University of Agriculture Makurdi, Nigeria — Innovation and Service

IASC ISI — International Association for Statistical Computing, African Members Group — International Statistical Institute

WEBINAR ON STATISTICAL COMPUTING USING SMART SURVEY METHODOLOGY DEPLOYED WITH EMERGENCY NUTRITION ASSEESSMENT (ENA-for-SMART) SOFTWARE.

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Abstract

In this part of the webinar:

- An insight into the use of ENA for SMART software as deployed in a Nutrition and Retrospective Mortality survey would be presented.

- It would be presented as a standard, simplified, cross-sectional field survey method designed to aid the collection of quality, up-to-date and timely nutrition and mortality data; necessary for decision-making.

- During this webinar, it is expected that the interest and curiosity of many Statisticians and other participants toward strengthening the Nutrition Information System (NIS) in their countries, including conducting nutrition surveys on a more regular basis would be awakened;

- and in the long run, it would help to address the current shortage of qualified SMART survey managers and master trainers globally who are Statisticians.

What does SMART stand for?

- S=Standardized

- M=Monitoring and

- A=Assessment for

- R=Relief and

- T=Transition

It is an inter-agency initiative launched in 2002 by a network of organizations and humanitarian practitioners.

- SMART methodology is a standardized, simplified field survey approach that produces a snapshot of the current situation on the ground.

- It was developed in 2006 by a panel of experts in epidemiology, nutrition, food security, early warning systems and statistics (Demographers).

- SMART was originally devised to assess acute malnutrition and mortality in emergencies.

- But It is now used in all settings, including development and displaced populations.

- Surveys using SMART produce representative, accurate and precise estimates:

- Global Acute Malnutrition (GAM)

- Moderate Acute Malnutrition (MAM)

- Severe Acute Malnutrition (SAM)

- Chronic malnutrition(stunting)

- Underweight and retrospective mortality.

- These main indicators gathered through the SMART methodology provide the best available validated data that can be used for effective decision making and resource allocation.

Why SMART methodology?

- SMART advocates a multi-partner, systematized approach that provides on-the-spot critically reliable information for decision-making, and establishies shared systems and resources for host government, partners and humanitarian organizations.

- SMART is an improved survey method that balances simplicity (for assessment of acute malnutrition) and technical soundness.

- The SMART method ensures consistent and reliable survey data to be collected and analyzed using single standardized methodology.

- The plausibility test component helps to verify data quality and flag instant problems of outlayers.

- SMART incorporates core elements of several survey methodologies and is continuously updated with current research and best practices.

- The Global Nutrition Cluster (GNC)- Technical Alliance also approves the methodology and encourages its dissemination.

- SMART facilitates the survey process with flexible and standardizes survey protocols .

- The SMART methodology is complimented by a user-friendly software known as ENA-for-SMART, which helps to simplify all stages of survey; starting from sample size calculation to automated report generation.
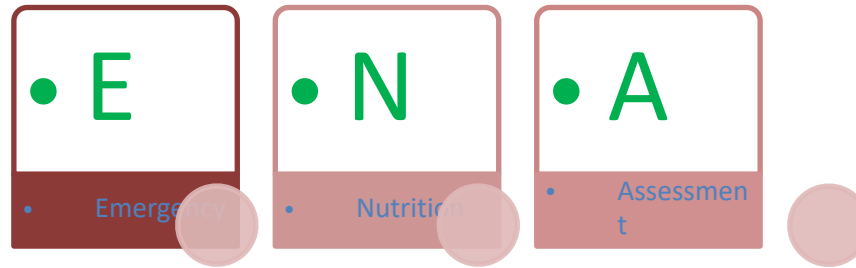
E=EMERGENCY
N=NUTRITION
A=ASSESSMENT

Available at https://smartmethodology.org/survey-planning-tools/smart-emergency-nutrition-assessment/

Latest Software version: ENA 2020 (updated January, 11th 2020)

- ENA (Emergency Nutrition Assessment) software provides a standardized reporting format that simplifies data entry and analysis.

- Facilitates the survey process with flexible sample & cluster sizes, and standardizes survey protocols.

- With the use of replacement clusters, household selection techniques and best field practices (e.g. for absent children or empty households).

What are the Possible Major Objectives of a Nutrition/Mortality Survey?

- To assess the impact and severity of an emergency

- To determine need for new program

- To evaluate existing programs

- To assess performance

- To advocate

SMART Nutrition/Mortality Survey Process/ Steps

How does nutritional survey work?

- Based on nutritional status of children under-5:

  - Most vital, basic public health indicators of the severity of a humanitarian crisis.

  - Useful to identify current need and prioritize resources.

  - Useful to monitor the extent to which the relief system is meeting the needs of the population.

How does nutritional survey work? continued...

- Why measure nutritional status under-5?
  - Closely linked with risk of death.
  - Used to draw conclusions on whole population.

Nutrition & Mortality Survey Components

- Survey manual

- Standard Forms/questionnaires digitized in ODK format (Kobo collect)

- Random Number Generation (Random App)

- Calendar Events

- Weight for Height WHO table

- Height board

- Digital Scale

- MUAC (Mid-Upper-Arm Circumference)

Nutrition & Mortality Survey Manual

- Contains the information needed to conduct a nutrition & mortality survey.

- Contains information on:

  – Background on planning; different steps.
  – How to solve problems in the field.
  – How to ensure quality of survey.

Background on malnutrition

- A state in which an individual's physiological and physical functions are impaired.
- "Wasting" = "acute malnutrition".

- Different classification of acute malnutrition:
  - *Moderate, severe, global.*

- Clinical forms of malnutrition:
  - *Marasmus and Kwashiorkor*

Marasmus

Kwashiorkor

Nutritional Survey in Emergency

- Objective is to evaluate the nutritional status of a population affected by an emergency (war, insurgency, regugee camps,IDPs camp etc.)

- Who?

- What?

- How?

- Why?

Nutrition Survey

Target population:

- Children 6 – 59 months . Due to difficult age estimations, we will take children >65cm to <110cm of height

• Anthropometric parameters to measure:

- Length/height
- Weight, Mid upper arm circumference (MUAC)

Data to collect

- Age
- Sex
- Presence or absence of edema

- **Indication** of the severity of the situation in the **whole population.**

- Children aged 6-59 months (>65cm to < 110cm):
  - In growth period
  - Particularly vulnerable to disease and food shortage
  - Face a higher risk of mortality in cases of crises
  - Considered to be the most sensitive to nutritional stress

Estimating age

— Child's immunization card, road-to-health card, or other written document with the child's age or date of birth written on it.

— If the age of a neighbour's child is known, ask whether or not their child was born before or after the selected child.

— Use a local-events calendar.

Events Calendar for Monguno Town, Borno State, August 2017 - July 2022 (Updated in June 2022)

Hausa Month	Local Season	Religious date	Events	Month/year	Age in Months

Measuring MUAC - Key Points and Recommendations

- Measurements should be made to the nearest mm.

- Arm circumference is measured on the upper left arm.

- It is not standardised for age and measures are not universally accepted.

Estimating age from height

- Height cut-off can be used for selecting children instead of age.

- The height of normal children aged 6 and 59 months is approximately 65 cm and 110 cm respectively.

How to measure MUAC

Measuring weight - Key Points and Recommendations

- Weight should be measured to the nearest 100g (0.1 kg).

- Always weigh the child before measuring the height.

- The scales should be *calibrated* before and after each day, using the same standard weight.

- The scales should always first be set at zero, with the weighing pants, basket or basin attached.

How to take weight of a child using hanging scales

Measuring weight continued…

Weighing mother and child on a digital scale

Measuring weight -
Key Points and Recommendations continued…

- If there are 2 eligible children in a household, always weigh the 'less fussy' one first.

- If child struggles preventing the needle from stabilising, try to involve the mother.

- Watch for older children who hold on to a bar attached to the balance!

- Mothers are usually wary of their children having to share hanging pants with others due to risk of faecal contamination or spread of disease.

How to measure a child's length (≤87cm)

How to measure height of a child > 87cm

Measuring length or height -
Key Points and Recommendations

- Height should be measured to the nearest 0.1 cm.

- Children up to 87 cm in height are measured lying down on a horizontal measuring board.

- Children above 87 cm are measured standing up.

- In some cultures, not appropriate to measure children lying down and need to follow different procedure.

Background on malnutrition

- Information on a child's weight, height or age alone not sufficient to determine nutritional status.

- During the survey, MUAC, height, weight, age and the presence of oedemas are used to estimate what proportion of a population is malnourished.

How to check for edema
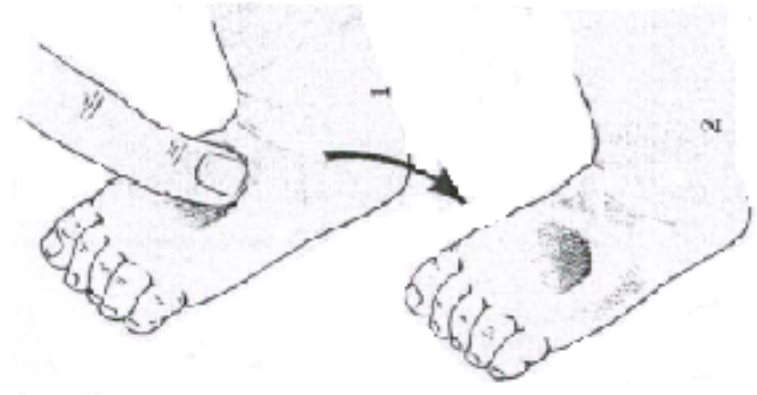
PCc 6
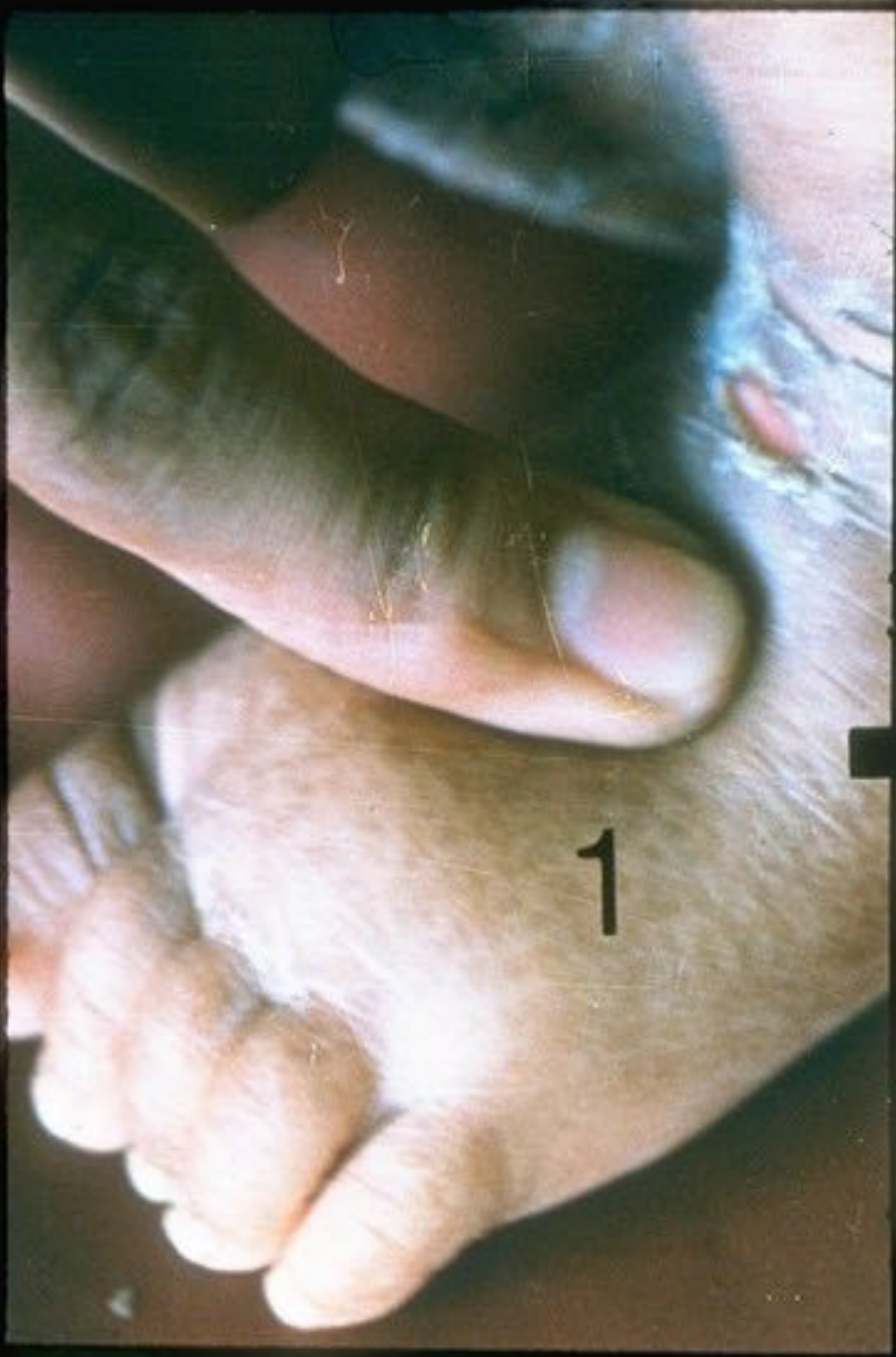
Checking for edema -
Key Points and Recommendations

- Edema is the retention of water in the tissues of the body.

- Tested after weight and height/length measurements.

- Hard pressure is *not* required to test for edema.

Interpreting weight and height measurements

- **Weight-for-height** is a measure of how thin a child is.

- Calculating the weight-for-height of a child in the survey and comparing it to the reference population tells us if a child is malnourished or not:

  - Use of a reference table of weight-for-height.

  - For each height, there is an average of weight considered healthy.

Expressed as a **Z-score**.
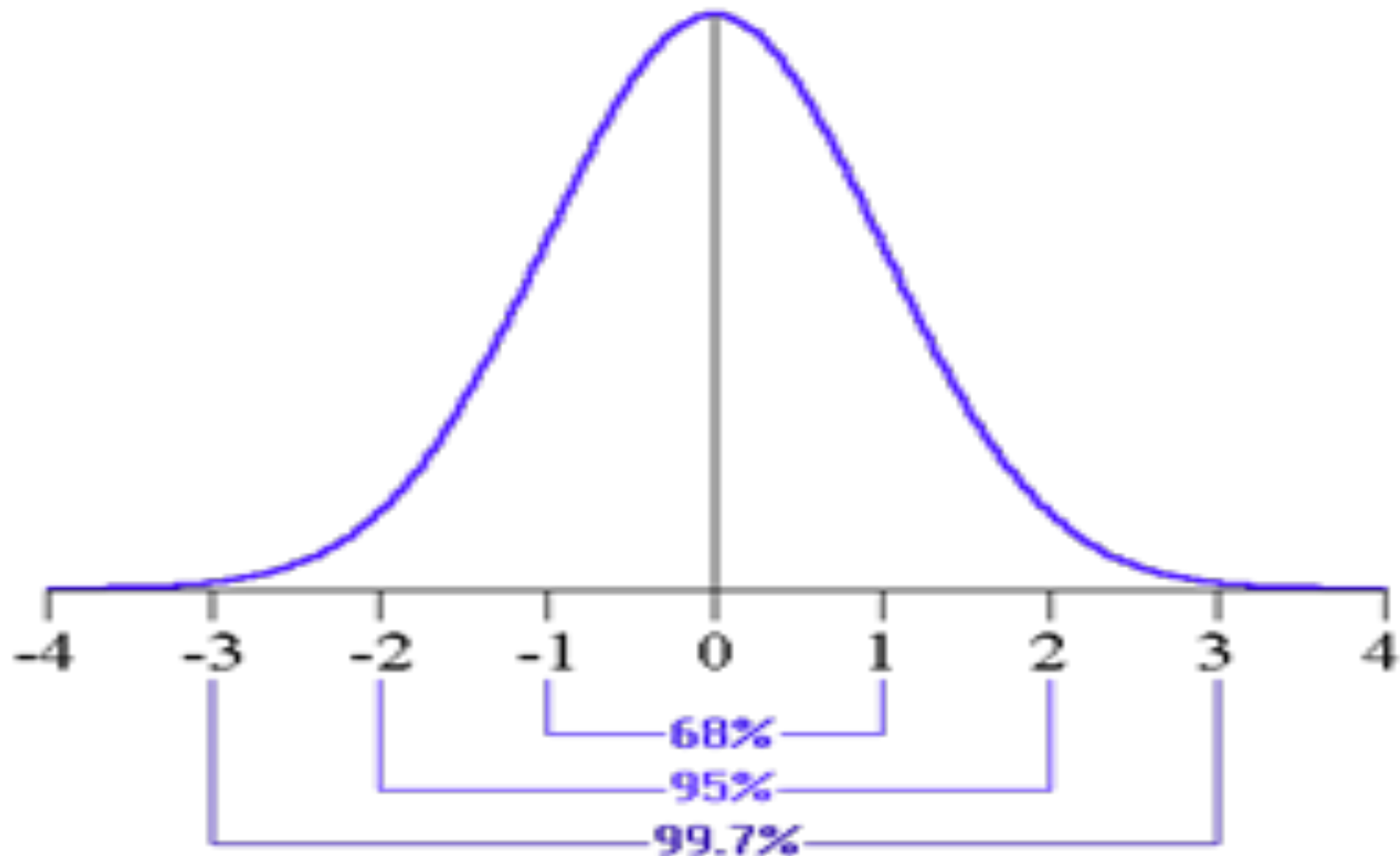
Reference Table for Weight-for-Height Index (WHO 2005 standards)

Nutritional status	WFH Kg – Z-score	Is bilateral edema present?
Normal	Index ≥ -2	NO
Moderate acute malnutrition	-3 ≤ Index < -2	NO
Severe acute malnutrition	Index < -3	YES OR NO
	Index > - 3	YES

Planning the Survey

Parameters for anthropometry and mortality data collection plan

- **Anthropometry**

-Estimated prevlence of GAM(%) for most recent study in the area

-Desired precision(diverse from SMART)

-Design effect for WHZ-score from previous survey

-% of children under-five

-Average HH size

-Non-response rate ffomprevious survey

Mortality

-Estimated death rate for a most recent study in the area

-Desired precision (diverse from SMART)

-Design effect for CDR from previous survey

-Recall period in days

-Average HH size

-Non-response rate from previous survey

Sample Sizes/Cluster Selection based on PPS

Cluster/Team Planning: Example 1

Cluster/Team Planning: Example 2

Training

- ENA Software assesses quality of training on taking anthropometric measurements (standardization test).

- Software indicates when team gives wrong results and needs to change or re-trainning.

Introduction to the standardization test

Standardization Test-Overview

- All members of the teams measure at least 10 different children twice, with a time interval between individual measures.

- Each team member is then given a score of competence in performing measures.

- Any misunderstandings or errors in technique are corrected during the training.

Standardization Test-Procedure

- Supervisor weighs and measures each child without allowing the trainees to see values.

- Each child, with his/her mother, remains at a fixed location with ID number clearly marked.

- Trainees conduct first round of measurements and record results on standard form.

- Trainees take a break.

- Trainees conduct second round of measurements and record results on standard form.

Standardization test-Procedure continued...

- Equipment used should be same as the one used in survey.

- Equipment should not rotate.

- Only one pair of measurers should be with a child at any one time.

- Talking between pairs of trainee measurers during this exercise not allowed.

- Supervisor's observations (checklist).

Data entry form

At the end of the exercise the data forms should look something like those below:

Enumerator name.............. ID ### 1st measure			
Child	Weight (Kg)	Height (cm)	Muac (mm)
1	14.6	96.0	120
2	10.3	89.8	110
3	13.8	105.1	122
4	11.1	84.5	127
5	10.8	89.3	108
6	9.4	76.3	119
7	10.3	87.6	107
8	14.3	101.1	124
9	8.0	74.3	127
10	15.6	97.0	112

Enumerator name.............. ID ### 2nd measure			
Child	Weight (Kg)	Height (cm)	Muac (mm)
1	14.8	96.1	120
2	10.4	89.5	110
3	13.8	105.3	122
4	11.0	84.7	127
5	10.7	89.0	108
6	9.4	76.4	118
7	10.3	87.6	105
8	14.1	101.2	124
9	8.1	74.1	125
10	15.4	97.5	112

Training continued…

Data Collection

- Questionnaires are digitized in ODK format into Kobocolect tool kit

- Collected from smart Andriod phones or tablets in the field

- Thereafter, transfered to a dicated server via the submission console at the end of every days enumeration.

Forms and Questionnaires

- Simple to use questionnaires to assess nutritional status   and also for a mortality survey.

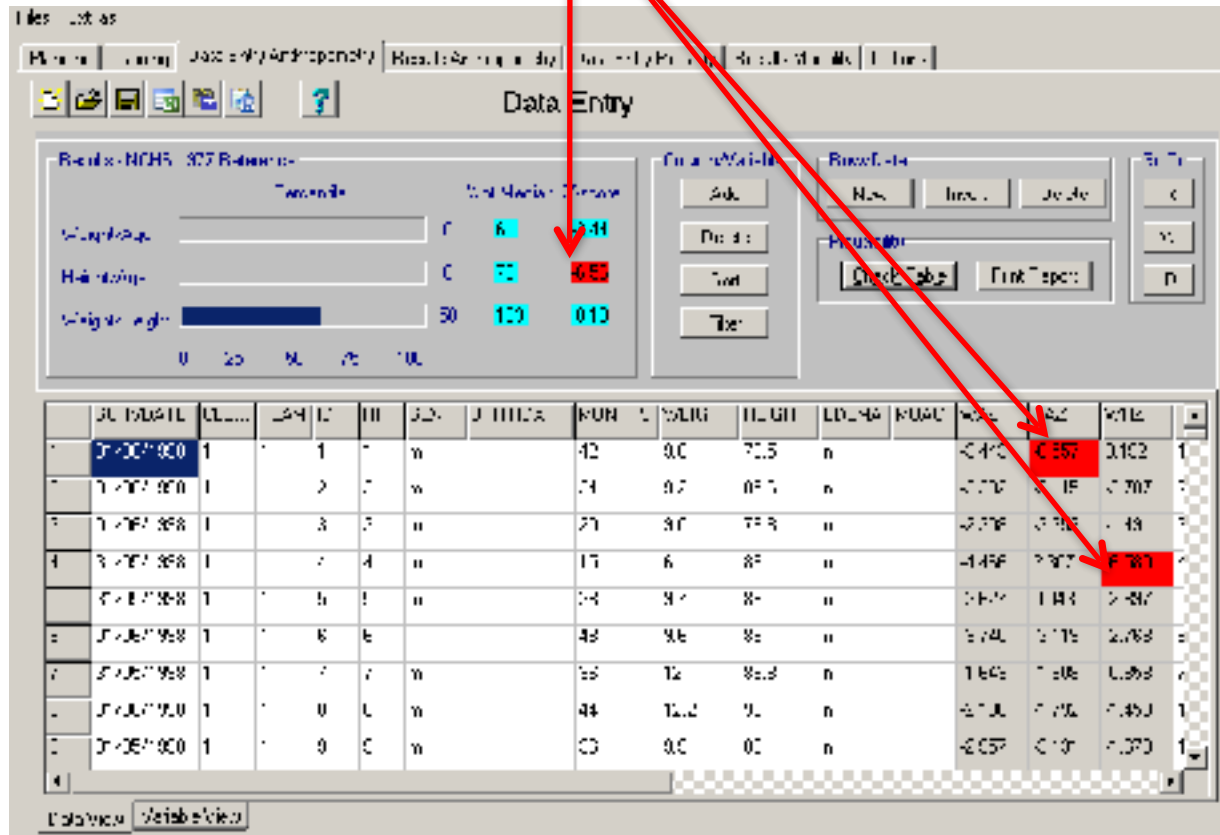# Anthropometry Questionnaire

Nutritional data survey form for children from 6 to 59 months

Team number: _____ (1-6)   Cluster: _____ Date: ____/____/_____   Site name: _____

Child no.	HH no.	Name (if missing)	Sex (M/F)	Age in months (±)	Weight (Kg) ±100g	Height (cm) ±0.1cm	Oedema (Y/N)[*]	MUAC (mm)[**]	WH (Z scores)	Covered by the program (Y/N)	Has child ever received a measles vaccine? 1=Yes, card seen 2=Yes, card not seen 3=No
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

* Refer if "YES."   ** Refer if "<115mm".

Data Entry

Software uses '**flags**' for showing where there is a mistake and which teams are making the mistakes.

Data collection continued...

Team in the field
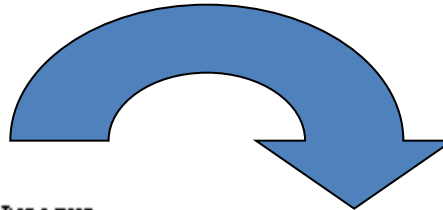
Supervisor in the field office

Result Anthropometry

INTRODUCTION TO MORTALITY SURVEY

Measuring mortality

- Cross-sectional survey gathers data at single point in time

- Mortality measurement is rate:

 -CMR, U5MR and other disagregated death rates

- Requires counting deaths over period of time

- Therefore, must gather data from retrospectively

- Questions about deaths during specific period in the past (recall period) are asked

Measuring mortality

- Determines number of household members alive on day of survey

- Asks number of deaths and births within household during recall period

- Asks which members entered the household during the recall

- Adds members who left the household during the recall

Measuring mortality – general principles
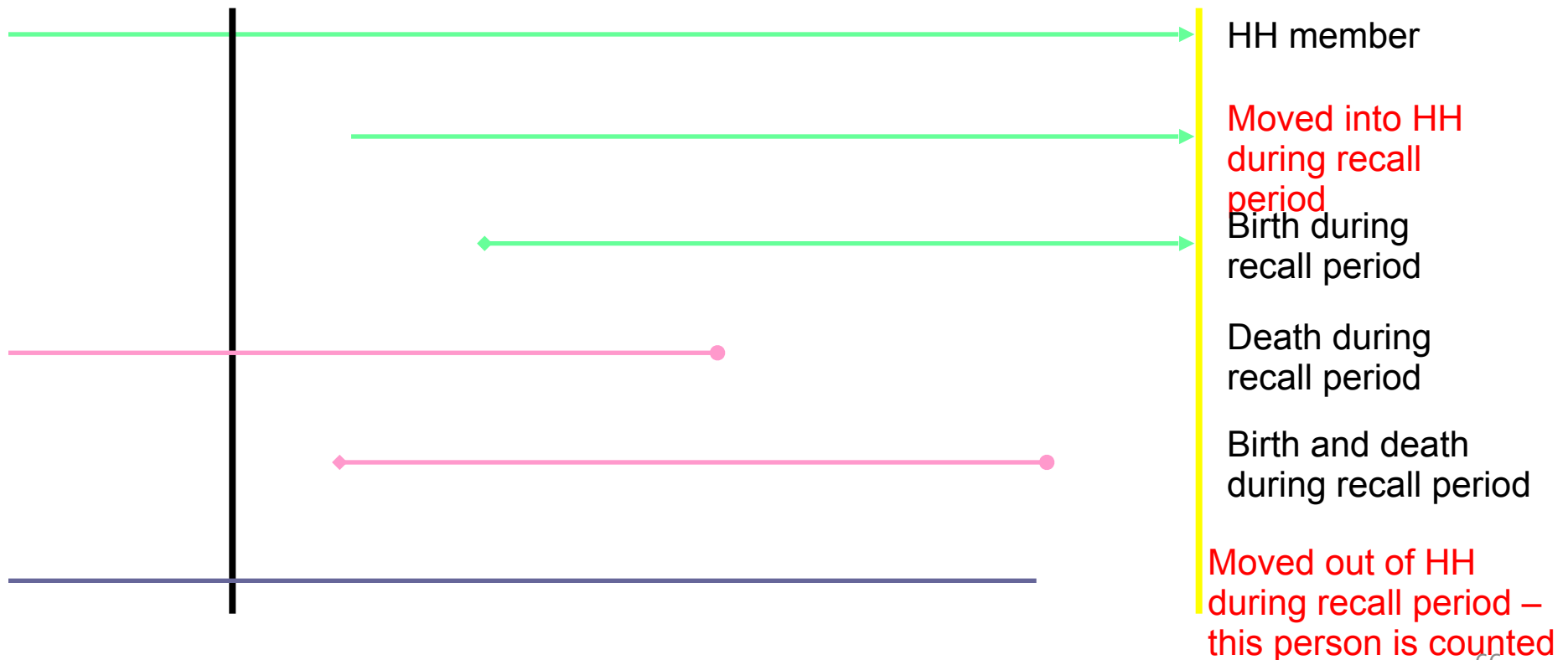
Recall period

- Beginning of period must be well-known date
  - Major holiday or festival
  - Occurrence everyone remembers
- End of period is day of survey data collection

Measuring mortality

HH census

Beginning of
recall period

End of recall period
(usually when survey data collected)

HH member

Moved into HH
during recall
period

Birth during
recall period

Death during
recall period

Birth and death
during recall period

Moved out of HH
during recall period –
this person is counted

66

Mortality Questionnaire

Questionnaire for household composition and mortality (one sheet/household)

Team number: _____ (1-6)   Cluster: _____   Date: ___/___/_____   Site name: _____   HH number:_____

ID No.	Sex M/F*	Age in year (m)	Present now [currently living in the HH]? Y/N**	Born during the recall period? Y/N**	Join HH during the recall period? Y/N**	Deaths during the recall period? Y/N**	Leave HH during the recall period? Y/N**	Supervisor part (to complete at the end of the day)	
1									
2									
3								**All current HH members**	
4									
5								**Current HH members < 5 years**	
6									
7								**Current HH members who arrived during recall (exclude births)**	
8									
9									
10									
11								**Current HH members who arrived during recall <5 years**	
12									
13									
14								**Past HH members who left during recall (exclude deaths)**	
15									
16									
17									
18									
19								**Past HH members who left during recall < 5 years**	
20									
21									
22								**Births during recall**	
23									
24								**Total deaths**	
25								**Deaths < 5 years**	

Recall period –.. (27/01/2011) to date   * M– male / F– female
HH (Household) = people eating from the same cooking pot   ** Y= yes / N= no

Calculation of Death Rates

Many thanks for listening

- For further enquiries on physical training opportunities contact:

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