

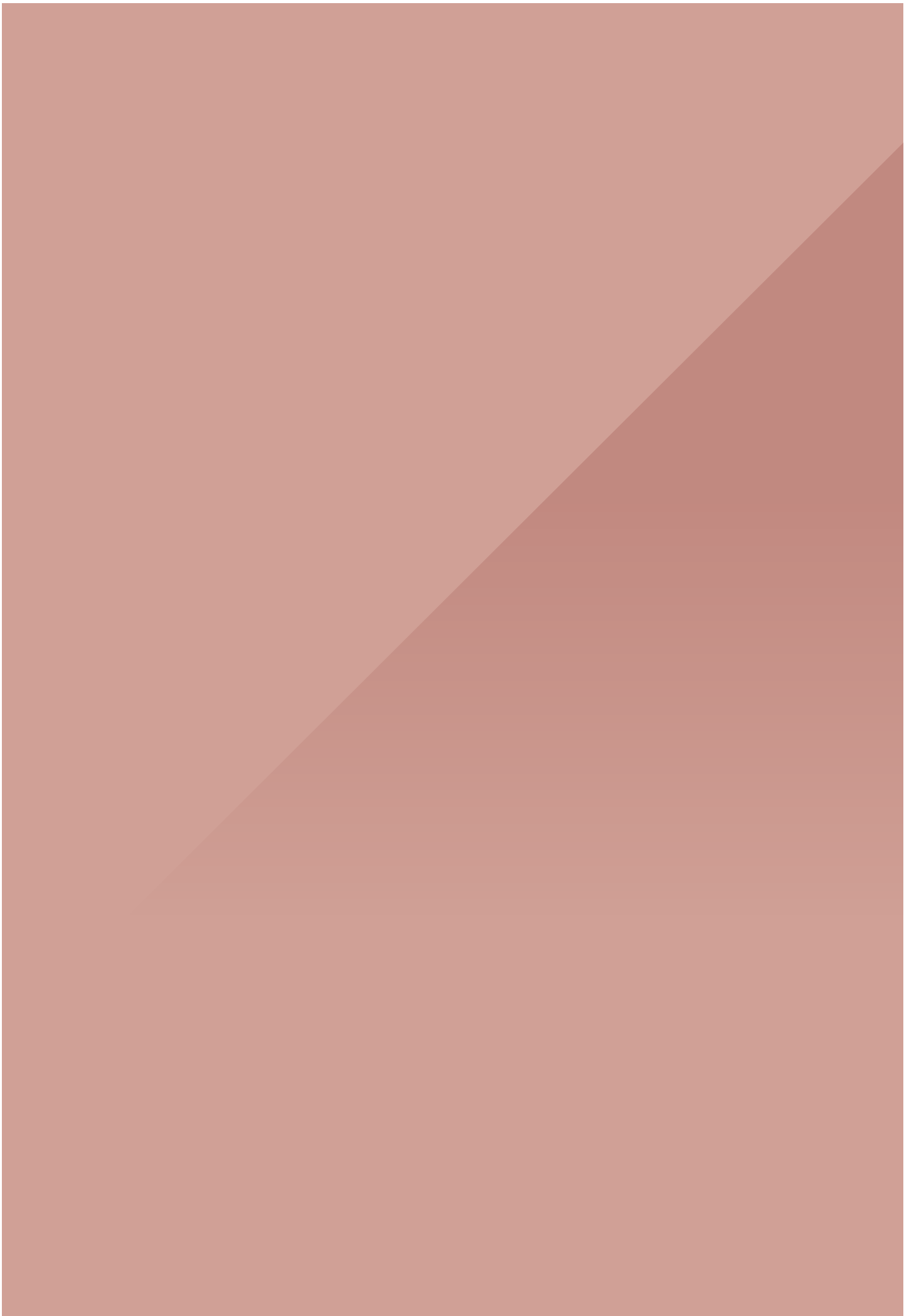
UNHCR
STANDARDISED EXPANDED
NUTRITION SURVEY (SENS) GUIDELINES
FOR REFUGEE POPULATIONS

MODULE 3:
ANAEMIA

A PRACTICAL STEP-BY-STEP GUIDE

VERSION 3 (2018)





UNHCR
STANDARDISED EXPANDED
NUTRITION SURVEY (SENS) GUIDELINES
FOR REFUGEE POPULATIONS

MODULE 3:
ANAEMIA

A PRACTICAL STEP-BY-STEP GUIDE

VERSION 3 (2018)

Table of Contents

KEY MESSAGES	4
DEFINITION OF SOME KEY TERMS	5
OBJECTIVES AND TARGET GROUPS	6
DATA COLLECTION	9
MEASUREMENT METHODS	9
MATERIAL NEEDED	10
CASE DEFINITION	11
ETHICAL CONSIDERATIONS	12
STANDARD PROCEDURE AND QUALITY ASSURANCE	12
TRAINING	21
THEORETICAL COMPONENT	21
PRACTICAL COMPONENT	22
QUESTIONNAIRE AND INSTRUCTIONS	23
DATA REVIEW	29
DAILY QUESTIONNAIRE CHECK	29
DATABASE CHECK	29
PRESENTATION OF RESULTS	31
RESULTS TABLES AND FIGURES	31
DATA ANALYSIS	38
ANALYSIS PROCEDURES	38
COMMON ERRORS AND CHALLENGES IN DATA ANALYSIS	41
USE OF RESULTS	42
CLASSIFICATION OF PUBLIC HEALTH PROBLEM AND TARGETS	42
POSSIBLE CAUSES OF ANAEMIA	42
RECOMMENDATIONS	44

ANNEX 1- ORDERING INFORMATION.	46
ANNEX 2- SENS QUESTIONNAIRES.	47
ANNEX 3- REFERRAL FORM.	49
ANNEX 4- ANAEMIA QUALITY ASSURANCE LOGSHEET.	52
ANNEX 5- TROUBLESHOOTING GUIDE (HEMOCUE 301)	53
ANNEX 6- ANAEMIA TEST FOR SURVEYORS.	55
ANNEX 7- STANDARDISATION EXERCISE.	57
ANNEX 8- EPI INFO DATA ENTRY.	59
ANNEX 9- EPI INFO ANALYSIS.	62

Key messages

- Data on the prevalence of anaemia is essential to collect in refugee settings for monitoring purposes. This module is only intended to be used for assessing anaemia status of populations through SENS surveys and is distinct from assessment in a clinic or hospital.
- Data should be collected on the prevalence of anaemia among children aged 6-59 months and non-pregnant women of reproductive age (15-49 years). Although rare, other age groups are sometimes also included when justified.
- Standard questionnaires should be used for the collection of anaemia data.
- Standard methods should be followed for measuring haemoglobin (Hb) using the HemoCue machine and for standardising the process to maintain the quality, reliability and usability of the results.
- Hb concentrations should be reported in g/dL for consistency purpose. Prevalence of anaemia should be reported by categories (mild, moderate and severe). Overall prevalence of anaemia in children 6-59 months should be reported using two cut offs: Hb<11 g/dL and Hb<10 g/dL¹.
- Providing good quality training to survey teams collecting Hb data, supervising them well, and checking the quality of the equipment and measurements on a regular basis throughout the survey will help ensure that the anaemia data are reliable.
- There are standard ways of reporting anaemia results that should be followed in all SENS survey reports produced in refugee contexts.

¹ Currently it is recommended to track anaemia defined as Hb<11 g/dl. At the time of writing, WHO was in the process of undertaking a consultation process to review its global guidelines for haemoglobin thresholds used to define anaemia at the individual and population level.

Definition of some key terms

Anaemia: a condition caused by a reduced Hb concentration in the blood (i.e. decrease in number of red blood cells). This results in reduced oxygen-carrying capacity, and may lead to reduced aerobic activity in the body's cells.

Antenatal Care Clinic: commonly referred to as ANC. Those clinics provide care and follow-up for pregnant and lactating women.

Haemoglobin: the oxygen-carrying part of red blood cells. The amount of haemoglobin (Hb) in blood is typically expressed in g/dL (grams of Hb per decilitre of blood). It is also sometimes expressed in g/L (grams of Hb per litre of blood).

HemoCue: portable device used to measure Hb concentration in the blood.

Iron deficiency: not enough iron in the body can result in iron deficiency anaemia because iron is necessary to make Hb. Iron deficiency is due to inadequate dietary iron and blood loss.

Iron-folic acid supplements: supplements provided to pregnant women. WHO recommends daily oral iron and folic acid supplementation with 30mg to 60mg of elemental iron and 400µg of folic acid for pregnant women to prevent maternal anaemia, puerperal sepsis, low birth weight and preterm birth.

Objectives and target groups

- The standard target groups to routinely include in an anaemia assessment in refugee contexts are: children aged 6-59 months and non-pregnant women of reproductive age between 15-49 years (including lactating women²).

Objectives should be worded as follows in the survey protocol and report:

Primary objective:

- To measure the prevalence of anaemia in children aged 6-59 months *and* in women of reproductive age between 15-49 years (non-pregnant).

Secondary objective:

- To determine enrolment into Antenatal Care Clinic and coverage of iron-folic acid supplementation in pregnant women.

Things to note:

- There will be Antenatal Care Clinic (ANC) in most refugee settings to take care of and follow-up on pregnant and lactating women. A SENS survey is a good opportunity to ask about enrolment of the surveyed pregnant women into the ANC running in the area and ask if they are receiving iron-folic acid supplementation. This will only provide a rough estimation of the coverage of such programmes due to the small sample size of pregnant women found during SENS surveys, but can still highlight problems. This is why this objective should always be worded as a secondary objective.
- **Sample size requirements for SENS anaemia assessment in children aged 6-59 months:** Select one of the scenarios outlined in **Table 1** below based on the survey design and the number of children aged 6-59 months calculated with ENA for SMART software.

² Anaemia cut-offs for pregnant women should be adjusted depending on the stage of pregnancy. In surveys, gestational age is difficult to ascertain and rarely collected. Because of these difficulties and the small sample size, pregnant women are not included in nutrition surveys for the assessment of anaemia in refugee settings.

TABLE 1 SAMPLE SIZE REQUIREMENTS FOR SENS ANAEMIA ASSESSMENT IN CHILDREN AGED 6-59 MONTHS

Survey design	Children anaemia scenario	Module 2 (Anthropometry and Health) sample size children 6-59 months (calculated using ENA for SMART software)	Module 3 (Anaemia) sample size children 6-59 months
Cluster sampling	1	≤600 children	Assess all eligible children found in all randomly selected households for anaemia.
	2	>600 children	Half of the sampled households (sub-sample) should be randomly selected and all eligible children found in these households should be assessed for anaemia.
Simple or systematic random sampling	3	≤400 children	Assess all eligible children found in all randomly selected households for anaemia.
	4	>400 children	Half of the sampled households (sub-sample) should be randomly selected and all eligible children found in these households should be assessed for anaemia.

- **Sample size requirements for SENS anaemia assessment in women of reproductive age (15-49 years):**
The sample size should be selected according to one of the scenarios below.

i. **Women anaemia scenario 1:** *You need to measure the prevalence of anaemia in women of reproductive age (15-49 years) for surveillance purposes but you do not need to assess the impact of an intervention and are not planning to intervene with a direct anaemia intervention (e.g. blanket iron supplementation to all women) in the immediate future:*

- With any survey design, half of the sampled households (sub-sample) should be randomly selected and all eligible women found in these households should be assessed for anaemia.

ii. **Women anaemia scenario 2:** *You are planning to implement/have been implementing a direct intervention (e.g. blanket iron supplementation to all women) to reduce anaemia in women of reproductive age (15-49 years) and you need to assess the baseline prevalence and impact of the intervention:*

- With any survey design, follow the same sampling scenario used in children for anaemia assessment (see **Table 1** above).

- Collect anaemia data on other age groups if necessary and if feasible, as outlined in **Table 2**. **Contact UNHCR HQ / Regional Offices for further guidance on assessing these groups.**

TABLE 2 SAMPLING ADDITIONAL, OPTIONAL AGE GROUPS

Target group	When	Advantages	Challenges
School-aged children	<ul style="list-style-type: none"> if an iron intervention is planned to be targeted at school-aged children and needs and / or impact have to be assessed Or if there are good reasons to believe there may be a widespread problem in this age group. 	<ul style="list-style-type: none"> knowledge about the prevalence to target prevention activities. 	<ul style="list-style-type: none"> may be difficult to find enough eligible children if school attendance is high. In this situation, consider sampling from schools.
Adolescents 13-18 years	<ul style="list-style-type: none"> if an iron intervention is planned to be targeted at adolescent girls and needs and / or impact have to be assessed Or if there are good reasons to believe there may be a widespread problem in this age group. 	<ul style="list-style-type: none"> knowledge about the prevalence to target prevention activities. 	<ul style="list-style-type: none"> may be difficult to find enough adolescent girls if school attendance is high. In this situation, consider sampling from schools.
Pregnant women	<ul style="list-style-type: none"> if the prevalence of anaemia in pregnant women needs to be known for advocacy purposes for example to initiate or improve ANC services such as iron and folic acid supplementation. 	<ul style="list-style-type: none"> knowledge about the prevalence to target prevention activities. 	<ul style="list-style-type: none"> the appropriate cut-offs for anaemia depend on the gestational age of the pregnancy so calculating an accurate prevalence is not straightforward. may be difficult to find enough pregnant women to reach the minimum required sample size. in some cultures, some women may be reluctant to admit that they are pregnant; some women may not know that they are pregnant early in pregnancy.

Data collection

Measurement methods



Haemoglobin concentration in children 6-59 months and women 15-49 years: Hb concentration is taken from a capillary blood sample from the fingertip and recorded to the closest gram per decilitre (g/dL) or gram per litre (g/L) by using the portable HemoCue machine. Note that the unit of measure cannot be changed in the Hemocue 301 machines and hence, it is highly recommended to purchase and use Hemocue machines giving the units in g/dL since this is the unit to be used for reporting results (more details shown below). If severe anaemia is detected, the measurement may be repeated for confirmation purpose.

Age of children 6-59 months and women 15-49 years: exact date of birth or month and year of birth calculated using local events calendar should be recorded for children. Refer to **Module 1** (Anthropometry and Health) for information on collecting children's age. For women, the exact date of birth is not recorded; reported age is recorded in years.


Pregnancy status: Hb concentration is affected by pregnancy and therefore it is necessary to know whether the surveyed woman is pregnant or not. In addition, this information is linked to the household information on mosquito net utilisation (see **Module 6** on mosquito net coverage). A verbal confirmation is sufficient for the purpose of the SENS survey.

ANC enrolment and iron-folic acid pills coverage: it is standard to enrol a pregnant woman in an ANC programme and to distribute iron and folic acid supplements to women in the second and third trimester of pregnancy. Women may also receive supplements during lactation in many refugee operations. Verbal confirmation is sought on whether the woman is currently enrolled in the ANC programme and is receiving any iron-folic acid pills.

Material needed

- A supplies planning tool is provided to help in calculating the amount of equipment and supplies needed and to estimate the overall cost. See SENS Pre-Module tool: [**Tool 10-** Survey Supplies Planning Tool]. 
- A list of international suppliers is provided in **Annex 1**.
- The Anaemia SENS questionnaire for children 6-59 months is shown in **Annex 2** and for women in **Annex 3**. See SENS Pre-Module tools: [**Tool 11-** Full SENS questionnaire] and [**Tool 12-** Full SENS Questionnaire with Instructions]. 

Things to note:

- During data collection in MDC surveys, the anthropometric and haemoglobin measurements in children aged 6-59 months and women should be recorded in the SENS Pre-module SENS tool: [**Tool 14-** Participants and measures control sheet]. This allows surveyors to avoid registration mistakes and/or missing data. This tool also allows survey manager and/or supervisors to verify the recorded data within each questionnaire and possibly correct or complete missing and/or aberrant data. 

Haemoglobin concentration measurements:

- HemoCue Hb 301 Analyser and Analyser cases and inserts
- Safety lancets (sizing of at least 2.25mm)
- HemoCue microcuvettes 301
- HemoCue cleaning spatula (for cleaning interior of HemoCue machine)
- Eurotrol Hb 301 Control solutions: high, low, normal (for quality control of the entire HemoCue system i.e. both HemoCue machine and microcuvettes; this check is different than the internal electronic self-test)
- Cotton balls and antiseptic or alcohol swabs
- Latex gloves
- Sticking plasters / band aids (optional)
- Gauze pad or tissue paper (for wiping blood drop)
- Biohazard waste containers (for sharps and contaminated supplies)
- Spare batteries (for HemoCue machine)
- Technical forms for MDC surveys. Paper questionnaires for paper-based surveys (always carry extra copies)
- Referral forms to refer severely anaemic children and women for treatment³.

³ Referral and treatment for anaemia should follow local treatment standards.

Case definition

- Anaemia is said to exist when the level of circulating Hb in the patient is lower than that of healthy persons of the same age group and sex in the same environment. The most common type of anaemia is due to iron deficiency resulting from inadequate iron intake from foods.
- Hb concentrations should be reported in g/dL for consistency purposes. Hb levels should be categorised according to WHO recommended cut-offs (shown in **Table 3**) to determine the prevalence of anaemia (mild, moderate and severe).
- In SENS reports, overall prevalence of anaemia should be reported using two cut offs: Hb<11 g/dL and Hb<10 g/dL. At the time of writing, WHO was in the process of undertaking a consultation process to review its global guidelines for haemoglobin thresholds used to define anaemia at the individual and population level.

TABLE 3 DEFINITION OF ANAEMIA – WHO RECOMMENDED CUT-OFFS

Age/Sex groups	Categories of Anaemia* (Hb g/dL)			
	Total	Mild	Moderate	Severe
Children 6-59 months	< 11.0	10.0-10.9	7.0-9.9	< 7.0
Non-pregnant adult females 15-49 years**	< 12.0	11.0-11.9	8.0-10.9	< 8.0
Pregnant Women***	< 11.0	10.0-10.9	7.0-9.9	< 7.0

Source: WHO (2000) The Management of Nutrition in Major Emergencies. Values are given for a population living at sea level.

*These categories are for people living at sea level. At elevations above 1000m, Hb concentrations increase as an adaptive response to the lower partial pressure of oxygen and reduced oxygen saturation of blood. The compensatory increase in red cell production ensures that sufficient oxygen is supplied to tissues. Refer to SENS Anaemia tool for guidance on how haemoglobin is corrected for altitude: [Tool 5- Hb Adjustment for altitude].

**This category includes lactating women.

***Anaemia cut-offs for pregnant women should be adjusted depending on the stage of pregnancy. In surveys, gestational age is difficult to ascertain and rarely collected. Because of these difficulties and the small sample size, pregnant women are not included in nutrition surveys for the assessment of anaemia in refugee settings.

Ethical considerations

Referral process for severely anaemic individuals should be done as follows:

- A standard questionnaire will be administered with the consent of the householder. Refer to **SENS Pre-Module Step 13** for guidance on approaching households and seeking informed consent.
- The participants should be referred for treatment if found to be severely anaemic according to the local treatment standards (if treatment facilities are available). If referring patients, the agreement of the health facilities should be obtained before the survey starts (**severe anaemia cases need urgent follow-up**).
- Severely anaemic participants should be given a paper referral slip to take with them to the health facility. Refer to **Annex 4** for an example of a referral slip to use during the survey.

Standard procedure and quality assurance

- Use the **HemoCue Hb 301 Analyser**, instead of the HemoCue B-Haemoglobin or HemoCue 201, as it is more suited for field conditions.
- Once the seal of the microcuvette container is broken, the microcuvettes are stable for three months *only*.
- Do not use microcuvettes if the container has been opened for more than three months. (Tip: write the date of opening on the container).
- Record the Hb results according to the unit given by the HemoCue machine; it will be either grams per decilitre (g/dL) or grams per litre (g/L). Note that it is highly recommended to purchase and use HemoCue machines giving the units in g/dL.
- Use g/dL as the unit for reporting Hb measurement results in the final SENS report.
- Equipment and supplies should be carried in a back pack with great care (similar to a laptop computer). The HemoCue machine should be carried in its hard-cover case with an insert to ensure safe transport and protection from dust and moisture. (Tip: an Analyser case and insert can be ordered from the manufacturer of HemoCue).



FIGURE 1 HEMOCUE HB 301 ANALYSER, MICROCUVETTES, CARRY CASE, AND SAFETY LANCETS


Things to watch out for:

- Even if left unopened, HemoCue microcuvettes have a shelf life after time of manufacturing (2 years). When placing the order, be sure to ask the manufacturer the expiry date of the boxes that will be shipped.
- Use only one type of HemoCue machine in a survey to avoid any confusion and mixing up of microcuvettes that are not compatible (microcuvettes for HemoCue 201 cannot be used in a HemoCue 301 machine).
- Ensure to use an Analyser carry case with insert to transport the HemoCue machines and the supplies. This will ensure the supplies are well protected from dust and moisture.

The following procedures need to be followed during the survey by the survey manager:

- **Check microcuvette container daily:** check the microcuvette containers of each team to ensure that enough are left for conducting the Hb tests for the day. If not, ensure the survey team carries additional microcuvettes with them.
- **Inspect HemoCue machine daily:** visually inspect the HemoCue machine of each team to ensure that it is clean. If not, follow the cleaning procedures described in **Box 1**.

- **Clean microcuvette holder (when needed):** visually inspect the HemoCue microcuvette holder of each team to ensure that it is clean. If not, follow the cleaning procedures described in **Box 2**.
- **Check function of HemoCue machine at least twice during the survey (baseline and mid-point):** a control of the total system i.e. both photometer and microcuvette, should be performed with liquid control solutions before the survey and at mid-point; this check is different than the self-test of the machine itself mentioned below. Control solution (Eurotrol Hb 301 Control) results should fall within assigned ranges. Record the results in a Quality Assurance Logsheet for each HemoCue machine used in the survey. For an example of a form to use for this purpose, see **Annex 5** or see SENS Anaemia Module tool: [**Tool 1- Anaemia Quality Assurance Logsheet**]. If there is a problem, replace the HemoCue machine for the rest of the survey immediately and inform HQ or the regional office, who will provide some further guidance. 
- **Understand error codes:** the HemoCue 301 Analyser has an internal electronic self-test; this self-test is automatic and is only done on the machine (and not on the microcuvette) and is meant to complement the check with the control solutions. Every time the analyser is turned on, it will automatically verify the measurement performance. This test is performed at regular intervals if the analyser remains switched on. Upon passing the self-test, the display will show the HemoCue symbol and three flashing dashes, indicating that the analyser is ready to perform a measurement. An error code will be displayed if this self-test fails. Refer to the troubleshooting guide in **Annex 6** to see a description of error codes and action to be undertaken in case of problem or see SENS Anaemia Module tool: [**Tool 2- Troubleshooting Guide HemoCue 301**]. If you are unable to resolve the problem by following the guide, replace the HemoCue machine for the rest of the survey immediately and inform HQ or the regional office, who will provide some further guidance. 

BOX 1: CLEANING PROCEDURES FOR HEMOCUE MACHINE

- Wipe the exterior of the HemoCue machine with a damp cloth that has been rinsed in soap and water. Ensure the cloth is not too wet before wiping the machine.
- **Never** use soap and water on the interior of the HemoCue machine. Use the HemoCue cleaner (spatula) for cleaning the interior of the machine.
- Record that the HemoCue machine was cleaned in the Anaemia Quality Assurance Logsheet (SENS Anaemia Module **Tool 1**).

FIGURE 2 HEMOCUE CLEANER (SPATULA)



BOX 2: CLEANING PROCEDURES FOR MICROCUVETTE HOLDER

- Wear gloves and gently remove the microcuvette holder from the machine.
- Wipe the microcuvette holder with a disinfectant solution.
- Allow it to air dry completely or dry it completely with gauze if necessary before re-inserting it in the HemoCue machine.
- Record that the HemoCue machine was cleaned in the Anaemia Quality Assurance Logsheet (SENS Anaemia Module **Tool 1**).

*The following procedure needs to be followed to **stick a finger**:*

- **Explain procedure:** briefly explain the procedure and explain that they may experience a pain from the finger prick. Explain that the benefits to participants will be that their anaemia status will be known and that they will be referred to the health clinic if they are found to be severely anaemic. If the participant is uncomfortable with the procedure, answer any questions s/he may have. Ensure that the participant knows that s/he is free to withdraw from the survey at any time and that nothing bad will happen if s/he does.
- **Prepare workstation:** put on a new pair of gloves and layout all the supplies to be used for the measurement on a piece of paper roll. Close the microcuvette container immediately after taking out the microcuvette. In very hot climates (more than 40 °C), do **not** leave the microcuvette out of the container for longer than five minutes and transport the HemoCue machine and microcuvettes in cool boxes whenever available.
- **Ensure correct position of participant:** face the participant and, if you are right-handed, position yourself to be able to comfortably hold the participant's finger with your left hand while using your right hand to hold the lancet or microcuvette (reverse if you are left-handed). A young child who is tested should be seated on the mother's or caregiver's lap, and be provided with reassurance and distracted during testing.
- **Hold participant's hand:** do not hold the participant's hand so tightly so as to obstruct blood flow.
- **Select finger:** choose the participant's middle or ring finger for the finger stick. The selected finger should not be swollen and should be minimally callused. Remove any rings that are on this finger because the ring might interfere with blood flow. Rings on other fingers do not have to be removed unless they are in the way of the tester.
- **Check finger:** feel the participant's fingers for warmth. If the fingers are cold, rub the fingers vigorously. If warm water is available, you can also warm them by washing them in the warm water.
- **Massage finger:** hold the participant's finger for the finger stick. Use a rolling motion to gently massage the finger from the top of knuckle towards the fingertip to increase blood flow.
- **Disinfect finger:** clean the participant's fingertip with an antiseptic and allow to air dry.
- **Hold finger:** hold the participant's finger and apply gentle pressure to firm the skin so that the lancet will go deeper into the finger.
- **Place lancet:** hold the lancet between two fingers and rest the thumb on the needle trigger. Place the lancet on the side of the fingertip rather than on the pad of the fingertip (this will especially help in case fingers are heavily callused).

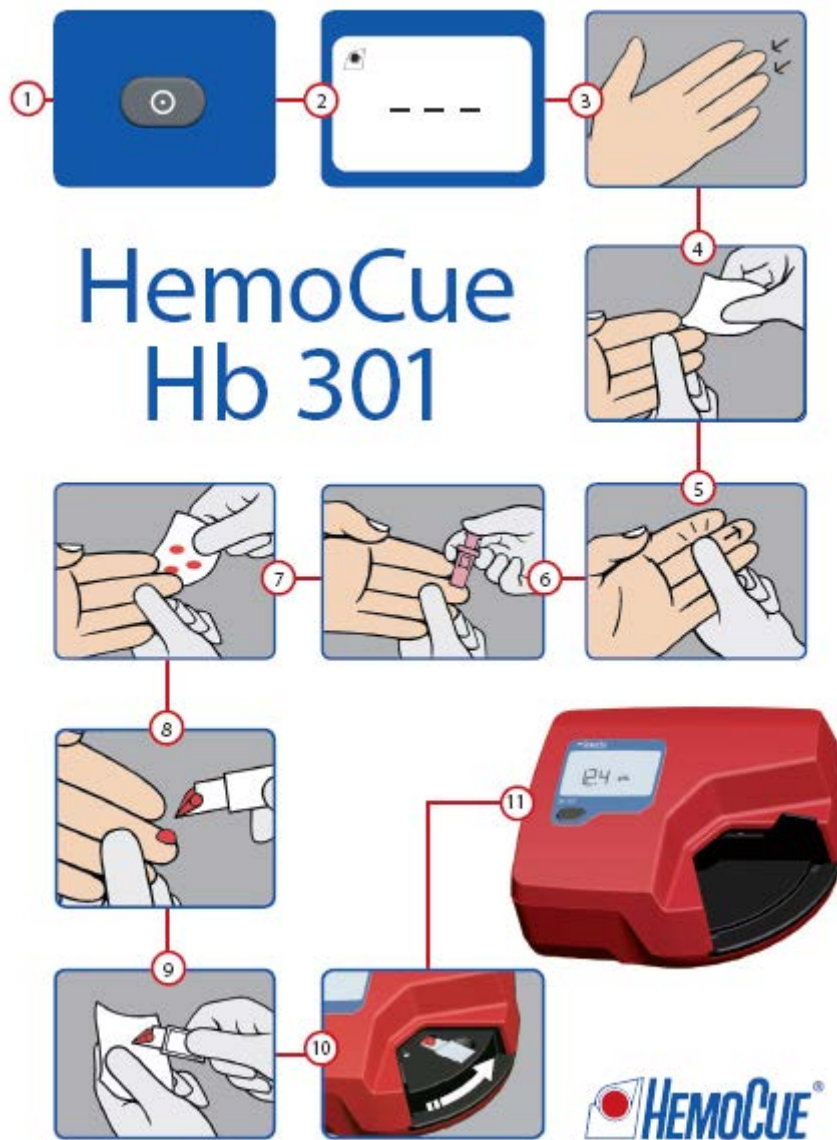
- **Stick finger:** use a rolling motion to massage the participant's finger even more from the top of knuckle towards the fingertip to increase blood flow. Push firmly the lancet against the participant's skin before triggering the needle with your thumb. Dispose of the lancet immediately after use in a biohazard waste container.
- **Initiate blood flow:** apply gentle pressure to the wrist, palm and top of knuckle to initiate blood flow. Do **not** squeeze or rub the tip of the finger because you may dilute the blood drop with interstitial fluid.

*The following procedure needs to be followed to **fill the microcuvette** after the finger has been pricked:*

- **Wipe away 1st and 2nd blood drop:** using a clean **dry** gauze pad or tissue paper, wipe away the first two drops of blood. **Do not wipe away the drops with alcohol.**
- **Sample 3rd drop:** sample the third drop of blood. The drop of blood should be large enough to fill the microcuvette in one touch. Note that the HemoCue 301 instructional movie mentions sampling the 4th drop. **It is acceptable and recommended to sample the 3rd drop of blood unlike what is shown in the HemoCue 301 movie demonstration.**
- **Fill microcuvette:** hold the finger in one hand. Touch the tip of the microcuvette into the middle of the blood drop and fill the microcuvette completely with a single drop of blood in one step. The microcuvette fills itself by capillary action.
- **Inspect microcuvette:** inspect the microcuvette for air bubbles and check if it is completely filled by holding it up to the light. If you see air bubbles, discard the microcuvette. If you see that it is not completely filled, discard the microcuvette. **Never refill a partially filled microcuvette with the same drop of blood** because the blood may have started to clot and will give an incorrect reading. If a new microcuvette is needed, refill a new microcuvette from a new blood drop from the same finger puncture if feasible. Otherwise, you may have to make a new prick. If you do need to make another prick, you should use another finger.
- **Wipe off excess blood:** carefully wipe off any excess blood from the flat sides of the microcuvette with a clean dry gauze pad or tissue paper. Make sure that no blood is sucked out of the microcuvette while wiping it.
- **Place microcuvette in holder:** immediately place the filled microcuvette into the microcuvette holder and read the microcuvette within three minutes of sampling.
- **Slide holder:** gently slide the microcuvette holder into the machine until the stop point is reached. Do not 'slam' the holder into position for reading. This may spray blood droplets, which negatively affects the reading.
- **Apply a cotton ball or sticking plaster:** while the HemoCue machine is reading the sample, apply a cotton ball or a plaster to the puncture wound on the participant's finger.
- **Record reading:** after a few seconds, the Hb value will appear on the display. Record this value.
- **Dispose of the microcuvette:** dispose of the microcuvette immediately in the biohazard waste container after reading it.

- Dispose of gloves and contaminated material:** dispose of the gloves and contaminated supplies in the biohazard waste container. All blood samples and contaminated supplies should be handled with extreme care because blood is a potential source of infection with HIV, Hepatitis B and C Virus and other blood-borne pathogens.

FIGURE 3 STANDARD PROCEDURE USING THE HEMOCUE




*This checklist should be followed by survey workers to **protect themselves and the survey population from exposure to blood**:*

- **Wash your hands:** always wash hands with soap and water at the start and end of the workday (or before and after each break) and dry hands with a clean paper towel.
- **Cover your cuts:** cover all cuts with bandages to prevent any possibility of blood from survey population coming into contact with any cuts.
- **Wear gloves:** always wear well-fitting disposable latex gloves when sampling blood to protect against exposure to blood. Gloves must be worn during Hb measurement until all specimens and materials are disposed of. Gloves must be disposed of as bio hazardous waste. Gloves must be never reused! Always order large size for men and medium size for women. The sample collector must have the correct size of glove for them to use.
- **Use new pairs of gloves for each participant:** always change gloves after collecting blood from each participant and dispose of the gloves at the end of the testing in the biohazard waste container.
- **Avoid penetrating injuries:** although gloves can prevent blood contamination, they cannot prevent penetrating injuries caused by the instruments used for finger sticks. It is highly recommended to use self-retractable single-use lancet devices to reduce the risk of penetrating injuries. Lancets should not be used for purposes other than a single finger stick to collect blood for the anaemia testing. The lancets should not be broken or destroyed for curiosity or other purposes. Immediately after the testing is completed, the devices should be placed in a puncture-resistant biohazard waste container for further disposal.
- **Clean up blood spills:** immediately clean up any blood spills with an antiseptic so that survey workers and participants do not touch any blood.
- **Disposal in biohazard waste:** all materials coming in contact with blood must be placed in bio hazardous waste containers after use and disposed of according to standards. Immediately dispose of any tissue paper, gloves, gauze pads, used lancets, microcuvettes and other supplies that have been in contact with blood in the biohazard waste container.
- **Labelling of bio hazardous waste containers:** the bio hazardous waste containers must be labelled '*biohazard*'. Take precaution when storing and transporting the waste containers during the fieldwork, and establish procedures to ensure proper disposal of all waste products.
- **If an accident occurs:** any skin surfaces or mucous membranes that come in contact with blood must be immediately and thoroughly washed with a large amount of water and soap. The survey manager is to be contacted immediately.
- **No eating and drinking during blood collection:** eating and drinking may distract from the procedure and are not permitted during blood collection.

Things to watch out for:

- **Table 4** describes the most common errors experienced by survey workers in data collection.

TABLE 4 COMMON ERRORS EXPERIENCED IN DATA COLLECTION

Common error	Description	Solution
Improperly stored microcuvettes	Improperly stored microcuvettes should not be used for testing. Microcuvettes should not be kept in unsealed containers for longer than 3 months.	The containers must be kept closed when not in use to avoid exposure to moisture.
Not setting-up properly	Not preparing all needed materials before testing a participant may affect the quality of the reading.	Place a microcuvette, cotton ball with antiseptic solution or alcohol swab, a gauze pad or tissue paper, and a lancet on a 'work station'; turn on HemoCue machine; pull out microcuvette holder to 'locked' position so that digital screen is ready; put on latex gloves.
Removing microcuvette from container with fingers wet with alcohol	This can result in alcohol coming into contact with the microcuvette; thus the selected microcuvette as well as others inside the container can be destroyed.	Take the microcuvette out of its container before handling a wet alcohol swab.
Underfilling the microcuvette	<p>The microcuvette is only partially filled or only the red circle of the microcuvette is filled with blood. Never use an under filled microcuvette and never refill a partially filled microcuvette with same drop of blood because the blood may have started to clot and will give an incorrect reading.</p> 	Refill a new microcuvette from a new blood drop from the same finger puncture if feasible. Otherwise, you may have to make a new prick. If you do need to make another prick, you should use another finger.
Mixing alcohol with blood drop	Not letting finger to dry completely after disinfecting with alcohol will give a faulty reading. Even a trace of alcohol getting into the microcuvette will affect the reading.	Allow finger to air dry after wiping with alcohol.
Shallow finger puncture	A finger puncture that is too shallow because lancet was not properly placed or not enough pressure was placed while releasing the lancet will restrict blood flow.	A deep puncture done with a quick stab will result in better blood flow and more rapid completion of the test.
Obstructing blood flow	Restricting blood flow to the participant's fingertip following the finger stick because the finger is held tightly will affect testing.	Release the participant's finger after the stick to allow blood flow; also hold the participant's hand without squeezing and restricting blood flow to the fingertip.

Common error	Description	Solution
'Milking' the finger	Excessive massaging or squeezing of the finger will cause tissue juice (interstitial fluid) to mix with and dilute the blood. This will result in erroneous test results, particularly in yielding low levels of Hb concentration in the blood.	A good finger stick should result in spontaneous blood flow, negating the need to apply pressure to the finger. If stimulating blood flow is needed, apply gentle pressure with your thumb on the opposite side of the participant's finger from the puncture site.
Using the wrong drop of blood	Not appropriately wiping off the first two drops may result in an unrepresentative blood sample being tested.	Firmly wipe off the first two large blood drops. Firm wiping will stimulate blood flow. Discarding the first two large drops will allow flow of a representative blood sample.
Air bubbles in microcuvette	Holding the microcuvette in inverted position (slit facing down) during filling can lead to air bubbles being trapped resulting in erroneous reading.	Hold the microcuvette with the slit facing up and the pointed tip touching the blood drop.
'Topping off' the microcuvette	'Topping off' a partially filled microcuvette with repeated blood collection will result in erroneous measurement. Red cells of blood introduced later will not be adequately analysed.	Allow a large blood drop to form on the participant's finger so that it will completely fill the microcuvette in one motion. Once filled, hold the microcuvette in place for about 2-3 seconds longer to ensure complete filling.
Blood on outside of microcuvette	Not cleaning off blood on outside of microcuvette before testing can result in erroneously high reading.	Wipe off excess blood from sides of microcuvette using a 'butter knife' motion to ensure that blood from inside the microcuvette is not removed.
Inadequate placement of the microcuvette	'Slamming' the microcuvette holder into place can lead to blood drops spattering inside the reading chamber. This action can damage the reader.	Push the microcuvette holder gently into position. Clean the microcuvette holder with an alcohol swab or disinfectant solution, and completely dry before testing. Clean the interior of the HemoCue machine with a spatula according to the procedure described in SENS Anaemia tool: [Tool 1- Quality Assurance Logsheets].
Not referring the severely anaemic participants according to local treatment standards	The participant is diagnosed as severely anaemic and the surveyors do not refer the participant according to the local treatment standards when a facility is available.	Participants should be referred for treatment if found to be severely anaemic according to the local treatment standards and should be given a paper referral slip to take with them to the health facility.



Training

- The training needs to contain a mix of theory, practical exercises, a standardisation exercise, as well as a written test.
- Each survey team should have **at least** one member who has been trained and tested to take Hb measurements.
- It is crucial that the survey manager(s) refresh their skills before beginning the training.
- The training will last at least one full day with half a day on theory and practice, and half a day on the standardisation exercise.

Theoretical component

The theoretical component on haemoglobin measurement should include the following information:

- Responsibilities of team members
- Equipment and supplies needed
- Standard procedures to follow (standard protocol, informed consent, ethical considerations and referral)
- Safety measures to follow
- Maintenance and transport of equipment
- Common errors and ways to avoid them
- A written test is provided in **Annex 7**. For answers, see SENS Anaemia tool: [**Tool 3**- Anaemia Test Surveyors Answers].



Practical component

The practical training on haemoglobin measurement should include the following activities:

- The survey manager conducts a demonstration and the trainees practice on each other, taking at least one measurement from two different fingers.
- An exercise to standardise the trainees' Hb measurements should be conducted. For instructions on the recommended exercise see **Annex 8** or see SENS Anaemia tool: [**Tool 4-** Anaemia Standardisation Exercise].



Questionnaire and instructions

- The Anaemia SENS questionnaire for children 6-59 months is shown in **Annex 2** and for women in **Annex 3**. See SENS Pre-Module tools: [**Tool 11**- Full SENS questionnaire] and [**Tool 12**- Full SENS Questionnaire with Instructions].
- The **tables 5-8** below provide instructions on the questionnaire for adaptation to the local context, explain the rationale of each question and highlight special instructions to be given to the surveyors.



TABLE 5 ANAEMIA MODULE: EXPLANATION OF QUESTIONS FOR SECTION CHILD1

Question number/ Section CHILD1	Variable name	Question	Special Instructions
			<p>This section is to be administered to all children in the selected households between 0-59 months if the IYCF module is included, or 6-59 months if the IYCF module is not included.</p> <p>These questions need to be asked to the mother or the main caregiver.</p>
CH1	ID	ID number	<p>Include as many eligible children as there are in the household.</p> <p>The ID number is automatically generated in mobile data collection (MDC) surveys for each household starting at 1.</p>
CH2	CHCONST	<p>Was consent given for conducting the interview and the measurements?</p> <p>1= Yes 2= No</p>	<p>Ensure that you have introduced the team and informed them about the interview and the measurements.</p> <p>If answer is « 2 » (No), stop here for the child questionnaire.</p>
CH3	CHNAME	Name of the child	This is asked to facilitate the interview process. Usually only the first name is entered. The name of the child/respondent will not be used.
CH4	SEX	Sex of [NAME OF CHILD]?	Sex is recorded as male ("m") or female ("f").

Question number/ Section CHILD1	Variable name	Question	Special Instructions
CH5	XDOBK	<p>Do you have an official age documentation for [NAME OF CHILD]?</p> <p>1= Yes 2= No</p>	<p>The exact date of birth (day, month, year) is recorded from either an EPI card, child health card or birth notification if available. Note that the 'UNHCR manifest' should <u>never</u> be used for recording the age of a child.</p> <p>If no reliable proof of age is available, age is estimated in months using a local events calendar or by comparing the selected child with a sibling or the child of a neighbor whose ages are known, and is recorded in months on the questionnaire (question CH7).</p> <p>If the child's age can absolutely not be determined by using a local events calendar or by probing, the child's height can be used for inclusion; the child must measure between 67 cm and 110 cm.</p> <p>This variable is not used during analysis. Refer to SENS Anthropometry and Health tool: [Tool 2- Setting-up ENA software for SENS] for guidance on how to format age data.</p> <p>If answer is « 2 » (No), go to CH7.</p>
CH6	BIRTHDAT	<p>[NAME OF CHILD]'s date of birth (Day/ Month/Year)</p> <p>dd/mm/yyyy</p>	<p>The exact birth date should only be taken from an age documentation showing day, month and year of birth.</p> <p>For paper-based surveys: record from age documentation. Leave blank if no valid age documentation.</p>
CH7	MONTHS	<p>Age of [NAME OF CHILD] in months</p> <p>Lower limit=0 months (or 6 months if the IYCF module is not included) Upper limit=59.99 months</p>	<p>Since no age documentation is available, estimate age using a local events calendar.</p> <p>For paper-based surveys: if age documentation available, record the age in months from the date of birth.</p> <p>This is automatically calculated in MDC if birthdate is available.</p> <p>Refer to SENS Module 2 tool: [Tool 1- Local events calendar] for a model local events calendar with instructions on how to use and adapt.</p>

TABLE 6 ANAEMIA MODULE: EXPLANATION OF QUESTIONS FOR SECTION CHILD3

Question number/ Section CHILD3	Variable name	Question	Special Instructions
			<p>This section is to be administered to all children between 6 and 59 months of age.</p> <p>These questions need to be asked to the mother or the main caregiver.</p> <p>In MDC surveys, this section is automatically skipped for the children not eligible based on age (<6 months).</p>
CH24	HBUNIT	Units of measurement of your HemoCue device (g/dL or g/L) (IF APPLICABLE)	<p>Only include this question if your HemoCue devices used in the same survey have different units (g/dL and g/L).</p> <p>Data analysis and reporting is done in g/dL. In surveys using MDC methods the Hb concentrations in g/L will be automatically converted in the final database in g/dL. This variable is not used during analysis.</p>
CH25	CHHB	[NAME OF CHILD]'s haemoglobin (Hb) in g/dL (± 0.1 g/dL) or in g/L (± 1 g/L) Lower limit= 2.0g/dL Upper limit= 22.0g/dL	<p>Record the data according to the unit given by the HemoCue machine (g/L or g/dL). Don't forget the decimal if Hb is measured in g/dL.</p> <p>For analysis and reporting, always use or convert the value to g/dL. In surveys using MDC methods, the Hb concentrations in g/L will be automatically converted in the final database in g/dL.</p> <p>At elevations above 1000m, Hb concentrations increase. Refer to SENS Anaemia tool for guidance on how haemoglobin is corrected for altitude: [Tool 5- Hb adjustment for altitude]. In surveys using MDC methods the Hb concentrations will be automatically corrected for altitude.</p>
CH27	REFA-NEM	Automatic referral for child who has severe anaemia.	<p>Child needs to be referred for severe anaemia (if Hb<7.0g/dL).</p> <p>Fill out a referral form: one slip is for the mother/caregiver and the other is for the health facility.</p> <p>Refer to SENS Anthropometry and Health tool: [Tool 3- Referral form] for an example of a referral slip to use during the survey. This variable is not used during analysis.</p>

TABLE 7 ANAEMIA MODULE: EXPLANATION OF QUESTIONS FOR SECTION WM1

Question number/ Section WM1	Variable name	Question	Special Instructions
			<p>This section is to be administered to all eligible women aged between 15 and 49 years in the selected households.</p> <p>These questions need to be asked to each eligible woman.</p>
WM1	WMID	ID Number	<p>Include as many eligible women as there are in the household.</p> <p>The ID number is automatically generated in MDC surveys for each household starting at 1.</p>
WM2	WM-CONST	<p>Was consent given for conducting the interview and the measurements?</p> <p>1= Yes 2= No 3= Absent</p>	<p>Ensure that you have introduced the team and informed them about the interview and the measurements.</p> <p>If an individual is absent, the team leader should record this information and determine another time to return on the same day. The team should revisit an absent individual up to two times, if it is logistically feasible, on the same survey day and/or before to leave the survey area. If they are unsuccessful after this, the individual should be recorded as an absence and they should not be replaced with another household or individual.</p> <p>Refer to SENS Pre-module tool: [Tool 8- Data collection control sheet] for a model tool to help track the absentees.</p> <p>If answer is « 2 » (No) or « 3 » (Absent), stop here for the woman questionnaire.</p>
WM3	WMNAME	Name of the woman	<p>This is asked to facilitate the interview process. Usually only the first name is entered. The name of the respondent will not used.</p>
WM4	WMAGE	<p>Age of [NAME OF WOMAN] in years</p> <p>Lower limit= 15 years Upper limit= 49 years</p>	<p>Only women between 15 and 49 are being interviewed.</p> <p>Reported age is recorded. You do not need to see proof of age showing official date of birth.</p>

TABLE 8 ANTHROPOMETRY AND HEALTH MODULE: EXPLANATION OF QUESTIONS FOR SECTION WM2

Question number/ Section WM2	Variable name	Question	Special Instructions
			<p>This section is to be administered to all eligible women between 15 and 49 years in the selected household.</p> <p>These questions need to be asked to each eligible woman.</p>
WM5	PREG-NANT	<p>Are you pregnant?</p> <p>1= Yes 2= No 8= Don't know</p>	<p>Make sure to adapt the question to the context to ensure that it is asked in a culturally acceptable manner.</p> <p>If the answer is « No » or « Don't know », the woman should still be assessed for anaemia and it will be assumed that she is not pregnant.</p> <p>In some settings, MUAC is only measured in pregnant and lactating women (PLW). Skip patterns will need to be added here in order to only measure MUAC in PLW.</p> <p>If answer is « 2 » (No) or « 8 » (Absent), go to WM8.</p>
WM6	ANC	<p>Are you currently enrolled in the ANC programme?</p> <p>1= Yes 2= No 8= Don't know</p>	<p>Make sure to use the local name given to the ANC programme.</p> <p>This question is only for pregnant women, i.e. women who answered “Yes” to the previous question (WM5).</p>
WM7	FEREC	<p>Are you currently receiving iron-folate pills?</p> <p>1= Yes 2= No 8= Don't know</p>	<p>Make sure to use the local name given to the iron-folate tablet.</p> <p>An iron-folate tablet used in setting should be shown to the respondent when asked to recall.</p> <p>This question is only for pregnant women, i.e. women who answered “Yes” to the previous question (WM5).</p>
WM8	LACTAT	<p>Are you currently breastfeeding?</p> <p>1= Yes 2= No 8= Don't know</p>	<p>In some settings, MUAC is only measured in pregnant and lactating women (PLW). Skip patterns will need to be added here in order to only measure MUAC in PLW.</p> <p>If answer is « 2 » (No) or « 8 » (Don't know), go to WM10.</p>
WM9	LACTA-TU6	<p>Is the child you are breastfeeding younger than 6 months old?</p> <p>1= Yes 2= No 8= Don't know</p>	<p>If the mother is breastfeeding more than one child, as long as one is younger than 6 months old, choose answer option “1” (Yes).</p>
WM10	WMBSFP	<p>Are you currently enrolled in the BSFP?</p> <p>1= Yes 2= No 8= Don't know</p> <p>(IF APPLICABLE)</p>	<p>This question is only asked to pregnant and lactating women with an infant less than 6 months of age.</p> <p>Include the local name of the blanket supplementary feeding product (BSFP).</p> <p>The nutritional commodity provided in BSFP should be shown to the respondent.</p> <p>In MDC surveys, this question is automatically skipped for the women not eligible for the programme based on their physiological status. In paper-based surveys, ask this questions to all women aged 15-49 years to facilitate the interview process.</p>

Question number/ Section WM2	Variable name	Question	Special Instructions
WM11	WMMUAC	<p>NAME OF WOMAN]'s MUAC in mm (± 1mm) or cm (± 0.1cm)</p> <p>Lower limit= 160 mm Upper limit= 500 mm</p> <p>(OPTIONAL)</p>	<p>MUAC is always measured at the mid-point of the left upper arm.</p> <p>Depending on the context, MUAC can be measured in mm or in cm. Adapt the questionnaire accordingly.</p> <p>Don't forget the decimal when MUAC is measured in cm.</p>
WM12	HBUNIT	<p>Units of measurement of your HemoCue device (g/dL or g/L)</p> <p>(IF APPLICABLE)</p>	<p>Only include this question if your HemoCue devices used in the same survey have different units (g/dL and g/L).</p> <p>Data analysis and reporting is done in g/dL. In surveys using MDC methods the Hb concentrations in g/L will be automatically converted in the final database in g/dL. This variable is not used during analysis.</p>
WM13	WMHB	<p>[NAME OF WOMAN]'s haemoglobin (Hb) in g/dL (± 0.1 g/dL) or in g/L (± 1g/L)</p> <p>Lower limit= 2.0g/dL Upper limit= 22.0g/dL</p>	<p>Record the data according to the unit given by the HemoCue machine (g/L or g/dL). Don't forget the decimal if Hb is measured in g/dL.</p> <p>For analysis and reporting, always use or convert the value to g/dL. In surveys using MDC methods, the Hb concentrations in g/L will be automatically converted in the final database in g/dL.</p> <p>At elevations above 1000m, Hb concentrations increase. Refer to SENS Anaemia tool for guidance on how haemoglobin is corrected for altitude: [Tool 5- Hb adjustment for altitude]. In surveys using MDC methods the Hb concentrations will be automatically corrected for altitude.</p>
WM14	WMREF-MAL	<p>Automatic referral for woman with signs of acute malnutrition</p>	<p>The referral for woman with signs of acute malnutrition will be included only if MUAC is measured (WMMUAC).</p> <p>Adapt the admission criteria cut-offs to the survey context. For example, woman needs to be referred for acute malnutrition if MUAC < 210 mm.</p> <p>Fill out a referral form: one slip is for the woman and the other is for the health facility.</p> <p>Refer to SENS Anthropometry and Health tool: [Tool 3- Referral form] for an example of a referral slip to use during the survey. This variable is not used during analysis.</p>
WM15	WMRE-FAN	<p>Automatic referral for woman who has severe anaemia</p>	<p>Woman needs to be referred for severe anaemia if Hb < 8.0g/dL.</p> <p>Fill out a referral form: one slip is for the woman and the other is for the health facility.</p> <p>Refer to SENS Anthropometry and Health tool: [Tool 3- Referral form] for an example of a referral slip to use during the survey. This variable is not used during analysis.</p>

Data review

- Refer to SENS Pre-module Tool: [**Tool 15**- Standard Operating Procedure (SOP) for SENS data management] for guidance on how to conduct these checks.



Daily questionnaire check- for consistency, completeness and missing data

- The survey manager and supervisors will not have the chance to observe every interview conducted but they are responsible for reviewing every questionnaire for errors. Reviewing questionnaires should be done in the field, if possible, so that any problem can be resolved immediately and if not then at the end of each day.
- While in the field or at the end of each field work day, look at the filled forms on the smartphones (or the questionnaires if a paper-based survey was conducted) from each team and follow the procedure described below:
 - Check that consent was given for the interview (variable: CHCONST, WMCONST). If consent was not given, ask the surveyors if they know the reasons. If there are many refusals, understanding why will help clarify any misunderstandings, concerns or misconceptions with the community being surveyed.
 - Check for missing data and ‘don’t know’ answers (these should always be minimal). If there are missing values, the survey teams should be told the next day to be more careful and not miss any question. If there is a significant number of ‘don’t know’ answers for certain teams, the survey manager or supervisor(s) should accompany the teams the next day to the field to check on the way they conduct the interviews.
 - Check that referral (variables: REFANEM for child and WMREFAN for woman) was done appropriately in case severe anaemia was detected (check data collection control sheet and referral forms for that information).

Database check

- Brief guidance on the data review process is provided in **Annex 9** using Epi Info 7 and in the SENS Pre-module Tool: [**Tool 15**- Standard Operating Procedure (SOP) for SENS data management].
- Free guidance on the use of Epi Info for Windows and training material on Epi Info can be found at the following site: <http://www.cdc.gov/EpiInfo>



Checking for missing data

- For each missing data relating to age and haemoglobin, find out the corresponding child and woman, and check the values manually entered in the participants and measures control sheet (for paper-based surveys, check with the original questionnaire). If it was a data entry error into the smartphones (on the paper questionnaire), correct it.

Haemoglobin

- Screen for missing Hb values to identify data entry oversights (variables: CHHB, WMHB).
- If the Hb value is missing, the child or woman cannot be included in the anaemia analysis.



Age

- Screen for missing age values (variables: MONTHS and WMAGE) and determine if this was a data entry oversight or if the child was recruited on the basis of height (see **Figure 1** in the SENS Anthropometry and Health module for the decision tree on how to collect age data). You should ask the survey team to explain why age is missing.
- If age is missing (even after checking the participants and measures control sheet), assess whether or not the child can be found the next day to determine the age. If not, then the child can still be included in the anaemia analysis. You will need to ensure the child is eligible to be in the survey based on the height/length (i.e. in the required height range of 67-110cm).
- If age is missing for the woman, the woman can still be included in the analysis.


Physiological status, ANC enrolment and iron-folic acid pill coverage

- Screen for missing values to identify data entry oversight (variables: PREGNANT, ANC, FEREC, LACTAT, LACTATU6).
- If the variable is missing for a woman, the woman cannot be included in the analysis of that specific variable.

Presentation of results

- Anaemia results should be descriptive and presented as proportions (with 95% CI) and means for the overall sample and according to age-specific criteria.
- When presenting the results from several camps with a representative sample drawn from each camp into one report, results can be presented two different ways: i) reporting results for each indicator from each camp separately or ii) combining results from all camps into one table per indicator. See SENS Pre-Module tools: [**Tool 19**- Dolo SENS Report 2017] and [**Tool 20a**- Jordan SENS Report 2016]. 
- When several camps are surveyed with a representative sample drawn from each camp, it is sometimes necessary and important to report combined results. Weighting the data will need to be done if you have conducted surveys in a number of different camps or areas, and need to combine the results for reporting or planning purposes. It is not required to report the combined results for all indicators or to report the confidence intervals for the combined estimates. See the SENS Pre-Module tool that will automatically generate weighed prevalence results for proportions and means: [**Tool 21**- Weighting Data Tool]. 
- All survey reports should present results the tables and figures shown below.
- Where an exhaustive methodology is used, confidence intervals should not be presented if all eligible children/women from all households are assessed for anaemia. However, if sub-sampling was done for the anaemia assessment in children and/or women, confidence intervals should be presented.

Results tables and figures

- There are several trend figures that are recommended to be included in the final SENS report that are not automatically generated by ENA for SMART. Refer to **SENS Pre-Module Step 15** for a description on constructing trend graphs and on how to interpret trends and differences. For a tool that will automatically generate trend graphs, see SENS Pre-Module tool: [**Tool 17**- Trends and Graphs]. 
- Showing the recommended figures will allow for the assessment of trends. Note that, to identify a trend, it is advised that prevalence data from at least three time points are obtained from SENS surveys carried out at similar times of the year. Trend analyses need to be interpreted with caution. Nevertheless, they can be useful for assessing the situation and major differences seen from year to year should warrant further investigation. The confidence intervals are an integral part of the results. Assessment of changes over time should take into consideration population arrivals/departures, outbreaks, major changes in assistance, new nutrition programmes etc.

Children 6-59 months

- Details on target and actual number of children aged 6-59 months surveyed are shown in Module 2-Anthropometry and Health.

TABLE 9 PREVALENCE OF TOTAL ANAEMIA, ANAEMIA CATEGORIES, AND MEAN HAEMOGLOBIN CONCENTRATION IN CHILDREN 6-59 MONTHS OF AGE AND BY AGE GROUP

		6-59 months n =	6-23 months n =	24-59 months n =
Total Anaemia (Hb<11.0 g/dL)		(n) % (95% CI)	(n) % (95% CI)	(n) % (95% CI)
Mild Anaemia (Hb 10.0-10.9 g/dL)		(n) % (95% CI)	(n) % (95% CI)	(n) % (95% CI)
Moderate Anaemia (7.0-9.9 g/dL)		(n) % (95% CI)	(n) % (95% CI)	(n) % (95% CI)
Severe Anaemia (<7.0 g/dL)		(n) % (95% CI)	(n) % (95% CI)	(n) % (95% CI)
Mean Hb (g/dL) (SD) [range]	SRS design*	g/dL (SD) [min, max]	g/dL (SD) [min, max]	g/dL (SD) [min, max]
Mean Hb (g/dL) (95% CI) [range]	Cluster design*	g/dL (95% CI) [min, max]	g/dL (95% CI) [min, max]	g/dL (95% CI) [min, max]

*When using the Means commands in Epi Info, it will provide the standard deviation (SD) when using the Statistics module and the 95% Confidence Interval when using the Advanced Statistics module. Refer to Annex 9 for further guidance on data analysis with Epi Info.

TABLE 10 PREVALENCE OF MODERATE AND SEVERE ANAEMIA IN CHILDREN 6-59 MONTHS OF AGE AND BY AGE GROUP (THIS IS AN IMPORTANT TABLE TO ADD TO ALL SENS REPORTS AS IT WILL HELP TRACK ANAEMIA PREVALENCE USING THE TWO CUT-OFFS: HB<11 G/DL AND HB<10 G/DL)

	6-59 months n =	6-23 months n =	24-59 months n =
Moderate and Severe Anaemia (Hb<10.0 g/dL)	(n) % (95% CI)	(n) % (95% CI)	(n) % (95% CI)

- Anaemia prevalence (mild, moderate and severe) and mean Hb results in children 6-59 months should be presented from year to year as shown in the example figures below.

FIGURE 4 PREVALENCE OF ANAEMIA BY CATEGORIES IN CHILDREN 6-59 MONTHS FROM 2015-2018. **NOTE THAT A TREND CAN ONLY BE IDENTIFIED WHEN THERE ARE AT LEAST THREE TIME POINTS. IT IS ADVISED THAT PREVALENCE DATA ARE OBTAINED FROM SENS SURVEYS CARRIED OUT AT SIMILAR TIMES OF THE YEAR. (THIS FIGURE CAN BE AUTOMATICALLY GENERATED BY USING SENS PRE-MODULE TOOL 17- TRENDS AND GRAPHS)**

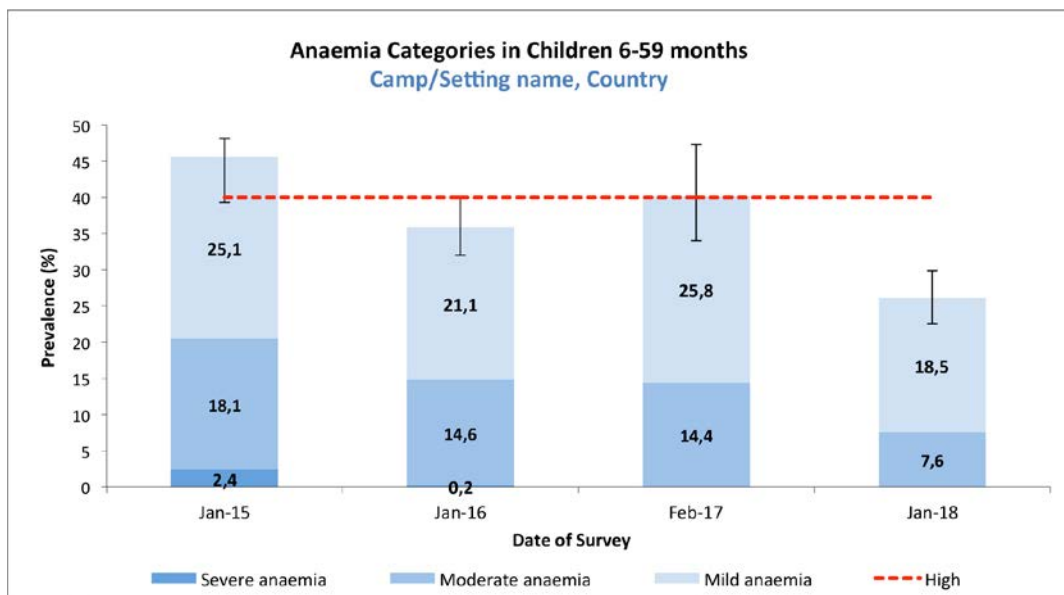


FIGURE 5 PREVALENCE OF TOTAL ANAEMIA (<11 G/DL), AND MODERATE AND SEVERE ANAEMIA (<10 G/DL) WITH 95% CI IN CHILDREN 6-59 MONTHS FROM 2015-2018. **NOTE THAT A TREND CAN ONLY BE IDENTIFIED WHEN THERE ARE AT LEAST THREE TIME POINTS. IT IS ADVISED THAT DATA ARE OBTAINED FROM SENS SURVEYS CARRIED OUT AT SIMILAR TIMES OF THE YEAR. (THIS FIGURE CAN BE AUTOMATICALLY GENERATED BY USING SENS PRE-MODULE TOOL 17- TRENDS AND GRAPHS)**

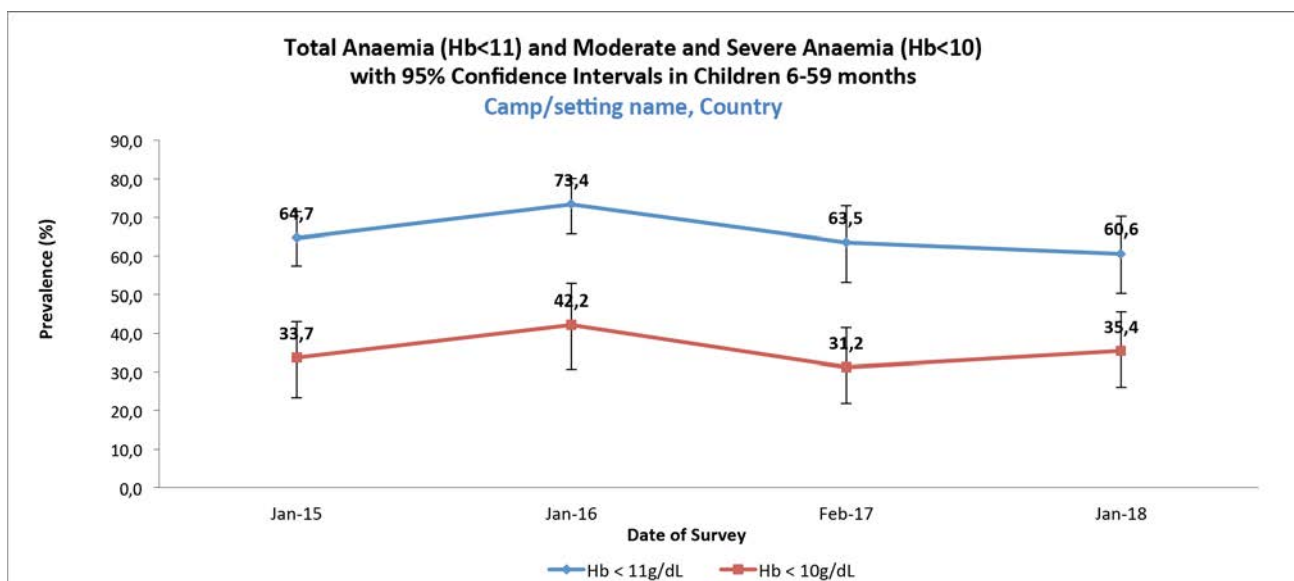
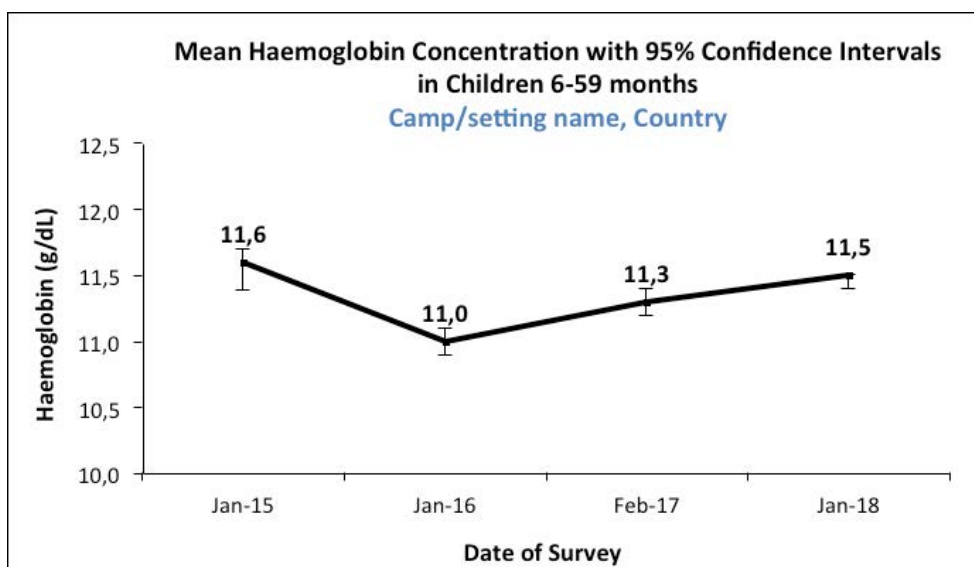


FIGURE 6 MEAN HAEMOGLOBIN CONCENTRATION WITH 95% CI IN CHILDREN 6-59 MONTHS FROM 2015-2018. **NOTE THAT A TREND CAN ONLY BE IDENTIFIED WHEN THERE ARE AT LEAST THREE TIME POINTS. IT IS ADVISED THAT DATA ARE OBTAINED FROM SENS SURVEYS CARRIED OUT AT SIMILAR TIMES OF THE YEAR.** (THIS FIGURE CAN BE AUTOMATICALLY GENERATED BY USING SENS PRE-MODULE TOOL 17-TRENDS AND GRAPHS)



Things to watch out for:

- In refugee camp settings, there can be large population movements in and out of the camps. These should not be ignored when interpreting change (or absence of change) in indicators over time.
- When the surveyed population is not stable and varies in number and / or composition over time, a lack of change in a specific indicator (e.g. anaemia) is not necessarily due to a lack of effect of the interventions implemented in a refugee camp.
- Contact UNHCR HQ / Regional offices for support on how to interpret trends⁴.

⁴ Monitoring and evaluation of programmes in unstable populations: Experiences with the UNHCR Global SENS Database <https://www.enonline.net/fex/57/unhcrglobalsensdatabase>

Women 15-49 years

TABLE 11 WOMEN PHYSIOLOGICAL STATUS AND AGE

Physiological status	Number/total	% of sample
Non-pregnant, non-lactating		
Pregnant		
Lactating with an infant less than 6 months		
Lactating with an infant greater than 6 months		
Mean age in years [min, max] (all women)		

TABLE 12 PREVALENCE OF ANAEMIA AND HAEMOGLOBIN CONCENTRATION IN NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS)

Anaemia in non-pregnant women of reproductive age (15-49 years)		All n =
Total Anaemia (<12.0 g/dL)		(n) % (95% CI)
Mild Anaemia (11.0-11.9 g/dL)		(n) % (95% CI)
Moderate Anaemia (8.0-10.9 g/dL)		(n) % (95% CI)
Severe Anaemia (<8.0 g/dL)		(n) % (95% CI)
Mean Hb (g/dL) (SD) [range]	SRS design*	g/dL (SD) [min, max]
Mean Hb (g/dL) (95% CI) [range]	Cluster design*	g/dL (95% CI) [min, max]

*When using the Means commands in Epi Info, it will provide the standard deviation (SD) when using the Statistics module and the 95% Confidence Interval when using the Advanced Statistics module. Refer to Annex 9 for further guidance on data analysis with Epi Info.

- Anaemia prevalence (mild, moderate and severe) and mean Hb results in women of reproductive age (non-pregnant) should be presented from year to year as shown in the example figures below.

FIGURE 7 PREVALENCE OF ANAEMIA BY CATEGORIES IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) FROM 2015-2018. **NOTE THAT A TREND CAN ONLY BE IDENTIFIED WHEN THERE ARE AT LEAST THREE TIME POINTS. IT IS ADVISED THAT PREVALENCE DATA ARE OBTAINED FROM SENS SURVEYS CARRIED OUT AT SIMILAR TIMES OF THE YEAR. (THIS FIGURE CAN BE AUTOMATICALLY GENERATED BY USING SENS PRE-MODULE TOOL 17- TRENDS AND GRAPHS)**

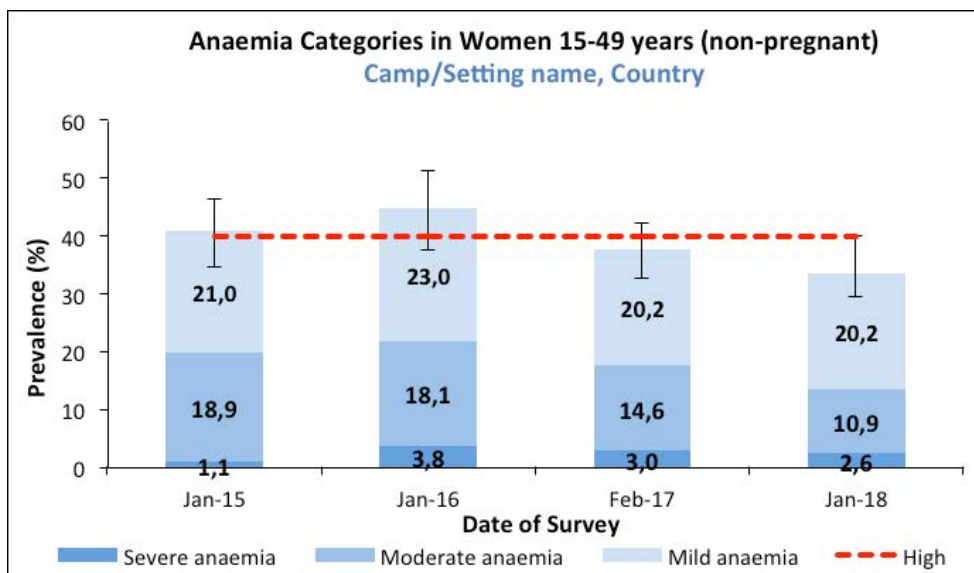
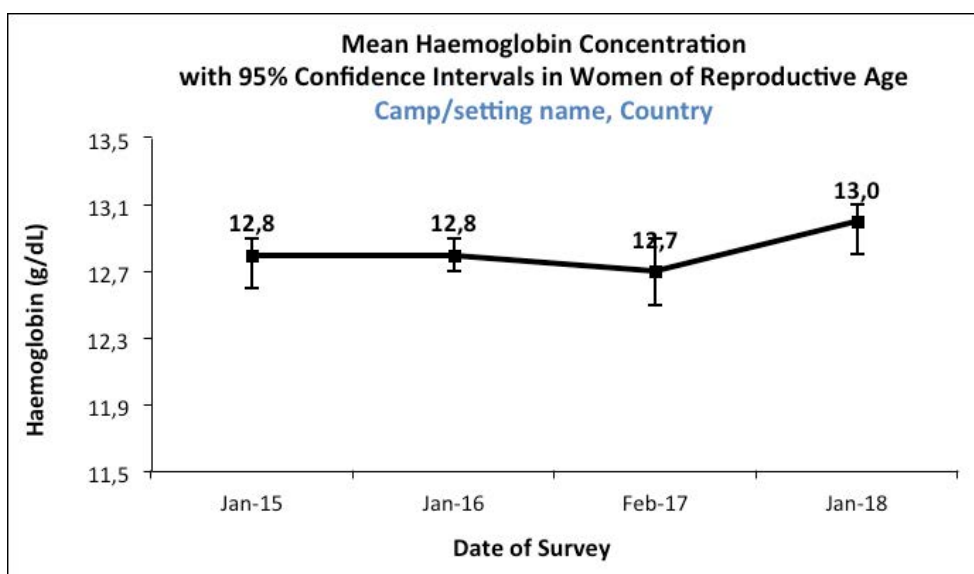


FIGURE 8 MEAN HAEMOGLOBIN CONCENTRATION WITH 95% CI IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) FROM 2015-2018. **NOTE THAT A TREND CAN ONLY BE IDENTIFIED WHEN THERE ARE AT LEAST THREE TIME POINTS. IT IS ADVISED THAT DATA ARE OBTAINED FROM SENS SURVEYS CARRIED OUT AT SIMILAR TIMES OF THE YEAR. (THIS FIGURE CAN BE AUTOMATICALLY GENERATED BY USING SENS PRE-MODULE TOOL 17- TRENDS AND GRAPHS)**



Things to watch out for:

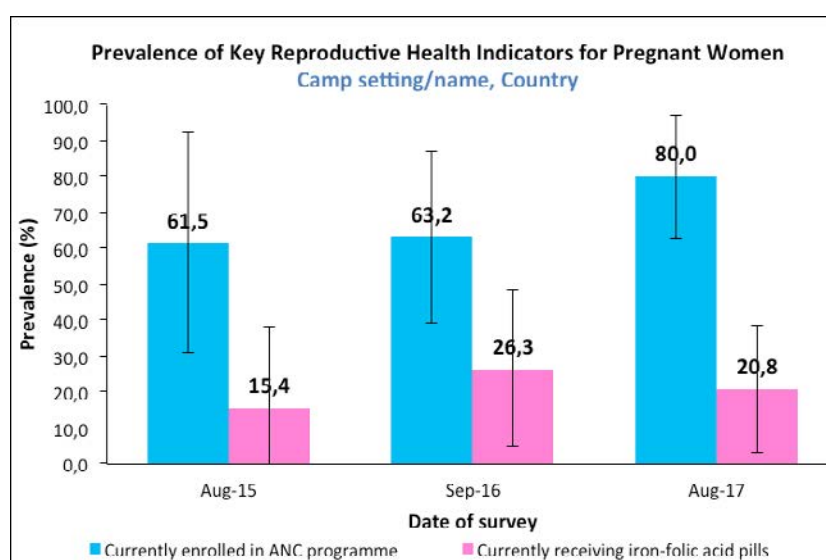
- In refugee camp settings, there can be large population movements in and out of the camps. These should not be ignored when interpreting change (or absence of change) in indicators over time.
- When the surveyed population is not stable and varies in number and / or composition over time, a lack of change in a specific indicator (e.g. anaemia) is not necessarily due to a lack of effect of the interventions implemented in a refugee camp.
- Contact UNHCR HQ / Regional offices for support on how to interpret trends⁵.

TABLE 13 ANC ENROLMENT AND IRON-FOLIC ACID PILLS COVERAGE AMONG PREGNANT WOMEN (15-49 YEARS)

	Number /total	% (95% CI)
Currently enrolled in ANC programme		
Currently receiving iron-folic acid pills		

- There is a trend graph that is recommended to be included in the final SENS report even though sample sizes of pregnant women are small for these two indicators collected as part of SENS surveys (see Figure below).

FIGURE 9 ANC ENROLMENT AND COVERAGE OF IRON-ACID FOLIC SUPPLEMENTATION IN PREGNANT WOMEN 15-49 YEARS FROM 2015-2017. NOTE THAT A TREND CAN ONLY BE IDENTIFIED WHEN THERE ARE AT LEAST THREE TIME POINTS (THIS FIGURE CAN BE AUTOMATICALLY GENERATED BY USING SENS PRE-MODULE TOOL 17- TRENDS AND GRAPHS)



⁵ Monitoring and evaluation of programmes in unstable populations: Experiences with the UNHCR Global SENS Database <https://www.enonline.net/fex/57/unhcrglobalsensdatabase>

Data Analysis

- Make sure that the data has been reviewed before starting the analysis process.
- Brief guidance on using Epi Info software for analysis is provided below. Refer to **Annex 9** for standard analysis commands using Epi Info 7. Free guidance on the use of Epi Info for Windows and training material on Epi Info can be found at the following site: <http://www.cdc.gov/EpiInfo>
- Refer to SENS Anaemia tool for instructions on how to adjust haemoglobin for altitude: [**Tool 5**- Hb Adjustment for altitude]. Refer to the model report SENS Anaemia tool where haemoglobin was adjusted for altitude: [**Tool 6**- SENS Report Rwanda 2018]. Adjustment of haemoglobin values should be done for any survey conducted at an altitude higher than 1000 meters above sea level. A list of camps where haemoglobin adjustment needs to be done is provided in **Tool 5**, however you should still check the altitude of the site or camp you are surveying as it may not be on the list.



Analysis procedures

Total anaemia in children 6-59 months and women 15-49 years (non-pregnant)

- Define a new variable for total anaemia, i.e. ANAEMIA.
- Recode the CHHB and WMHB variables to ANAEMIA using the cut-offs shown in **Table 3**.
- The ANAEMIA variable should equal “0”, “no anaemia” or “no” if the child / woman has no anaemia and should equal “1”, “anaemia” or “yes” if the child / woman is anaemic.
- Use the ‘Select’ command in Epi Info to proceed with analysis of anaemia in non-pregnant women only. E.g.: Select ‘PREGNANT’ equal to ‘2’ or ‘8’.
- If the survey design was simple or systematic random sampling, use Epi Info ‘Frequencies’ command to fill out **Tables 9 and 12**.
- If the survey design was cluster sampling, use Epi Info ‘Complex Sample Frequencies’ command (PSU is the CLUSTER variable) to fill out **Tables 9 and 12**.

Anaemia categories in children 6-59 months and women 15-49 years (non-pregnant)

- Define a new variable for anaemia categories, i.e. ANAEMIA_c.
- Recode the CHHB and WMHB variable to ANAEMIA_c using the cut-offs shown in **Table 3**. The ANAEMIA_c variable should equal “0” or “no anaemia” if the child / woman has no anaemia, should equal “1” or “mild” if the child / woman is mildly anaemic, “2” or “moderate” if the child / woman is moderately anaemic and “3” or “severe” if the child / women is severely anaemic.

- If the survey design was simple or systematic random sampling, use Epi Info ‘Frequencies’ command to fill out **Tables 9 and 12**.
- If the survey design was cluster sampling, use Epi Info ‘Complex Sample Frequencies’ command (PSU is the CLUSTER variable) to fill out **Tables 9 and 12**.

Mean haemoglobin in children 6-59 months and women 15-49 years (non-pregnant)

- If the survey design was simple or systematic random sampling, use Epi Info ‘Means’ command on the CHHB and WMHB variables to fill out **Tables 9 and 12**.
- If the survey design was cluster sampling, use Epi Info ‘Complex Sample Means’ command on the CHHB and WMHB variables (PSU is the CLUSTER variable) to fill out **Tables 9 and 12**.

Total anaemia and anaemia categories by age in children 6-23 and 24-59 months

- Define a new variable for anaemia age group, i.e. AGEGROUP.
- Recode the MONTHS variable into AGEGROUP. The AGEGROUP variable should equal “1” or “6-23” if the child is between 6-23.99 months of age and should equal “2” or “24-59” if the child is between 24-59.99 months of age.
- If the survey design was simple or systematic random sampling, use Epi Info ‘Frequencies’ command on the newly defined ANAEMIA and ANAEMIA_c variables, and use the ‘Stratify by’ option to disaggregate analysis by age group to fill out **Table 9**.
- With cluster surveys, first use the ‘Select’ command in Epi Info to proceed with analysis by age group (note that the ‘Stratify by’ option in the ‘Complex Sample Frequencies’ command differs from the one in the ‘Frequencies’ command; with complex sampling this option is to be used in stratified surveys *only*). Then, use the ‘Complex Sample Frequencies’ command on the newly defined ANAEMIA and ANAEMIA_c variables with each age group breakdown (PSU is the CLUSTER variable) to fill out **Table 9**.

Mean haemoglobin by age in children 6-23 and 24-59 months

- If the survey design was simple or systematic random sampling, use Epi Info ‘Means’ commands on the CHHB variable, and use the ‘Stratify by’ option to disaggregate analysis by age group to fill out **Table 9**.
- With cluster surveys, first use the ‘Select’ command in Epi Info to proceed with analysis by age group. Then, use the ‘Complex Sample Means’ command on the CHHB variable with each age group breakdown (PSU is the CLUSTER variable) to fill out **Table 9**.

Moderate and severe anaemia (Hb<10 g/dL) in children 6-59 months and by age

- Define a new variable for moderate and severe anaemia, i.e. HBLESS10.
- Recode the CHHB variable to HBLESS10 using the cut-offs shown in **Table 3**. The HBLESS10 variable should equal “0” or “high Hb” if the child has an Hb \geq 10 g/dL and should equal “1” or “low Hb” if the child has an Hb<10 g/dL.
- If the survey design was simple or systematic random sampling, use Epi Info ‘Frequencies’ command to fill out **Table 10**. Then use the ‘Stratify by’ option to disaggregate analysis by age group.
- If the survey design was cluster sampling, use the ‘Complex Sample Frequencies’ command (PSU is the CLUSTER variable) to fill out **Table 10**. Then use the ‘Select’ command in Epi Info to proceed with analysis by age group.

ANC enrolment and iron-folic acid pills coverage in pregnant women

- ANC enrolment and iron-folic acid pill coverage are calculated for pregnant women only.
- Use the ‘Select’ command in Epi Info to proceed with analysis of pregnant women *only* and exclude from analysis women with answer ‘8’ (‘Don’t know’).
- If the survey design was simple or systematic random sampling, use Epi Info ‘Frequencies’ command to fill out **Table 13**.
- If the survey design was cluster sampling, use Epi Info ‘Complex Sample Frequencies’ command (PSU is the CLUSTER variable) to fill out **Table 13**.

Common errors and challenges in data analysis

Table 14 describes the most common errors experienced by survey managers and supervisors when conducting the final data analysis.

TABLE 14 COMMON ERRORS EXPERIENCED IN DATA ANALYSIS

Common errors	Examples	Solution
Reporting the wrong unit for Hb	Use of g/dL when the HemoCue machine actually gave results in g/L, or vice versa (only in paper-based surveys).	Use g/dL for reporting all survey results, as shown in Tables 9, 10 and 12 .
Using the wrong cut-off for defining categories of anaemia in different age groups	Defining moderate anaemia in children as Hb 7.0-10.9 g/dL. Defining moderate anaemia in women of reproductive age as Hb 8.0-11.9 g/dL.	Ensure you use the WHO classification shown in Table 3 .
Not reporting confidence intervals around the anaemia prevalence estimate	Only reporting the point estimate in the final report. Often, this is because the procedure for the analysis function that takes into account cluster sampling to adjust for confidence intervals is not known by the user.	If cluster sampling is used, use the Complex Sample module in Epi Info (Advanced statistics) for analysis of anaemia results.
Reporting an incorrect confidence interval for the anaemia prevalence	In a cluster survey, reporting the confidence interval not taking into account the complex sampling. This will be misleading and will give you the impression that your survey is more precise than it actually is. With complex sampling, confidence intervals are usually wider than when using simple or systematic random sampling.	If cluster sampling is used, use the Complex Sample module in Epi Info (Advanced statistics) for analysis of anaemia results.
Not taking into consideration a weighting factor when combining anaemia prevalence estimates from several camps	When surveying several camps with a representative sample drawn from each camp, combining the samples from all camps to calculate the overall prevalence without taking into consideration a weighting factor.	For a tool that will automatically generate weighed prevalence results, see SENS Pre-Module tool: [Tool 21 - Weighting Data Tool].
Reporting anaemia results according to certain aggregates of clusters	Reporting the anaemia results per group of clusters or per camp section / block.	Do not disaggregate cluster surveys according to clusters in the presentation of results. All clusters merged together from all sections / blocks of the camp are representative of the camp as a whole and should not be disaggregated.
Reporting a change in the anaemia situation without any evaluation of whether the observed change is statistically significant or real	Using the point estimate results of two surveys (e.g. 36% vs. 39%) and concluding that there has been a change in anaemia prevalence without looking at the confidence intervals or conducting a statistical test.	Assess whether the confidence intervals overlap and conduct a statistical test using the CDC IERHB calculator. See SENS Pre-Module tool: [Tool 18 - CDC Calculator two surveys].



Use of results

Classification of public health problem and targets

Anaemia data

- UNHCR target for the prevalence of anaemia in children 6-59 months of age and in women 15-49 years of age should be < 20% corresponding to the 'low' category as defined by WHO and shown in **Table 15**.
- The severity of the public health situation should be classified according to WHO criteria as shown in **Table 15**.

TABLE 15 WHO CLASSIFICATION OF PUBLIC HEALTH SIGNIFICANCE

Classification	High	Medium	Low
Prevalence of anaemia	≥40%	20-39%	5-19%

Source: WHO (2000) The Management of Nutrition in Major Emergencies

Possible causes of anaemia

- In the context of refugee (and displaced) populations, the most important cause of anaemia is usually inadequate dietary intake of micronutrients (especially iron, folic acid, vitamin B12), and a lack of appropriate complementary foods given the dependency on food aid.
- There are also often high rates of infections given crowded refugee environments and poor access to water and sanitation, thus the high prevalence of anaemia in refugees may stem from infections such as malaria, hookworm or schistosomiasis.
- If the causes of anaemia need to be investigated (**Table 16**) as part of the SENS survey, specialist support will be needed for the assessment. Contact UNHCR HQ / Regional Offices for assistance in seeking support.

TABLE 16 INVESTIGATING THE CAUSES OF ANAEMIA

Objective	Indicator	Recommended age group(s)	Recommended methods of measurements	Response option(s) if survey results indicate a public health problem
Determine prevalence of iron deficiency as a risk factor for anaemia	Iron deficiency	1. Children 6-59 months 2. Women of reproductive age (15-49 years)	sTfR, and/or Serum ferritin and CRP/AGP; and/or; transferrin saturation; and/or free erythrocyte protoporphyrin. Measurement requires a blood sample.	<ul style="list-style-type: none"> Improvement of micronutrient contents of food ration. Food security activities. Interventions using special nutritional products in target group(s). BCC on iron-rich foods and prevention.
Determine prevalence of malaria infection as a risk factor for anaemia	Malaria infection	1. Children 6-59 months 2. Women of reproductive age (15-49 years)	Rapid Diagnostic Test or thick/thin blood smear using a capillary or venous blood sample.	<ul style="list-style-type: none"> Distribution of mosquito nets. BCC on mosquito net use and prevention. Spraying campaign. Provision of treatment.
Determine prevalence of hookworm / whipworm as a risk factor for anaemia	Helminth: hookworm or whipworm	Children 6-59 months of age	Stool sample microscopy.	<ul style="list-style-type: none"> Deworming activities in target group(s). BCC on prevention of infection.
Determine prevalence of schistosomiasis as a risk factor for anaemia	Helminth: schistosomiasis	Women of reproductive age (15-49 years)	Prevalence of haematuria or egg counts from a urine sample.	<ul style="list-style-type: none"> Deworming activities in target group(s). BCC on prevention of infection.
Determine prevalence of sickle cell anaemia as a risk factor for anaemia	Sickle cell anaemia	1. Children 6-59 months 2. Women of reproductive age (15-49 years)	Sickling test conducted on a blood sample.	<ul style="list-style-type: none"> BCC on disease management. Treatment.
Determine prevalence of thalassemia as a risk factor for anaemia	Thalassemia	1. Children 6-59 months 2. Women of reproductive age (15-49 years)	Blood microscopy, gel electrophoresis, and/or DNA analysis.	<ul style="list-style-type: none"> BCC on disease management.

Recommendations

- The anaemia assessment results are to assist public health partners working in refugee settings to better plan their anaemia control programming.
- Preventing and treating anaemia among refugees and other persons of concern to UNHCR demands a multi-dimensional and comprehensive approach in public health and nutrition. The specific anaemia activities encompass:
 - The reinforcement of existing activities (e.g. malaria control, deworming campaigns and antenatal activities);
 - Introduction of new activities such as use of lipid based nutrient supplements or micronutrient powders. Refer to [UNHCR Operational Guidance on the Use of Special Nutritional Products to Reduce Micronutrient Deficiencies and Malnutrition in Refugee Populations](#);
 - Provision of micronutrients through improving the micronutrient content of the general food ration;
 - Strengthening and standardising assessment and monitoring / evaluation of anaemia control activities;
 - Providing information and education for the refugee community on anaemia and micronutrient deficiencies;
 - A multi-dimensional approach to food security among refugees including: use of cash, fresh food vouchers, income generating activities, cash and food for work programmes, and augmenting safety net programmes for vulnerable groups;
 - Strengthening of training of health staff for anaemia detection and treatment as well as investment in equipment for measuring anaemia and ensuring adequate quantities of appropriate treatment.

ANNEXES



Annex 1- Ordering information

Refer to SENS Pre-Module **Tool 10** (Survey Supplies Planning Sheet) for more details on quantity to be ordered based on the number of teams included in the survey and the planned sample size.



HemoCue supplier information

The following HemoCue supplies should be available for each survey: HemoCue 301 Analysers, HemoCue 301 Analyser Cases and inserts, HemoCue cleaning spatula packs, safety lancets (sizing of at least 2.25mm), microcuvettes 301, Eurotrol Hb 301 Control solutions: High, Low and Normal.

UNHCR has a frame agreement with Hemocue AB (Sweden). As such you can order the supplies through the normal procurement procedures, but be aware that this can take a long time. An alternative if time is short could be to request assistance from UNHCR HQ (PHS – nutrition), with the quantities requires, full budget codes and delivery address and full details of the contact person. This may be a quicker alternative to receive your supplies.

Non-UNHCR SENS users can contact the following supplier or your local supplier to place your order. Give ample time (at least 8 weeks) between ordering of supplies and survey implementation.

HemoCue AB
Box 1204
262 23 Ängelholm
SWEDEN

Phone: +46 77 570 02 10

Fax: +46 77 570 02 12

E-mail: info@HemoCue.se

Website: <http://www.HemoCue.com/>

They have several offices around the world that can be found on the website <https://www.hemocue.com/en/contact/world-contact>

Note: HemoCue machines need to be cleaned, controlled and serviced regularly to ensure they are working accurately. Moreover, Eurotrol Hb 301 Control solutions are needed for each survey to perform a check of the entire HemoCue system, i.e. both HemoCue machine and microcuvettes; this check is different than the internal electronic self-test and these must be purchased for each survey.

Annex 2- CHILD SENS QUESTIONNAIRE

See SENS Pre-Module tools: [Tool 11- Full SENS questionnaire] and [Tool 12- Full SENS Questionnaire with Instructions].



No	QUESTION	ANSWER CODES	
SECTION CHILD1: Details of the Child 0-59 months or 6-59 months THIS SECTION IS TO BE ADMINISTERED TO ALL CHILDREN IN THE SELECTED HOUSEHOLDS BETWEEN 0-59 MONTHS OR 6-59 MONTHS: DEPENDING ON WHICH SENS MODULE IS INCLUDED.			
Note	THESE QUESTIONS NEED TO BE ASKED TO THE MOTHER OR THE MAIN CAREGIVER.		
CH1	ID Number ID		<input type="text"/>
CH2	Was consent given for conducting the interview and the measurements? ENSURE THAT YOU HAVE INTRODUCED THE TEAM AND INFORMED THEM ABOUT THE INTERVIEW AND THE MEASUREMENTS. CHCONST	Yes1 No2	<input type="text"/> IF ANSWER IS 2 STOP HERE
CH3	Name of the child ONLY WRITE FIRST NAME. CHNAME	<input type="text"/>	
CH4	Sex of [NAME OF CHILD]? SEX	Malem Femalef	<input type="text"/>
CH5	Do you have an official age documentation for [NAME OF CHILD]? XDOBK	Yes1 No2	<input type="text"/> IF ANSWER IS 2 GO TO CH7
CH6	[NAME OF CHILD]'s date of birth THE EXACT BIRTH DATE SHOULD ONLY BE TAKEN FROM AN AGE DOCUMENTATION SHOWING DAY, MONTH AND YEAR OF BIRTH. FOR PAPER-BASED SURVEYS: RECORD FROM AGE DOCUMENTATION. LEAVE BLANK IF NO VALID AGE DOCUMENTATION. BIRTHDAT	Day/Month/Year..... _ _ / _ _ / _ _ _ _	
CH7	Age of [NAME OF CHILD] in months Lower limit=0 months (or 6 months if the IYCF module is not included) Upper limit=59.99 months MONTHS	SINCE NO AGE DOCUMENTATION IS AVAILABLE, ESTIMATE AGE USING A LOCAL EVENTS CALENDAR. FOR PAPER-BASED SURVEYS: IF AGE DOCUMENTATION AVAILABLE, RECORD THE AGE IN MONTHS FROM THE DATE OF BIRTH.	<input type="text"/> months
Note	Verify that the child is \${MONTHS} months old. Remember, if they are older than 59 months; they are not eligible for inclusion and you should stop here.		

SECTION CHILD3: Nutrition, Health and Anaemia Status of the Child 6-59 months THIS SECTION IS TO BE ADMINISTERED TO ALL CHILDREN BETWEEN 6 AND 59 MONTHS OF AGE. EXCLUDE HB MEASUREMENTS IF SENS MODULE 3 (ANAEMIA MODULE) IS NOT INCLUDED. IN MDC SURVEYS, THIS SECTION IS AUTOMATICALLY SKIPPED FOR THE CHILDREN NOT ELIGIBLE BASED ON AGE (<6 MONTHS).			
CH24	Units of measurement of your HemoCue device (g/dL or g/L) (IF APPLICABLE) HBUNIT	g/dLgdl g/L..... gl	_ _ _ _
CH25	[NAME OF CHILD]'s haemoglobin (Hb) in g/dL (±0.1 g/dL) or in g/L (±1g/L) APPLICABLE ONLY IF HB MEASURED IN G/DL: DON'T FORGET THE DECIMAL. Lower limit=2.0g/dL Upper limit=22.0g/dL CHHB		_ _ _ . _ g/dL OR _ _ _ _ g/L
CH26	Automatic referral for child with signs of acute malnutrition who is not already enrolled in a nutrition programme: <ul style="list-style-type: none"> Child needs to be referred for moderate acute malnutrition (if MUAC<125mm and MUAC≥115mm and/or WHZ<-2 and WHZ≥-3 and if ENROL equals to 3 or 8). Child needs to be referred for severe acute malnutrition (if MUAC<115mm and/or WHZ<-3 and/or bilateral pitting oedema is yes and if ENROL equals to 3 or 8). FILL OUT A REFERRAL FORM: ONE SLIP IS FOR THE MOTHER/CAREGIVER AND THE OTHER IS FOR THE HEALTH FACILITY. REFMAM/REFSAM		
CH27	Automatic referral for child who has severe anaemia: <ul style="list-style-type: none"> Child needs to be referred for severe anaemia (if Hb<7.0g/dL). FILL OUT A REFERRAL FORM: ONE SLIP IS FOR THE MOTHER/CAREGIVER AND THE OTHER IS FOR THE HEALTH FACILITY. REFANEM		
	Interviewer: I confirm that questionnaire is complete: yes/no		
	Supervisor: I confirm that questionnaire is complete.: yes/no MESSAGE TO INTERVIEWER: DO NOT ANSWER THIS QUESTION.		

Annex 3- WOMAN SENS QUESTIONNAIRE

See SENS Pre-Module tools: [Tool 11- Full SENS questionnaire] and [Tool 12- Full SENS Questionnaire with Instructions].



No	QUESTION	ANSWER CODES	
<p>SECTION WM1: Details of the Woman 15-49 years THIS SECTION IS TO BE ADMINISTERED TO ALL ELIGIBLE WOMEN AGED BETWEEN 15 AND 49 YEARS IN THE SELECTED HOUSEHOLDS.</p>			
Note	THESE QUESTIONS NEED TO BE ASKED TO EACH ELIGIBLE WOMAN		
WM1	ID Number WMID		<input type="text"/>
WM2	Was consent given for conducting the interview and the measurements? ENSURE THAT YOU HAVE INTRODUCED THE TEAM AND INFORMED THEM ABOUT THE INTERVIEW AND THE MEASUREMENTS. WMCONST	Yes.....1 No.....2 Absent.....3	<input type="text"/> IF ANSWER IS 2 or 3 STOP HERE
WM3	Name of the woman ONLY WRITE FIRST NAME. WMNAME	<input type="text"/>	
WM4	Age of [NAME OF WOMAN] in years ONLY WOMEN BETWEEN 15 AND 49 ARE BEING INTERVIEWED. Lower limit=15 years Upper limit=49 years WMAGE		<input type="text"/> <input type="text"/> <input type="text"/> years
<p>SECTION WM2: Anthropometry, Physiological and Anaemia Status of the Woman 15-49 years THIS SECTION IS TO BE ADMINISTERED TO ALL ELIGIBLE WOMEN BETWEEN 15 AND 49 YEARS IN THE SELECTED HOUSEHOLD.</p>			
WM5	Are you pregnant? PREGNANT	Yes.....1 No.....2 Don't know.....8	<input type="text"/> IF ANSWER IS 2 OR 8 GO TO WM8
WM6	Are you currently <u>enrolled</u> in the ANC programme? ANC	Yes.....1 No.....2 Don't know.....8	<input type="text"/>

<p>WM7</p>	<p>Are you currently <u>receiving</u> iron-folate pills?</p> <p>SHOW PILL.</p> <p>FEREC</p>	<p>Yes.....1 No.....2 Don't know.....8</p>	<p style="text-align: right;"> _ </p>
<p>WM8</p>	<p>Are you currently breastfeeding? (OPTIONAL)</p> <p>LACTAT</p>	<p>Yes.....1 No.....2 Don't know.....8</p>	<p style="text-align: right;"> _ </p> <p>IF ANSWER IS 2 OR 8 GO TO WM10</p>
<p>WM9</p>	<p>Is the child you are breastfeeding younger than 6 months old? (OPTIONAL)</p> <p>LACTATU6</p>	<p>Yes.....1 No.....2 Don't know.....8</p>	<p style="text-align: right;"> _ </p>
<p>WM10</p>	<p>Are you currently enrolled in the BSFP? (IF APPLICABLE)</p> <p>SHOW COMMODITY/PACKAGING GIVEN IN BSFP.</p> <p>WMBSFP</p>	<p>Yes.....1 No.....2 Don't know.....8</p>	<p style="text-align: right;"> _ </p>
<p>WM11</p>	<p>[NAME OF WOMAN]'s MUAC in mm (±1mm) or cm (±0.1cm) (OPTIONAL)</p> <p>MEASURE LEFT ARM. APPLICABLE ONLY IF MUAC MEASURED IN CM: DON'T FORGET THE DECIMAL.</p> <p>Lower limit=160 mm Upper limit=500 mm</p> <p>WMMUAC</p>		<p style="text-align: right;"> _ _ _ mm</p> <p style="text-align: right;">OR</p> <p style="text-align: right;"> _ _ . _ cm</p>
<p>WM12</p>	<p>Units of measurement of your HemoCue device (g/dL or g/L) (IF APPLICABLE)</p> <p>WMHBUNIT</p>	<p>g/dL..... gdl g/L..... gl</p>	<p style="text-align: right;"> _ </p>
<p>WM13</p>	<p>[NAME OF WOMAN]'s haemoglobin in g/dL (±0.1 g/dL) or in g/L (±1g/L)</p> <p>APPLICABLE ONLY IF HB MEASURED IN G/DL: DON'T FORGET THE DECIMAL.</p> <p>Lower limit=2.0g/gL Upper limit=22.0g/dL</p> <p>WMHB</p>		<p style="text-align: right;"> _ _ . _ g/dL</p> <p style="text-align: right;">OR</p> <p style="text-align: right;"> _ _ _ g/L</p>

WM14	<p>Automatic referral for woman with signs of acute malnutrition:</p> <ul style="list-style-type: none"> • Woman needs to be referred for acute malnutrition (if MUAC< [INSERT VALUE] mm) (TO BE INCLUDED ONLY IF MUAC IS MEASURED) <p>FILL OUT A REFERRAL FORM: ONE SLIP IS FOR THE WOMAN AND THE OTHER IS FOR THE HEALTH FACILITY.</p> <p>WMREFMAL</p>
WM15	<p>Automatic referral for woman Who has severe anaemia:</p> <ul style="list-style-type: none"> • Woman needs to be referred for severe anaemia (if Hb<8.0g/dL) <p>FILL OUT A REFERRAL FORM: ONE SLIP IS FOR THE WOMAN AND THE OTHER IS FOR THE HEALTH FACILITY.</p> <p>WMREFAN</p>
	<p>Interviewer: I confirm that questionnaire is complete: yes/no</p>
	<p>Supervisor: I confirm that questionnaire is complete.: yes/no</p> <p>MESSAGE TO INTERVIEWER: DO NOT ANSWER THIS QUESTION.</p>

Annex 4- Referral form

REFERRAL FORM (CAREGIVER)	REFERRAL FORM (DUPLICATE FOR HEALTH FACILITY)
Woman <input type="checkbox"/> Child 6-59 mo <input type="checkbox"/>	Woman <input type="checkbox"/> Child 6-59 mo <input type="checkbox"/>
Woman's Full Name : _____	Woman's Full Name : _____
Child's Full Name (if applicable): _____	Child's Full Name (if applicable): _____
Block number: _____ Age: _____ Months <input type="checkbox"/> Years <input type="checkbox"/>	Block number: _____ Age: _____ Months <input type="checkbox"/> Years <input type="checkbox"/>
Sex: Female <input type="checkbox"/> Male <input type="checkbox"/>	Sex: Female <input type="checkbox"/> Male <input type="checkbox"/>
Referred for: Malnutrition <input type="checkbox"/> Severe anaemia <input type="checkbox"/>	Referred for: Malnutrition <input type="checkbox"/> Severe anaemia <input type="checkbox"/>
Malnutrition MUAC: _____ mm WHZ: _____	Malnutrition MUAC: _____ mm WHZ: _____
Oedema: <input type="checkbox"/> Yes <input type="checkbox"/> No	Oedema: <input type="checkbox"/> Yes <input type="checkbox"/> No
Severe anaemia Hb: _____ g/dL	Severe anaemia Hb: _____ g/dL
SENS Survey team number: _____ Date: _____ Signature of team leader: _____	SENS Survey team number: _____ Date: _____ Signature of team leader: _____

Annex 5- Anaemia quality assurance logsheet

Instructions for filling in the quality assurance checklist

- Complete the quality assurance checklist for anaemia when you check that the HemoCue Hb301 devices are working properly using Eurotrol Hb 301 control solutions.
- A control card allows the verification of up to 4 HemoCue devices (1 device per column). If more than 4 HemoCue devices are used during the survey, fill out several checklists.
- Indicate the results of the sample analysis for quality control with the Eurotrol Hb 301 solutions in either g/dL or g/L, depending on the HemoCue Hb 301 device unit tested.
- Controls of the entire HemoCue Hb 301 system (analyser, microcuvette and operator), and functions, must be performed at least twice during a survey: before data collection begins, and in the middle of the collection period. If several camps or survey areas are completed, perform a device check between each camp / survey area.

Information on Eurotrol solutions

- To carry out a control of the entire HemoCue Hb 301 system (analyser, microcuvette and operator) and functions, the Eurotrol Hb 301 control solutions (bovine substance) must be used.
- The control substance has three different levels and is available in dropper bottles of 1.0 ml: i) low: 7.2 g/dL \pm 0.8 g/dL (72 g/L \pm 8 g/L); ii) normal: 13.1 g/dL \pm 1.2 g/dL (131 g/L \pm 12 g/L), and iii) high: 17.0 g/dL \pm 1.5 g/dL (170 g/L \pm 15 g/L).
- If solutions are stored sealed in a refrigerator at 2-8°C (35-46°F), they may be stored for 1 year from the date of manufacture. After opening the vials, the solutions are stable for 14 days when they are properly closed and stored at room temperature (15-30°C), or for 30 days if stored in a refrigerator at 2-8°C.

Eurotrol solutions for the HemoCue
Hb 301 analyser



Quality assurance CHECK SHEET for anaemia

This document is also available in SENS Anaemia tool: [**Tool 1- Quality Assurance Logsheets**].



# HemoCue Hb 301 device	_ _	_ _	_ _	_ _
Testing Date: (dd/mm)	_ _ / _ _	_ _ / _ _	_ _ / _ _	_ _ / _ _
Date that the box of microcuvettes was opened (dd/mm)	_ _ / _ _	_ _ / _ _	_ _ / _ _	_ _ / _ _
Visual inspection completed	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Cleaning the HemoCue device: • External cleaning by wiping with a damp cloth • Internal cleaning with a cleaning spatula	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
Microcuvette holder cleaned	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Results of sample analysis for quality control (Eurotrol Hb 301) HemoCue Hb 301 g/dL unit (change if g/L unit) • Eurotrol Low (7.2 ± 0.8 g/dL; Range [6.4-8.0]) • Eurotrol Normal (13.1 ± 1.2 g/dL; Range [11.9-14.3]) • Eurotrol High (17.0 ± 1.5 g/dL; Range 15.5-18.5)	_ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No _ _ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No _ _ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No	_ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No _ _ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No _ _ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No	_ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No _ _ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No _ _ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No	_ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No _ _ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No _ _ . _ Specify if acceptable value: <input type="checkbox"/> Yes <input type="checkbox"/> No
Error code	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, specify the code:	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, specify the code:	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, specify the code:	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, specify the code:
Comments				

Annex 6- Troubleshooting Guide (HEMOCUE 301)

This document is also available in SENS Anaemia tool: [**Tool 2- Troubleshooting Guide HemoCue 301**].



Error code	Explanation	Action
The analyser shows an error code	May be a temporary fault.	Turn off the analyser and turn it on again after 30 seconds. Take a new microcuvette and repeat the measurement. If the problem continues, see specific error code below.
E00	No stable endpoint of the measurement is found within the time range. 1. The cuvette is faulty 2. The circuit board is out of order	1a. Check the expiration date for the microcuvettes. 1b. Take a new microcuvette and repeat the measurement. 2. The analyser needs service. Contact UNHCR HQ (PHS).
E01-E05	1. Dirty optronic unit or faulty electronics or optronic unit.	1a. Turn off the analyser and clean the optronic unit. 1b. The analyser needs service. Contact UNHCR HQ (PHS).
E06	1. Unstable blank value. The analyser might be cold.	1. Turn off the analyser and allow to reach room temperature. If the problem continues, the analyser needs service. Contact UNHCR HQ (PHS).
E07	1. The battery power is too low.	1a. The batteries need to be replaced. Turn off the analyser and replace the batteries, 4 type AA. 1b. Use the power adapter.
E08	The absorbance is too high. 1. Light blocking item in the cuvette holder.	1a. Check that the analyser and microcuvettes are used according to the HemoCue Hb 301 operating manual and instructions for use. 1b. The analyser needs service. Contact UNHCR HQ (PHS).
E10-E30	1. Dirty optronic unit or faulty electronics or optronic unit.	1a. Turn off the analyser and clean the optronic unit. 1b. The analyser needs service. Contact UNHCR HQ (PHS).
E40	1. The cuvette holder is not replaced properly after cleaning. 2. Dirty optronic unit. 3. The microcuvette is not a HemoCue Hb 301 microcuvette. 4. The microcuvette is damaged.	1. Make sure that the cuvette holder is replaced properly. 2. Turn off the analyser and clean the optronic unit. 3. Only use HemoCue Hb 301 microcuvettes in the HemoCue Hb 301 Analyser. 4. Take a new microcuvette and repeat the measurement.
E41-49	1. The optronic unit has been scratched due to incorrect maintenance. 2. Hardware error.	1. Clean the optronic unit, using the HemoCue Cleaner. The analyser needs service. Contact UNHCR HQ (PHS). 2. The analyser needs service. Contact UNHCR HQ (PHS).
HHH	1. Measured value exceeds 25.6 g/dL (256 g/L, 15.9 mmol/L).	1. A control of the total system should be performed with liquid Eurotrol control solutions (low, normal, high).
No characters on the display	1. The analyser is not receiving power. 2. If on battery power, the batteries need to be replaced. 3. The display is out of order.	1a. Check that the power adapter is connected to the analyser and the AC power supply. 1b. Check that the cable is not damaged. 2. Turn off the analyser and replace the batteries, 4 type AA. 3. The analyser needs service. Contact UNHCR HQ (PHS).
The display contains erroneous characters	1. The display is out of order. 2. The microprocessor is out of order.	1. The analyser needs service. Contact UNHCR HQ (PHS). 2. The analyser needs service. Contact UNHCR HQ (PHS).

The display shows “FIR”	This function is for manufacturing use only.	<ol style="list-style-type: none"> 1. Remove and replace all cables and / or batteries, and restart. 2. The analyser needs service. Contact UNHCR HQ (PHS).
The display shows “battery picture”	<ol style="list-style-type: none"> 1. The batteries need to be replaced. 2. If on AC power, the power adapter or the circuit board is out of order. 	<ol style="list-style-type: none"> 1. Turn off the analyser and replace the batteries, 4 type AA. <ol style="list-style-type: none"> 2a. Check that the power adapter is properly connected and working. 2b. The analyser needs service. Contact UNHCR HQ (PHS).
The display does not switch from ‘timer symbol’ and “Hb” to three flashing dashes and ‘hemocuvette symbol’ (ready for measuring)	<ol style="list-style-type: none"> 1. The cuvette holder sensor is out of order. 	<ol style="list-style-type: none"> 1. The analyser needs service. Contact UNHCR HQ (PHS).
Measurement on control materials are out of range-either too high or too low	<ol style="list-style-type: none"> 1. The microcuvettes are beyond their expiration date, damaged or have been improperly stored. 2. The optical eye of the microcuvette is contaminated. 3. The controls are beyond their expiration dates or have been improperly stored. 4. The control has not been mixed properly and / or is not at room temperature. 5. The microcuvette has not been placed in the analyser within 40 seconds of filling. 6. Air bubbles in the microcuvette. 7. The optronic unit is dirty. 8. The control is not suitable for use with the HemoCue Hb 301 system. 9. The calibration of the analyser has been changed. 	<ol style="list-style-type: none"> 1. Check the expiration date and the storage conditions of the microcuvettes. 2. Remeasure the control with a new microcuvette. 3. Check the expiration date and the storage conditions of the control. Remeasure the control with a new microcuvette. If the problem continues, contact the manufacturer of the control. 4. Make sure that the control is mixed properly and at room temperature. If the problem continues, contact the manufacturer of the control. 5. Remeasure the control with a new microcuvette. 6. Check the microcuvette for air bubbles. Remeasure the control with a new microcuvette. 7. Clean the optronic unit. 8. Contact the distributor for control information. 9. The analyser needs service. Contact UNHCR HQ (PHS).
Measurement on patient samples are higher or lower than anticipated	<ol style="list-style-type: none"> 1. Improper sampling technique. 2. The microcuvettes are beyond their expiration date, damaged or have been improperly stored. 3. The optical eye of the microcuvette is contaminated. 4. Air bubbles in the microcuvette. 5. The optronic unit is dirty. 6. The calibration of the analyser has been changed. 	<ol style="list-style-type: none"> 1. Check the expiration date and the storage conditions of the microcuvettes. 2. Remeasure the sample with a new microcuvette. 3. Check the microcuvette for air bubbles. Remeasure the sample with a new microcuvette. 4. Clean the optronic unit. 5. The analyser needs service. Contact UNHCR HQ (PHS).

Annex 7- Anaemia Test for Surveyors

The test is to be preferably done pre- and post-training. Select (circle) the answer/s you believe to be the correct ones. **There may be more than one correct answer per question.**

(1) Which indicator is most commonly used to indicate anaemia in SENS surveys?

- -----

(2) During a nutritional survey, the measurement of anaemia in children 6-59 months of age:

- a. Is done from a prick on the foot
- b. Is done from a prick on the index or middle finger
- c. Is done from a prick on the thumb or index finger
- d. Is done from a prick on the middle or ring finger

(3) A woman of reproductive age (non-pregnant) presenting with haemoglobin concentration below 8.0 g/dL is considered :

- a. Anaemic
- b. Moderately anaemic
- c. Severely anaemic
- d. Non-anaemic

(4) Please fill out the table below with the appropriate cut-off values:

Age group	Categories of Anaemia (Hb g/dL)			
	Total	Mild	Moderate	Severe
Children 6-59 months				

(5) State five common errors that happen when measuring haemoglobin concentration with the HemoCue, which could result in faulty readings?

1. _____

2. _____

3. _____

4. _____

5. _____

(6) What action(s) should never be undertaken when assessing haemoglobin concentration?

- a. Use the same pair of gloves on two individuals
- b. Hurt the individual by pricking
- c. Filling up the microcuvette using the first drop of blood
- d. Use a HemoCue machine that is damaged
- e. Spill some blood on the individual's clothes

(7) Which of the following steps must be followed when doing a haemoglobin test during a nutritional survey?

- a. Inform the individual about the standard procedure
- b. Inform the individual about the haemoglobin results from the neighbour's house
- c. Obtain verbal informed consent
- d. Put a sticking plaster on the pricked finger
- e. Tell the individual that the procedure will be painless

(For the answers, see SENS Anaemia tool: **[Tool 3- Test Surveyors Answers]**)



Annex 8- Standardisation exercise

This is also available in SENS Anaemia tool: [**Tool 4- Anaemia Standardisation Exercise**].



The suggested practical exercise described below is not a true standardisation test, however it will help you standardise the way the Hb measurements are taken and select the best Hb measurers. If you have time to conduct a standardisation test, refer to the following publication: Burger S and Pierre-Louis J. A procedure to estimate the accuracy and reliability of HemoCue™ measurements of survey workers. ILSI. 2003

Typically, a training on haemoglobin measurement will contain between 5 to 12 members. For the standardising exercise, each trainee should take two measurements (i.e. filing out two microcuvettes from two different blood drops-blood drop #3 and #4) from two different finger sticks from a minimum of 3 fellow trainees. Use the table below to write down the results and assess the quality of the Hb measurements.

FORM FOR STANDARDISATION EXERCISE

Volunteer name	Assessing how good the trainee is at filling up the microcuvette										Assessing how good the trainee is at finger sticking	
	Finger 1					Finger 2					C9	C10
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C1-C5	Potential reasons for dif-ference \geq (+/-) 0.5 g/dL
1	Blood drop #3	Blood drop #4	C1- C2	Potential reasons for dif-ference \geq (+/-) 0.5 g/dL	Blood drop #3	Blood drop #4	C5-C6	Potential reasons for dif-ference \geq (+/-) 0.5 g/dL				
2												
3												

EXAMPLE OF A FILLED OUT FORM

Volunteer name	Assessing how good the trainee is at filling up the microcuvette										Assessing how good the trainee is at finger sticking	
	Finger 1					Finger 2					C9	C10
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Potential reasons for difference $\geq (+/-)$ 0.5 g/dL	Potential reasons for difference $\geq (+/-)$ 0.5 g/dL
	Blood drop #3	Blood drop #4	C1- C2	Potential reasons for difference $\geq (+/-)$ 0.5 g/dL	Blood drop #3	Blood drop #4	C5-C6	Potential reasons for difference $\geq (+/-)$ 0.5 g/dL				
1	9.4	9.7	-0.3	-	9.7	9.3	0.4	-	-0.3	-	-	
2	11.0	11.6	-0.6	2 nd microcuvette not completely filled	11.3	11.0	0.3	-	-0.3	-	-	
3	10.9	12.2	-1.3	2 nd microcuvette not completely filled	11.6	11.9	-0.3	-	0.7	Squeezed finger 1 while filling microcuvette		
4	12.6	12.5	0.1	-	11.8	12.4	-0.6	Air bubbles in 1 st microcuvette	0.8	Air bubbles in finger 2 microcuvette		
5	10.0	12.8	-2.8	Alcohol not dry before filling 1 st microcuvette	13.3	13.0	0.3	-	-3.3	Alcohol not dry before filling microcuvette on finger 1		

Annex 9- Epi info Analysis

CHILDREN ANAEMIA

Below are the standard Epi Info codes to use for analysis.

Refer to the fictitious dataset available for practical purposes; Go to SENS Anaemia tool: [Tool 7- CH Data]; and see the Excel database PIL_0618_CH_PILOT.



The practical Excel database PIL_0618_CH_PILOT is from a survey using *simple random sampling*.

DATA REVIEW

Ranges and codes

Run these commands (together or separately; regardless of the survey design) and make sure that the ranges and codes of the variables entered in the database match the standard questionnaire. This step can be omitted when using MDC surveys given that ranges and codes are pre-set, and that values outside of the pre-set ranges and codes cannot be entered during data collection.

FREQ CHCONST

For the below variables, only perform these checks on children having provided consent, i.e. `SELECT CHCONST=1`

FREQ SEX
MEANS MONTHS
MEANS CHHB

Missing data

You should check the missing data in your database and make a note on this in the final SENS report. **Refer to the Data Review section for detailed instructions to follow with missing data.**

The commands below need to be run separately, one by one. After selecting the variable using the code shown below, use the “LIST” command to view the specific records with missing data and double-check with the original data collection questionnaire. Then cancel the selected variable by typing “SELECT” and proceed with checking another variable.

This step is important to do with MDC surveys as well as paper-based surveys.

For the below variables, only perform these checks on children having provided consent, i.e. `SELECT CHCONST=1`

`SELECT MONTHS >= 6 AND MONTHS<60 AND CHHB=(.)`
`SELECT` (this will cancel the selected variable)

DATA ANALYSIS

Results from the practical survey dataset entitled PIL_0618_CH_PILOT (simple random sampling survey) are illustrated below. Refer to the SENS Pre-Module **Annex 4** for detailed explanations on how to interpret Epi-info analysis outputs when using different survey designs.

TOTAL ANAEMIA, ANAEMIA CATEGORIES AND MEAN HB ANALYSIS FOR CHILDREN AGED 6-59 MONTHS AND BY AGE GROUP ANALYSIS

PREVALENCE OF TOTAL ANAEMIA, ANAEMIA CATEGORIES, AND MEAN HAEMOGLOBIN CONCENTRATION IN CHILDREN 6-59 MONTHS OF AGE AND BY AGE GROUP

		6-59 months (95% CI) N=502	6-23 months (95% CI) N=182	24-59 months (95% CI) N=320
Total Anaemia (Hb<11.0 g/dL)		(196) 39.0% (34.9-43.4)	(102) 56.0% (48.5-63.4)	(94) 29.4% (24.7-34.6)
Mild Anaemia (Hb 10.0-10.9 g/dL)		(113) 22.5% (19.1-26.4)	(57) 31.3% (24.7-38.6)	(56) 17.5% (13.7-22.0)
Moderate Anaemia (7.0-9.9 g/dL)		(83) 16.5% (13.5-20.0)	(45) 24.7% (18.6-31.7)	(38) 11.9% (8.8-15.9)
Severe Anaemia (<7.0 g/dL)		(0) 0.0%	(0) 0.0%	(0) 0.0%
Mean Hb (g/dL) (SD) [range]	Simple random sampling	11.2 g/dL (1.32) [7.4-15.4]	10.8 g/dL (1.30) [7.6-15.0]	11.5 g/dL (1.27) [7.4-15.4]

Total Anaemia in children aged 6-59 months

SELECT MONTHS>=6

DEFINE ANAEMIA

RECODE CHHB TO ANAEMIA

LOVALUE - 10.9 = "ANAEMIA"




11.0 - HIVALUE = "NO ANAEMIA"

END

FREQ ANAEMIA

If you are analysing a cluster survey, you need to use the Complex Sample commands in the Advanced Statistics module and the code is as follows:

FREQ ANAEMIA PSUVAR=CLUSTER

ANAEMIA	Frequency	Percent	Cum. Percent	
ANAEMIA	196	39.04%	39.04%	
NO ANAEMIA	306	60.96%	100.00%	
Total	502	100.00%	100.00%	

Wilson 95% Conf Limits

ANAEMIA	34.87%	43.38%
NO ANAEMIA	56.62%	65.13%

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

Anaemia categories in children aged 6-59 months

SELECT MONTHS>=6

DEFINE ANAEMIA_c

RECODE CHHB TO ANAEMIA_c

LOVALUE - 6.9 = "SEVERE"

7.0 - 9.9 = "MODERATE"

10.0 - 10.9 = "MILD"





11.0 - HIVALUE = "NO ANAEMIA"

END

FREQ ANAEMIA_c

If you are analysing a cluster survey, you need to use the Complex Sample commands in the Advanced Statistics module and the code is as follows:

FREQ ANAEMIA_c PSUVAR=CLUSTER

ANAEMIA_c	Frequency	Percent	Cum. Percent	
MILD	113	22.51%	22.51%	
MODERATE	83	16.53%	39.04%	
NO ANAEMIA	306	60.96%	100.00%	
Total	502	100.00%	100.00%	

Wilson 95% Conf Limits

MILD	19.07%	26.36%
MODERATE	13.54%	20.04%
NO ANAEMIA	56.62%	65.13%

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

Mean haemoglobin in children aged 6-59 months

SELECT MONTHS>=6

MEANS CHHB

If you are analysing a cluster survey, you need to use the Complex Sample commands in the Advanced Statistics module and the code is as follows:

MEANS CHHB PSUVAR=CLUSTER

Obs	Total	Mean	Variance	Std Dev
502.0000	5635.0000	11.2251	1.7512	1.3233
Minimum	25%	Median	75%	Maximum
7.4000	10.4000	11.3000	12.1000	15.4000
				Mode
				11.3000

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

Age categories

DEFINE AGEGROUP

RECODE MONTHS TO AGEGROUP

6 - 23.99 = 1

24 - 59.99 = 2




END

Anaemia, anaemia categories and mean haemoglobin in children aged 6-23 and 24-59 months (simple random survey)

Use the newly generated variables 'ANAEMIA', 'ANAEMIA_c' and 'AGEGROUP' defined above to conduct the following analysis.





FREQ ANAEMIA ANAEMIA_c STRATAVAR = AGEGROUP

6-23 months

ANAEMIA	Frequency	Percent	Cum. Percent	
ANAEMIA	102	56.04%	56.04%	
NO ANAEMIA	80	43.96%	100.00%	
Total	182	100.00%	100.00%	

Exact 95% Conf Limits




ANAEMIA	48.51%	63.38%
NO ANAEMIA	36.62%	51.49%

ANAEMIA_C	Frequency	Percent	Cum. Percent	
MILD	57	31.32%	31.32%	
MODERATE	45	24.73%	56.04%	
NO ANAEMIA	80	43.96%	100.00%	
Total	182	100.00%	100.00%	

Exact 95% Conf Limits

MILD	24.66%	38.60%
MODERATE	18.64%	31.65%
NO ANAEMIA	36.62%	51.49%

24-59 months

ANAEMIA	Frequency	Percent	Cum. Percent	
ANAEMIA	94	29.38%	29.38%	
NO ANAEMIA	226	70.63%	100.00%	
Total	320	100.00%	100.00%	

Wilson 95% Conf Limits

ANAEMIA	24.65%	34.59%
NO ANAEMIA	65.41%	75.35%

ANAEMIA_C	Frequency	Percent	Cum. Percent	
MILD	56	17.50%	17.50%	
MODERATE	38	11.88%	29.38%	
NO ANAEMIA	226	70.63%	100.00%	
Total	320	100.00%	100.00%	

Wilson 95% Conf Limits

MILD	13.73%	22.04%
MODERATE	8.78%	15.88%
NO ANAEMIA	65.41%	75.35%

MEANS CHHB STRATAVAR = AGEGROUP

6-23 months

Obs	Total	Mean	Variance	Std Dev	
182.0000	1959.0000	10.7637	1.6782	1.2955	
Minimum	25%	Median	75%	Maximum	Mode
7.6000	10.0000	10.7000	11.6000	15.0000	10.5000

24-59 months

Obs	Total	Mean	Variance	Std Dev	
320.0000	3676.0000	11.4875	1.6076	1.2679	
Minimum	25%	Median	75%	Maximum	Mode
7.4000	10.7000	11.5000	12.3000	15.4000	11.3000

Anaemia, anaemia categories and mean haemoglobin in children aged 6-23 months (cluster survey)

If you are analysing a cluster survey, the code is as follows:

SELECT AGEGROUP=1

FREQ ANAEMIA ANAEMIA_c PSUVAR=CLUSTER

MEANS CHHB PSUVAR=CLUSTER

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded)

Anaemia, anaemia categories and mean haemoglobin in children aged 24-59 months (cluster survey)

If you are analysing a cluster survey, the code is as follows:

SELECT AGEGROUP=2

FREQ ANAEMIA ANAEMIA_c PSUVAR=CLUSTER

MEANS CHHB PSUVAR=CLUSTER

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

MODERATE AND SEVERE ANAEMIA (HB<10) IN CHILDREN AGED 6-59 MONTHS AND BY AGE GROUP ANALYSIS

PREVALENCE OF MODERATE AND SEVERE ANAEMIA IN CHILDREN 6-59 MONTHS OF AGE AND BY AGE GROUP

	6-59 months (95% CI) N=502	6-23 months (95% CI) N=182	24-59 months (95% CI) N=320
Moderate and Severe Anaemia (Hb<10.0 g/dL)	(83) 16.5% (13.5-20.0)	(45) 24.7% (18.6-31.7)	(38) 11.9% (8.8-15.9)

Moderate and severe anaemia (Hb<10 g/dL) in children aged 6-59 months

SELECT MONTHS>=6

DEFINE HBLESS10

RECODE CHHB TO HBLESS10

LOVALUE - 9.9 = "LOW HB"




10.0 - HIVALUE = "HIGH HB"

END

FREQ HBLESS10

If you are analysing a cluster survey, you need to use the Complex Sample commands in the Advanced Statistics module and the code is as follows:

FREQ HBLESS10 PSUVAR=CLUSTER

HBLESS10	Frequency	Percent	Cum. Percent	
HIGH HB	419	83.47%	83.47%	
LOW HB	83	16.53%	100.00%	
Total	502	100.00%	100.00%	

Wilson 95% Conf Limits

HIGH HB	79.96%	86.46%
LOW HB	13.54%	20.04%




SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

Moderate and severe anaemia (Hb<10 g/dL) in children aged 6-23 and 24-59 months (simple random survey)

Use the newly generated variables ‘HBLESS10’ and ‘AGEGROUP’ defined above to conduct the following analysis.

FREQ HBLESS10 STRATAVAR = AGEGROUP




6-23 months

HBLESS10	Frequency	Percent	Cum. Percent	
HIGH HB	137	75.27%	75.27%	
LOW HB	45	24.73%	100.00%	
Total	182	100.00%	100.00%	

Exact 95% Conf Limits

HIGH HB	68.35%	81.36%
LOW HB	18.64%	31.65%

24-59 months

HBLESS10	Frequency	Percent	Cum. Percent	
HIGH HB	282	88.13%	88.13%	
LOW HB	38	11.88%	100.00%	
Total	320	100.00%	100.00%	

Wilson 95% Conf Limits

HIGH HB	84.12%	91.22%
LOW HB	8.78%	15.88%

Moderate and severe anaemia (Hb<10 g/dL) in children aged 6-23 months (cluster survey)

If you are analysing a cluster survey, the code is as follows:

SELECT AGEGROUP=1

FREQ HBLESS10 PSUVAR=CLUSTER

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded)

Moderate and severe anaemia (Hb<10 g/dL) in children aged 24-59 months (cluster survey)

If you are analysing a cluster survey, the code is as follows:

SELECT AGEGROUP=2

FREQ HBLESS10 PSUVAR=CLUSTER

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

WOMEN ANAEMIA

Below are the standard Epi Info codes to use for analysis.

Refer to the fictitious dataset available for practical purposes; Go to SENS Anaemia tool: [Tool 8- WM Data]; and see the Excel database PIL_0618_WM_PILOT.



The practical Excel database PIL_0618_WM_PILOT is from a SENS survey using *simple random sampling*.

DATA REVIEW

Ranges and codes

Run these commands (together or separately; regardless of the survey design) and make sure that the ranges and codes of the variables entered in the database match the standard questionnaire. This step can be omitted when using MDC surveys given that ranges and codes are pre-set, and that values outside of the pre-set ranges and codes cannot be entered during data collection.

FREQ WMCONST

For the below variables, only perform these checks on women having provided consent, i.e. **SELECT WMCONST=1**

MEANS WMAGE
 MEANS WMHB

FREQ PREGNANT
 FREQ ANC
 FREQ FEREC

Missing data

You should check the missing data in your database and make a note on this in the final SENS report. **Refer to the Data Review section for detailed instructions to follow with missing data.**

The commands below need to be run separately, one by one. After selecting the variable using the code shown below, use the “LIST” command to view the specific records with missing data. Then cancel the selected variable by typing “SELECT” and proceed with checking another variable.

This step is important to do with MDC surveys as well as paper-based surveys.

For the below variables, only perform these checks on women having provided consent, i.e. **SELECT WMCONST=1**

SELECT WMAGE=(.)
 SELECT (this will cancel the selected variable)

SELECT PREGNANT=2 OR PREGNANT=8 (this is equivalent to PREGNANT<>1). Then SELECT WMHB=(.)

SELECT PREGNANT=(.)

SELECT PREGNANT=1 AND ANC=(.)

SELECT PREGNANT=1 AND FEREC=(.)

DATA ANALYSIS

Results from the practical survey dataset entitled PIL_0618_WM_PILOT (simple random sampling survey) are illustrated below.

WOMEN PHYSIOLOGICAL STATUS AND AGE

WOMEN PHYSIOLOGICAL STATUS AND AGE (OPTIONAL)

Physiological status	Number/total	% of sample
Non-pregnant, non-lactating	122/279	43.7%
Pregnant	42/279	15.1%
Lactating with an infant less than 6 months	45/115	39.1%
Lactating with an infant greater than 6 months	70/115	60.9%
Mean age in years [min, max] (all women)	26.6 years [15-47]	

Percent of non-pregnant and non-lactating women

SELECT PREGNANT<>8 AND LACTAT<>8

DEFINE NONPREGLACT

IF PREGNANT=2 AND LACTAT=2 THEN

 NONPREGLACT="YES"

ELSE




 NONPREGLACT="NO"

END

FREQ NONPREGLACT

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

FREQ NONPREGLACT PSUVAR=CLUSTER

NONPREGLACT	Frequency	Percent	Cum. Percent	
NO	157	56,27%	56,27%	
YES	122	43,73%	100,00%	
Total	279	100,00%	100,00%	

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).




Percent of pregnant women

SELECT PREGNANT<>8

FREQ PREGNANT

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

FREQ PREGNANT PSUVAR=CLUSTER

PREGNANT	Frequency	Percent	Cum. Percent	
1	42	15,05%	15,05%	
2	237	84,95%	100,00%	
Total	279	100,00%	100,00%	

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).




Percent of lactating women with an infant less than 6 months

SELECT LACTAT=1 AND LACTATU6<8

FREQ LACTATU6

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

FREQ LACTATU6 PSUVAR=CLUSTER

LACTATU6	Frequency	Percent	Cum. Percent	
1	45	39,13%	39,13%	
2	70	60,87%	100,00%	
Total	115	100,00%	100,00%	

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded)




Percent of lactating women with an infant greater than 6 months

SELECT LACTAT<8

FREQ LACTATU6

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

FREQ LACTATU6 PSUVAR=CLUSTER

LACTATU6	Frequency	Percent	Cum. Percent	
1	45	39,13%	39,13%	
2	70	60,87%	100,00%	
Total	115	100,00%	100,00%	

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

Mean age of women

MEANS WMAGE

Obs	Total	Mean	Variance	Std Dev
279,0000	7417,0000	26,5842	58,9992	7,6811
Minimum	25%	Median	75%	Maximum
15,0000	20,0000	26,0000	31,0000	47,0000
				Mode
				30,0000

TOTAL ANAEMIA, ANAEMIA CATEGORIES AND MEAN HB ANALYSIS

PREVALENCE OF ANAEMIA AND HAEMOGLOBIN CONCENTRATION IN NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS)

Anaemia in non-pregnant women of reproductive age (15-49 years)		All (95% CI) N=227
Total Anaemia (<12.0 g/dL)		(80) 35.2% (29.0-41.8)
Mild Anaemia (11.0-11.9 g/dL)		(54) 23.8% (18.4-29.9)
Moderate Anaemia (8.0-10.9 g/dL)		(26) 11.5% (7.6-16.3)
Severe Anaemia (<8.0 g/dL)		0.0%
Mean Hb (g/dL) (SD) [range]	SRS design	12.4 g/dL (1.28) [8.0-15.9]

Total Anaemia

DEFINE ANAEMIA

RECODE WMHB TO ANAEMIA

LOVALUE - 11.9 = "ANAEMIA"
12.0 - HIVALUE = "NO ANAEMIA"

END

SELECT PREGNANT=2 OR PREGNANT=8 (This is equivalent to SELECT PREGNANT<>1)

FREQ ANAEMIA

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

FREQ ANAEMIA PSUVAR=CLUSTER

ANAEMIA	Frequency	Percent	Cum. Percent	
ANAEMIA	80	35.24%	35.24%	
NO ANAEMIA	147	64.76%	100.00%	
Total	227	100.00%	100.00%	

Exact 95% Conf Limits

ANAEMIA	29.04%	41.84%
NO ANAEMIA	58.16%	70.96%

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

Anaemia categories

DEFINE ANAEMIA_c

RECODE WMHB TO ANAEMIA_c

LOVALUE - 7.9 = "SEVERE"

8.0 - 10.9 = "MODERATE"

11.0 - 11.9 = "MILD"

12.0 - HIVALUE = "NO ANAEMIA"

END

SELECT PREGNANT=2 OR PREGNANT=8 (this is equivalent to SELECT PREGNANT <>1)

FREQ ANAEMIA_c

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

FREQ ANAEMIA_c PSUVAR=CLUSTER

ANAEMIA_C	Frequency	Percent	Cum. Percent	
MILD	54	23.79%	23.79%	
MODERATE	26	11.45%	35.24%	
NO ANAEMIA	147	64.76%	100.00%	
Total	227	100.00%	100.00%	

Exact 95% Conf Limits

MILD	18.40%	29.87%
MODERATE	7.62%	16.33%
NO ANAEMIA	58.16%	70.96%

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

Mean haemoglobin

SELECT PREGNANT=2 OR PREGNANT=8 (this is equivalent to **SELECT PREGNANT <>1**)

MEANS WMHB

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

MEANS WMHB PSUVAR=CLUSTER

Obs	Total	Mean	Variance	Std Dev	
227.0000	2821.4000	12.4291	1.6422	1.2815	
Minimum	25%	Median	75%	Maximum	Mode
8.0000	11.6000	12.6000	13.3000	15.9000	12.6000

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

ANC ENROLMENT AND IRON-FOLIC ACID PILLS COVERAGE ANALYSIS

ANC ENROLMENT AND IRON-FOLIC ACID PILLS COVERAGE AMONG PREGNANT WOMEN (15-49 YEARS)

	Number /total	% (95% CI)
Currently enrolled in ANC programme	39/42	92.9% (80.5-98.5)
Currently receiving iron-folic acid pills	38/42	90.5% (77.4-97.3)

ANC enrolment

SELECT PREGNANT=1 AND ANC<>8

FREQ ANC

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

FREQ ANC PSUVAR=CLUSTER

ANC	Frequency	Percent	Cum. Percent	
1	39	92,86%	92,86%	
2	3	7,14%	100,00%	
Total	42	100,00%	100,00%	

Exact 95% Conf Limits

1	80,52%	98,50%
2	1,50%	19,48%

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).

Iron-folic acid pills coverage

SELECT PREGNANT=1 AND FEREC<>8

FREQ FEREC

If you are analysing a cluster survey, you need to use the C-Sample commands and the code is as follows:

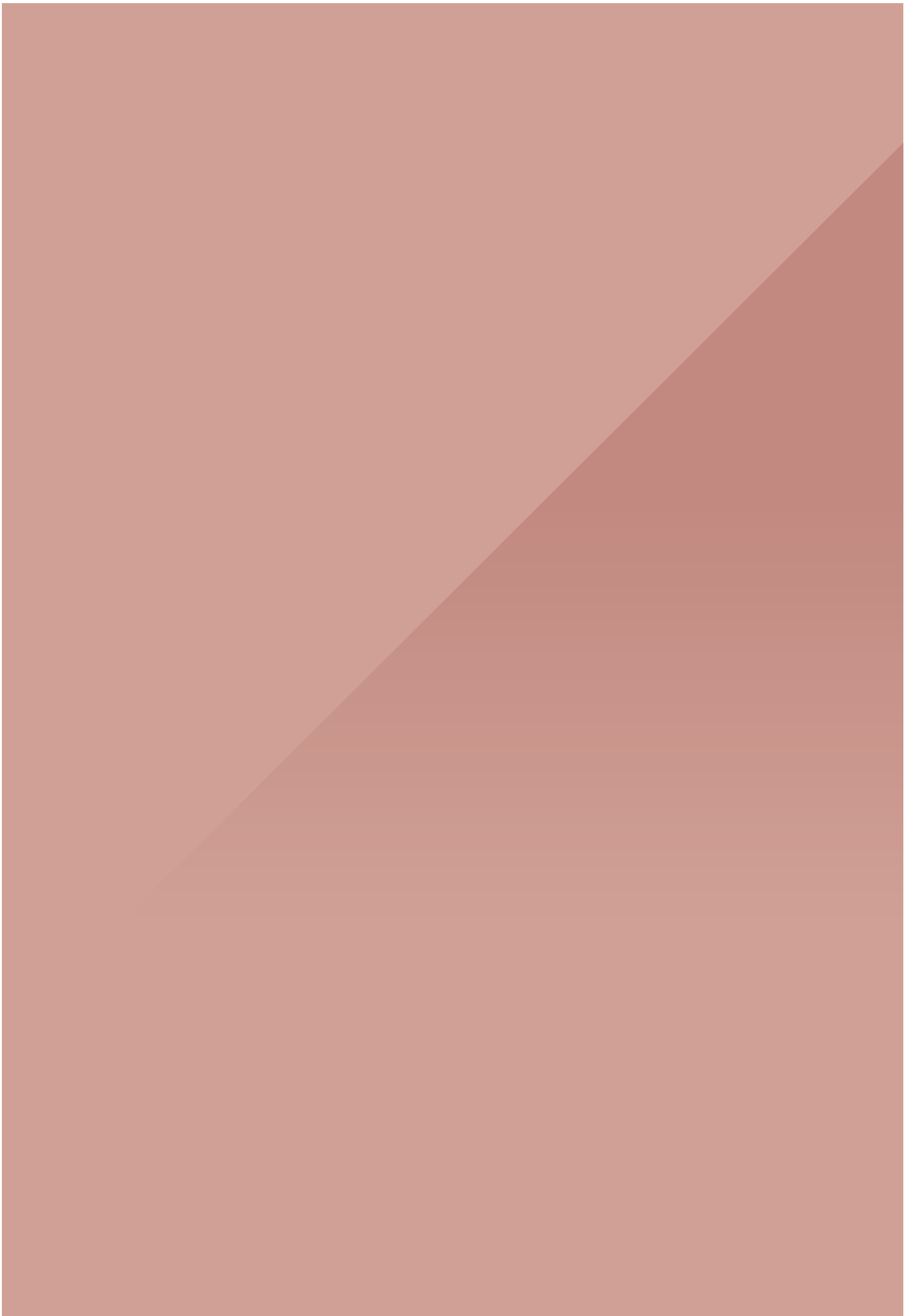
FREQ FEREC PSUVAR=CLUSTER

FEREC	Frequency	Percent	Cum. Percent	
1	38	90,48%	90,48%	
2	4	9,52%	100,00%	
Total	42	100,00%	100,00%	

Exact 95% Conf Limits

1	77,38%	97,34%
2	2,66%	22,62%

SELECT (this will cancel the selected variable(s); only to be executed after the analysis is done and the results recorded).



UNHCR
STANDARDISED EXPANDED
NUTRITION SURVEY (SENS) GUIDELINES
FOR REFUGEE POPULATIONS

MODULE 3:
ANAEMIA