REPUBLIC OF UGANDA

GUIDELINES ON NUTRTION SURVEY METHODOLOGY IN UGANDA

PART B: Operational manual for conducting a nutrition survey in Uganda

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Director General- Ministry of Health

Sign:

TABLE OF CONTENTS

Background and the ENA Software

Background & Introduction

This operational manual has been designed to help implementing partners conduct nutrition surveys in line with the new national guidelines for conducting nutrition surveys.

Since 2003 more than 50 annual nutrition assessments have been conducted in Lango, Acholi, Teso and Karamoja sub-regions through more than 7 agencies including academic institutions. In addition, UNHCR has been supporting biannual nutrition assessments in the refugee settlements of West Nile and Western Uganda for more than 10 years.

While conducting these nutrition and health assessments, different approaches, methodologies and tools have been used by partners. Many variations in study design, timing of nutrition surveys, variables assessed and data analysis have been used, making comparison and trend analysis difficult.

This therefore prompted the need to harmonize nutrition assessment methodologies through a National guideline on nutrition survey methodology in-line with the internationally recognised *Standardized Monitoring and Assessment of Relief and Transitions* (SMART) protocol.

SMART

Text box 1

SMART protocol

The interagency *Standardized Monitoring and Assessment of Relief and Transitions* (SMART) initiative developed the SMART protocol: a generic method that provides timely and reliable data in a standardized way for prioritizing humanitarian assistance for policy and program decisions.

Data reliability is further facilitated by the development of the software program (ENA for SMART) that simplifies the laborious process of survey planning, data entry and analysis with built-in statistical manipulations that generate sampling size, design effect, cluster groupings, and automatic standard tables and graphs. In addition to this the software has a built-in data quality assurance (plausibility check) program that helps assess the validity of the data and limit data entry errors

The full SMART methodology can be downloaded from: http://www.smartindicators.org/

The ENA for SMART software can be downloaded from: http://www.nutrisurvey.de/ena/ena.html

Who is the operational manual for?

The operational manual is designed for a coordinating supervisor or manager of surveys with nutrition experience and basic knowledge on survey methodologies.

How to use the operational manual

The operational manual is divided into the 17 main steps to effectively plan, conduct and analyse a nutrition survey based on the national guideline. For the steps that require the use of ENA software, an easy to use pull-out section on how to use ENA software is included.

The 17 steps are as follows:

Step 1: Deciding to do a nutrition survey

Step 2: Appraisal of the context

Step 3: Decide on target group, target area and timing of the survey

Step 4: Define the justification and objectives of the survey

Step 5: Inform key partners

Step 6: Select Indices

Step 7: Select sampling method

Step 8: Calculate Sample size

Step 9: Selecting the household/clusters

Step 10: Determine the schedule for the survey

Step 11: Prepare material list and Develop survey tools

Step 12: Recruit and Train team

Step 13: Collection of Data

Step 14: Data entry & Quality checks

Step 15: Analysis and interpretation

Step 16: Report writing

Step 17: Dissemination

ENA for SMART software

<u>Opening ENA</u>

Once installed, the first box that will appear on the screen has the names of the persons who designed this software, as well as the e-mail and website from where ENA has been downloaded.

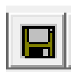
Click OK.

The software has different screens (planning, training, data entry, results, and options) which follows the steps of a survey. However the software will automatically open on the **Data Entry Anthropometry** page first.

<u>Opening an existing database</u>

To open an existing database:

Click on  and search for the location where the database was last saved (ENA are saved in the **“.as**“ format and a back-up is automatically saved in the “**.bk**” format).

Before leaving ENA for SMART it is important to save the file by clicking on  using a unique name (See text box 2)

Text box 2

SAVING THE DATABASE

It is important to give a unique name to the survey. The name should start with the 2 letter country code for Uganda (UG), then the date (month_year) of the survey, followed by the name of the implementing organisation and finally the name of the area (abbreviated if necessary).

For example: A survey conducted by WFP in Kitgum in April 2007 would be saved as follows:

UG_ 0407_WFP_KITGUM

Step 1: Deciding to do a nutrition survey

In deciding whether to do a survey the following questions need to be answered:

i. What do you need to assess?
ii. Has another organization recently carried out a survey in the same area?
iii. Is the information already available in other suitable formats?
iv. What does the organization want the results for?
v. How will the organization respond to the results? (There is no point in conducting a survey if you know that a response will not be possible.)
vi. How will the results of the assessment address the priorities of the government and Ministry of Health?
vii. Are the results crucial for decision making?

The above questions should enable you to define clearly and concisely the justifications for carrying out a nutrition survey and help set clear and specific objectives.

Step 2: Appraisal of the context

In planning nutrition surveys, it is important to collect information on the context of the proposed area(s) to be surveyed. Up-to date information should be gathered from key informants as well as agencies working in the area.

Broader information can be obtained from published material such as the Demographic Health Surveys, National Household Surveys, and the National census data.

From the information obtained, clear and specific objectives can be developed.

Step 3: Decide on target group, target area and timing of the survey

Target group

For all surveys in Uganda, the anthropometric data is collected on the primary target group which are children aged 6 to 59 months (and/or height 65 cm-110 cm).

The nutrition status of children aged 6–59-months in a population has been shown to be a good proxy for the nutrition status of the wider community: assuming that the age group 6–59 month are the most vulnerable group in the society, or at least as vulnerable as the other age groups.

For estimating under-five age specific mortality rate (ASMR-U5) data should be collected for all children under 5 and includes the primary target group as well as the 0-6 month age group.

Crude mortality rate should be collected for the total population of the target area.

In some cases additional population subgroups might be included in a nutrition survey, such as: children less than 6 months and adults (e.g. women of reproductive age, the elderly, adolescents etc).

Inclusion of these additional groups in the nutrition survey should be clearly justified and specific objectives defined.

Defining the geographic target area for the survey

In designing the survey, the area and population to be surveyed should be carefully defined and a map of the target area should be included in the report.

The target area chosen should consider government priorities, and should if possible, correspond to an **administrative area**.

In defining the targeted area, care should be taken to ensure that the survey results would be representative of the population in which that area lies. So the survey should be conducted in an area where the population is expected to have a similar nutritional status and mortality rates. If this is not the case the results will be an average of the two areas and will not give an appropriate perspective of either situation[1].

Deciding timing of the survey

The timing of a survey will depend on the needs and subsequent objectives of the implementing partner therefore it is important to clearly define and justify the proposed timing of a nutritional survey.

In almost every rural population, seasonal variations in acute malnutrition can be found. Therefore, in order to look at yearly trends in nutritional status, seasonal variations must be taken into account. Nutrition surveys should be carried out at the same time of year in order to allow comparability, further compilation and analysis.

Hunger Gap

A hunger gap is: a period of food scarcity; a lean period; coinciding often with planting seasons. In agricultural population, the hunger gap is at its peak just before the harvest period, while for pastoralists, it is experienced at the end of the dry season when milk availability is low and animals are in poor condition.

Towards the end of the hunger gap, there is typically an increase in the prevalence of acute malnutrition.

Uganda has 3 main patterns of agricultural seasonality: Two cropping seasons (bi-modal), single cropping season (uni-modal) and year-round.

Around the Lake Victoria Basin, regular rains ensure that agricultural production is possible year-round and therefore no distinct hunger gaps are seen.

The uni-modal season (found mainly in Karamoja) has one main harvest period (September to December) and subsequent hunger gap between **April and September**.

The bi-modal season (typical for most of Uganda except Karamoja sub-region and the Lake Victoria Basin) has 2 harvests (a major harvest in June to August and a second less important harvest in November/December) with a hunger gap between **March and June/July** but also a period of food deficit during the month of **November**, however the magnitude of the food deficit is not enough to qualify as a hunger gap.

However, it is important to note that the timing of the hunger gap will vary depending on the previous harvest and on the onset of rains. Therefore, it is important to ascertain during the planning stages of the survey the likely period of the hunger gap.

Emergencies:

Nutritional status may need to be assessed after an emergency (natural disaster, epidemic or security risks). At the onset of an emergency, more rapid means of assessing the nutritional status of an affected population should be used such as rapid assessments combined with routine data from the Health Management Information System (HMIS). However, a formal nutrition survey as described in the national guideline should be planned for when the situation stabilizes in order to have a more accurate assessment of the nutritional situation.

[1] Dealing with such heterogeneity is discussed in the sampling section of the guidelines.

Programmatic monitoring and evaluation

Nutritional surveys can also be implemented to monitor the effect of nutrition project interventions on the health and nutrition status of the target population. The information obtained can be used to make informed decisions on how to improve project deliverables. The timing should be agreed on at the start of the project. At the end of an intervention, an evaluation can be carried out to assess the impact of the project.

Step 4: Define the justification and objectives of the survey

Justification to do a nutrition survey

Surveys are expensive, time-consuming, and can become a burden on the surveyed population, therefore it is important to have clear justifications for carrying out a nutrition and survey. No survey should be decided on likely.

One or more of the following justifications should guide the decision to carry out a survey in Uganda.

i. To establish a baseline at the start of a program.
ii. To evaluate/monitor the impact of a program.
iii. To measure the impact of a significant change in the circumstances or situation in which a population lives (e.g. an impending or actual food crisis, natural disasters or transitional population movement).
iv. To monitor over time the health and nutrition situation of a population in a stable environment.
v. Cross-sectional assessment of the nutrition status of a community.

Defining nutrition survey objectives

Clear and specific objectives should be defined and stated at the on-set. This will make the planning and analysis of the survey much easier and help the survey team, target population and stakeholders understand why the survey is being conducted. General and specific objectives should be defined.

The general objective of nutrition surveys is to assess the current nutrition and health status of a specific population.

The specific objectives may vary depending on the interventions, situations or circumstances in place or intended, and may include the following:

1. To determine the prevalence of malnutrition (wasting, stunting and underweight) among children aged 6-59 months (and/or measuring 65-110 cm in length or height).
2. To determine the nutritional status of a specific sub-group (e.g. women of reproductive age, adolescents or the elderly).
3. To determine the coverage of health interventions (e.g. measles vaccinations, vitamin A supplementation and oral polio vaccine) among children aged 6-59 months.
4. To determine the levels of retrospective crude mortality rates and age specific mortality rates for under-5s in a specific time period.
5. To determine the incidence of common diseases (diarrhoea, measles and ARI) among the target population, two weeks prior to the assessment.

6. To determine the possible causes of malnutrition in target population.
7. To identify possible interventions that addresses the causal factors of malnutrition.

Step 5: Inform key partners

It is important to share information about when and where you plan to undertake a nutrition survey to prevent unnecessary duplication and overlap of surveys.

Clearance from Ministry of Health

All agencies planning to undertake nutrition surveys should seek clearance from the Ministry of Health and provide an approved proposal, tools and a cover letter. The Nutrition Technical Working Group should validate the survey implementation request.

Informing stakeholders

After clearance from the MoH, it is important to inform all stakeholders in the target area (particularly the District Health Teams and Representatives of Local Government) of the impending survey and share with them the survey proposal and tools. It is important to share information about when, where, why and how you plan to undertake a nutrition survey to prevent unnecessary duplication and overlap of surveys.

Step 6: Select Indices

These guidelines outline the basic indices and their variables that ALL nutrition surveys conducted in Uganda MUST include. In addition to these, certain contextual information have been listed that should be collected.

Additional indices may also be included to meet the needs of the organization. In deciding the inclusion of additional indices and their variables, consideration has to be given as to whether the information could be collected in other ways (e.g. from clinics, sentinel sites or surveillance systems), or whether it would be better to conduct a separate survey to collect the supplementary information.

If the additional variables must be collected at the household level, they must be quickly and reliably obtained during a short visit to the household since each additional piece of data collected prolongs and complicates the survey. Thus, any additional information to be collected should be clearly stated and justified and have a realistic prospect of leading to a meaningful intervention.

Key variables and indices

- Nutritional status of children between 6-59 months:
  - Wasting as defined by weight-for-height
    - Global Acute Malnutrition
    - Severe Acute Malnutrition
  - Stunting as defined as height-for-age
  - Underweight as defined as weight-for-age
  - Oedema
  - Mid-Upper Arm Circumference

- Retrospective mortality
  - Crude mortality rate
  - Age- specific mortality rate for children Under-five (ASMR-U5)

- Measles vaccination coverage

Nutritional status of children between 6-59 months

To determine the nutrition status of an individual, the weight, height, age, and presence of oedema are recorded. The relationship of these measurements to each other is compared to international reference curves: the 2005 WHO standards and the 1977 NCHS references (see text box 3).

Text box 3

REFERENCE POPULATION CURVES (WHO vs. NCHS)

To assess malnutrition as determined by weight-for-height (WFH), height-for-age (HFA), and weight-for-age (WFA), individual measurements are compared to international reference curves made up of a reference population.

Until recently, the reference curves were derived from surveys undertaken in the United States and are commonly known as the **NCHS reference 1977**.

However, a review of the NCHS growth reference has found that they did not adequately represent early childhood growth and that new growth curves were necessary. Therefore, WHO undertook the Multi-centre Growth Reference Study (MGRS) and generated new curves for assessing the growth and development of children the world over.

These new reference curves are known as **WHO standard 2005.**

ENA provides the option for analysis using either reference curves. So until Uganda officially adopts the WHO standards and to facilitate the comparison with previous surveys where only the NCHS curves were used, it is recommended that both NCHS reference curves and WHO standard curves are used.

Anthropometric indices are usually expressed in two ways: as the **percentage of the median value** of the reference standard, or as **z-scores derived from the reference/standard** (see text box 4). Z-scores and percentage of median produce slightly different estimates of the prevalence of malnutrition.

Text box 4

EXPRESION OF THE NUTRITON INDICES
(Z-scores vs. percentage of the median)

<u>The percentage of the median</u>

The percentage of the median WFH (often written WHM), compares the weight of the child to the median weight of children of the same height in the reference population. The calculation of WHM for each child is based on the child's weight and the median weight for children of the same height (and sex) in the reference population:
WHM = the child's weight divided by the reference median weight × 100

<u>The z-score</u>

A z-score is another measure of how far a child is from the median WFH of the reference (often written WHZ). In the reference population, all children of the same height are distributed about the median weight. The z-score of a child being measured is the number of standard deviations the child is away from the median weight of the reference population at the same height (and sex).

The z-score is said to be more statistically valid than the percentage of the median, and has become the standard index used in nutrition surveys.

Weight for Height

Weight for height reflects recent weight loss or gain. It is the best indicator of **wasting** and is thus the indicator used for determining **acute malnutrition**.
This is usually expressed in a Global Acute Malnutrition and Severe Acute Malnutrition:

- Global Acute Malnutrition (GAM) is the total number of children under 6-59 months whose WFH is less than -2 SD and/or has bilateral oedema divided by total number of children 6-59months.

- Severe Acute Malnutrition (SAM) is the total children 6-59months whose weight-for-height is less than -3 SD and/or has bilateral oedema divided by total number of children 6-59months.

Height for Age

Height for age reflects skeletal growth and is the best indicator of **stunting**. This is the indicator used for determining **chronic malnutrition**.

Weight for Age

Weight for age is a composite index, which reflects wasting, stunting or a combination of the two. Rapidly changing WFA can be assumed to be the result of changing WFH, while low WFA among older children is more likely to be the result of low HFA. Hence, this is the indicator used for determining **underweight** or **under-nutrition**. It is *not* a good indication of recent nutritional stress but it is used to track the progress of an individual child in the community.

Oedema

Pitting oedema on both feet (bilateral oedema) is the sign of kwashiorkor and is classified as severely malnourished even if the WFH z-score or percent of median is “normal”.

Mid-Upper Arm Circumference

Mid-Upper Arm Circumference (MUAC) directly assesses the amount of soft tissue in the arm and is another measure of thinness (or fatness) for children greater than 65cm in height/length.

It is the easiest index to use in the community (for screening) to identify individual children in need of referral for further assessment or treatment. Because MUAC is used in this way, it is useful to know the relationship between WFH and MUAC in a particular community to establish an effective screening programme.

Mortality Rates

Mortality rates are key indicators in determining the severity of a situation and are one of the most specific indicators of the health and welfare status of a population.

Crude mortality rate[2]

Crude Mortality Rate (CMR) is defined as the number of people of all ages and both sexes who die in a given time interval, divided by the total population at the mid-point of that time interval, on the assumption that all deaths, births, and movements in or out are evenly distributed across the interval.
The units for CMR are **deaths per 10,000 per day** when the “time interval” is expressed in days and should be reported in this format to avoid confusion.

[2] In the ENA software this is referred to as the Crude Death Rate.

Age- specific mortality rate for children Under-five (ASMR-U5)

This is just like any other mortality rate, but restricted to children less than 5 years old during time interval.
ASMR-U5 has been called the "Under-5 mortality rate" in previous surveys. The Under-5 mortality rate is calculated and expressed differently. Therefore, the term ASMR-U5 will be used to maintain a distinction between the two measures. (See text box 5).

Text box 5

Comparison of ASMR-U5 and U5MR

- Both measure mortality risk for children below five years.
- U5MR is expressed as the cumulative probability of dying before the age of 5 years in a hypothetical cohort of 1,000 births. While ASMR-U5 is expressed relative to the mid-interval under 5 population.
- Because U5MR expresses risk over five years, whereas ASMR-U5 expresses risk per year, U5MR is usually 5 times larger as the ASMR-U5.
- In the nutrition surveys which include mortality studies, there is not enough information to obtain U5MR, **therefore only ASMR-U5 can be assessed**.

Measles Vaccination Coverage

Measles and malnutrition are closely associated: poor nutrition makes un-immunized children more susceptible to measles and makes the attack of measles worse. In turn, measles leads to increases in malnutrition rates in children under 5. Low vaccination rates can increase the risk of contracting measles and therefore it is important to find out the rate of measles in children aged 6-59 month in order to use this group as a proxy indicator for the whole population.

In Uganda, measles vaccinations are routinely given at 9 months[3] therefore by finding out if a child aged between 9-59 months has been vaccinated against measles it is possible to determine the coverage rate. This can be done by examining the child health card or by asking the caregiver (both coverage rates should be reported).

Contextual information

Certain contextual information must be collected in order to understand the possible cause of malnutrition observed, these are linked to the UNICEF conceptual Framework for the causes of malnutrition.

The following topics should be covered in all surveys conducted in Uganda:

Morbidity

Examples of indicators:

- Percentage of children with diarrhoea in last two weeks.
- Percentage of children with malaria in last two weeks.
- Percentage of children with respiratory infections in last two weeks.
- Percentage of children with skin infections in last two weeks.
- Percentage of children with other infections in last two weeks.

[3] During a measles outbreak, children as young as 6 months may be vaccinated.

Maternal/child care (including infant feeding practices)

Examples of indicators:

- Percentage of children breastfed within 1 hour of birth.
- Percentage of children exclusively breastfed for the first 6 months.
- Percentage of children above 6 months fed on complementary foods.
- Percentage of children breast feeding for at least 24 months.

Water and sanitation:

Examples of indicators:

- Type of water sources.
- Amount of water used per person per day.
- Amount of borehole water, treated water used per person per day.
- Proportion of households having own latrine and type.
- Proportion of households using any latrine and type.
- Hand washing behaviours.

Food security and livelihood

Examples of indicators:

- Main source of income.
- Recent selling of assets.
- Possession of animals.
- Size of cultivatable land.
- Food shortage coping strategies.
- Food diversity.
- Number of meals/ day.

Access to health care

Examples of indicators:

- Distance to nearest health facility.
- Type of health facility used.
- Cost of treatment.

Collection of contextual information

How the contextual information is collected will depend on the capacity, resources and objectives of the implementing agency. You may decide to obtain the information from secondary sources or collect primary data per cluster or households.

In order to obtain the most accurate "picture" of the nutritional situation, it is important to triangulate the information by using different methods of data collection.

Different methods for data collection include:

i. Secondary data
ii. Household questionnaires
iii. Focus group discussions
iv. In-depth interviews with key informant
v. Observational studies

Secondary information

In most areas, there are many implementing partners who have already conducted studies, assessment and surveys in the area. It is important to make the most of this available information to prevent duplication of activities.

When using secondary data, the following is important:

- The source and reliability of the data (you must reference all secondary data in the final report)
- Ensure that the data covers the target area and population
- The data is up to date and still relevant of the situation

Household Questionnaire

Household questionnaires can be used to obtain specific information at the household level.

If a household questionnaire is administered at the same time as the anthropometric measurements, it is important that it is quick to administer and focuses on the key information that is essential at the household level (for example: if all households in a village obtain their water from the same source then this information does not need to be collected for every household).

Annex 13 shows an example of a household questionnaire form.

Focus group discussions (FGD)

A focus group discussion is extremely useful way of obtaining a lot of information without having to ask every household.

It is an informal way of guiding a discussion to obtain information about a certain topic. It involves in-depth interviews with a small group of participants ranging from 5-11 persons. The ideally number of participants should be an odd number (7, 9 and11) and they should have similar characteristics in terms of age, gender, educational status, ethnicity, etc.

It is important to seek out for people who may be more vulnerable to malnutrition e.g. female headed households, destitute or the poor. About 12-15 focus group discussions should be held in an assessment from representative sites/ clusters. A criteria should be developed that will help to identify the participants for the FGDs. For example one may want to hold a focus group discussion with women or men from the various wealth groups of a particular livelihood group.

In a focus group discussion, the interviewer acts as a moderator/facilitator of the group discussion process, his/her role involves introducing the topics, probing questions, eliciting responses from the respondents and guiding the participants not to go outside the main issue of discussion. He/she has a checklist to endure that the key topics are covered (a sample checklist can be found in annex 10).

The moderator's role should be passive and should not dominate the discussion.

Direct Observation

It involves watching people and events to see how something happens rather than how it is perceived. It facilitates confirmation of some of the qualitative information given through focus group discussion or confirmation of some quantitative data like presence of sanitary facilities, water points etc. In nutrition assessments the following can be observed.

- Food availability and access: Direct observations are made through market visits and observation of commodities available, livestock and pasture condition, checking granaries, visiting food distribution sites, observing food prices (price tags), beggars, cleared pastures.
- Health and sanitation: Direct observations are made during visits to water catchments areas and noting both the time taken for a return trip, flow and quality of water, storage facilities of the water and the sanitation system. The general health condition for example in terms of skin diseases, eye problems and runny nose/ARI are observed.
- Nutrition: A clinical observation of the nutritional condition of children is made and cases of wasting, bilateral oedema and micro-nutrient deficiencies noted.
- Population movement: Existence of displaced people, beggars and destitute.
- Interventions: Existence of intervening agencies and their field operations.

Direct observation can be used to confirm information that respondents may provide on the same matter. Observations are useful for overcoming contradictions provided in interviews by respondents.

Case study

The case study concentrates on the history and the 'story' of a specific individual or situation. Factors that contribute to malnutrition of an individual child in IDPs, refugee camps or in given livelihood zone would constitute a case study. The case study must be understood in its own context. However, by undertaking a number of such studies, some trends might be identified or further investigation might be prompted. Case studies cannot be used alone but can be used to confirm information gathered by qualitative data.

Key informant interviews

A key informant is a person who is likely to have an in-depth insight, knowledge and experience about the issue of interest.

A key informant interview is a qualitative, in-depth interview of selected people for their first-hand knowledge about a topic of interest. The interviewer probes for feelings, opinions and views of the key informant. It requires the interviewer to be skilled in the questioning technique so as to elicit the required response. The interviews are semi structured, relying on a list of issues to be discussed, allowing for a free flow of ideas and information.

See annex 14 for a semi-structured interviewing form.

Additional indices

Depending on need; organizations can adopt and use different indicators to supplement the nutrition and mortality information.

Other additional indicators include:

Socio-economic indicators

- Female/Child headed households
- Family status
- Level of education of the head of household

Micronutrient deficiencies

- Clinical signs of: Vitamin A, Iron and Iodine deficiencies
- Biochemical assessment of Serum Retinol, Anaemia (HaemCue is advised) and urinary iodine
- Dietary intake assessment: household iodized salt use, consumption of vitamin A and iron rich foods
- Supplementation; uptake of vitamin A supplementation by children 6-59 months

Programme coverage

- Percentage of children who have been in a
    - Nutrition screening sessions
    - Growth Promotion Monitoring
    - Feeding programme in the last 6 months
    - Child Days-Plus
- Distance to the nearest service provision centres/points for the programs mentioned above.

Body mass index (BMI): An index used to assess underweight, overweight, and risk for overweight.

Step 7: Select sampling method

Formal or scientific sampling is the process of choosing a sample from a population in such a way that inferences can be drawn from it to represent the entire population from which the sample was taken. As such it is important that the chosen sample is indeed representative of the whole population; this is achieved by choosing households at random so that each household in the populations has the same equal chance of being selected.

Three main methods are recommended for nutrition and mortality surveys: 1) simple random sampling 2) systematic random sampling and 3) cluster sampling.

Simple Random Sampling

This method should only be used when an up-to-date list of all eligible households can be obtained; all the households can be located and are concentrated within a small area.

Households eligible to participate in the survey are drawn using a random number table until the required sample size is achieved. In practice, a reliable list is rarely available, and it may be necessary to visit the area beforehand and list all the eligible households.

(See page 28 for detailed description of this method)

Systematic Random Sampling

Systematic random sampling is used when there is either a reliable/ up to date list of households or where households are arranged is some order and the total number of households is known.

The first household is chosen at random. The subsequent households are visited systematically using a “sampling interval”; this is determined by dividing the total number of households by the sample size.

This technique can also be used to select the households to sample **within** a “cluster,” in 2 stage cluster sampling.

(See page 30 for detailed description of this method)

Two stage or cluster Sampling

Two-stage cluster sampling is used in large populations where no accurate population register is available and households cannot be visited systematically. Cluster sampling usually reduces the distance the survey team has to walk. However, the sample size is always greater so that more households need to be visited.

(See page 30 for detailed description of this method)

In statistical terms, all sampling methods are equivalent, as long as they result in a representative sample. The same sampling method should be used throughout the survey.

The sampling scheme that should be chosen is determined mainly by the size of the population and the physical area and organization of the households. See annex 9 for flow chart on choosing the appropriate sampling method.

Step 8: Calculate Sample size

Obtaining population data

Population data should be collected as near to the time of the survey as possible to ensure that it is up to date (particular if there is extensive population movement).

When available the latest approved population data of the target area should be used.

As many sources of information as possible should be used to list all the known households or villages in the target area as well as the population size; including the proportion of children under 5.

Sample size for anthropometric data

The software ENA should be used to calculate sample size instead of using the same sample size for all surveys.

For calculating sample size for anthropometric data the following should be considered:

1. The expected malnutrition prevalence
2. The minimum acceptable precision level (confidence level)
3. The likely design effect (if the survey is to use cluster sampling)
4. Percentage increase to allow for contingencies.

In practice, however, selections of sample size are almost always a trade-off between the ideal and the feasible. On one hand, a sample size that is too small gives results with limited precision and therefore questionable usefulness, while on the other hand beyond a certain level, increasing sample size produces only small improvements in precision yet it may imply a disproportionate increase in cost.

Defining the precision level

It is important for the precision of the nutrition survey to be known. This gives an indication on how wide a confidence interval can be tolerated.

A greater precision requires a larger sample size. To determine just how much precision is required, the main question, which the survey intends to answer, must be clear. If a survey is meant to establish a widespread malnutrition problem, a low precision level can be used (5-10%). However, if the survey results are to be compared to a baseline or a follow-up survey, a higher precision level (2-3%) is necessary in order to ensure that any differences between two or more situations are detected.

Table 1 show the precision needed at various levels of malnutrition prevalence (acute and chronic).

Table 1: Precision needed at various levels of malnutrition prevalence

Malnutrition prevalence %	Confidence Interval Range	Desired precision ± %
5	3 – 7	2.0
7.5	5 – 10	2.5
10	7 – 13	3
13.5	10 – 17	3.5
15	11 – 19	4.0
20	15 – 20	5.0
30	22.5 – 37.5	7.5
40	30 – 50	10.0

Expected malnutrition prevalence

The expected malnutrition prevalence can be obtained from a prior survey or one in a similar adjacent area.

Estimates can also be generated from routine and surveillance data for example; proportions of children presenting to clinics with malnutrition.

When estimating malnutrition prevalence it is important to consider if the situation is better or worse than previous years or adjacent similar areas.

Defining the design effect:

For calculating sample size for cluster sampling, a correction factor accounting for heterogeneity among clusters in the population must be used. This factor is called the "design effect."

Traditionally a design effect of 2 has been used as standard, this encompasses most emergency situations; however as Uganda moves away from emergencies, the homogeneity of the population is increased and a lower design effect may be more applicable. Therefore it is important to establish an appropriate design effect for the surveyed area (see table 2).

Table 2: Suggested design effect for specific contexts

Design effect	Context
≤ 1	Population is homogenous, usually found within a small area, such as a sub-county
1 - 1.5	Slight differences seen between clusters.
1.5 - 2	Differences seen between clusters
2 - 2.5	High variation between clusters. Such as a county with population in camps, transit sites and villages of origin
2.5 -3	Some clusters are not affected and others are severely affected

In highly heterogeneous populations, it may be worthwhile conducting 2 separate surveys with lower design effect and subsequently lower sample size.

Alternatively, increasing the number of clusters to be surveyed will reduce the design effect (see text box 6).

Increasing to allow for contingencies

After the sample size has been calculated, the number should be increased slightly and rounded up to a convenient number. This is to allow for contingencies such as being unable to measure all the children in selected households or having to exclude data from analysis during the "cleaning".

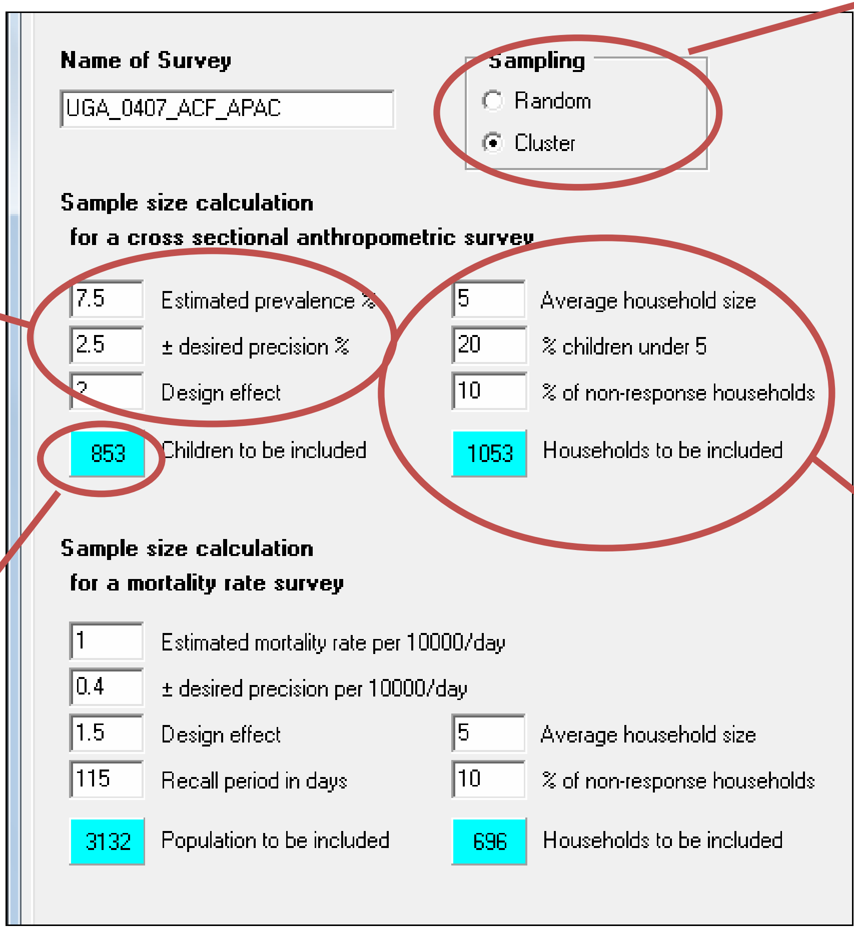
In general the sample size is normally increased by 10% to allow for these and other unforeseen contingencies.

Using ENA to calculate Nutrition sample size- Planning screen

Select **Cluster** if cluster sampling.
Select **Random** if systematic or simple random sampling

Complete this section with:

1. The expected malnutrition prevalence
2. The precision level (acceptable confidence level)
3. The likely design effect (for cluster sampling)



This section should be left blank
This is due to highly variable household sizes in Uganda and therefore it is not currently used for surveys in Uganda.

Sample size
This needs to be increased by 10%to obtain **the Final sample size.**

Sample size for mortality

It is recommended that ENA is used to calculate sample size for crude mortality rate.

Sample size determination is dependent on the following:

i. The expected crude death rate
ii. The minimum acceptable precision level
iii. The recall period
iv. Average household size
v. The likely design effect (if the survey is to use cluster sampling)
vi. Percentage increase to allow for contingencies.

Define the anticipated Crude Mortality Rate

As with prevalence of malnutrition, this can be obtained from previous surveys or from discussion with key informants (bearing in mind that a CMR of 1/10,000/day is the level that is often used to declare an emergency).

Define the minimum acceptable precision level

As with sample size for nutritional status; if a survey is meant to establish a widespread problem, a low precision level can be used. However, if the survey results are to be compared to a baseline or a follow-up survey, a higher precision level is appropriate in order to ensure that any differences between two or more situations are detected

It is generally not possible to achieve a precision much greater than 0.3 deaths/10,000/day with a survey of a reasonable size and a three-month recall period. If higher precision is required, the recall period would need to be lengthened.

The following table gives the desired precision at the various estimated CMR.

Table 3: Desired precision at various levels of CMR:

CMR, /10,000/day	Confidence Interval	Desired precision /10,000/day
0.5	0.2 – 0.8	0.30
1.0	0.6 – 1.4	0.40
1.5	1.0 – 2.0	0.50
2.0	1.25 – 2.75	0.75
3.0	2.0 – 4.0	1.00

Define the Recall period

The *recall period* for the mortality survey is the *time interval over which you count deaths*. Deaths that occurred before the recall period are not recorded as deaths. The length of the recall period is thus a critical factor in determining the mortality rate.

A three-month (90 days) recall period is recommended for nutrition surveys: This is a compromise between the number of households to be visited, the precision of the data generated and the estimation of the death rate that is close enough to the current situation to allow for planning health and nutrition interventions.

Although 90 days is the recommended recall period, the beginning of the recall period should always be a date that everyone in the population remembers, e.g., a major holiday or festival (Christmas, beginning of Ramadan, Duvali, etc.), an episode of catastrophic weather, an election, coup, political decree, or similar memorable event.

For example: A survey carried out in April may use the 1st of January as the beginning of the recall period and therefore the recall period will be 4 months (120 days), this will provide more accurate information than using an arbitrary date.

Define the design effect

As with nutritional status, a correction factor accounting for heterogeneity among clusters in the population must be used.

In emergencies where violence causes a large proportion of deaths, the violence is very rarely evenly distributed in time or place, and the design effect can be very high (up to 10). Such high design effects require very large sample sizes if meaningful data are to be produced.

Define the average household size

ENA calculates the sample size in numbers of individuals but the sampling unit used is the household and the mortality questionnaire is administered to the household. Therefore the sample size of individuals must be converted to number of households. This is done by dividing by the sample size average household size.

Average household size can be obtained from past surveys, population data and discussion with key informants. It is advisable to use the most conservative estimate in order to ensure that the sample size is achieved.

For example: The calculated sample size is 5122 individuals. Discussions with key informants revealed that the average household size is 5-6 persons per household. The more conservative estimate of a households is 5 therefore, the number of households to be visited is 5122/5 = 1024.4 or 1025 (rounded to the highest whole number).

Define the percent of non-response households

As for nutrition data, the sample size is increased slightly to allow for contingencies such as being unable to interview a household or having to exclude data from analysis during the “cleaning”.

Normally, the sample size (in this case the number of households) is increased by 10% to allow for these and other unforeseen contingencies.

Sample size calculations for ASMR-U5

Mortality data are normally collected for the children under 5 years old, and the ASMR-U5 calculated and presented in the report. However, because the 0–5-year-olds form 15–20% of most populations, the sample size for these children obtained from the household interviews will be about one fifth of the sample size for the CMR and therefore insufficient to generate an accurate estimation of ASMR-U5.

If a similar precision is required for the ASMR-U5 as for the CMR, then it is necessary to undertake a separate mortality survey to obtain this data specifically.

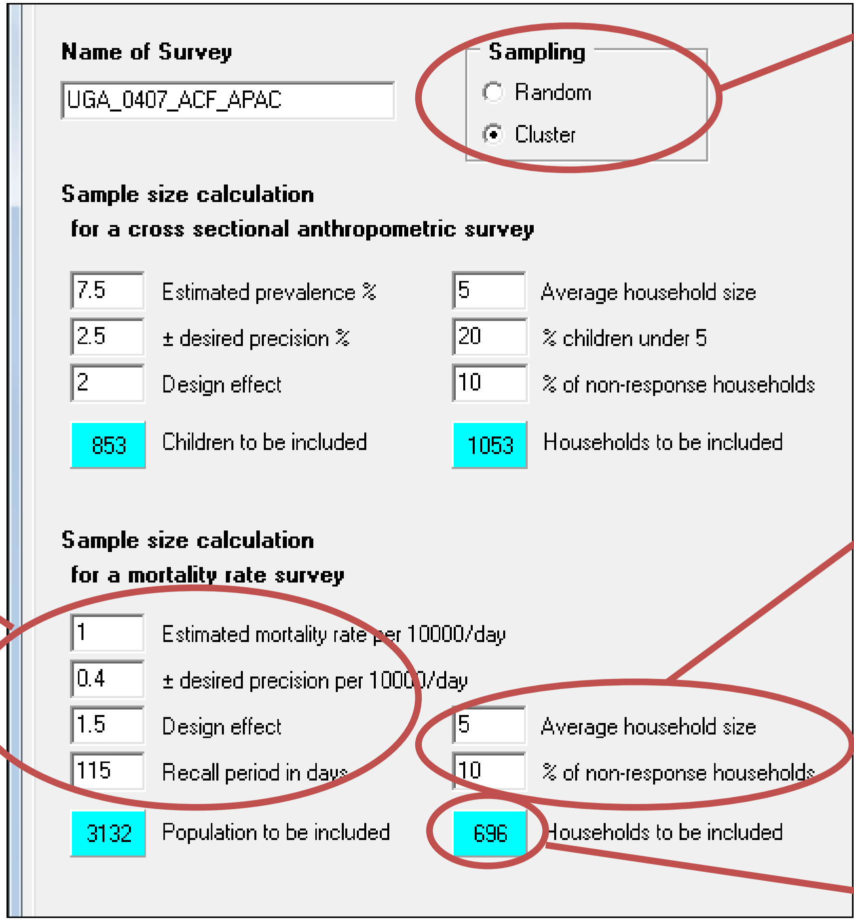
The precision of the ASMR-U5 is not normally considered when designing a combined nutrition/mortality survey and therefore when reporting ASMR-U5 the confidence interval should be taken into account while interpreting this outcome.

Using ENA to calculate Mortality sample size – Planning Screen

Unlike the anthropometry sample size, for Mortality, ENA calculates the number of households required including a percentage of non-response household

Complete this section with:

3. Define the expected crude mortality rate
4. Define the acceptable precision level
5. The likely design effect (if the survey is to use cluster sampling) The recall period



Select **Cluster** if Cluster sampling.

Select **Random** if systematic of simple random sampling

Complete this section with:

1. Average household size
2. Percentage increase to allow for contingencies.

This is the **FINAL TOTAL** number of households to be visited (including the percentage increase for contingencies)

Sample Size for Multiple Outcomes

All nutrition surveys will measure at least 2 outcomes (nutritional status and mortality). It is important that the sample size is calculated for each outcome.

Table 4: Example of sample sizes for different outcomes

Target group and indicator	Sample size	Number of persons in target group per household	Number of households required
Wasting (< –2 SD)	456	1.2	380
CMR	2189	5	438
Anaemia of women of childbearing age	193	2	97

To ensure that all outcomes have an adequate sample size to generate accurate data, 2 methods can be used.

<u>Overall large sample size method:</u>

In this method the largest sample size calculated is used for all outcomes.

In the above example, CMR has the largest sample size of 438 household. Therefore 438 households will be visited and the mortality questionnaire, anthropometric measurements of ALL children 6-59 months (and/or 65-110cm) will be taken and the anaemia level of ALL women of childbearing age will be measured.

<u>Different sample size methods:</u>

The survey team is divided into 2 groups; those that carry out the anthropometric measurements and those that administer the questionnaire part of the survey. Assuming the questionnaire is quicker to administer, this group goes ahead, selecting and marking the households that have been visited until the required number of households have been visited. The anthropometric group follows visiting the same marked households and measures as many children as is required.

Good communication between both groups is necessary to ensure that the same households are visited. The benefit of this method is that only the required number of children is measured and for anaemia levels, only the required number of women of child bearing age is assessed.

Another benefit is the forewarning of the household that the anthropometric team will be arriving and therefore the children can be prepared for the measurement.

However, by separating the two activities the anthropometric group does not make use of the rapport established by the group administering the questionnaire.

Number of clusters to be included in the survey

Traditionally 30 clusters has always been chosen however it is best to calculate the number of clusters to visit based on the realistic number of children a team can measure in 1 day. If it is anticipated that the teams can only measure, say, 20 children per day, then the best strategy is to increase the number of clusters, bearing in mind the increased logistical needs of having more clusters.

You should always plan to have at least 30 clusters. As the number of clusters decreases, the design effect increases rapidly, and fewer than 26 clusters can yield unreliable results.

Text box 6

Cluster sampling scenario

A team was working in very difficult terrain and could visit about 18 households per day. If the total sample size was calculated to be 720 children, then the planners should plan to have 40 clusters of 18 children in each cluster, not 30 clusters of 24 children each. Using 24 children per cluster, the teams would have to spend two days at each cluster site.

Suppose an initial design effect of 2.0 was used for the sample size calculation. As the number of clusters is increased, planners could decide to reduce the design effect to 1.8. This, in turn, would reduce the desired sample size from 720 to 648, and the survey could be revised to include 36 clusters of 18 children each. Four teams could complete the data collection in nine days in comfort without being harassed. If the planners insist on 30 clusters, each team having to spend two days at each cluster, the team would spend the first day measuring 18 children and the second day 6 children. The survey would then take 15 days for four teams to complete, and the survey would probably be of a lower quality.

This illustrates the importance of doing a sample size calculation for each survey, having a cluster size that the team can easily complete in one day, and choosing a realistic design effect.

Step 9: Selecting the household/clusters

In simple and systematic random sampling, the household is selected directly whereas in the cluster sampling, first the clusters are selected then the households are selected within the cluster.

Sampling at the household level

For anthropometric data, the sample size is calculated per child however it is the household that is the sampling unit so when selecting the household the following should be observed, in order to ensure a representative sample is chosen and limit introduction of biases:

- Use the pre-determined definition of a household to identify a household (see text box 7).
- Visit ONLY randomly selected households. No households may be excluded or substituted for any reason.
- ALL children in the specified age group (6-59 months) belonging to each selected household must be measured.
- Households with no children MUST be included for mortality/demographic and other data collection, even if they cannot provide any subjects for anthropometric measurements.

Text box 7

Ugandan Definition of Household

In Uganda, the household is defined as:

"A group of people who live and eat their meals together for at least 6 of the 12 months preceding the interview."

The following categories of people are considered as household members even though they have lived for less than 6 months in the past 12 months:

- infants who are less than 6 months old,
- newly married who have been living together for less than 6 months,
- students and seasonal workers who have not been living in or as part of another household, and
- Other persons living together for less than 6 months but who are expected to live in the household permanently (or for a longer duration).
- Servants, farm workers and other such individuals who live and take meals with the household are to be identified as household members, even though they may not have blood relationship with the household head.

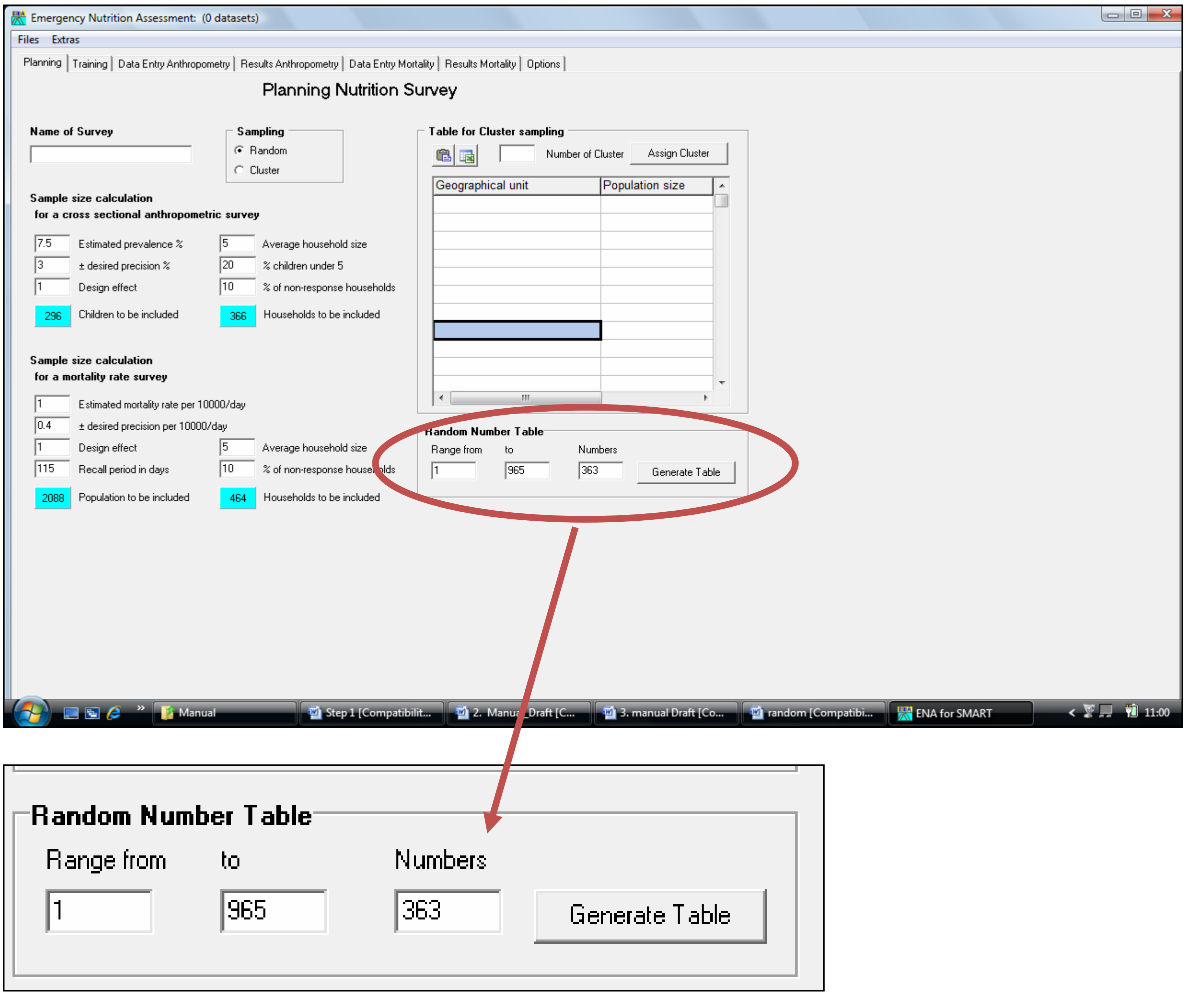
UBOS definition

Steps in conducting Simple Random Sampling

1. Calculate sample size using ENA
2. Convert the sample size into the number of households to be visited in order to obtain required number of households e.g. if the required sample size is 544 and there are, on average 1.5 children (6-59 months) per household, the number of households to be visited is 544/1.5=362.6 or 363 (round up to the nearest whole number).
3. Obtain the most recent list of all households or go to the area and make a list of all households included in the area of interest
4. Assign each household on the list an identification number
5. Using a random number table generated by ENA select the households to be visited.
6. Visit all of these (and only these) households. No households may be excluded or substituted for ANY reason.
7. For the anthropometry, measure ALL children aged 6-59 month in the selected household.

Using ENA to generate Random Number Table

On the Planning screen of ENA use the **Random Number Table** section:



Include the number of households listed (in the example Range from 1 to 965) and the number of households that must be visited (363) and click "on Generate Table".
ENA will generate a random number table in a separate Word document each number represent the identification number of a household to be visited.

Random Number table

Range: 1 to 965, Number: 363

313	***537***	***240***	***215***	***72***	***548***	***116***	***78***	***41***	***685***	***855***	***8***
	305	***900***	***640***	***196***	***634***	***629***	***312***	***644***	***91***	***866***	***130***
	136	***53***	***126***	***792***	***61***	***551***	***468***	***663***	***864***	***355***	***391***

Steps in conducting Systematic Random sampling

1. Obtain lists and numbers of or households in the selected camp and assign a specific number for each household.
2. Calculate sample size using ENA
3. Convert the sample size into the number of households to be visited in order to obtain required sample. E.g. if the required sample size is 544 and there are, on average 1.5 children (6-59 months) per household, the number of households to be visited is 544/1.5=362.6 or 363 (round up to the nearest whole number).
4. Calculate a sampling interval by dividing the total number of households by the number that must be visited. If the number of households is 5000, and 363 are to be visited, the sampling interval is 5000/363= 13.8, or 13 (round <u>down</u> to nearest whole number in this calculation).
5. Selection of first household; this is chosen at random by drawing a number between 1 and the sampling interval (13). If, for example, the number drawn is 7, start with the seventh house on the list.
6. Select the next household by adding the sampling interval to the first household identification number, e.g. 7+13=20.
7. Continue in this way (e.g. 7, 20, 33, 46, etc) until the number of households required for the survey has been systematically selected.
8. Visit all of these (and only these) households. No households may be excluded or substituted for ANY reason.
9. For the anthropometry, assess ALL children aged 6-59 month in the selected household.

Steps in conducting Two stage cluster Sampling

The sampling is split into two stages: In the first stage, the whole population is divided, on paper, into the smallest discrete geographical area for which population data is known or can be estimated, such as a village. Clusters are then randomly selected from these geographical areas with the chance of any cluster being selected is proportional to the size of its population. This is called sampling with “probability proportional to population size” (PPS) and means that each household in the whole population has an equal chance of being selected.

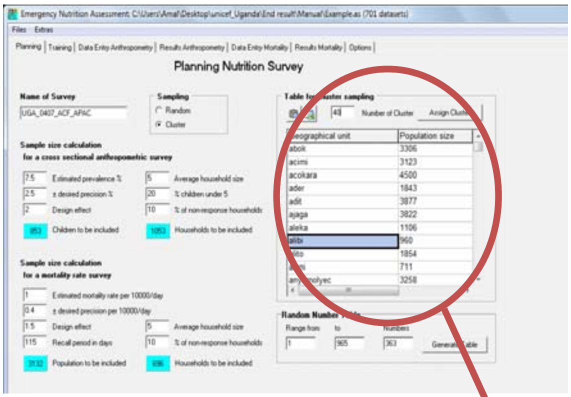
In the second stage, the households are chosen at random from within each cluster, preferably using simple or systematic random sampling. However if the households are arranged in a non-organised method, then the Epi method can be used.

<u>Stage 1: Selecting the clusters</u>

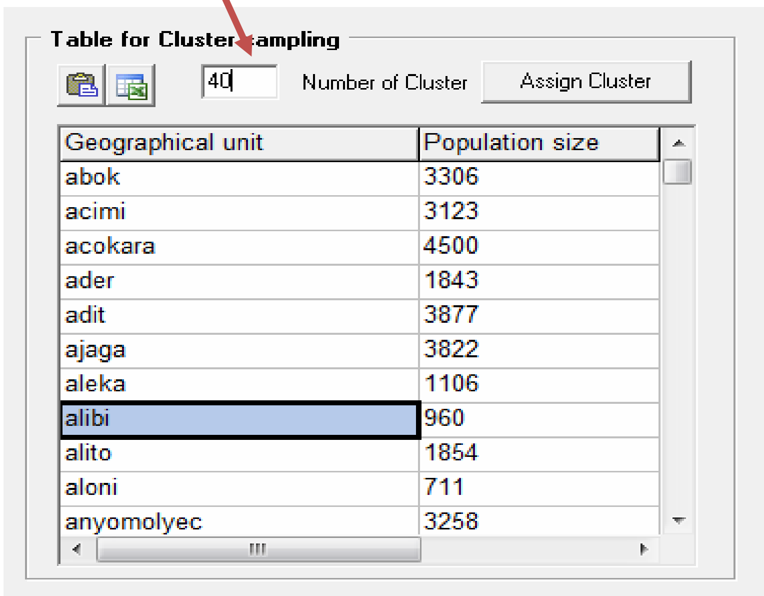
1. Calculate the sample size using ENA.
2. Calculate the number of clusters to visit.
3. Obtain a list of all the villages and their population size in the target area.
4. Use ENA to select clusters using probability proportional to population size.

Using ENA to generate Clusters- Planning Screen

On the Planning page of ENA use the “**Table for Cluster sampling”** section:



5. In the “**Table for Cluster sampling**” enter the names of all the villages into the left column (called “Geographical Unit”) and their population size into the right-hand column called “Population size”(the order the village are entered does not make a difference.)



6. Click on “**Assign Cluster**” ENA will assign the number of clusters to be visited in a separate Word document. As seen bellow

Assignment of Clusters

Geographical unit	Population size	Assigned cluster
Ngai tc	3306	1
Acimi	3123	2
Acokara	4500	
Abok	5127	3,4
Adit	3877	5

Assigning clusters should be done once only and all the selected clusters should be visited, therefore at this stage it is important to exclude any village that are inaccessible.

7. Large villages or sections of towns may be selected for more than one cluster. In this example Abok has 2 clusters assigned to it. In this case, the village should be divided in two equal sections geographically (e.g. north and south) and one cluster taken at random from each division (using the random table method or writing down each division on a piece of paper and randomly select one of these).

Text box 8

If population data is not available at the village level

Often population data is not available at the village level but estimates are available at the Parish level.

Steps in choosing the clusters:

1. Obtain a list of all the villages in each parish. This can be obtained from local parish leaders or other partners working in the area.
2. Determine the sample size using ENA and the number of clusters to be visited.
3. On the planning screen of ENA in the "Table for Cluster sampling". Enter the names of all the parishes into the left column (called "Geographical Unit") and their corresponding population size into the right-hand column.
4. Click on "**Assign Cluster**" to generate the number of clusters to visit in each Parish.
5. Within the Parish randomly select the number of clusters to be visited (use the random table method or writing down each village on a piece of paper and randomly select one of these).

Stage 2: selecting individual households within a cluster

There are several methods of choosing the households from the cluster. The best way is to treat each cluster as if it is a "small population" and to select the houses using the simple or systematic random sampling methods described above.

Simple and systematic random sampling within a cluster:

If the cluster is to be taken from a larger population, the first step of stage two is to subdivide the population into segments of roughly the same number of people. One of these segments is then chosen from the random number table. In this way the "village" is reduced to an area containing up to 250 households. These households are then listed, and the required households selected from the list by simple or—if they are arranged in some logical order—systematic random sampling.

If it is not possible to select the households in this way, the "EPI" method can be used however this generates less representative results.

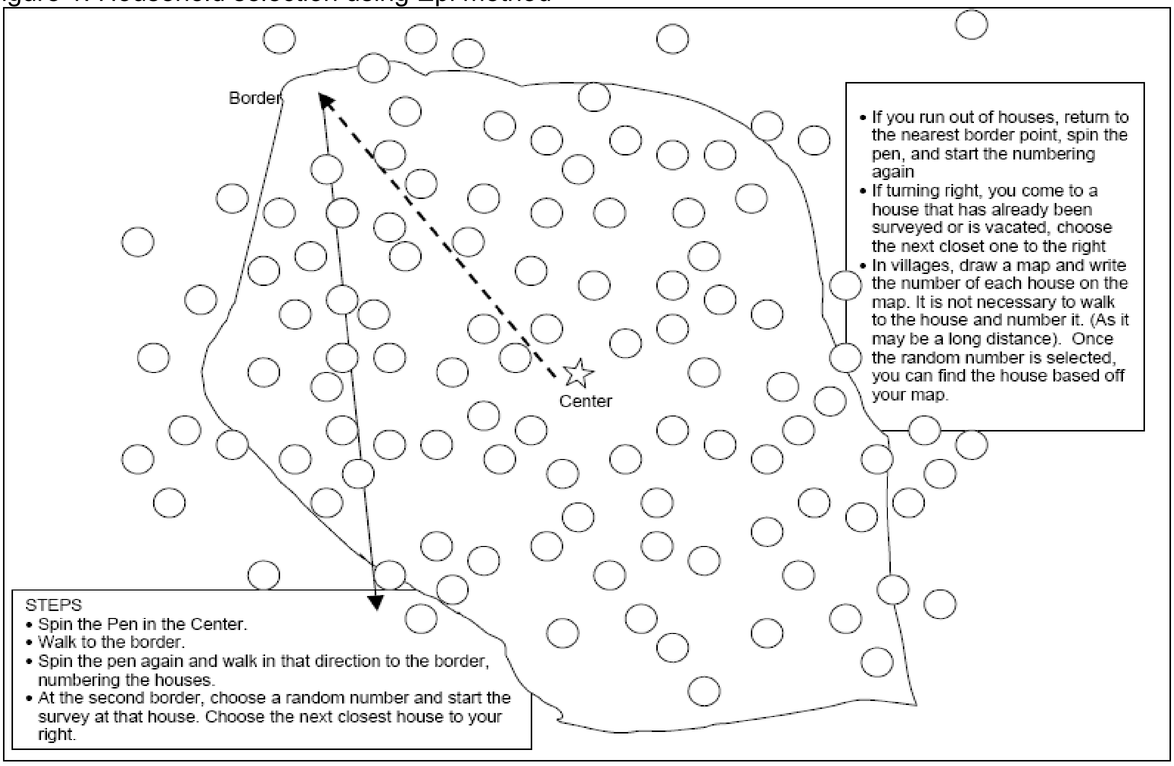
The EPI method within a cluster

When the team arrives at the selected cluster, the following procedure should be followed after discussions with the local leaders:

1. With the help of the local leader, establish the geographical centre of the village.
2. From the centre of the village, randomly choose a direction by spinning a bottle, pencil, or pen on the ground and noting the direction it points when it stops.
3. Walk in the direction indicated, to the edge of the village.
4. At the edge of the village spin the bottle again until it points into the body of the village. Walk along this second line counting each house on the way until you reach the edge of the village.
5. Using a random number list (see annex 5) select the first house to be visited by drawing a random number between 1 and the number of households counted when walking. For example, if the number of households counted was 27, then select a random number between one and 27.

6. Examine all children aged 6–59 months in the household for the nutritional survey and complete the mortality questionnaire.
7. The subsequent households are chosen by proximity. (it is important to find out during the planning phase if the households are spread-out or not)
    - In a cluster where the houses are closely packed together, choose the next house on the right. Continue in this way until the required number of households has been visited.
    - In a cluster that is spread out, to save time, choose the house with the **door** closest to the last house surveyed, whether on the right or left. Continue in this way until the required number of households has been visited.

Figure 1: Household selection using Epi method



Inaccessible clusters

In the case where certain clusters cannot be accessed by the team, it is necessary to plan for their replacement <u>at the initial planning stage</u>. These replacement clusters do not need to be visited, if less than 10% of the initially identified clusters turn out to be inaccessible.

At the planning stage, using the same sampling frame as was used for the selection of the initial clusters select 10% clusters, and retain them as a reserve for replacement. When the survey teams finish surveying their clusters, the number of clusters that the teams were not able to visit should be counted.

- If less than 10% of the clusters were not surveyed, then there is no need to visit the replacement clusters.

- If 10% or more of the clusters were not surveyed, then <u>all</u> the replacement clusters must be surveyed.

It is not acceptable to just visit a neighbouring, similar cluster if one cannot be accessed, because it violates the principle of equal probability of selection.

For example: If the number of clusters to be visited is 36 clusters, then select 10% → 10% of 36 is 4 clusters.

If after the survey more than 10% of the selected clusters were not visited (i.e. 4 or more clusters were not visited), then ALL of the 4 extra replacement clusters should be visited.

If after the survey less than 10% of the clusters were not visited, i.e. only 3 clusters or less were not visited, then the extra replacement clusters do not need to be visited and the analysis is carried out on the collected data.

Choice of sampling methods in complex areas

Conflict and post-conflict areas

As the IDP camps in the northern region of Uganda are being disbanded to varying degrees, the use of camp level estimates of nutrition and mortality of all camps in a district no longer gives an accurate picture of the nutritional status of the area.

It is recommended that a two-stage cluster methodology is used, where the geographical units used are the parishes, camps[4] and transit sites[5]. The population is stratified with regards to these 3 "geographical units", within which the clusters are selected. For parishes the clusters are village, for camps and transit sites the clusters are wards/zones.

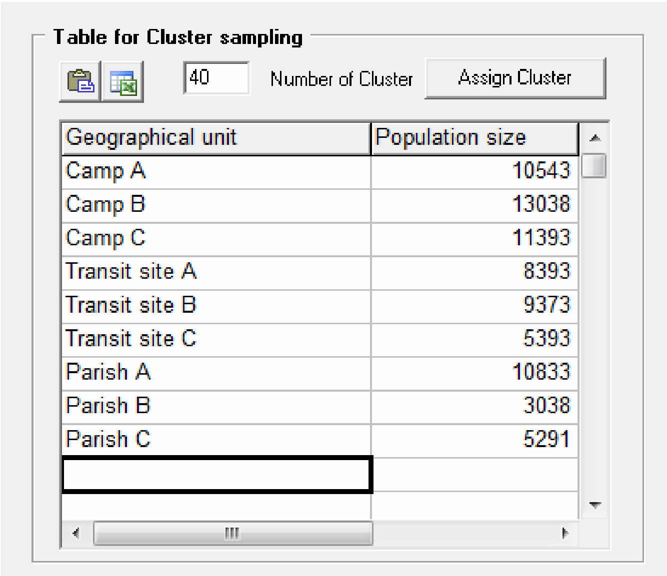
This method provides comparable and representative data of the area irrespective of status of IDP camps (organized or scattered house, household lists are available or not) and to the percentage of population who have returned to their village of origin or settled in transit sites.

Camp level estimates should only be considered if there are strong indications for camp level estimates e.g. for programming purpose. In this situation, systematic random sampling should be used **only** if an up-to-date household list is available or if the households are arranged in an organised manner otherwise the cluster sample method should be used, by dividing the camps into cells/zones/wards.

[4] Camps are also known as mother camp, main camp, IDP camp
[5] Transit sites are also known as satellite sites, settlement camps

Using ENA to generate Clusters in conflict and post-conflict area

1. Determine the sample size using ENA and calculate the number of clusters to visit.
2. Obtain a list of all the villages in each parish of the target area and their population size.
3. Obtain a list of all wards/zones in each camp in the target area and their population size.
4. Obtain a list of all wards/zones in each transit site in the target area and their population size.
5. On the Planning screen of ENA in the "**Table for Cluster sampling**" enter the names of all the camps, parishes and transit sites into the left column called "Geographical Unit" and their population size into the right-hand column called "Population size".



Geographical unit	Population size
Camp A	10543
Camp B	13038
Camp C	11393
Transit site A	8393
Transit site B	9373
Transit site C	5393
Parish A	10833
Parish B	3038
Parish C	5291

6. Click on "**Assign Cluster**" ENA will assign the number of clusters to be visited in a separate Word document. As seen bellow

Assignment of Clusters

Geographical unit	***Population size***	Assigned cluster
Camp A	10543	1,2,3,4,5
Camp B	13038	6,7,8,9,10,11,12
Camp C	11393	13,14,15,16,17,18
Transit site A	8393	19,20,21,22
Transit site B	9373	23,24,25,26,27
Transit site C	5393	28,29,30
Parish A	10833	31,32,33,34,35
Parish B	3038	36,37

NB: Assigning clusters should be done once only and all the selected clusters should be visited, therefore at this stage it is important to exclude any camps, transit sites or Parishes that are inaccessible.

In this example, 5 clusters have been assigned to Camp A. So from a list of all zones/wards in camp A the 5 wards/zones should be randomly selected (using the random table method or writing down each zone/ward on a piece of paper and randomly select one of these). The same method applies for Parish A where 5 villages will be randomly selected.

Karamoja sub-region

For the Karamoja sub-region most villages are divided into manyattas, therefore cluster sampling method should be used.

For nomadic populations, it is advisable to increase the number of clusters (fewer children or households will need to be included per cluster and therefore you are more likely to reach the number of children or households required per cluster). Also it is important to increase the percentage of non-response to take into account empty households if a nomadic group has already moved on by the time the survey team has reached the cluster:

1st stage sampling: selecting the cluster
As described for parish level data, resulting in villages being selected.

2nd stage sampling; selection of Household:

Each village may or may not consist of several manyattas.

No manyattas

- If there are no manyattas in the village, household selection is as described above in "Stage 2: selecting individual households within a cluster".

Manyattas present

- If the village contains manyattas, obtain a list of manyattas in the village and randomly select one of the manyattas, using the random table method or writing down each manyatta on a piece of paper and randomly select one of these.
- The selected Manyatta is then visited for data collection. The households are selected as described in "Stage 2: selecting individual households within a cluster"
- If you are unable to complete the number of children or number of households required for the cluster, a second manyatta in the village is selected randomly using the random table method or writing down each manyatta on a piece of paper and randomly selecting one of these.

Refugee camp settlement

The choice of sampling method is the same as the rest of Uganda. However if only the nutritional status of refugees is required then it is important to count the number of non-refugees encountered during the survey.

Problems and solutions in selecting households

The following problems may be encountered in the field, listed are some of the solution to ensure a representative sample.

Too many children
In cluster sampling, when the last house is visited to get the last child in a cluster, there are often several children in the household. If so, they should *all* be measured and included in the sample. Thus, if the planned cluster size is 25, some of the clusters will end up with one or two more children in the cluster.
In systematic sampling, the plan for selecting houses should be followed and all the children in the houses measured, even if this means that more children are measured than calculated by the sample size.

Not enough children
In cluster sampling, if the team runs out of houses to measure in a village (e.g. they go to all the houses in a village) without identifying enough children, it will be necessary to go to the next nearest village to complete the survey (this should be determined during the planning phase). When they arrive at the next village, the process of selecting a house at which to start is repeated. Proceed from house to house until a sufficient number of children have been measured.

In systematic sampling, if the team has finished going to all the houses planned and there were insufficient numbers of children, the whole sampling procedure needs to be repeated to select the remaining children. This is done by finding a new sampling interval and a new starting point (this should be done in the planning stage).

The sampling should not end when the predetermined number of children is found; it should continue until all the houses that were selected are visited, even if there are additional children and subjects for the morality survey; they form part of the sample.

No substitution
In each of the methods of selecting households, whenever a household is selected according to the rules, there should not be a substitution for this house for any reason.

If for any reason the selected house is not included, the team must make a note and go to the next house according to the rules. Another house is not substituted for the properly selected house. This is not usually a problem with the EPI method, because the rules say that the nearest house to the right should be the next selected. (In this case, however, a house to the left should not be substituted.)

Measure all the children
All the children living within the household in the correct age range should be included in the sample and measured. If two eligible children are found in a household, both are included, even if they are twins. This is extremely important, as it ensures that every child has the same chance of being selected, which is a basic principle of the survey design.

No children
For all the sampling methods, if there are no children under age 5 in a household, the house should remain a part of the "sample" that contributes zero children to the nutritional part of the survey. However, it is very important to include this house for the mortality survey. Collect the data on mortality and any other data that forms part of the survey, record the household on the nutritional data form as having no eligible children, and proceed to the next house according to the rules.

Empty houses
If the house is empty, the neighbours should be asked about the family that lives in that house. On the data collection form, record why the house is empty (if this can be determined). If the residents are likely to return before the team leaves that cluster, the team should return to the house to include the residents in the survey. An absentee form can be completed to help re-locate the house (see figure 2).

Figure 2: Absentee Form

ABSENTEE FORM		
DATE________________	TEAM N°:_________	
ZONE: ______________		
CLUSTER N°:_________		
CHILD N°: ________________		
CHILD NAME: ________________		
MOTHER NAME: ________________		
REMARKS ON THE PLACE OF THE HOUSE:		

If the house is permanently empty or the residents will not return before the team must leave, this house can be skipped and a note made. If the house is empty because all the members are dead, the neighbour should be interviewed and all the residents recorded as having died. Again, do not substitute a house that is not in the original sample for the empty house.

Absent children
If a child lives in the house but is not present at the time of the survey, this child is recorded on the datasheet when the house is visited. Of course the weight and height cannot be entered at that stage. Tell the mother you will come back to the house later in the day, after you have been to all the other houses in the cluster or systematic sample. Then go back to the house to find the child. Again an absentee form can be completed to help re-locate the house.

The team should continue to look for missing children until they leave the survey area. There are always some children who cannot be weighed or measured, and this needs to be recorded and reported. The team **should not** simply take another child and forget about the child that is missing.

Disabled children
Disabled children that would otherwise be eligible should be included where possible. If it is not possible to measure height and/or weight due to deformity or other abnormality, the child should be given an ID number and the data recorded as missing (and a note taken).
Of course, with missing height and/or weight, they will not be included in the final sample unless they have oedema.

Child in a centre/hospital
If a child has been admitted to a hospital or feeding centre, the team must go to the centre and measure the child. This is critical; as such a child is very likely to be malnourished. If it is impossible to visit the centre (it may be many miles away), the child should be included in the datasheet and a note added that the child was in a feeding centre. The child should be recorded as severely malnourished. In reality, the child may or may not be severely malnourished.

Step 10: Determine the schedule for the survey

During the planning phase, it is important to liaise with local leaders to obtain as much information as possible on the selected clusters. This will greatly help in the daily planning and management of the survey.

The exact dates of the assessment should be chosen so as to avoid market days, local celebrations, food distribution days, vaccination campaigns, or other times when people are likely to be away from home.

In addition to the above information it is useful to find out the distance (in time and km/miles) a cluster is from base camp and the current accessibility; for example roads may be impassable during the rainy season or the cluster is only accessible by boat/foot.

At this stage it is also important to find out if the cluster is spread out (in order to decide if households are selected by proximity on the right only or left and right). It is also important to find out where is the nearest cluster that is within the target area and not an already selected (this cluster will be visited if insufficient children/households have been sampled in the selected cluster).

Annex 17 gives an example of practical information form to be filled with local authorities.

A detailed planning of the clusters to be visited should be made including the data and time a cluster will be visited.

The local councils, village chiefs and other local authorities of the selected cluster should be informed well in advance that a survey will be conducted in their area including the day and time of the survey. This will ensure that surveyed population are available on the day of the survey and will help reduce the number of absentees.

Annex 18 gives an example of a planning sheet for a cluster.

Step 11: Prepare material list and Develop survey tools

Survey material list

During the preparatory phase of the survey, an inventory of all the material resources required and available should be completed. Measuring instruments, questionnaires, means of transport, fuel, safety equipment, and other material necessary for the proper functioning of the teams should be clearly identified and budgeted for before start of a nutrition survey.

Spare equipment is needed to allow for damage or loss (particularly weighing scales, MUAC tapes and height boards)

Annex 15 shows an example of an inventory list of most common material needed in nutrition surveys along with a daily check list of material that the teams must take with them to the field.

Survey tools

It is important to develop and trial all survey tools during the planning phase. The tools should be developed before the training of the survey team and used during the training.

Data collection tools and questionnaires

With the objectives and selected indicators in mind the data collection forms and questionnaires should be designed so as to capture all the required information.

In developing a questionnaire the following should be looked at:

- They should be carefully worded for the local context, therefore it is important to use local terms.
- If the questionnaire needs to be translated into the local language, it should be back-translated to the original language using a different translator to ensure accurate translation.
- Pre-test the questionnaire in an area that is not part of the real survey but similar in terms of language used and ethnic groups found

Example of questionnaires:

Anthropometric data collection form	See annex 6
Mortality data collection form	See annex 7
Household questionnaire	See annex 13
Focus group discussion form	See annex 10
Key Informant interview form	See annex 14
Assessment of BMI	See annex 24

Local events calendar and age converter:

A local events calendar is used to help the survey team estimate the age of a child. It lists dates on which important events took place during the past five years: this can include local holidays, floods, fires, political elections, major health campaigns or agricultural events etc. The caregiver is asked whether the child is born before or after a certain event (see annex 20 for an example of a local-events calendar).

The Age converter is used to convert the date from month and year into age in months and helps reduce errors in estimating age in months. (See annex 2)

In developing a local events calendar the following should be taken into account:

- It should be developed in conjunctions with local level partners, key informants who have a good knowledge of past events in the surveys area.
- Care should be taken that the events are specific to the surveys area and population.
- The final calendar should be trialled and tested by the enumerators; to ensure the calendar is appropriate to the local environment and that all staff members are comfortable with its use.

<u>Other Survey tools:</u>

This may include field guide for surveyors (to jog their memories on the proper techniques in the field), program of the day, or a list of feeding programmes in the area.

Annex 11 and 12 shows an example of guide for surveyors and summary guide for surveyors respectively.

Step 12: Recruit and Train team

Recruit the team

The importance of competent enumerators is emphasized since all surveys are prone to errors arising out of improper data collection. Proper screening of enumerators who are fluent in English and the local language of the target area, but who are also physically fit (there is usually a lot of walking), is essential. Enumerators can be from the same community as long as they are able to comprehend the nutrition and health issues and grasp the main concepts behind nutrition surveys.

To carry out the survey at least 1 coordinating supervisor and the survey teams is needed. The number of survey teams required will depend on the sample size, time available and logistical and material resources for implementing the survey.

The survey team should be made up of <u>at least 3 people</u>: 1 team leader and 2 enumerators per team. If the questionnaire section of the survey is carried out separately, a fourth enumerator may be needed.

The <u>coordinating supervisor</u> has the overall responsibility for training team members, visiting teams in the field, ensuring that households are selected properly, and ensuring the equipment is functioning and calibrated and that measurements are taken and recorded accurately

The <u>team leader</u> is responsible for the quality and reliability of the data collected by ensuring that the enumerators take the measurements properly and that all the forms are correctly completed.

The <u>enumerators</u> are responsible for taking anthropometric measurements.

In addition to these three (or four) members of the team; it is often also useful to have a respected community member on the team (for example the village chief of the cluster). This person can introduce the survey team to the population and assist in guiding the team around the location.

Enumerator training

The training of enumerators is important in ensuring that accurate data are collected. Such training should be organized and well coordinated before each survey. Every team member should undergo **exactly the same training**, whatever their former experience, to ensure standardization of methods.

The training should be tailored down to the level of tasks expected of the field staff and should last **at least 3 days** (annex 23 gives an outline for training)

The following 5 sections should be included in a training program for nutrition survey enumerators:

1. Theoretical sessions:
   - A clear explanation of the objectives of the assessment.
   - A clear explanation of roles and responsibilities of each team member.
   - An explanation of the sampling method that stresses the reasoning behind and importance of each child and household having an equal chance of being selected (including households without children for the mortality survey).
   - Background to nutrition, all forms of malnutrition and its causes.

2. Practical sessions:
   - Using the field questionnaires, data entry forms and other survey tools.
   - If possible, visit a nutritional rehabilitation unit to see and feel children with severe malnutrition especially oedema.
   - Taking anthropometric measurements.
   - Use of weight-for-height tables for identification of acute malnutrition and referral to the nearest appropriate facility.

3. Field pilot test:
   - During the last day of the training, the team should visit a village that is not part of the real survey, but is similar and convenient to the training location. The teams should go through all the steps in conducting the survey.

4. Standardization test:

The objective of a standardization test is to assess whether or not the enumerators are taking the measurements in a standard and accurate way, and to test their precision in taking measurements.

For each enumerator, the difference between the two measurements is calculated to assess the **precision**, and a mean of the measurement is calculated to assess the **accuracy**.

The standardization test can also be used for the final selection of enumerators.

Conducting a Standardization test

The standardization exercise is performed with a group of children whose ages fall within the range for the survey (6-59 months). These should be healthy children as their height and weight will be repeatedly taken.

This exercise is tiring on the children and caregiver, so it is important that the process is carefully explained to the caregivers and that the equipment is set up and organised before the children arrive.

Steps in conducting a standardisation test:

1. Give each child an ID number from 1 to 10, the child should remain in a fixed location with the ID number clearly marked.
2. The children should be arranged so that the distance between each child is far enough to prevent the enumerators from seeing each other's results.
3. Each enumerator should be given an ID number starting with 1.
4. The supervisor takes the weight and height of each child without the enumerators seeing the values. The supervisor's data may be assumed to be of higher quality than the enumerator, however the actual values should relate closely to the mean value for all the teams[6].
5. Each enumerator measures and records the weight and height measurements on standardization form for each child. The enumerators rotate but the measuring equipment should not so that each child is always measured with the same equipment.
6. The enumerators should take a break.
7. After the break, the whole process is repeated so that the supervisor and each enumerator have measured the child twice without seeing the previous result.

[6] The supervisor's results can be taken as a "gold standard" or the mean of all the measurements can be taken as the gold standard.

8. Enter the data into ENA software to analyse the results and produce the training-report (see annex 8).

To minimise the number of times a child is measured, one lead enumerator in each team takes the measurements.

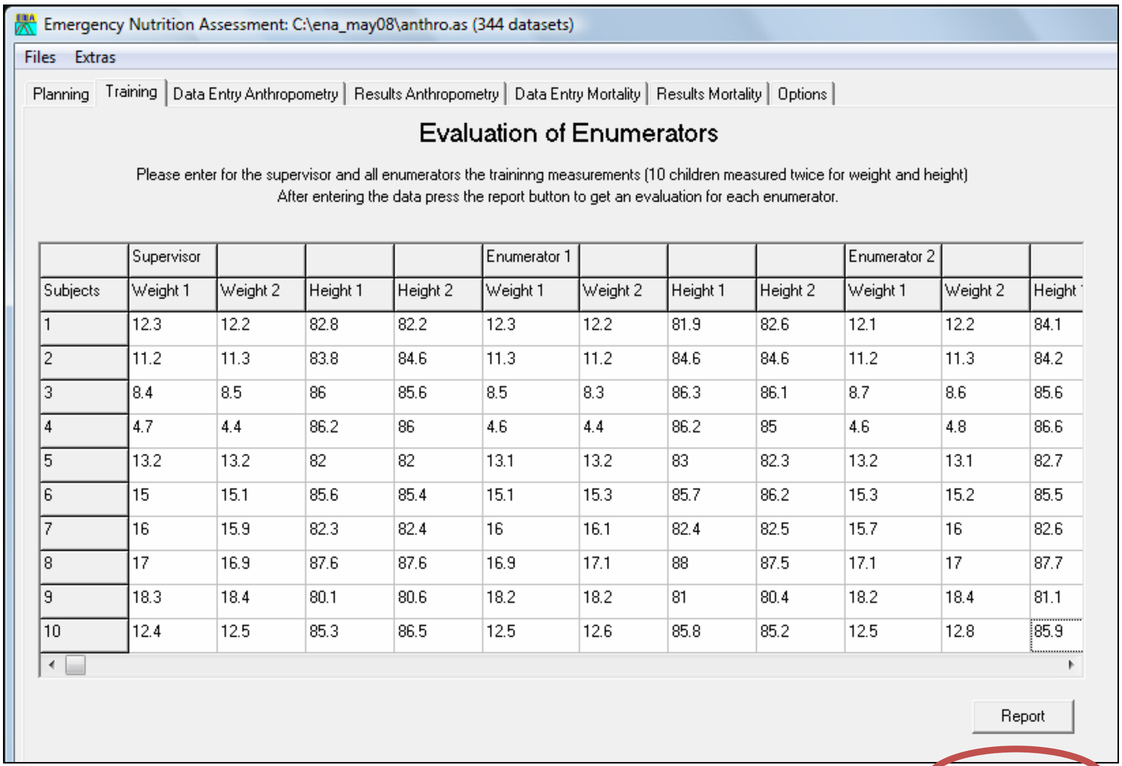
Figure 3: Example of a completed standardisation form

Enumerator name………… ID ###	1st measure	
Child	Weight (Kg)	Height (cm)
1	14.6	96.0
2	10.3	89.8
3	13.8	105.1
4	11.1	84.5
5	10.8	89.3
6	9.4	76.3
7	10.3	87.6
8	14.3	101.1
9	8.0	74.3
10	15.6	97.0

Enumerator name………… ID ###	2nd measure	
Child	Weight (Kg)	Height (cm)
1	14.8	96.1
2	10.4	89.5
3	13.8	105.3
4	11.0	84.7
5	10.7	89.0
6	9.4	76.4
7	10.3	87.6
8	14.1	101.2
9	8.1	74.1
10	15.4	97.5

Using ENA to generate the standardisation test report – Training screen

The standardisation test results are entered into the **Training** screen.



	Supervisor				Enumerator 1				Enumerator 2		
Subjects	Weight 1	Weight 2	Height 1	Height 2	Weight 1	Weight 2	Height 1	Height 2	Weight 1	Weight 2	Height '
1	12.3	12.2	82.8	82.2	12.3	12.2	81.9	82.6	12.1	12.2	84.1
2	11.2	11.3	83.8	84.6	11.3	11.2	84.6	84.6	11.2	11.3	84.2
3	8.4	8.5	86	85.6	8.5	8.3	86.3	86.1	8.7	8.6	85.6
4	4.7	4.4	86.2	86	4.6	4.4	86.2	85	4.6	4.8	86.6
5	13.2	13.2	82	82	13.1	13.2	83	82.3	13.2	13.1	82.7
6	15	15.1	85.6	85.4	15.1	15.3	85.7	86.2	15.3	15.2	85.5
7	16	15.9	82.3	82.4	16	16.1	82.4	82.5	15.7	16	82.6
8	17	16.9	87.6	87.6	16.9	17.1	88	87.5	17.1	17	87.7
9	18.3	18.4	80.1	80.6	18.2	18.2	81	80.4	18.2	18.4	81.1
10	12.4	12.5	85.3	86.5	12.5	12.6	85.8	85.2	12.5	12.8	85.9

Click on Report to obtain the standardisation report in a new Word document.

The software calculates how preci[...]lt on the same child each time) and how accurate (how close the team is to "true" value, which is taken to be either the average or the supervisor's values) each enumerator is in taking the measurements (see annex 8 for the standardisation test report).

5. Quality control

This places emphasis on supervision, accuracy of measurements, respect for survey methodology, checking of data collection forms and equipment, and timely identification of errors in data through plausibility tests. Timely feedback is recommended.

Step 13: Collection of Data

Anthropometric data collection

Before taking anthropometric data for children, their age should first be determined in order to ensure they are within the target population. If age cannot be determined accurately a **height of 65-110 cm is used as a proxy indicator**. The number of children deemed eligible using height should be recorded and reported in the final report.

Two trained people are required in taking anthropometric measurements; **measurements should never be taken by one person alone.** Un-trained people should never be allowed to take anthropometric measurements. Annex 3 gives detailed description of taking anthropometric measurements)

Enumerators should weigh and measure **one child at a time** and complete the data collection forms using a pencil (to erase errors if need be) before measuring the next child; this avoids confusion and errors in data recording.

An example of an “Anthropometric data collection form” can be found in annex 6.

Annex 3 gives a detailed description of conducting anthropometric measurements.

Estimating Age

In a population where the exact date of birth is known for the WHOLE population, then the birthday should be recorded.

If for some of the population only the month and year of birth are known then the age of the child is estimated and recorded in months as oppose to the birth date. This should be used for ALL the children in the survey, even if the date of birth is know. An age converter chart can be used to convert month and year of birth into age in months (See annex 2)

The following methods may help in establish the age of the child.

- Use birth records (usually child’s health card), immunization card or other documents with the child’s date of birth.
- If the age of a neighbour is known, ask whether their child was born before or after the selected child.
- Use a “local-events-calendar” which shows dates on which important events took place during the past five years. This can include local holidays, floods, fires, political elections, major health campaigns or agricultural events etc. The caregiver is asked whether the child is born before or after a certain event (see annex 20 for an example of a local-events calendar).

Height/Length

Measurements are taken using a wooden measuring board, with a precision of 0.1 cm. Children greater than 24 months(proxy height ≥87 cm[7])are measured standing up while those less than 24 months(proxy height <87 cm) are measured lying down.

Weight

Weight should be measured to the nearest 100g (0.1kg) using a 25kg hanging scale or SECA Uniscale.
If culturally acceptable, all children should be weighed undressed (Annex 3 gives a detailed description of weighing children).

MUAC Measurement

MUAC should be measured on all children irrespective of height, this is to limit mistake in the field subsequent analysis should be done on only children greater than 65 cm in height.

The MUAC should be measured to the nearest millimetre (0.1cm), using a flexible non-elastic tape, midway between the tip of the acromion process and the tip of the olecranon process of the left arm with the arm hanging freely by the child's side.

Presence of Oedema

Diagnosis of nutritional oedema is done by applying a moderate thumb pressure on **BOTH** feet for three seconds. If oedema is present, a shallow pit will remain after releasing pressure from the feet. Only children with bilateral oedema (oedema on both feet) are diagnosed positive for nutritional Oedema.

Mortality data collection

Mortality rate is estimated for the whole population so mortality data has to be collected in all selected households whether eligible children (6-59 months and/or 65-110 cm) for the anthropometric measurements are present or not.

The mortality questionnaire should be administered to a responsible adult member of the household bearing in mind the sensitivity attached to the mention of death. It is important to use the predetermined definition of a household and that time is taken to ensure that the respondent is clear on what constitutes a household.

It is advisable to use one questionnaire per household (an example of a questionnaire can be found in annex 7)

To determine the mortality rates, the member of the selected household is interviewed to obtain information on births, deaths, in-migration and out-migration of all household members present for at least some part of the recall period.

ENA software calculates the Crude Mortality Rate in deaths/10,000/day using the following formula:

Crude Mortality Rate = 10,000/a*f/(b+f/2-e/2+d/2-c/2)
Where:
a = Number of recall days
b = Number of current household members
c = Number of people who joined the household
d = Number of people who left the household
e = Number of births during recall

[7] These are the new cut-offs to be used with the new WHO reference curves

f = Number of deaths during recall period

The same formula is used to estimate the ASMR-U5 but the household member is limited to children under 5 years old (including the 0-6 months old)

Therefore the following information needs to be collected in the field:

- Current household member – Total and <5 years
  (All household members who slept in the household the night before the interview)
- Current household member who arrived during the recall period – Total and <5 years (excluding births)
- Past household members who left during the recall period – Total and <5 years
  (Anybody who was part of the household at the beginning of the recall period but is no longer part of the household – excluding deaths)
- Births during the recall period
- Deaths during the recall period – Total and <5 years

Calculation of the number of days for the recall period

For the survey as a whole, end-date used for the recall period is the mid-point of the survey fieldwork.

In other words, if the beginning of the recall period is 1st of January and the interviews take place during the period 24 March to 7 April, then the end-date used to calculate a recall period for purposes of mortality estimation would be 31st March.

The endpoint for an individual interview is the night before the interview.

Text box 9

Neonatal deaths

In keeping with basic protocols for registering vital events, a live birth should be recorded as a birth and a death that follows during the recall period should be recorded as a death - they are two separate events and should be recorded as such in the household enumeration tables. In the Summary table, for purposes of entry into ENA, however, it is important that an infant birth and death should be recorded **only as a death** and not as a birth and a death.

If a birth and death were entered for the same person, the two events would cancel each other out in terms of contributions of "person-time" of exposure.

Ref Courtland Robinson Technical Paper on Mortality Global Nutrition Cluster Meeting on SMART 7-9 April, 2008

Text box 10

In- and Out- Migration

In many societies, even under ordinary circumstances, movements in and out of the household are routine occurrences. While it is important to measure migration into and out of the household, however, it is also reasonable, under most circumstances, to assume that short-term movements in and out of the household will not significantly affect the mortality estimates.

Thus, for purposes of simplification, it is recommended that:

- In-migration only measure those who entered the household during the recall period and stayed (either up to the current time or until time of death)
- Out-migration only measures those who left the household and stayed away (if they died while away from the household, that would <u>not</u> be counted as a household death).

As with neo-natal death, for in-migration, a person who enters the household and subsequently dies during the recall period should have both events recorded but for purposes of entry into ENA, it is important that is recorded **only as a death**.

Ref Courtland Robinson Technical Paper on Mortality Global Nutrition Cluster Meeting on SMART 7-9 April, 2008

Field Supervision

Field supervision is important in ensuring valid data collection and minimising bias. The coordinating supervisor should:

- Make frequent unannounced spot checks on the teams in the field.
- Ensure that the methodology is closely followed and document any deviations.
- Check all forms to ensure that all sections are accurately completed.
- Ensure that all instruments to be used the survey teams are calibrated every day.

It is particularly important to check cases of oedema, as there are often no cases seen during the training and some team members may therefore be prone to mistaking a overweight child for one with oedema (particularly with younger children). The supervisor should note teams that report a lot of oedema, and visit some of these children to verify their status.

<u>Minimising Bias</u>

Bias is anything other than sampling error that causes the results of the survey to be different from the actual population prevalence or rate. Bias cannot be calculated nor its effect upon the result assessed. It is the main reason why surveys may not give an accurate result.

As bias cannot usually be calculated or corrected by the computer after data collection is finished, it is critical to avoid bias during sampling and data collection. Bias is minimized by adequate training, use of good technique and proper supervision.

However, the quantitative data can be examined using ENA to see if there is likely to be some form of systematic bias. The teams should be aware that such techniques will be applied during the analysis to discourage their succumbing to the temptation to take shortcuts.

Examples of bias

1. Because the foot piece of a length-board was loose, one team systematically measured the height of each child 1 cm taller than he or she really was. Even though weight was accurately measured, each child's WFH z-score was lower than it should be and the prevalence of

wasting was exaggerated. Any inaccuracy in the equipment or measurement technique will lead to systematic bias.

2. Inaccurately taken weight and height—even when the inaccuracy is random and evenly distributed between over- and under-measurement—results in systematic overestimation of the prevalence of wasting. This overestimate is greater for severe malnutrition than for moderate malnutrition, and relatively greater when the true prevalence is low than when it is high.

Shortcuts are likely to be taken if the survey teams are required to work too hard, if there is inadequate time allocated to rest periods and refreshments, or if the time that can be spent in a particular household to administer the mortality questionnaire and measure the children properly is insufficient. Therefore, the data may be much more accurate if there are 20, rather than 30, households in each cluster. This tends to be more common in rough terrain or when there are long distances to walk.

The following are some of the sources of bias that occur during the interview.

- Recall error*:* Respondents often fail to recall all deaths during a given recall period. Infant deaths, in particular those within a short time after birth, are particularly under-reported. Respondents may also misreport ages, dates, and salient events.
- “Calendar” error: Respondents may report events as happening within the recall period when they did not (or vice versa) due to lack of clarity about dates.
- “Age heaping”/digit preference: Respondents may round ages to the nearest year i.e. 12, 24, 36 and 48 months.
- Sensitivity/taboos about death: In general, the death of a household member is not a subject discussed readily with strangers.
- Deliberate misleading: In some populations, with experience of relief operations, some respondents may deliberately give incorrect answers in the expectation of continuing or increased aid.
- Interviewer error: Enumerators may ask questions or write down answers incorrectly, skip questions, assume answers, or rush respondents in an effort to complete the interview quickly.

Every day, if possible, the supervisor should arrange for data to be entered into the computer. Recording errors, unlikely results, and other problems with the data may become clear at this stage since the ENA software will automatically flag abnormal values as data are entered.

Assess performance per team:

By entering the data in the field, the supervisor can assess the performance of each team by conducting a plausibility check report for each team. Annex 16 gives an example of a Plausibility check report.

ENA reports the following per team:
- Percentage of values out of range
- Age and sex ratios
- Digit preference scores for weight and height
- Standard Deviations for z-scores of WFH and HFA

Assess within cluster variation:

In addition to these, ENA produces a comparison of the Standard deviation of the WFH z-scores within cluster.

Teams tend to get tired during the day, and measurements are often taken more carefully in the morning than in the late afternoon. In the Plausibility check report, ENA displays the sum of the SD for all children measured first in all the clusters and the same for the second child measured and the third and the fourth etc. Ideal there should be no peaks and the distribution should be uniform. See annex 16 for an example of a Plausibility check report.

If possible, evening meetings should be organised on a daily basis to discuss problems that arise in the field and to encourage team members to discuss their experiences and findings. But also, to highlight discrepancies found in the plausibility checks.

If one of the teams is getting a large number of “flagged” results or aberrant standard deviations and/or sex and age ratios, the supervisor should accompany that team in the field.

Ethical issues

Although nutrition surveys would not qualify for research (since results cannot be generalised), data should still be collected in an ethical manner. Some ethical issues are highlighted here:

- Provide sufficient information to local authorities about the survey. Such information includes the purpose and objectives of the survey, the nature of the data collection procedures, the targeted subgroups in the community. Where possible, survey procedures and copies of survey questionnaires should be available to the community leaders for their comments prior to the survey.

- Where written consent is not possible, verbal consent must be obtained from all adult participants and parents guardians for children in the survey.

- The confidentiality of survey data should be protected by ensuring that information leading to identification of individual subjects is not shared, especially in the communities.

- Referrals for survey participants who show signs or symptoms that require immediate clinical attention should be made. Team leaders can for example refer severely malnourished individuals to the nearest health facilities. (annex 1 shows the weight-for-height table used for identification of malnourished children for referral to health facilities)

Figure 3: Example of a referral slip

TEAM NUMBER:

LOCATION:
CHILD NAME:

MOTHER NAME:

WEIGHT:

HEIGHT:

W/H%:

MUAC:

OEDEMA:

REFERRED TO: SFC | OTP | TFC

Step 14: Data entry & Quality checks

Computer software and data entry

Once the data has been gathered from the field, coding and entry into an appropriate computer program is the next stage. For the nutritional status and mortality data, they should be entered into the adapted software ENA for SMART.

Anthropometric data should be entered for each individual child whereas the mortality data should be entered per household.

A copy of the raw data should ALWAYS be saved in an Excel format as well as the original ENA format.

For other collected data (non-anthropometric and mortality) the most appropriate computer package should be used (e.g. Excel, EpiInfo, SPSS, STATA etc).

If data entry clerks are hired they should be familiar with ENA for SMART and any other computer programs used.

Before starting data entry in ENA, it is important to make sure that all the sections on the "Option" screen are correctly set.

Using ENA for Data Entry – Options screen

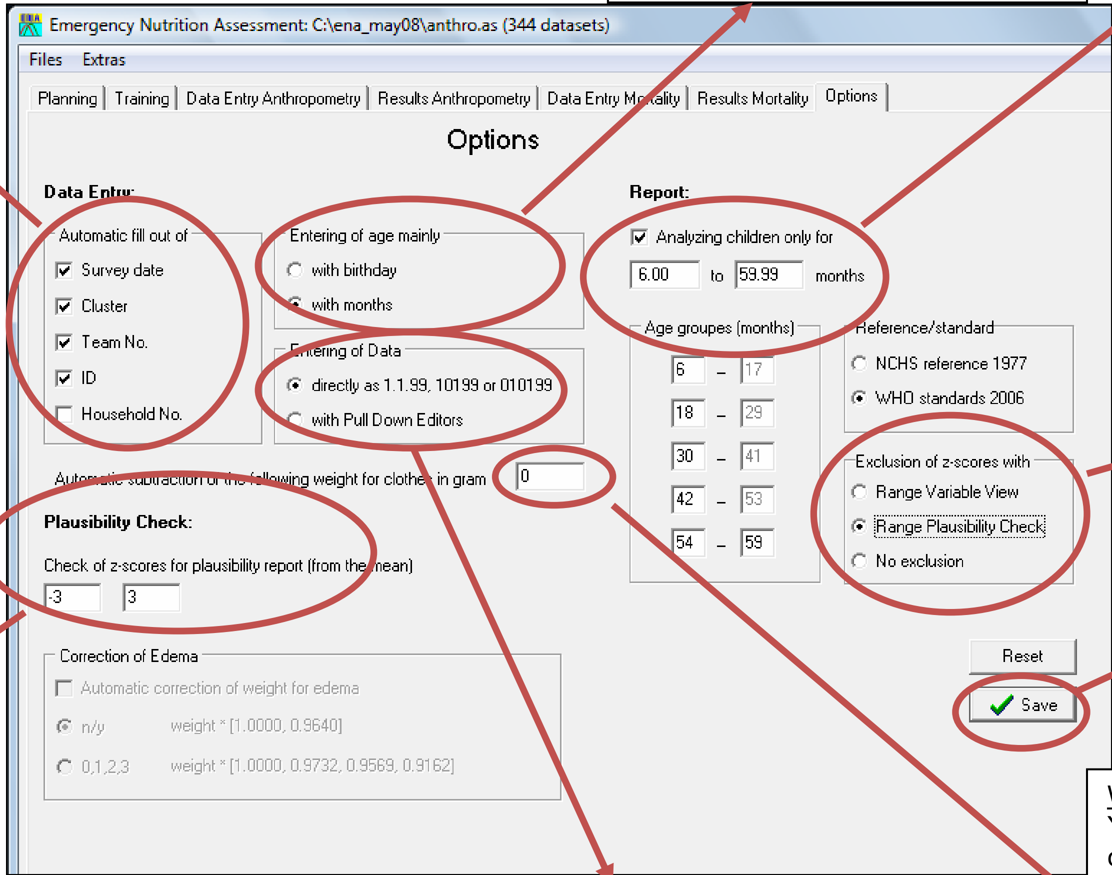
Before starting data entry it is important that the following parameters are set using the last screen in ENA "**Options**".

<u>Automatic fill out of:</u>
This section can be used to set which data you want to fill automatically in the **Data Entry Anthropometry**. It is recommended to un-select household number since the number of children in a household can be greater than 1.

<u>Entering of age mainly</u>
Either can be selected depending on the document found in the household level.

<u>Analyzing children only for</u>
It is important to make sure this is selected and includes the appropriate age range

<u>Age group</u>
The results in the report will be grouped by age (in months). You can change the age group by simply changing the lower range (ENA will automatically adjust the upper range)



<u>Exclusion of z-scores</u>
It is important that "Range Plausibility Check" option is selected

<u>Save</u>
It is important to remember to save at the end.

<u>Plausibility Check</u>
This sets the out of range values in the plausibility check and is used to generate "Flags". It should be maintained at -3 and 3

<u>Entering of data</u>
It is best to keep this as "directly as 1.1.99, 10199 or 010199"

<u>Weight of clothes</u>
You can enter the average weight of clothing to be automatically subtracted from the weight introduced in the **Data Entry Anthropometry.**

Using ENA for Data Entry – Data Entry Anthropometry

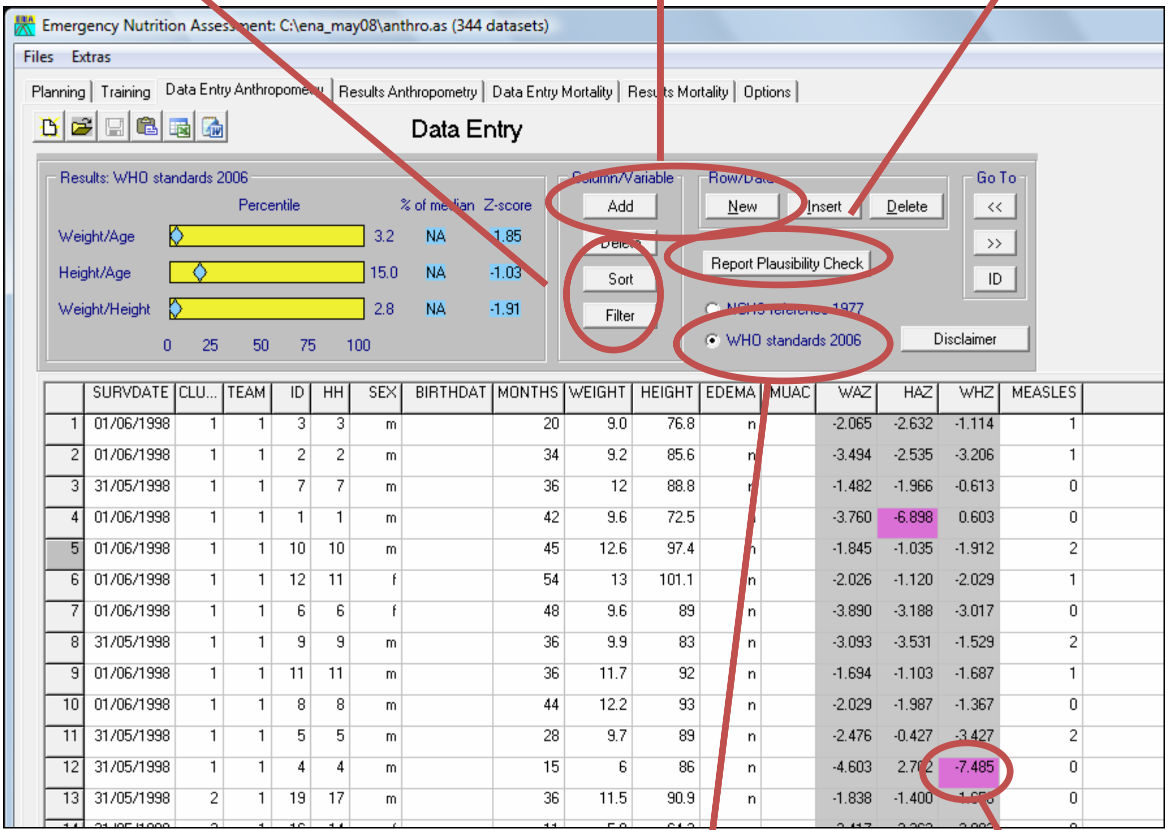
For anthropometric data the "**Data Entry Anthropometry**" screen is used.

The first 4 columns (SURVDATE, CLU.., TEAM and ID) will be automatically filled in as selected in the in the **Options** screen. The WAZ, HAZ and WHZ (z-scores for WFA, HFA and WFH respectively) are automatically calculated and filled in. Edema must be filled in "y" or "n".

The data can be sorted using **Sort** or a filter can be applied by using **Filter**.

Used to add extra variables or rows of data.

Clicking on this will produce the Plausibility Check report in a new Word document



The results can be displayed relative to the NCHS or the WHO curves and is selected here.

ENA will Flag and highlight in PINK implausible values.

→ New Survey

→ Open Survey

→ Save Survey

→ Paste data from clipboard (this icon should be used when you need to paste data from another program into ENA)

→ Transfer data to Excel Format

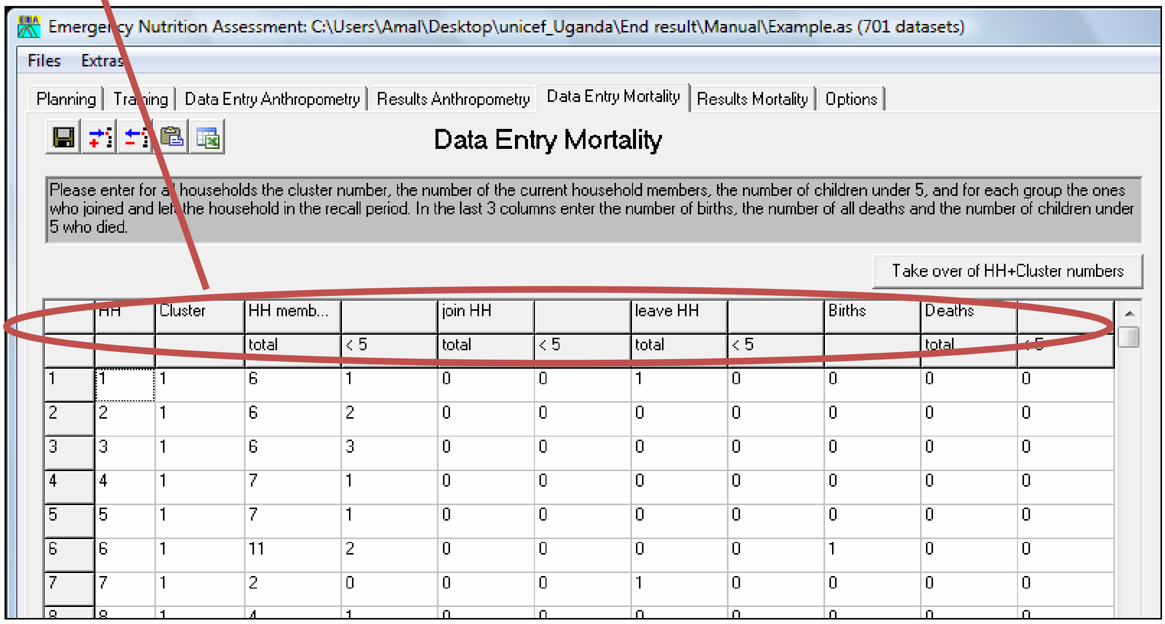
→ Report Word

Using ENA for Data Entry- Data Entry Mortality

For the mortality data the "**Data Entry Mortality**" screen is used and the data is entered per household

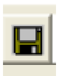
The columns are as follows:

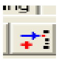
HH		Household
Cluster		Cluster number
"HH member"	"Total"	Current household members – total
	"< 5"	Current household members - < 5 years
Join HH	"Total"	Current household members who arrived during recall (exclude births)
	"< 5	Current household members who arrived during recall - <5 years
Leave	"Total"	Past household members who left during recall (exclude deaths)
	"< 5"	Past household members who left during recall - < 5 years
Births		Births during recall
Deaths	"Total"	Total deaths
	"< 5"	Deaths < 5 years

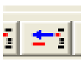


NB: For a child that was born and died in the recall period (neo-natal death) and for a household member that joined the household and subsequently died in the recall period it must be counted ONCE as a death ONLY.

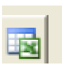
Icon on this page:

 → Save Survey

 → Add line

 → Erase line

 → Paste data from clipboard

 → Transfer data to Excel format

Data cleaning

During data cleaning, it is important NOT to remove any data from the database in order to allow a third party to analyse the data at a later date, and re-examine the data in its entirety.

The software automatically eliminates implausible values, out of range values and entries with missing values during the analysis.

It is important, therefore that the analysis is done with “exclusion of z-scores with Range Plausibility Check” (found on the **Results Anthropometry** screen) and to keep the default range of ± 3 z-scores in the “**Option** screen”. This will result 1 in 1000 children being incorrectly excluded. Increasing the plausibility boundaries will result in more children who are incorrectly included in the final analysis and may have a major effect in the end result.

Implausible values

Before carrying out the definitive analysis, any errors in the data need to be identified and, if possible, corrected. ENA highlights implausible values in 2 ways: Flags and Plausibility Check report.

Flags:
This is done partly during data entry; implausible values are “flagged” and coloured pink as the data is entered (see Using ENA for Data Entry – Data Entry Anthropometry).

Plausible Check report:

Implausible values based on the z-score of the mean are listed in the “plausibility check”. Click on the 

in the **Results Anthropometry** screen to produce the Plausibility Check report.

Both flagged and listed data entries should be checked against the raw paper data and correction made if necessary.

Do not eliminate these data from the database.

Missing data

If certain critical pieces of information are missing from a child’s survey record, it will not be possible to include the child in some of the anthropometric data analyses:

Age:
If information on age is missing, you can still include the child in the assessment of wasting and oedema, because these do not require age. However, you will need to be sure the child is eligible to be in the survey (i.e. in the required height range of 65cm–110cm).

Sex:
If information on sex is missing you should still include the child in the assessment of wasting and oedema. The reference population information on height and weight is sex specific. However, the difference between the sexes in terms of the WFH reference standards is small, and irrelevant for oedema.

Height:
If information on height is missing you cannot include the child in the assessment of wasting. However, the child can still be included in the analysis to estimate underweight rates and prevalence of oedema.

Weight:
If information on weight is missing you cannot include the child in the assessment of wasting. However, the child can still be included in an analysis of oedema.

Data outside the required range:

In nutrition surveys, only children aged 6–59 months are measured, so children outside these ranges should not be included in the results. In the ENA software, the default is to accept any child who is in the correct age range, even if the height is out of range. During analysis, the software will automatically exclude children outside the age range.

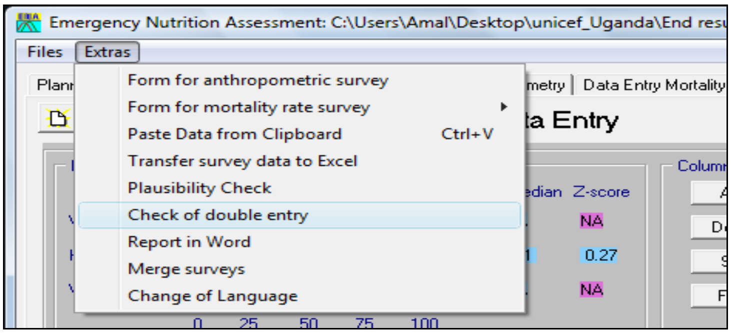
Double entry

To minimise errors in data entry, the data can be entered twice by 2 different data entry clerks, the two databases are then compared for inconsistencies.

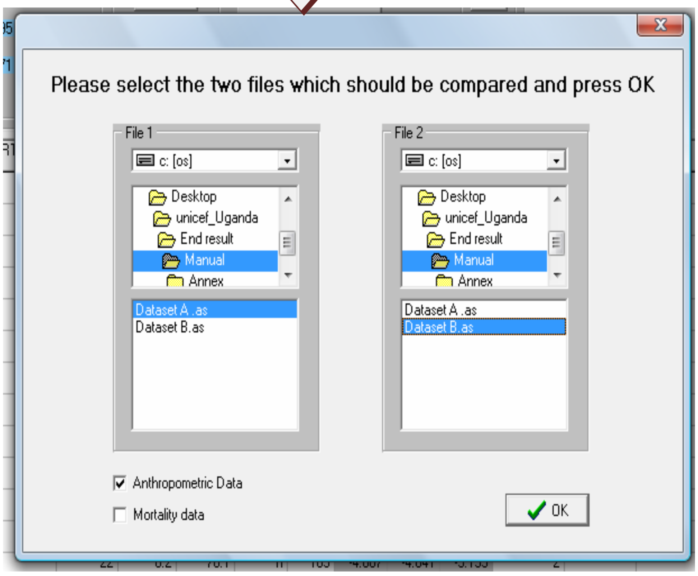
ENA can be used to compare both data sets. (See using ENA to check Double Entry)

Using ENA to Check Double Entry

1. In **Extras** on the "**Data Entry Anthropometry**" screen select "**Check of double entry**"



The following window will appear.



2. Select the two datasets to compare and press OK. In this example, Dataset A will be compared to Dataset B.
3. A Word document will be opened with the following (it is recommended to change the Page set up to Landscape)

Check of double entry

Anthropometric Data

Difference in Line: 1

Dataset A .as	25/4/2007	23	4	6	6	f	31	14.1
Dataset B as	27/4/2007	23	4	6	6	m	31	141

Difference in Line: 6

Dataset A .as	26/4/2007	16	4	15	13	m	12	9
Dataset B.as	26/4/2007	16	4	13	13	m	13	9

4. Refer back to the original paper copy to correct the entry. Correct and save only one of the data sets for analysis

Validity Checks

The accuracy and reliability of the data can be examined by looking at the distribution of the data, ENA carries out the essential statistical tests required to assess the validity of nutrition surveys.

Clicking on the Report Plausibility Check on the **Data Entry Anthropometry** screen (see using ENA for Data Entry – Data Entry Anthropometry) will produce a word document with the plausibility check report.

See annex 16 for an example for a Plausibility check report

All tests should be considered in their entirety, taking into account the context and interpretation of the results before decisions on the validity of the data are made.

The variable/tests are listed in the table with the acceptable range for the test, a brief description of the test and where the information can be obtained (see table 5).

Table 5: Validity checks

Variable/tests	Acceptable Range	Description	Where to find the information
Sample size	Greater than the calculated sample size	It is important to ensure that the resulting analysis is carried out on a sample size greater than or equal to the calculated sample sizes prior to adding the 10% contingency (both for the anthropometric and the mortality data).	In the main results panel of the "**Results Anthropometry**" screen. See Using ENA for Analysis – Results Anthropometry screen (cont.)
Out of usual range values (Flags) Weight for Height:	Less than 3% of the sample size	"Flags" are measurements that are highly unlikely to be correct as they out of the usual range (± 3 z-scores of the mean). ENA highlights these biologically implausible values by either highlighting in pink as the data is entered or listing them in a word document in the "plausibility check". Both should be checked against the raw data and corrected if necessary. The number of z-scores should be recorded in the final report.	In the main results panel of the "**Results Anthropometry**" screen. See Using ENA for Analysis – Results Anthropometry screen (cont.)
Out of usual range values (Flags) Height for Age:	Less than 5% of the sample size		
Age distribution	There should not be any obvious peaks	Often there are peaks at the 12, 24, 46 and 48 months as the age of the child is rounded this suggested insufficient probing by the enumerators	See plausibility check report
Age ratio of 6-29 months to 30-59 months Age ratio = (6-29 months) / (30-59 months)	between 0.78 and 1.18, Ideal ratio = 0.98	This allows a view of the representativeness of the sample. Age bias is a particular concern for anthropometry, as younger age groups (6-29 months) are more likely to be malnourished than older age groups (30-59 months). This means that a ratio below 0.78 there is under representation of the younger children (or over-representation of older children) and may give a lower prevalence of malnutrition.	See plausibility check report
Overall sex ratio	between 0.8 and 1.2	Like the age distribution, this allows a view of the representativeness of the sample and should be similar to the distribution within the population.	See plausibility check report

Digit Preference Score Weight and Height	• 0-5 good, • 5-10 acceptable, • 10-20 poor • 20 unacceptable	This indicates how accurately the measurements were taken and if rounding to the nearest round number occurred. For weight and height measurement, there should be no digit preferences; however a small degree of rounding will not affect the end result.	See plausibility check report
Standard Deviations Weight for height	between 0.8 and 1.2 z-score	The standard deviation (SD) of the z-scores for weight-for-height and height-for-age is an important check and should be examined carefully. It tells you if there is substantial random error in the measurements. The higher the SD, the more erroneous results there are in the dataset If it the SD for WFH is above 1.2 then the calculated prevalence of malnutrition (from the mean with an SD of 1) should be reported and the counted prevalence noted in the annex.	See plausibility check report
Standard Deviations Height for age	1.10 and 1.30 z-score		See plausibility check report
Skewness Weight for height	Between ± 1	This is a measure of the degree of asymmetry of the data around the mean. A normal distribution is symmetrical and has zero skewness so a positive skewness indicates a long right tail while a negative indicates a long left tail.	See plausibility check report
Kurtosis Weight for height	Between ± 1	This shows the relative flatness of the data compared to a normal distribution. The normal distribution has zero kurtosis, so a positive value indicates a peaked distribution while a negative is a flat one.	See plausibility check report
Index of Dispersion (ID) and Poisson distribution	GAM $p > 0.05$ SAM $p > 0.05$	If $p > 0.05$ The cases appear to be randomly distributed among the clusters. If $p < 0.05$ The cases are aggregated into certain clusters - there appear to be pockets of cases.	See plausibility check report

Step 15: Analysis and interpretation

Data analysis

An analysis plan should be drawn to ensure that the research questions are answered adequately. Both descriptive and interpretive analysis is necessary.

ENA for SMART should be used in the analysis of the nutrition and mortality data. At present, ENA does not analyse MUAC or measles coverage, these can be analysed using Excel.

The data can be exported to an Excel spreadsheet by clicking on  in the **Data Entry Anthropometry** Screen.

<u>Analysis in cluster sampling method</u>

If the data is collected using the two-stage cluster sampling methodology, the analysis should be done on one set of data without disaggregating it. The results from all clusters are combined to give an estimate for the whole population from which the sample was taken. The results from each cluster <u>should not</u> be used as an estimate of the prevalence of malnutrition in those individual locations because the sample size in each location is too small.

Other collected data should be analysis using the most appropriate computer package (Excel, EpiInfo, SPSS, STATA etc)

<u>Analysis of different variables</u>

To analyse the data by age group other than 6-59 months, use the "Option" screen in ENA (see using ENA for Data Entry – Option screen) and change the age range to the desired age range in the "analysing children only for".

For analysis by other variables, the filter function on the "**Data Entry Anthropometry**" screen should be used (see Using ENA for Analysis – Filter function).

Text box 11

Differenced between teams

If any particular team has obtained data that is statistically different from the other teams, it is likely that this team's technique has created a systematic bias.

If this happens, and if there is time, the aberrant team's clusters should be re-sampled using a different team and the new data substituted for the aberrant data.

If re-sampling is not feasible within a reasonable time, the data should be analyzed with and without the aberrant clusters, and both results reported with a recommendation from the survey supervisor indicating which result is likely to be more reliable.

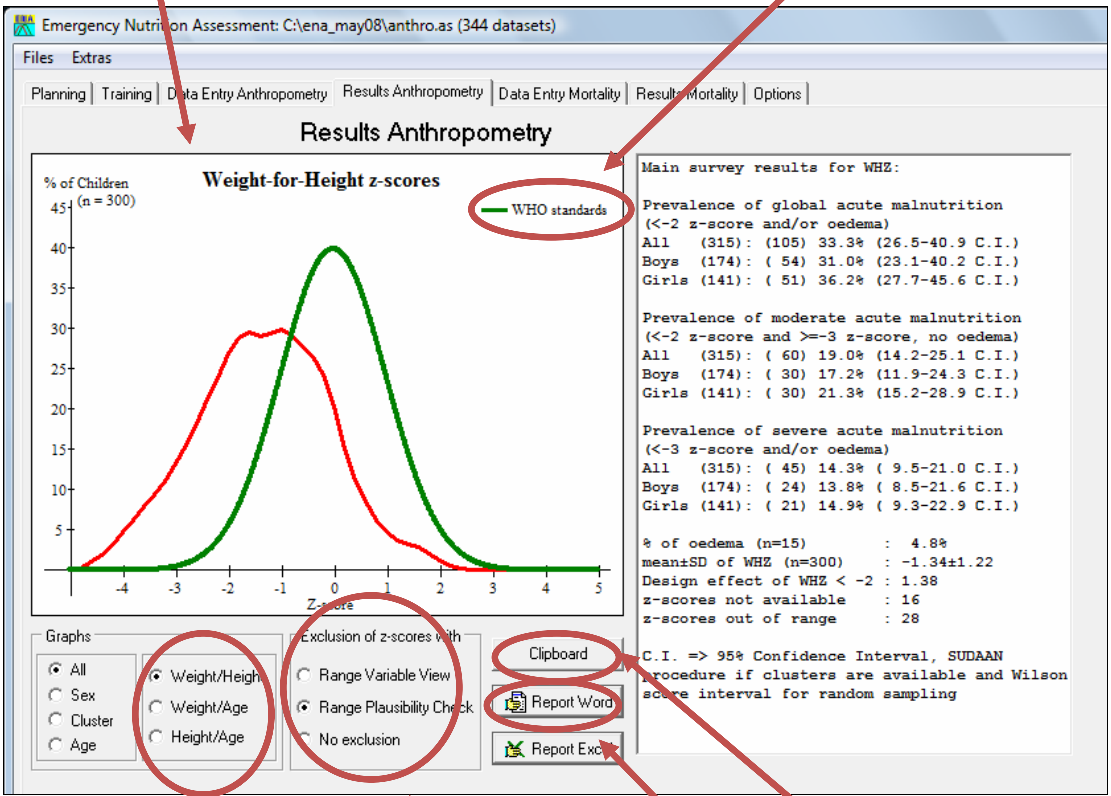
There has to be a full report of such occurrences and how they are resolved (e.g., perhaps the team's equipment is faulty or their training has been inadequate).

Using ENA for Analysis – Results Anthropometry screen

The results for the Anthropometric data are present on the Results anthropometry screen.

This give a visual representation of the data compared to the reference population

This shows which reference data the results are based on. To change between the WHO and NCHS curves, you need to go to the Data Entry Anthropometry screen and select the reference data you wish to use.



Clipboard
This can be used to past/copy the displayed graph into another document

This send the ALL the results to a word document in a report format. If the WHO Standards are selected in **Data Entry Anthropometry** screen then the report will display the results with respect to the WHO curves

By default WFH results are displayed.
To display WFA results just check **Weight/Age** and for HFA check **Height/Age**

It is important that "**Range Plausibility Check**" is selected in order to count how many out of range values in the dataset

Using ENA for Analysis – Results Anthropometry screen (cont)

The results are displayed for the total sample and separately for boys and girls and include prevalence of Global Acute Malnutrition, Moderate acute malnutrition, and severe acute malnutrition with their respective confidence intervals

Total sample size on which the analysis was done on. This value should be included in final report

The number of cases of malnutrition

The prevalence and Confidence Interval

```
Main survey results for WHZ:

Prevalence of global acute malnutrition
(<-2 z-score and/or oedema)
All   (315): (105) 33.3% (26.5-40.9 C.I.)
Boys  (174): ( 54) 31.0% (23.1-40.2 C.I.)
Girls (141): ( 51) 36.2% (27.7-45.6 C.I.)

Prevalence of moderate acute malnutrition
(<-2 z-score and >=-3 z-score, no oedema)
All   (315): ( 60) 19.0% (14.2-25.1 C.I.)
Boys  (174): ( 30) 17.2% (11.9-24.3 C.I.)
Girls (141): ( 30) 21.3% (15.2-28.9 C.I.)

Prevalence of severe acute malnutrition
(<-3 z-score and/or oedema)
All   (315): ( 45) 14.3% ( 9.5-21.0 C.I.)
Boys  (174): ( 24) 13.8% ( 8.5-21.6 C.I.)
Girls (141): ( 21) 14.9% ( 9.3-22.9 C.I.)

% of oedema (n=15)            :  4.8%
mean±SD of WHZ (n=300)        : -1.34±1.22
Design effect of WHZ < -2     : 1.38
z-scores not available        : 16
z-scores out of range         : 28

C.I. => 95% Confidence Interval, SUDAAN
procedure if clusters are available and Wilson
score interval for random sampling
```

The number and prevalence of oedema cases in sample

Design effect of WHZ< - 2
(For cluster sampling)
This shows the actual design effect of the sample. It should be less than the design effect used to calculate the sample size

z-scores not available:

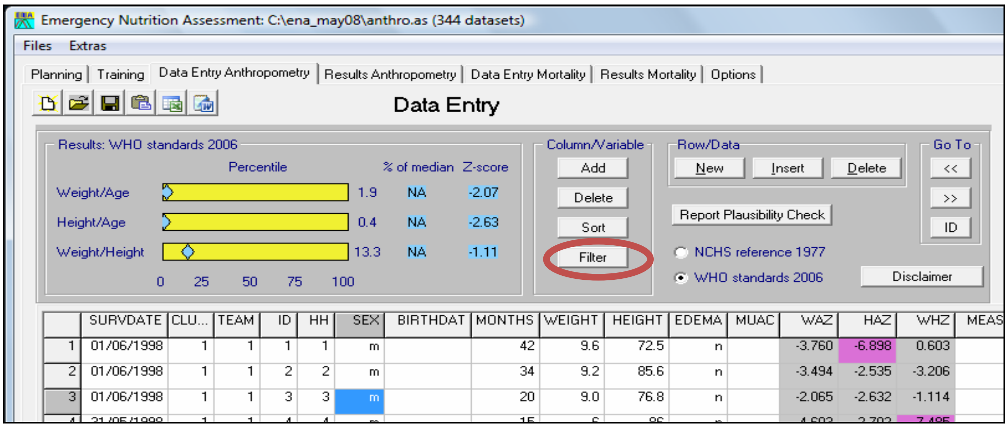
The number of entries for which a z-score could not be calculated due to missing value(s).
This value should be included in the final report.

Z-scores out of range:

This value indicates the number of implausible values i.e. Out of the ± 3 z-scores of the mean.

Using ENA for Analysis – Filter function

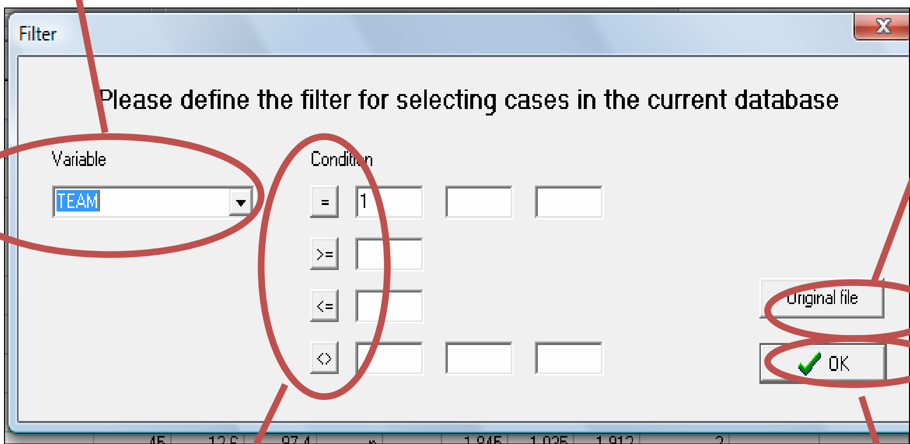
To obtain results based on different variables (per team or cluster etc). Use the **Filter** function on the **Data Entry Anthropometry**.



When you select **Filter**, the following window will appear.

Variable
Select the variable to sort by from the drop-down menu.

To return to the full dataset, click on **Original file**.



Condition

Enter the variable number you which to sort.
In this example the data will be filter to include only results from team 1.

Select **OK** to sort the data

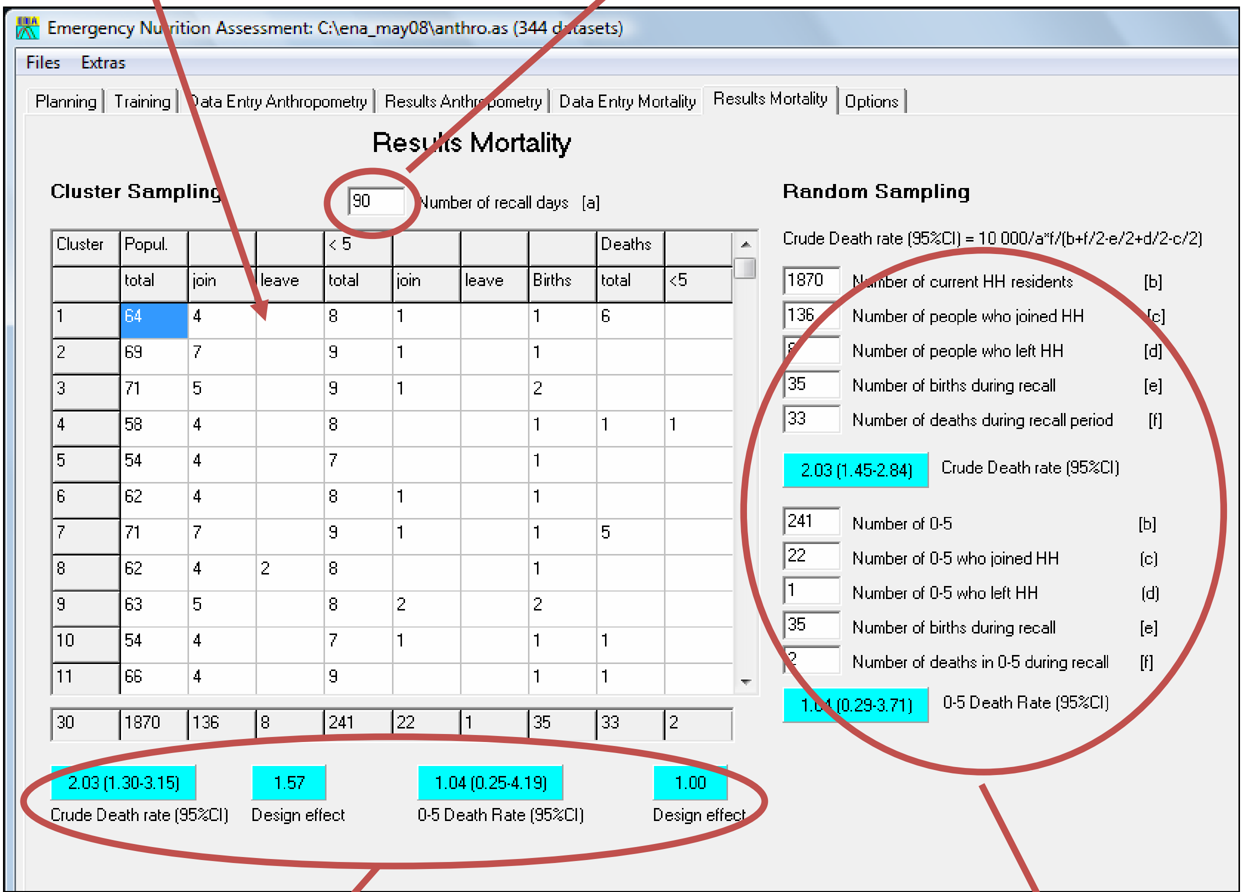
Using ENA for Analysis – Results Mortality screen

The results for the Crude mortality and ASMR-U5 are found on the **Results Mortality screen**

This table provides a summary of the mortality data per cluster for Cluster sampling.

Number of recall days

This is the number of days from the beginning of the recall period to the mid-point of the survey fieldwork.



This gives the CMR and ASMR-U5 with confidence intervals for data using **Cluster Sampling** including the design effect of the sample.

This gives the CMR and ASMR-U5 with confidence intervals for data using **Simple or Systematic Random Sampling**.

These results should NOT be used if cluster sampling is used.

Interpretation of Results

The Inter Agency Standing Committee (IASC) and Standing Committee on Nutrition Task Force on Assessment, Monitoring, and Evaluation recommend a full change to WHO 2005 standards as from June 2009. This depends on sensitization and will vary by country.

Anthropometric Results

Anthropometric results should be interpreted based on the WHO classifications as described below using the WHO standard curves.

Cut offs for acute malnutrition (wasting)

Acute malnutrition based on weight-for-Height in z-scores and percentage of the median

Table 6: Cut off points for acute malnutrition (weight for height)

	Degree of malnutrition	Definition using z-score	Definitions using % of median
Acute	None/Mild	≥ -2.0	≥ 80%
	Moderate	≥ - 3.0 but <-2.0	≥70% but <80%
	Severe	<-3.0 or oedema	<70% or Oedema
Global Acute (GAM)	Moderate + Severe	<-2.0 and/or Oedema	<80% and/or Oedema
Severe Acute (SAM)	Severe	< - 3.0 and/ or Oedema	<70% and/or Oedema

Cut off points for chronic malnutrition (Stunting)

Chronic malnutrition based on Height-for-Age in z-scores and percentage of the median

Table 7: Cut off points for chronic malnutrition (height for age)

	Height for age z-scores	Height for age % of median
Normal/Not Stunted	≥-2 z-scores	≥ 90%
Moderate chronic malnutrition	≥ - 3.0 but <-2.0	≥ 80% and <90%
Severe chronic malnutrition/Severely stunted	<-3 Z scores	<80%
Total chronic malnutrition/Total stunted (moderate + severe)	<-2 Z score	<90%

Cut off points for Underweight

Underweight based on Weight-for-Age in z-scores and percentage of the median

Table 8: Cut off points for Underweight

Description of Nutritional Status	Weight for Age Index Z scores	Weight for Age % of median
Severe Underweight	<-3 Z scores	<70%
Moderately Underweight	≥ - 3.0 but <-2.0	≥ 70% and <80%
Total Underweight (moderate plus severe)	<-2 Z score	<80%
Normal	≥-2 Z-scores	≥ 80%

Using a global classifications of malnutrition

The following classifications for malnutrition have been established by WHO as levels for interpreting WFH, HFA and WFA z-scores (WHO 2002).

For acute malnutrition (wasting), care needs to be taken to assess the context; a prevalence classified as "poor/medium" but which is likely to get worst will have different programmatic implications than a prevalence classified as "serious/high" but where the situation is likely to improve (e.g. impending good harvest).

Table 9: prevalence of malnutrition and interpretation levels

Index	Normal/ Low	Poor/ Medium	Serious/ High	Critical/ Very high
Wasting (GAM)	<5%	5-9.9%	10-14.9%	>15%
Stunting	<20%	20-29.9%	30-39.9%	>40%
Underweight	<10%	10-19.9%	20-29.9%	>30%

Risk of mortality using MUAC

For children taller/greater than 65 cm

Table 10: MUAC cut-offs and risk of mortality

Nutritional Status	MUAC
Severe	**<11.0 cm**
Moderate	**>11.0 and 12.5 cm**
Mild malnutrition	**>12.5 and 13.5cm**
Satisfactory nutritional status	**> 13.5cm**

Note: New WHO standards recommend MUAC < 115 mm as criteria for severe malnutrition among children of age 6 months and above.

Mortality Rates

Table 11: Mortality rates and their interpretation

MORTALITY INDICATOR LEVEL		SUGGESTION
CMR	**ASMR-U5**	
<0.5/10,000/day	<1.0/10,000/day	Normal for stable situations in developing countries.
≥1.0/10,000/day	≥2.0/10,000/day	Very serious situation. Should investigate.
≥2.0/10,000/day	≥4.0/10,000/day	Emergency out of control. Demand immediate actions.

Measles Vaccination Coverage:

In Uganda, the measles vaccination coverage deemed satisfactory is 90% coverage confirmed with and without a child health card.

Although it is still important to document the coverage rate confirmed with a child health card.

Trend Analysis

Comparing like with like

When comparing two surveys to assess the trends in malnutrition or mortality of a given population, it is important to ensure that:

The same target population and areas are covered: The sampling frame can vary considerably between surveys, for example, a survey conducted in an area may only have included refugees or IDPs in camps or it may have excluded areas due to inaccessibility and insecurity. Furthermore, it is important to ensure that there have not been any major migrations in or out of the survey population or significant mortality that could affect the comparability of the population.

Similar methodologies are used: including representative sampling methods, and same definitions of malnutrition (percent of the median or z-score, same age groups, etc): For example, it is not possible to make directly comparison between percent of the median results and z-score results. It is often wrongly assumed that malnutrition expressed in percentage of the median or in z-scores is more or less the same. In reality, large differences can be found between the results expressed in percentage of the median and results expressed in z-scores. Furthermore, with the introduction of the WHO standards care should be taken not to compare results based on the WHO standards with results based on the NCHS references.

Timing: In almost every rural population, seasonal variations in acute malnutrition can be found. Therefore, it is important to take into account the timing of the assessment when comparing surveys. For example when comparing a survey carried out during the hunger gap and another carried out during the time of plenty, it is not possible to assess trends in acute malnutrition rates.

If you have access to the raw data and assuming the field methodology and surveys population and target area are the same, it is worthwhile re-running the data in ENA and generating the results with respect to both the NCHS and the WHO curves.

If this is not possible an algorithm in an Excel spreadsheet has been developed to convert estimates based in NCHS reference into estimates based on WHO standards (see NCH to WHO Algorithm spreadsheet). However it is important to note that the precision of the generated estimates makes conclusion on the differences observed very difficult.

Statistical comparison of malnutrition levels between two surveys

In order to see if there has been a change in the nutritional situation of a population, you need to compare the prevalence of malnutrition between two surveys. A common mistake is to report a change in nutrition status without any evaluation of whether the observed change is real, or merely a sampling artefact.

The simplest way to determine whether two survey results are significantly different is to look at the Confidence Intervals (CIs) for each survey. If the CIs around the prevalence of malnutrition do not touch or overlap, then you can conclude there is a statistically significant difference between the two prevalence surveys. Usually, when the CIs overlap, the difference is not statistically significant.

However, in some cases even if the intervals do overlap a statistical difference may exist. An Excel spreadsheet has been developed to look at the statistical difference of overlapping confidence intervals (see prevalence_difference spreadsheet). Or further statistical tests need to be applied before any conclusion on the differences can be made.

Step 16: Report writing

A nutrition survey report should provide an accurate account of the nutritional situation in a given area for intervention planning, decision-making, and advocacy.

It should contain all the information that allows the reader to understand why the survey was conducted, the methods used, the population to which the results apply, the results themselves, any additional relevant information, and a summary of problems encountered.

The report should always be presented in the standard format developed for all nutrition surveys in Uganda (an example can be found in annex 21).

Step 17: Dissemination

It is important to ensure that the results are disseminated to the relevant people.

All surveys should be handed in to the MoH Nutrition Section for wider dissemination.

Preliminary Results

After data collection, preliminary results should be handed in to the MoH Nutrition section within **2 weeks**. This is to ensure that critical results (such as a high level of acute malnutrition) are acted upon as soon as possible and prevent unnecessary delays in the provision of assistance in emergencies.
The preliminary results should be made up of:

- Brief description of the surveyed area and population.
- Anthropometric data
- Mortality data (CMR and ASMR-U5)
- Any other interested parties

Full Report

A full report should be provided to the MoH Nutrition section within **4 weeks** of data collection.

The MoH Nutrition Section will use the validation check list to assess the validity of the survey (see annex 19). This check list can be used by implementing partner to ensure that all relevant sections of the survey report have been adequately completed.

Following validation, the nutrition survey report should be disseminated to:

- Local authorities of the surveyed area
- The Health, Nutrition and HIV/AIDS cluster group (cluster lead WHO)
- The Food Security and Agricultural cluster (cluster lead FAO)
- The WASH cluster (cluster lead UNICEF).