly check a child's MUAC and look for edema, and MUAC-based programs show great promise for improving coverage: in Sierra Leone one such a program showed superior coverage to standard protocol based on weight-for-height measures [5] while in Bangladesh, CHWs using MUAC achieved over 90% coverage. [2]

ALIMA has conducted two studies in the Mirriah District of Niger to test the Mother-MUAC strategy and estimate the effectiveness and costs of empowering mothers to screen their own children for malnutrition. The pilot study conducted in 2012 with 103 mother-child pairs, showed that minimally trained mothers could classify their children by MUAC color-coded class as well as CHWs. [6] Both groups had similarly high sensitivity and specificity for severe acute malnutrition (SAM) and global acute malnutrition (GAM). Classification errors only occurred at the boundaries between normal/MAM and MAM/SAM. Accuracy was not influenced by which arm (right or left) was measured nor by how the mid-point of the upper arm was determined (by-eye or by measurement), providing evidence that can simplify the use of an already easy-to-understand tool, while maintaining accuracy and precision.

A larger study from 2013-2014 showed that the approach could successfully be scaled up at the health zone level. After training more than 13,000 mothers and caretakers, family members performed as well as or better than CHWs with regards to both MUAC and checking for edema. SAM was detected earlier (i.e. higher median MUAC) and there were significantly fewer hospitalizations among children screened by their mothers or caretakers, demonstrating one of the major benefits of early detection. [7] Making mothers the focal point of screening cost substantially less per child than the strategy relying on CHWs (\$1.04 versus \$3.00.)

ALIMA has expanded Mother-MUAC to several more countries and aims to implement the strategy in all of its malnutrition treatment programs. The guidelines presented here are the product of ALIMA's lessons learned with the hope that other organizations will also adopt this strategy. It includes the set of tools developed to plan and deliver training

sessions for mothers and caretakers on how to use MUAC tapes and check for edema, and monitor the quality of implementation. It is our aim that wherever childhood malnutrition is prevalent, all families in the near future will be familiar with these techniques and empowered to screen their own children. Mothers and family members are the ones who can detect wasting and/or edema in its earliest stages, and Mother-MUAC could catalyze real progress in reducing malnutrition-related child mortality and morbidity.



**The MUAC bracelet is very easy to use. Mothers understand it well and they make sure to do the test at home.**

Dr. Nafissa Dan Bouzoua, medical coordinator for ALIMA.

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## DEVELOPING A TRAINING STRATEGY

*There is no one-size-fits-all approach to teaching mothers how to use and interpret a MUAC tape or check for edema. The first step is to identify a strategy that is adapted to the context and meets the objectives of an intervention. For example, you should initially determine whether Mother-MUAC will be delivered as a stand-alone project or combined with another program (e.g. vaccination campaign, targeted blanket feeding, and/or seasonal malaria chemoprevention, etc) and whether you will focus on group training sessions or individual trainings.*

### — WHO has ALIMA trained?

The primary focus has been, of course, on mothers with children 6 – 59 months of age, as well as caretakers and other family members like grandparents, aunts, or uncles. Recent and soon-to-be mothers have also been included, in addition to many other interested family members, especially teenage girls. We have also found that engaging husbands and fathers is a good way to further generate community acceptance.

### — WHO has ALIMA used as trainers?

ALIMA has trained a variety of people to conduct trainings of mothers and other family members. CHWs and former CHWs have been most widely used as trainers, but so to have Health Promoters, Nutrition Assistants, and Nurses. CHWs continue to play an important role in promoting and delivering health efforts in a community, but utilizing CHWs to train mothers how to screen in the community, rather than screening children themselves, is better suited to their skills.

### — WHAT is the content of the training session for mothers and families?

Training sessions by ALIMA have mixed short presentations with practical demonstrations and hands-on practice of the screening techniques by mothers and other community members. Presentations include descriptions of malnutrition, how it is diagnosed and treated (using videos, pictures and drawings in support), and why it is important to teach mothers how to screen. The practical demonstrations of MUAC use and checking for edema is followed by mothers practicing the techniques themselves. To maximize the impact, ALIMA has found that key messages need to be as simple and clear as possible in the local language. Highlighting the fact that early detection can reduce the risk of death or the need for a lengthy hospital stay has been particularly effective.



### — WHERE has ALIMA conducted trainings?

ALIMA has taught tens of thousands of mothers to screen for malnutrition in Niger, Burkina Faso, Mali, and Chad. Our teams have found that opportunities for group and individual trainings exist in all health and nutrition interventions, and that it is relatively straightforward to incorporate into pre-existing programs. Training activities flow like a cascade from the community to the health center to the hospital, reinforcing key messages and actions along the way. Follow-up activities are important to ensure mothers successfully understand the screening techniques and that screening occurs routinely and regularly.

#### At the community level

- Dedicated mass training campaigns with group trainings in villages and individually in households over a period of two weeks
- Trainings attached to seasonal malaria chemoprevention (SMC) campaigns
- Trainings attached coverage surveys, mass

screenings or vaccination campaigns

- Identifying mothers who are leaders in their community to form small groups

#### At the health post or health center level

- In the triage waiting area
- After triage for those not needing further treatment
- During ‘cooking groups’ or other health promotion activities
- Upon discharge from SAM or MAM treatment

#### At the hospital/stabilization center

- During a hospital stay once a child is stabilized
- Individual training at discharge or graduation

#### Video presentations

- Using short demonstration videos can be a good way to reach mothers and caretakers with messages during training sessions.

### — HOW has ALIMA conducted monitoring and follow-up?

**Monitoring and follow-up actions are as important as the training itself. ALIMA has evaluated the effectiveness of the training and mothers’ ability to screen in two ways:**

- Supervisors have conducted checks in randomly selected households several weeks after the initial training in a given village, with repeat training sessions conducted if ~25% of households did not have a MUAC tape or did not use it correctly.
- Teams have monitored agreement between the MUAC color reported by the mother upon arrival at the health center or hospital and the MUAC measurement determined by an agent experienced in MUAC use (nutritional assistant, CHW, nurse, etc). Program supervisors should keep track of the percentage of ‘in agreement’ readings and take action if agreement drops below 90% by organizing refresher courses. Supervisors should also monitor median MUAC upon

admission to SAM or MAM programs to ensure that presentation is as close to the eligibility threshold as possible: 115 mm for SAM, 125 mm for MAM.

- The vast majority of edematous malnutrition should be detected at the 1+ stage (edema present only on the feet).

**There are multiple opportunities to ensure that screening activities occur regularly, including sending reminders by:**

- Media like radio advertisements
- SMS or Social media
- Using criers at the market
- During cooking club meetings
- Hanging up posters at the health center



## GETTING STARTED

### PLANNING AND IMPLEMENTING A MASS TRAINING CAMPAIGN

# 1

#### Determining your coverage area

When Mother-MUAC is first introduced to a community, covering an entire health area will help ensure maximum impact. For this you will need to define your population/zone and evaluate population density:

- Have comprehensive list of all villages in the health area with recent population estimates
- Identify village focal points who will be responsible for conducting training and following-up with mothers
- Identify opportunities to train mothers (e.g. when, where, and how)
- Identify ways to pass messages so regular screening activities as routine as possible (e.g. reminders via radio ads, SMS, social media, market criers, cooking clubs, or posters.)

# 2

#### Determining the Human Resources Needed for a Mass Training Campaign

The number of MUAC-trainers needed will vary based on population density. Based on ALIMA's experience coverage of an entire health zone in Mirriah District, Niger in 2013:

- Anticipate 1 trainer per 50-60 people per day in rural areas (or 100-120 people with a team of 2 trainers). In more densely populated areas, anticipate 1 trainer per 100-120 people per day (or 200-240 with a team of 2 trainers.)
- Anticipate 1 village per half-day unless villages are very close together.
- It is best not to schedule training sessions on market day
- Anticipate 1 or 2 days for return visits to villages to make the training available to mothers who could not attend the initial training

# 3

## Determining the Budget

ALIMA's experience in Niger shows that Mother-MUAC costs approximately \$1.00 USD per child per year (from mass trainings to monitoring and follow-up activities.) While Mother-MUAC is substantially less costly overall than a CHW-based screening strategy, it does require a higher initial investment. Overall costs included:

- **5000\$** : Initial training of trainers and mass Mother-MUAC campaign:
  - **75%** : Per diems for 16 trainers (training and 2 week campaign)
  - **10%** : Transport for trainers (fuel, driver, etc)
  - **15%** : Supervision costs and evaluation of the first training
- **2000\$** : Occasional supervision from community manager and per diem for the District Supervisor (1 supervisor for 16 trainers)
- **1750\$** : MUAC tapes estimated at \$0.14/tape distributed to 12,900 mothers and family members

# 5

## Developing a training session

ALIMA group training sessions have been a mix of presentation and practical demonstrations. Messages should be clear and simple, delivered in the local language. An outline of a 20-30 minute ALIMA training session includes:

- Welcome mothers and explain the objectives of Mother-MUAC
- What is malnutrition?
- What is the difference between wasting and edematous malnutrition?
- How to recognize the early signs of malnutrition
- Advantages of Mother-MUAC
- How to check the MUAC (followed by a practical demonstration)
- When to use MUAC and check for edema
- Thank mothers for their participation

# 4

## What to prepare for trainers

To organize a training of trainers, you will need to:

- Calculate the number of MUAC tapes needed per trainer
- Provide a set of training materials per trainer (e.g. visuals, edema mock-up, key messages, tally sheet to count participants, # MUAC tapes to distribute)
- Develop a timeline from pre-training visits (to explain the purpose of the training to community leaders and maximize the number of mothers available on training day) to post-training follow-up visits (to train mothers who were unavailable during the training sessions and supervise training quality.)
- Plan transportation and determine daily salary
- Prepare pictures and drawings for the presentation

To run group sessions in villages, trainers will need to:

- Limit groups to 20-25 mothers and family members
- Expect each session to last 20-30 minutes
- Allow for some extra time to do individual follow-up

# 6

## Following-up with mothers

Follow-up and tracking the effectiveness of the trainings is as important as the trainings themselves. ALIMA has found that monitoring at the health center can include the following questions during triage:

- Have you previously been trained to check your child's MUAC status?
- If yes: Did you check your child's MUAC/edema at home before coming to health center?
- If yes: Document the color/edema status found by the mother and compare with the measurement of the health center agent. When there is a discordant reading, the health center agent can do a practical demonstration with the mother





## SAMPLE MOTHER-MUAC GROUP TRAINING SESSION WITH KEY MESSAGES

A group Mother-MUAC teaching session mixes presentations about malnutrition with practical demonstrations of how to use and read a MUAC and how to check for edema.

Key messages should be delivered in clear, simple terms in the local language. Messages will need to be adapted to the circumstances, especially depending on whether:

- There is only SAM treatment available OR
- There is both MAM and SAM treatment available.

### — Welcome mothers and explain the objectives of Mother-MUAC

This training session is designed to teach you how to screen your own children and detect the early signs of malnutrition.

### — What is malnutrition?

All children need to eat nutritious food like beans, carrots, fish, meat, and eggs.

Malnutrition is caused by decreased food consumption, poor quality diets and/or disease resulting in malabsorption or lack of appetite causing a sudden loss of weight or edema.

### — How to recognize the early signs of malnutrition?

Low MUAC and edema are two signs of malnutrition.

Two recent studies by ALIMA show how MUAC training and use can be greatly simplified:

- MUAC can be performed on EITHER the left or right arm and the mid-point of the upper arm can be estimated without losing accuracy. (1)
- MUAC can be used on all children 6 months to 5 years of age REGARDLESS of their height (i.e. you no longer have to check if the child is 67 cm tall.) (2)

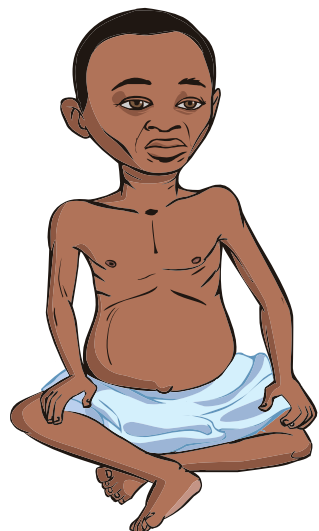
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— What is the difference between wasting (marasmus) and edematous malnutrition (kwashiorkor)?

To demonstrate the difference between wasting and edematous malnutrition, ALIMA has used pictures with the following descriptions:



**WASTING  
(MARASMUS)**

- Irritable, tired, and hungry
- Older looking face
- Muscle wasting, skin sticks to the bones
- Still has an appetite
- Sometimes has edema on both feet, legs, and/or face



**EDEMA  
(KWASHIORKOR)**

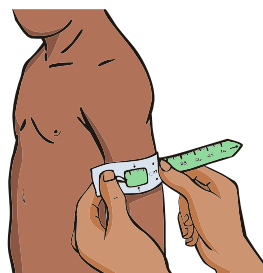
- Pitting edema on feet, legs, and/or face
- Seems sick, sad, does not move much
- Discolored and brittle hair
- Cracked skin
- Tired, loss of appetite
- Cries a lot

— Advantages of Mother-MUAC?

By regularly checking your child's MUAC and checking for edema, you can detect early signs of malnutrition and seek treatment. Early detection can reduce the risk of death for a child and reduce the risk of a child needing to be hospitalized for an extended period

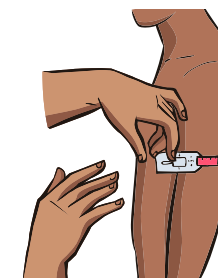
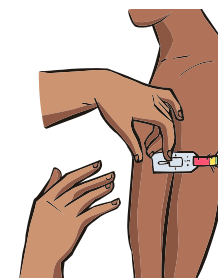
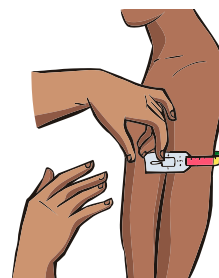
— How to check MUAC in three steps (followed by practical demonstration with three mother-child pairs)

Make sure your child is at least 6 months old. To check MUAC, the flexible colored measuring tape is wrapped around the mid-point of either the left or right upper arm. The color in the window of the wrapped tape indicates the nutritional condition of the child.



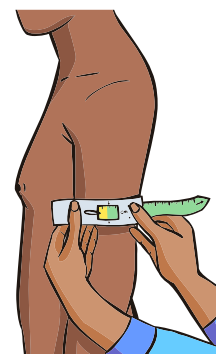
**1**

Slide the tape around either the left or right arm up to what you estimate to be the midpoint between the shoulder and elbow.



**2**

With the arm hanging down relaxed at the side of the body, tighten the tape with enough tension so the tape is held against the skin without pinching. (If the tape is too tight, the skin will be pinched. If the tape is too loose, the tape will not be touching the skin. Both can cause inaccurate measurements.)



**3**

Read the color in the window between the two arrows to identify the nutritional status of your child.

— What to do if the color of your child's MUAC is:



**RED**

Repeat the MUAC measure to be sure you are correct. If you measure Red twice, your child has severe malnutrition and can quickly become ill. You should go to the health center within 48 hours.

**YELLOW**

**In an area WITH MAM programming**

Your child may have moderate malnutrition. You should go to the MAM treatment program within 1 week. Encourage your child to eat nutritious foods like beans, carrots, fish, meat and eggs. Check the MUAC every few days to see if your child has become more malnourished (RED) in which case you should go to the health center within 48 hours.

**In an area WITHOUT MAM programming**

Your child may have moderate malnutrition. Unfortunately there are no programs in the area to address this. Try to feed him or her nutritious food like beans, carrots, fish, meat, and eggs. Check MUAC every few days and if your child becomes more malnourished (RED) go to the health center within 48 hours

**GREEN**

Your child is properly nourished. Continue to feed him or her nutritious food like beans, carrots, fish, meat, and eggs. Check MUAC every two weeks and watch for signs discussed during the group session.

— How to check for edema in two steps (followed by a practical demonstration with three mother-child pairs)



**1**

Press your thumbs down on top of your child's feet for three seconds



**2**

If there is still an imprint a few seconds after you have removed your thumbs, your child may have severe acute malnutrition so you should go to the health center as soon as possible.

— To demonstrate how to check for bi-lateral pitting edema, ALIMA has used a plastic bag filled with clay



### — When to check MUAC and check for edema?

You should check your child's MUAC and check for edema every two weeks or whenever you feel it is necessary. It is important to seek treatment at the earliest signs of malnutrition to decrease the risk of your child dying or needing to be hospitalized.

Keep the MUAC in a safe place in your house and do not bend the tape

### — It is important to remind mothers that :

You can ALWAYS visit the health center or hospital if you think your child is sick, or for whatever reason, regardless of MUAC or edema status and without a referral

*Thank the mothers for their participation and be available for individual follow-up questions*

## THANKS AND ACKNOWLEDGEMENTS

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MINISTÈRE DE LA SANTÉ  
PUBLIQUE  
RÉPUBLIQUE DU NIGER

Elsewhere in West Africa, this approach is based on partnership with the following national organizations: **AMCP** (Mali), **Health Alert** (Chad) and **Keoogo / SOS Médecins** (Burkina Faso).



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Aide humanitaire  
et Protection civile



Photo credits : Sylvain Cherkaoui/Cosmos





ALIMA is a humanitarian medical aid organization created in 2009. Teams work hand-in-hand with a network of local and national medical organizations to provide life-saving care to some of the world's most neglected communities in acute emergencies and recurring crises.

ALIMA's medical research priorities are determined together by this network and benefits further from partnerships with international organizations and academic research institutions.

Since its inception, ALIMA and its partners have treated nearly 2 million patients, led 41 emergency medical aid programs, and led 10 operational research projects focusing on malnutrition, malaria, emergency surgery, and Ebola.

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